DRAFT ENVIRONMENTAL ASSESSMENT

BROOKS/BARKSDALE WASTEWATER TREATMENT PLANT IMPROVEMENTS AND COLLECTION SYSTEM EXTENSION SECTION 340 PROJECT

SUMMERS COUNTY

WEST VIRGINIA

U.S. ARMY CORPS OF ENGINEERS

HUNTINGTON DISTRICT

HUNTINGTON, WEST VIRGINIA

OCTOBER 2010

FINDING OF NO SIGNIFICANT IMPACT
BROOKS/BARKSDALE WASTEWATER TREATMENT PLANT IMPROVEMENTS
AND COLLECTION SYSTEM EXTENSION
SECTION 340 PROJECT
SUMMERS COUNTY, WEST VIRGINIA

1. Members of my staff conducted an Environmental Assessment, in the overall public interest, concerning implementation of the Brooks/Barksdale Wastewater Treatment Plant Improvements and Collection System Extension Section 340 Project. The purpose of this project is to provide improved wastewater collection for the 90 customers within and nearby the communities of Brooks and Barksdale. The proposed project is authorized under Section 340 of the Water Resources Development Act (WRDA) of 1992, (Public Law 102-580), as amended.

2. The possible consequences of the project were studied for environmental, cultural, and social well-being effects. Another factor bearing on the assessment was the capability of the proposed project to meet the public's needs.

3. The Proposed Project Action Alternative and the No Federal Action Alternatives were the only alternatives carried forward for detailed evaluation. The Proposed Project Action Alternative involves the installation of a wastewater collection system serving approximately 90 customers. The Proposed Project Action Alternative is cost effective and is both environmentally and socially acceptable. The No Action Alternative would not be in the public's best interest and would continue to impact water quality and natural resources of the area.

4. An evaluation of the Proposed Alternative and the No Action Alternative produced the following pertinent conclusions:

   a. Environmental Considerations. The Huntington District took reasonable measures to assemble and present the known or foreseeable environmental impacts of the project in the Final Environmental Assessment (FEA). These impacts involve biological and human resources. The proposed project will provide improved wastewater collection for the existing communities and improve the water quality of the New River and several of its tributaries within the reach of the project. There may be an elevation in suspended sediment during the period of construction in adjacent streams; however, best management practices (BMPs) will be implemented to minimize impacts. One wetland was delineated within the project boundaries and will not be impacted by the proposed alignment. All adverse effects of project implementation are considered insignificant and should last only a few months longer than the construction period.

   b. Social Well-Being Considerations. The proposed project will provide wastewater collection for the communities of Brooks and Barksdale. No significant economic or social well-being impacts are foreseen as a result of the proposed project. Monitoring for the presence of archeological resources by qualified person(s) will be required and performed in various portions of the proposed alignment during construction. It is anticipated the project will have

no impact on sites of known significant archeological or historical importance as a result of the monitoring. The monitoring report will be provided to the District upon completion.

c. Coordination with Resource Agencies. Pursuant to the Fish and Wildlife Coordination Act (FWCA) of 1958, coordination with the U.S. Fish and Wildlife Service (FWS) was conducted. Coordination with the West Virginia Historic Preservation Office (SHPO), National Park Service (NPS), West Virginia Department of Environmental Protection (WVDEP), and West Virginia Division of Natural Resources (WVDNR) was also maintained through the National Environmental Policy Act (NEPA) process. Appropriate measures and best management practices were identified and incorporated into the proposed action alternative. Also, in accordance with the Endangered Species Act, as amended, the recommended plan should have No Effect on listed species.

d. Other Pertinent Compliance. No prime or unique farmland under the Farmland Protection Policy Act will be involved. All improvements will be primarily located on public road right-of-way and private land owned by residents. A portion of the improvements will be located on property owned by the NPS and the proposed alignment was reviewed by the NPS.

e. Other Public Interest Considerations. There was no significant opposition to the proposed action by state or local governments, or organized environmental groups. Comments received during the public review period were included in the FEA. There are no unresolved issues regarding the implementation of the project.

f. Section 176 (c) Clean Air Act. The proposed action was analyzed for conformity and applicability pursuant to regulations implementing Section 176 (c) of the Clean Air Act. It was determined the proposed action will not exceed deminimis levels or direct emissions of a criteria pollutant or its precursors and is exempted by 40 CFR Part 93.153. Any later indirect emissions are generally not within the District's continuing program responsibility and generally cannot be practicably controlled by the District. Upon completion the proposed project would not generate regulated air pollutants. For these reasons a conformity determination is not required for this action.

5. I find the Brooks/Barksdale Wastewater Treatment Plant Improvements and Collection System Extension Project was planned in accordance with current authorization as described in the FEA. The project is consistent with National policy, statutes, and administrative directives. This determination is based on thorough analysis and evaluation of the project and alternative courses of action. In conclusion, I find the proposed Brooks/Barksdale Wastewater Treatment Plant Improvements and Collection System Extension Project will have No Significant Adverse Impacts on the quality of the human and/or natural environment and preparation of an Environmental Impact Statement is not necessary.

_____ _____

Date

Robert D. Peterson
Colonel, Corps of Engineers
District Engineer

QUALITY CONTROL PLAN
DRAFT ENVIRONMENTAL ASSESSMENT
BROOKS/BARKSDALE WASTEWATER TREATMENT PLANT IMPROVEMENTS AND COLLECTION SYSTEM EXTENSION
SECTION 340 PROJECT

Volume: Draft Environmental Assessment
DEA Preparer: Michael D. McComas II, Ecologist
Organization: Planning Branch, Floodplain Management Services and Special Studies Section

Activity ID	Activity Description	Technical Reviewer	Certification Signature	Certification Date	Certification Man Hours
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District QC	Draft EA and FONSI	John Yeager	Steph P. Ohy for	2 DEC 2010	2.0

DRAFT ENVIRONMENTAL ASSESSMENT

BROOKS/BARKSDALE WASTEWATER TREATMENT PLANT IMPROVEMENTS AND COLLECTION SYSTEM EXTENSION SECTION 340 PROJECT

SUMMERS COUNTY

WEST VIRGINIA

U.S. ARMY CORPS OF ENGINEERS

HUNTINGTON DISTRICT

HUNTINGTON, WEST VIRGINIA

DECEMBER 2010

DRAFT ENVIRONMENTAL ASSESSMENT
BROOKS/BARKSDALE WASTEWATER TREATMENT PLANT IMPROVEMENTS
AND COLLECTION SYSTEM EXTENSION
SECTION 340 PROJECT
SUMMERS COUNTY, WEST VIRGINIA

RESPONSIBLE AGENCY: U.S. Army Corps of Engineers, Huntington District

ABSTRACT: The Brooks/Barksdale Wastewater Treatment Plant Improvements and Collection System Extension Section 340 Project is located in Summers County, West Virginia. Huntington District's analysis of economic, human and natural environments, and engineering designs determined the proposed alternative to be the most acceptable for the communities of Brooks and Barksdale. This alternative was selected because it is cost effective, environmentally sound, socially acceptable, and responsive to the needs of area residents.

Implementation of the proposed alternative will result in improved central wastewater collection and treatment for the communities of Brooks and Barksdale, located near the City of Hinton, WV. The proposed project is authorized under Section 340 of the Water Resources Development Act (WRDA) of 1992, (Public Law 102-580), as amended.

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SECTION 1 – Introduction

1.1 Foreword

The brief and concise nature of this document is consistent with the 40 CFR 1500-1508 regulatory requirements of the National Environmental Policy Act (NEPA) to reduce paperwork and delay by eliminating duplication with existing environmental documentation, incorporating pertinent material by reference, and by emphasizing interagency cooperation. In order to accomplish these NEPA objectives, the U.S. Army Corps of Engineers, Huntington District (Corps) has relied to a significant extent on existing environmental documentation, including the Environmental Report and associated documents for the proposed Wastewater Treatment Plant Improvements and Collection System Extension for Brooks/Barksdale prepared by Stafford Consultants, Inc. In addition, information and data from previously accomplished reports and from other agencies involved was incorporated into this Draft Environmental Assessment (DEA).

1.2 Background

The Brooks/Barksdale community is an unincorporated community located along the New River north of Hinton, WV. Hinton, the county seat of Summers County, is a "Railroad Town", formed about 1871 with the tremendous building boom that occurred from 1890 to l920. Hinton was established as a major terminal point on the railroad.

The City of Hinton operates a sanitary sewer system, through its Sanitary Board, serving primarily the incorporated area of the City and some small outlying areas. An upgrade to the City's system in the early 1990's included the construction of a new 0.625 MGD extended aeration wastewater treatment plant along State Route 20 near the current location of the Summers County High School. The old primary wastewater treatment plant was converted to a pumping station, and wastewater is pumped approximately 7,000 feet north along State Route 20 to the new plant. Sewer service was also extended to serve the Brooklin area in 2005.

Most residents and businesses within the project area obtain their water from the West Virginia American Water public water system and use individual septic systems for wastewater disposal. Exceptions include a few residents using individual wells and the Bass Lake Campground, which uses wells and a mass drain field system for wastewater disposal. The mass drain field also serves an adjacent trailer park. The project area lies adjacent to the New River and a portion of the project area lies within the New River Gorge National River boundary. Failing septic systems and direct discharges to the river and small tributaries contribute to pollution of the New River, particularly high fecal coliform counts.

The Hinton Wastewater Treatment Plant has ample capacity to accept and treat wastewater from the project area, but needs new screening and grit removal facilities to treat existing and new wastewater flows. These improvements to the plant are included in the proposed project.

Approximately 90 potential customers within the Brooks/Barksdale community are not served by a municipal/domestic wastewater collection and treatment system. Many of the potential customers lie within the floodplain and stream terrace of the New River. Most of the leach fields currently used by residents in the area lie in alluvial soils subject to high ground water that are not suitable for proper treatment of the wastewater. Given the physical location

and density of residents within the proposed project area, conventional domestic sewage treatment measures would be most appropriate. Such measures would provide adequate cost effective treatment. Additionally, failures of existing systems and direct discharges to streams in these areas contribute to pollution of the New River and several of its tributaries.

1.3 Purpose and Need

The purpose of the proposed project is to provide suitable wastewater treatment to the 90 potential customers within the Brooks/Barksdale community and reduce the fecal coliform contamination of the New River. The need is to provide a treatment system that corrects or replaces the failing septic systems currently in use in a cost efficient manner. Additionally, the Lower New River Watershed was listed on the Section 303 (d) list of impaired streams for the State of West Virginia in a 2006 Report published by the state. The Lower New River and Brooks Branch were listed as impaired as related to Water Contact Recreation and Public Water Supply categories. Both streams occur within and adjacent to the proposed project area. The watershed was found to have elevated fecal coliform levels above the impairment threshold. In 2008, a Total Maximum Daily Load (TMDL) plan was developed for the watershed to address impairments. In the 2008 TMDL report, failing septic systems and direct discharges were identified as the primary contributor to fecal coliform contamination throughout the Lower New River Watershed. At the present there are numerous failing septic tanks within the proposed project area.

1.4 Authority

The proposed Brooks/Barksdale Wastewater Treatment Plant Improvements and Collection System Extension Section 340 Project is authorized under Section 340 of the Water Resources Development Act (WRDA) of 1992, (Public Law 102-580), as amended.

1.5 Project Location / Regional Setting

The communities of Brooks and Barksdale are located just off of State Route 20 in Summers County, West Virginia (WV) and both are bordered to the west by the New River. Summers County is located in the southeastern region of the state. The communities of Brooks and Barksdale lie within the 3rd Congressional District of WV (Rahall-D).

The proposed project area lies within the Central Appalachian ecoregion. The Central Appalachian ecoregion stretches from central Pennsylvania to northern Tennessee and its geology is primarily comprised of sandstone, shale, conglomerate, and coal deposits. Bituminous coal mines are common throughout the region. Topography of the Central Appalachians varies widely and is predominantly mountainous with high, dissected, rugged plateaus as common landforms. Topography and soil characteristics limit agriculture within the region. Mixed mesophytic forest cover consisting of oaks and other northern hardwoods is common throughout this ecoregion.

The climate of Hinton, WV and the near vicinity is moderately mild with July typically being the hottest month of the year. The average maximum temperature for July is approximately 82° F. January is typically the coldest month of the year with an average minimum temperature of approximately 21° F. Annual precipitation of the immediate area typically ranges between 36-40 inches. The month of July is typically the wettest month of the year with an average of four inches of precipitation, and October the driest with just around two inches on average.

Both communities are just a few miles to the north of the county seat of Hinton, WV (See Exhibit 1 in Appendix A). The City of Hinton is located at the confluence of the New and Greenbrier Rivers and just below the dam of Bluestone Lake. According to the 2000 Census the population of Hinton, WV was 2,880 persons. Origins of the city of Hinton, WV and communities in its near vicinity can be traced to the railway development that occurred prior to the turn of the 20th century within the area. The boom of development generated by the C&O Railroad and railroad capitalist Collis P. Huntington spurred Hinton's population to almost 9,000 persons in 1925. At the present an active railway line still runs adjacent to the New River through the communities of Brooks and Barksdale and the City of Hinton. However, Hinton's population significantly reduced in the years following World War II from its early 20th century levels. The creation of more efficient highway systems, the diesel locomotive replacing the coal fired locomotive, the significant increase in airlines and personal automobiles for travel, and various economic trends and factors undoubtedly have played a role in Hinton's reduced population.

The New River is the lifeblood of Hinton and communities nearby, serving as multi-dimensional asset. Geologists and scientists have determined the New River is among the oldest rivers in the world. In addition to having a rich natural and cultural history, the river is a major tourist attraction, a prime recreational resource offering an abundance of opportunities, as well as a social landmark to the area. The portion of the New River which parallels the communities of Brooks and Barksdale lies within the boundaries of the New River Gorge National River. The New River Gorge National River was designated in 1978 and its corridor starts just downstream of Hinton and stretches 53 miles to Hawks Nest Dam in Fayette County near the community of Ansted, WV. Throughout the designated stretch the river is operated by the National Park Service (NPS). The NPS has jurisdiction over lands adjacent to the river throughout the designated stretch. These boundaries and acreages of these lands vary by location. More specifically the land corridor throughout the designated area is not uniform in width along the length of the river. There are several tracts of property owned and operated by the NPS adjacent to the communities of Brooks and Barksdale.

1.6 Demographics and Socioeconomics

The communities of Brooks and Barksdale are located within Summers County, WV. As aforementioned both communities are just a few miles to the north of the City of Hinton, the county seat of Summers County. The land area of Summers County totals approximately 361 square miles. According to the 2000 Census the population of Summers County was 14,388 persons. The U.S. Census Bureau estimated the population of Summers County to be 13,081 persons for 2009, a 9.1% decrease from the last Census figures in 2000. The 2000 Census indicated 5,530 households within the county with an average of 2.32 persons per household. The population of Summers County is comprised primarily of white persons. Estimates in 2009

indicate the population breakdown by ethnicity for Summers County to be: 90.2% White, 8.3% Black, 0.8% Hispanic or Latino, 0.4% American Indian or Alaska Native, and 0.2% Asian.

According to Census estimates in 2008 the median household income for Summers County was $28,145 compared to the state average of $37,528. The fact that the median household income for Summers County was 25% lower than the state average is significant. The rate of persons living below the poverty level within the county in 2008 was also over 25%. The declined income figures and high level of poverty of the County in recent years lend evidence to unfavorable economic conditions and continued population decreases within the County.

The three primary employment categories for Summers County in recent years are as follows: government (local, state, Federal), education and health services, and trade, transportation, and utilities. According to WorkForce West Virginia the unemployment rate for Summers County for August 2010 was 9.4%, slightly higher than 8.9% rate for the entire state. Unemployment figures are significantly higher at the present than they have been in recent history. However, due to economic conditions on a national scale this is the trend in many parts of the United States and not just exclusive to Summers County or West Virginia. According to WorkForce West Virginia the annual unemployment rate from 2002 through 2008 averaged 6.2% for Summers County for the seven-year period.

SECTION 2 – Alternatives and Proposed Action

2.1 No Action Alternative (NAA)

Under the NAA conditions no federal funds would be provided to construct this project this project. In all likelihood residents would continue to use septic systems in place or directly discharge wastewater to ditches or streams. The soil characteristics and conditions along with the high groundwater table in the area would undoubtedly allow contaminants from untreated wastewater to continue entering the New River and several of its tributaries. Ultimately the NAA would lead to continued degradation of water quality within the receiving watershed. The NAA does not meet the desires or needs of the local residents, nor does it protect or improve the water quality of the New River and several of its tributaries.

2.2 Alternative 1

Alternative 1 was generated by a Preliminary Engineering Report for the City of Hinton "Gold Coast, Beech Run, Madams Creek, River Road, and Brooks/Barksdale Sewer System" prepared by Stafford Consultants, Inc. in 2002. This alternative was generated as an amendment to a report produced earlier in 2001 to assess a wastewater collection and conveyance system that was primarily pressurized. This alternative maximizes the use of force main piping and grinder/pumping stations to convey wastewater for treatment. The amount of trenching required for associated piping would be reduced under this alternative as compared to a conventional gravity wastewater system. With a system that is primarily pressurized elevation and slope considerations are minimized and allow for more direct and streamlined alignments. The alignment of Alternative 1 would minimize the linear feet of excavation and piping and would require force main piping to cross several streams in various locations within the area it would serve. The construction of required pipelines would be by conventional open cut trench

excavation except for highway crossings, railroad crossings, and two stream crossings involving property owned by the NPS. At highway and railroad crossings construction methods involving jack and bore methods using steel casing pipe would be employed. At the two stream crossings on NPS property piping would be installed by a horizontal directional drilling method. The horizontal directional drilling would also take place in areas within Camp Brookside to minimize disturbances within its vicinity.

2.3 Alternative 2

Alternative 2 involves the installation of a conventional gravity wastewater system with grinder/pumping stations and force main as required by topography and other factors. This alternative maximizes the use of gravity collection lines, which then convey wastewater to the associated grinder/pumping stations. Conventional gravity systems generally require more excavation than systems utilizing pressurized lines. Alternative 2 was also generated from a Preliminary Engineering Report prepared by Stafford Consultants, Inc. The construction of required pipelines would be by conventional open cut trench excavation except for highway crossings, railroad crossings, and two stream crossings at the Camp Brookside property owned by the NPS. At highway and railroad crossings construction methods involving jack and bore methods using steel casing pipe would be employed. At the two stream crossings near Camp Brookside piping would be installed by a horizontal directional drilling method. Like Alternative 1 there would also be directional drilling on land within Camp Brookside.

2.4 Alternative 3

Alternative 3 also involves the installation of a conventional gravity wastewater system. This alternative has many similarities to Alternative 2 and is essentially the same in many regards. The primary difference under Alternative 3 involves the right-of-way on State Route 20. Under Alternative 3 the state right-of-way on the sides of State Route 20 would be used to locate wastewater piping in portions of the alignment. This is the only notable difference in Alternative 2 and Alternative 3. The linear feet of force main piping would be reduced somewhat under Alternative 3 when compared to Alternative 2.

2.5 Alternative 4

Like Alternative 3, Alternative 4 is practically the same as Alternative 2 with one distinct exception. Under Alternative 4, the directional drilling of two stream crossings near Camp Brookside would change slightly in location and the amount of horizontal drilling through the land portion of Camp Brookside would be reduced significantly. Instead, a path along the eastern edge of the island on which Camp Brookside is situated would need to be cleared and a trench excavated along its length to run the force main piping. This would require extensive removal of trees since the identified path is primarily wooded. The clearing would run approximately 500 feet in length and would be approximately 30 feet wide. It was determined that Alternative 4 would have costs very similar to Alternative 2 due to the extensive tree clearing. Alternative 4 also requires an additional 600 feet of piping in the Camp Brookside area compared to Alternative 2.

2.6 Screening of Alternatives

NAA:

Pros – temporary construction related impacts to resources would not occur under the NAA, since the NAA would not involve the installation of any sewer collection, conveyance, or treatment features

Cons – the NAA does not meet needs of the local residents, it would continue to contaminate the New River and tributaries within the project area, failing septic systems would continue to be used along with improper wastewater disposal measures, and two communities near an existing commercial wastewater treatment facility would not adjoin to the facility for proper wastewater treatment

Alternative 1:

Pros – minimizes amount of gravity sewer line required and limits extent of excavation

Cons – identified by Preliminary Engineering Report as the most costly method by a notable margin and requires same amount of stream crossings as most other formulated alternatives

Alternative 2:

Pros – identified by Preliminary Engineering Report to be cost effective compared to other alternatives, the alignment proposed is preferred by the NPS as it limits impacts to their valued resources, minimizes the amount of pumping stations required which reduces permanent real estate requirements and improves aesthetics

Cons – more excavation for gravity sewer lines to achieve necessary slopes would be required compared to Alternative 1, and would also require costly directional drilling on two crossings just as Alternative 1 does

Alternative 3:

Pros – like Alternative 2 it is primarily gravity sewer but would limit the amount of piping needed somewhat by routing lines along State Route 20 in designated right-of-way, allow excavation equipment easy access to accomplish trenching in right-of-way areas, and further maximize the use of previously disturbed areas in the alignment

Cons a waterline already in existence along the eastern right-of-way of State Route 20 throughout the entire length of the proposed project area and the opposite right-of-way is extremely over steepened as a result of the topography and adjacent railway lines below it

Alternative 4:

Pros – also primarily gravity sewer like Alternative 2 but the amount of costly horizontal directional drilling through the Camp Brookside area would be greatly reduced compared to the amount proposed under Alternative 2

Cons – would require significant amount of tree clearing and would produce the most impact to resources of all alternatives; would increase the amount of piping required in the Camp Brookside area by 600 feet; the property owner of Camp Brookside (NPS) is in opposition to the identified route and impacts of this Alternative; and cost required for the extensive tree removal rivals the cost of extensive horizontal directional drilling

It is important to note that each of the aforementioned alternatives include the construction of a new headworks building that contains screening and grit removal facilities adjacent to the existing aeration basin at the Hinton Wastewater Treatment Facility. Additionally, each includes the construction of a new dewatered sludge storage facility and replacement of a small pumping station with a larger capacity station. All of the additions and modifications will occur at the site of the existing Hinton Wastewater Treatment Facility. Due to limited real estate and the necessity for these facilities to be located directly adjacent to the existing wastewater treatment facility, plans for the facilities in each alternative are identical.

Upon evaluating the formulated alternatives, Alternative 2 is the only alternative capable of achieving the project's purpose and need; being economically feasible while minimizing environmental impact. Therefore, Alternatives 1, 3, and 4 have been eliminated from the detailed evaluations that follow and Alternative 2 is the Proposed Action Alternative (PAA). Throughout the remainder of this Environmental Assessment discussions will be limited to the PAA and the NAA.

2.7 Proposed Action Alternative (PAA)

The PAA involves the installation of a conventional gravity wastewater system with grinder/pumping stations and force main as required by topography and other factors. The design layout of the PAA requires 3,600 linear feet (LF) of six-inch gravity sewer line, 8,400 LF of eight-inch gravity sewer line, four wastewater pumping stations, and two grinder pumping stations. It also requires 2,500 LF of four-inch force main, 4,900 LF of three-inch force main, 1,100 LF of two-inch force main, and approximately 57 manholes. The construction of a new headworks building with screening and grit removal facilities along with a new dewatered sludge storage facility would be constructed at the existing Hinton Wastewater Treatment Facility near Summers County High School. The PAA would serve approximately 90 customers and would maximize the use of state right of way, but would also cross private lands and lands owned by the NPS. Under the PAA it is estimated that approximately 60% of line installation would take place in areas previously disturbed by roadway or utilities construction and the remaining 40% would primarily occur in lawns and forested areas. Drawings depicting the layout of the PAA can be viewed in Appendix B.

It is important to note that Stafford Consultants, Inc. has been engaged in ongoing coordination with the NPS to ensure that the alignment minimizes impacts to their property and resources. Several small changes to the alignment within the Camp Brookside property have been accomplished as part of this effort, and all changes minimize impact to the resources and aesthetics of the property. Stafford Consultants, Inc. has incorporated these minor changes into the most recent plans they have developed and the NPS is satisfied with the current alignment.

Investigations within the limits of the proposed project area were performed along the corridor of the alignment. The corridor of investigation consists of an area 50-foot on each side

of the alignment throughout its length. The footprint of two areas required for improvements to the existing wastewater treatment were also included.

Section 3 – Existing Conditions and Impacts to the Affected Environment

3.1 Aquatic Resources and Water Quality

A comprehensive field review was conducted on all aquatic features within the project area by R.E.I. Consultants, Inc. (REIC). The assessment of the various streams can be found in Appendix C. There are fourteen (14) stream crossings proposed under the PAA, including six (6) perennial stream crossings, four (4) intermittent stream crossings, and four (4) ephemeral stream crossings. The proposed stream crossings are located at Brooks Branch, Owens Branch, Collins Branch, backwaters of the New River, and five unnamed small tributaries to the New River. REIC also identified one stream crossing as Railroad Track drainage ditch.

The New River is designated as a National River. Portions of the project area lie within the boundary of the New River Gorge National River operated by the NPS. It is also designated as an American Heritage River by the U.S. Environmental Protection Agency (EPA) under the American Heritage Rivers Initiative (AHRI). Primary goals of the AHRI include environmental conservation, sustainable economic development, and preservation of history and cultural heritage.

The portion of the river within the project area is designated as the Lower New River by the West Virginia Department of Environmental Protection (WVDEP). Its designated uses include; Agriculture and Wildlife, Public Water Supply, Warm Water Fishery, Water Contact Recreation, and Water Supply Industrial. It is designated as impaired for both the Public Water Supply and Water Contact Recreation categories. In the 2006 Integrated Water Quality and Assessment Report published by WVDEP's Division of Water and Waste Management the New River was cited having fecal coliform impairments. The area of documented impairments stretches from the mouth of the river at Gauley Bridge, WV up to the Bluestone Dam in Hinton, WV. The stretch of the river adjacent to the proposed project area falls within the impaired stretch. In the same 2006 report, fecal coliform impairments were recorded on Brooks Branch from its confluence with the New River and upstream 1.7 miles. This impaired stretch of Brooks Branch also occurs within the proposed project area.

As a result of documented impairments, these streams were added to West Virginia's Section 303 (d) list of impaired streams. It is required that a TMDL plan be developed by the state for 303 (d) waters. A TMDL is basically a plan of action to achieve desired water quality parameters for impaired streams and water bodies. In 2008, a TMDL plan was developed for the Lower New River Watershed and TMDLs were assigned to Brooks Branch and the New River. The Lower New River Watershed Appendix found in the 2008 TMDL report identified several likely sources of fecal coliform pollution within the watershed. Exhibit 2 in Appendix A identifies streams within the Lower New River Watershed with elevated fecal coliform levels. Failing septic systems and direct discharges (straight pipes) of untreated wastewater were cited as the primary contributor of elevated fecal coliform levels within the watershed. Source

tracking efforts performed by WVDEP indicated there were almost 11,000 homes within the watershed not served by a commercial collection or treatment system. Exhibit 3 in Appendix A projects the estimated levels of waste loads from failing septic systems within subwatersheds of the Lower New River Watershed and the approximate limits of the proposed project are highlighted. Furthermore it is noted there are several densely populated areas within the watershed without commercial wastewater services. The communities of Brooks and Barksdale meet this classification by having moderate population densities. The 2008 TMDL report for the Lower New River Watershed notates that implementation of the TMDLs will primarily consist of providing commercial wastewater services to areas with no existing services. The PAA would essentially assist in attainment of TMDLs for the Lower New River.

Throughout its length in the State of West Virginia the New River is classified as a navigable waterway of the United States under Section 10 of the Rivers and Harbors Act of 1899. The New River mainstem is the only navigable waterway within the vicinity of the proposed project area. The PAA would not cross nor impact the New River mainstem. Therefore no Section 10 waters would be impacted by the PAA or NAA.

Two stream crossings under a slack water back channel of the New River are scheduled to be performed by subsurface horizontal directional drilling. There would be no dredge or fill into waters associated with these two stream crossings. All other streams to be crossed are small tributaries to the New River and are not designated as wild or scenic, exceptional warm water fisheries, or trout streams. Table 1 directly below contains the proposed stream crossings under the PAA. A Stream Crossing Assessment Report completed by REIC is included in Appendix C. Additionally, a USGS map showing the location of stream crossings is included as Exhibit4 in Appendix A.

Table 1: Proposed Stream Crossings for PAA

Stream Name	Stream Crossing	Stream Designation	GPS
Railroad Track drainage ditch	1	Ephemeral	37° 42' 30.2" 80° 53' 16.5"
Brooks Branch	2	Perennial	37° 42' 29.7" 80° 53' 17.2"
	3	Perennial	37° 42' 33.1" 80° 53' 23.6"
1st UT of New River	4	Intermittent	37° 42' 48.5" 80° 53' 16.5"
Backwater of New River / Collins Branch	5	Perennial	37° 43' 06.3" 80° 53' 22.1"
Backwater of New River	6	Perennial	37° 43' 21.3" 80° 53' 25.0"
Owens Branch	7	Perennial	37° 43' 27.8" 80° 53' 26.1"
	8	Perennial	37° 43' 25.0" 80° 53' 32.8"
2nd UT of New River	9	Ephemeral	37° 43' 29.7" 80° 53' 34.8"
3rd UT of New River	10	Intermittent	37° 43' 37.5" 80° 53' 41.1"
	11	Intermittent	37° 43' 38.2" 80° 53' 39.2"
4th UT of New River	12	Ephemeral	37° 43' 43.6" 80° 53' 46.8"
	13	Ephemeral	37° 43' 45.6" 80° 53' 42.7"
5th UT of New River	14	Intermittent	37° 42' 47.2" 80° 53' 49.4"

Due to the necessity to provide gravity flow, alternative alignments to minimize the number of stream crossings was very limited. As noted, the Lower New River and Brooks Branch are considered impaired as related to Water Contact Recreation and Public Water Supply categories. Pipeline installation for all but the two aforementioned proposed crossings in the slack water area will be by open cut trench. During construction, as the trench is excavated, native materials will be stockpiled adjacent to the trench and used for backfilling. The pipelines will have, at a minimum, three (3) feet of cover on top of the pipe across stream channels. For the PAA, there is potential for actions associated with the installation of piping to increase the level of suspended solids in adjacent streams. Best Management Practices (BMP's) will be implemented at each location to minimize impacts from trenching. Impacts to water quality within the watershed are anticipated to be minor and limited to the construction period of the PAA. The two stream crossings on each side of Camp Brookside will be installed by horizontal directional drilling. These crossings are each force mains that do not require the pipe be installed to a set vertical grade. Using this method, a launch and receiving pit will be excavated at the ends of the

section to be installed. The sewer line will be installed with fused joints to create a continuous pipeline that will be pulled through a drilled passageway without disturbance to the stream or ground surface. While the horizontal directional drilling technique provides advantages for minimizing potential damage at stream crossings on sensitive areas, it is not recommended for other stream crossings where gravity sewers must be constructed at critical grades.

Consultation with the Regulatory Branch of the Huntington District, USACE was performed to assure the PAA met Nationwide Permit (NWP) #12 criteria. NWP #12 pertains to "Utility Line Activities." As designed, the PAA complies with the criteria of a Nationwide Permit #12. Nationwide Permit #12 includes specific terms and conditions that must be met in order to comply with the Section 404 of the Clean Water Act. Measures will be taken to ensure all specific regional conditions and West Virginia 401 water quality certification special conditions associated with Nationwide Permit #12 are met. A breakdown of the special conditions along with the applicable Nationwide Permit conditions that must be followed can be found in Appendix D. **NOTE:** The various conditions listed were compiled out of the entirety of each category and do not account for all conditions associated with Nationwide Permit #12. Those listed directly correlate with actions anticipated under the PAA and are listed for that reason. However, all conditions that apply to Nationwide Permit #12 must be followed and can be found in Public Notice # 2008-6-Mod issued June 20, 2008 issued by the U.S. Army Corps of Engineers.

The contractor will be responsible for obtaining all other water resource related permits required as a result of actions associated with the PAA. Several other permit requirements are notated in conditions associated with Nationwide Permit #12 found in Appendix D.

Impacts to aquatic resources in and adjacent to the project area are anticipated to be minor and confined to the construction period of the PAA. Upon completion, the PAA will improve water quality in and around the project area and within the watershed by reducing fecal coliform loading from failing septic systems and straight pipe discharges. No construction related impacts to streams would occur under the NAA. However, degradation of water quality from failing septic systems and straight pipe discharges would continue within the vicinity of the proposed project and the Lower New River Watershed.

3.2 Terrestrial Resources

The Lower New River Watershed supports a wide variety of wildlife species and is heavily forested. Vast upland forested areas, bottomland hardwoods, riparian corridors, river islands, and old fields make the watershed suitable for a variety and forest game species, avifauna, herptofauna, furbearers, and non-game wildlife. However, the land use within the majority of the proposed project area is primarily residential consisting of disturbed right-of-way, lawn areas, and limited forested cover. Beyond the eastern border of the project area lays a significant amount of upland forested habitat that will not be impacted by the PAA. Tree species common to the area are: oaks, hickory, tulip poplar, hemlock, maple, and white pine, willow, and sycamore. Common understory species include: dogwood, laurel, sourwood, and rhododendron.

Bird populations are extremely diverse within the Lower New River Watershed and include a variety of species from the following families: Mockingbird and Thrasher, Crow and Jay, Wood Warblers, Grosbeak, Finch, Sparrow, and Bunting, Blackbird and Oriole, Swan, Geese, and Duck, Hawk and Eagle, Osprey, Falcon, Sandpiper, Owl, Woodpecker, and Swallow Family. Major game species include: wild turkey, ruffed grouse, cottontail rabbit, fox squirrel, gray

squirrel, grey fox, red fox, white-tailed deer, raccoon, black bear, and coyote. Riparian furbearers, especially beavers and muskrats, are common throughout the watershed. The unique river valley also houses a wide array of amphibian and reptile species.

The majority of disturbances associated with the PAA will occur on previously disturbed right-of-way, lawn areas, and a limited amount of forested area. The total clearing required in wooded areas is approximately 1.2 acres. The amount of tree clearing will be limited significantly through the evaluation of formulated alternatives and coordination with the NPS for the route through Camp Brookside.

Camp Brookside's significant historical, cultural, and ecological features were taken into consideration under the PAA. The NPS has performed extensive documentation on the Camp Brookside. A portion of technical report concerning plant communities occurring at Camp Brookside was furnished by the NPS. A copy of a map of the Plant Communities provided by the NPS and portions from the Technical Report NPS/NER/NRTR-2007/092 is included in Appendix J. In order to minimize potential environmental damage to plant communities of Camp Brookside, Stafford Consultants staked alternative routes through the facility for review by NPS personnel. The NPS provided a map of the preferred routing through the facility. To further minimize concern of environmental damage, the final design used horizontal directional drilling (HDD) as the installation technique to cross the Riverscour Prairie and Flatrock Pavement areas (as well as the stream crossings themselves).

For the southern HDD, the launch pit will be constructed in a previously developed area of the Camp and the directional drilling will proceed for approximately 690 feet to a receiving pit at the proposed pump station site in the Fox Addition. For the northern HDD, the launch pit will be excavated in a disturbed area adjacent to the existing access road to the Camp and the directional drilling will proceed for approximately 239 feet across the backwater slough to a receiving pit north of the Camp. Using this technique, the open cut trenching installation will be limited almost exclusively to previously developed portions of the Camp and areas previously disturbed by roadway or waterline installation. With the relatively small diameter force main required (3"), the plastic pipe material can be supplied in rolls or fused as needed. No additional staging area other than normal easement widths will be required.

Excluding the Camp Brookside area, the alignment for pipe installation of the PAA consists of a corridor of 16,000 feet total. Of this total, approximately 10,000 feet will be constructed along roadway shoulders, approximately 3,400 feet in lawn or open areas, and 2,600 feet within wooded lots. The total clearing required in wooded areas is estimated at 2,600' x 20' or approximately 1.2 acres. The roadway shoulders will be backfilled with the materials excavated from the trench with the surface area restored with stone or pavement to pre-construction conditions. Topsoil in the lawn areas will be segregated from other excavated materials and used to restore the disturbed areas following pipe installation and backfill. Clearing for pipe installation will be limited to the width needed for pipe installation (approximately twenty feet, depending of the depth of excavation). The depth of excavation for gravity piping will vary to accommodate needed elevations for proper flow. Following pipe installation, the trench will be backfilled with the excavated material and the disturbed areas restored to preconstruction contours. All disturbed areas will be seeded with native seed mixes and mulched to prevent erosion.

Due to the limited area and quantity of tree clearing and inclusion of subsurface drilling it is anticipated impacts associated with the PAA will be minor. Additionally, impacts to previously disturbed areas will be insignificant and temporary. The installation contractor is required to

implement BMP's to minimize erosion and sedimentation where appropriate and needed. There would be no impact to terrestrial resources as a result of the NAA.

3.3 Threatened and Endangered Species

The published inventory of Federally listed Threatened, Endangered, Proposed, and Candidate Species, maintained by the U.S. Fish and Wildlife Service (USFWS), was obtained for the potential impact limits of the PAA. The current inventory was obtained from the West Virginia Field Office Endangered Species website for the USFWS Northeast Region. The Northeast Region includes all of the State of West Virginia. The names and status of each species with documented potential to occur within Summers County are listed in Table 2 below.

Stafford Consultants, Inc. consulted the West Virginia Division of Natural Resources (WVDNR) (Wildlife Resource Section) regarding any potential state-listed rare, threatened or endangered (RTE) species or sensitive habitats occurring within the proposed project area. Correspondence was received from the Wildlife Resources Section that indicated they have no known records of state-listed RTE species or sensitive habitats occurring within the proposed project area.

Consultation with the USFWS Office in Elkins, WV was conducted by Stafford Consultants, Inc. to obtain their evaluation and conclusions on the potential impact the PAA poses to any Federally listed species or other specially categorized species of concern. Correspondence was received from the USFWS indicating no Federally listed endangered or threatened species are expected to be impacted by the proposed project. Section 7 consultation with the USFWS under the Endangered Species Act was satisfied and a biological assessment will not be required. The USFWS has highlighted the status of the bald eagle. It was recently delisted and is currently in recovery. However, the species is still afforded protection under the Bald and Golden Eagle Protection Act and the Migratory Bird Protection Act. Due to proposed project location and on-site habitat within the project area, no impacts are expected for this species. Both correspondence letters from WVDNR Wildlife Resource Section and the USFWS West Virginia Field Office can be found in Appendix E.

An onsite survey revealed the presence of a small plant community of Virginia Spiraea at Camp Brookside. Virginia Spiraea is a federally listed threatened species in WV. The area was delineated and the alignment of the PAA will have no effect on the identified plant community. In addition, the remainder of the alignment was found to be void of Virginia Spiraea resulting in no effect to the threatened plant.

Potential exists for minor and temporary impacts on water quality in areas where wastewater conveyance lines cross small tributaries. However, the limited disturbances associated with the PAA coupled with the use of best management practices will result in No Effect on any Federally listed T&E species or other species of concern. It is recommended that tree clearing activities be performed during the October-March timeframe if at all possible to minimize the potential for impact to roosting habitat for bats. No effect to T&E species or other species of concern would occur as a result of the PAA.

Table 2: Federally Listed T&E Species within Summers County, WV

Species	Status	Distribution
Indiana bat (*Myotis sodalis*)	**Endangered**	May occur throughout the state. The Indiana bat may use abandoned mine portals (confirmed in the New River Gorge National River, Fayette County) or occupy summer habitat throughout the entire state.
Virginia big-eared bat *(Corynorhinus [=Plecotus] townsendi virgini)*	**Endangered**	Known to utilize abandoned mine portals in the New River Gorge National River in Fayette County. May also occur in mine portals and caves throughout the state, particularly in Hardy, Kanawha, Mercer, Monroe, Nicholas, Preston, Raleigh, Summers, and Wyoming counties. Critical habitat
Eastern Cougar (*Felis concolor cougar*)	**Endangered**	May occur throughout the entire state. However, this species may be extinct or extirpated and there have been no documented, verified occurrences in WV in over 100 years
Virginia Spiraea (*Spiraea virginiana*)	**Threatened**	Known in Fayette, Greenbrier, Mercer, Nicholas, Raleigh, and Summers counties. May also potentially occur in Upshur County
List obtained from USFWS Northeast Region Website: West Virginia Field Office		

3.4 Wetlands

REIC performed a Wetland Determination and Delineation near the town of Hinton, in Green Sulphur District, Summers County, WV. The survey entailed a 50 ft. corridor of the proposed wastewater line path, so precise locations of all wetlands could be documented for the project area. The survey and delineation report can be found in Appendix F.

The project area was assessed for possible wetland areas. Wetlands were determined and delineated following the Corps of Engineers Wetland Delineation Manual (Technical Report Y-87-1). Wetland delineations included one wetland 0.4930 acres in size. The area was determined to be a true wetland based on the Corps of Engineers Wetland Delineation Manual (Technical Report Y-87-1), and was delineated using a modified Level II wetland determination. The study area was primarily located along the New River, just north of the town of Hinton, in Summers County, West Virginia. The USDA Soil Conservation Service Soil Survey of Summers County, West Virginia indicated that the soil series located within the study area were of the CeC, CeD, ChF, Cm, Ka, ShC, StC, and U2 series. The dominant soil present within the wetland area was Kanawha loam (Ka). This soil generally consists of mixed soil material and rock fragments. The one wetland identified is designated as a wet meadow wetland.

Upon comparison of the REIC's wetland delineation map and the NWI Map, the wetland boundary nearly coincides with the location of one of the freshwater ponds shown within the Bass Lake Campground. This wetland is apparently the result of filling of a former freshwater pond.

The PAA would not impact any wetlands. The wetland boundary will be marked in the field prior to construction and will be highlighted on the final approved project alignment sheets with a special construction project note stipulating no construction activities are authorized in these locations. No impacts to jurisdictional wetlands would occur under the NAA.

3.5 Air Quality

The USEPA is required to set air quality standards for pollutants considered harmful to public health and welfare. The Primary National Ambient Air Quality Standards (NAAQS) set limits to protect public health, including the health of sensitive populations such as asthmatics, children, and the elderly. Secondary standards set limits to protect public welfare, including protection against decreased visibility, and prevention of damage to animals, crops, vegetation, and buildings. These standards were established for the following six principal pollutants, called criteria pollutants (as listed under Section 108 of the CAA):

- Carbon monoxide (CO)
- Lead (Pb)
- Nitrogen dioxide (NO2)
- Ozone (O3)
- Particulate matter, classified by size as follows
    - An aerodynamic size less than or equal to 10 micrometers (PM10)
    - An aerodynamic size less than or equal to 2.5 micrometers (PM2.5)
- Sulfur dioxide (SO2)

USEPA and WVDEP data indicates all criteria pollutants are in attainment at the present in Summers County. This means it is presumed to meet all applicable air quality standards for criteria air pollutants according to Title 40 of the Code of Federal Regulations (40CFR) Part 81.336. Correspondence from WVDEP Division of Air Quality concerning the proposed project can be found in Appendix E.

According to the EPA fires, road dust, electricity generation, industrial processes, and fossil fuel combustion are among the main contributors to $PM_{2.5}$ in the atmosphere nationwide. Major contributing pollutants to the air in the project area are from indiscriminate burning of household refuge, woodlands, as well as from transportation/commercial vehicle exhaust. In general, they reduce atmospheric visibility and studies indicate they may adversely affect the respiratory system of individuals.

The only potential effect on air quality created by the PAA would be during the construction phase and would result from fossil fuel combustion in machinery used to install the wastewater conveyance lines. Basic emission generating items to be used would include: trenching equipment (backhoe, excavator, ditch witch), work trucks, gasoline powered generator, and a horizontal directional drilling rig. All emissions generated would be confined to the construction phase and the completed project would not generate any emissions once completed. Fugitive dust is to be minimized by wetting ground surfaces (travel routes) as necessary to minimize the amount of dust generated during the construction period. The PAA would be expected to generate emission levels significantly below the 100 tons/year threshold at which a conformity determination is required by the EPA. The implementation of the PAA would produce only minor, temporary air quality impacts in the vicinity of the selected project sites. The NAA would result in no significant or permanent changes to current ambient air conditions.

3.6 Cultural Resources

In compliance with Section 106 of the National Historic Preservation Act (NHPA) of 1966, as amended, and its regulating language (36 CFR, Part 800), a Phase I Archaeological Literature Review and Reconnaissance Survey of the proposed Brooks/Barksdale Wastewater Treatment Plant Improvements and Collection System Extension Section Project was prepared by Archaeological Consultants of the Midwest, Inc. The literature review revealed ten previously recorded sites located within the area to be served by the PAA. Additionally 55 sites were documented within a 1-mile radius of the project area. Survey methods outlined in the archeology contractor's approved scope of work were performed accordingly throughout the proposed project's corridor. Of the ten previously recorded sites, surveys did not reveal the presence of sites: 46Su18, 46Su79, 46Su155, 46Su156, and 46Su157 within right-of-way of the proposed alignment. Systematic surveys were able to document evidence of site 46Su112 and 46Su158 within the proposed project corridor. Additionally, surveys revealed two new archeological sites: site 46Su696 and 46Su697, both isolated prehistoric finds in the vicinity of 46Su18, a previously recorded site.

As noted in the Phase I Survey, most of the project area has been disturbed by road construction, landscaping, and the construction of private residences. However, a significant amount of land area within Camp Brookside is relatively undisturbed and the camp is classified as an eligible cultural landscape by the NPS. NPS cultural resource staff members have been coordinated with throughout the planning stages of the proposed project. Stafford Consultants, Inc. has worked with NPS cultural resource staff members to establish an alignment preferred by the NPS through Camp Brookside. These efforts resulted in rerouting the originally planned alignment to avoid sites 46Su681 and 46Su682, therefore eliminating potential impact. Stafford Consultants, Inc. updated the design of the PAA to reroute a portion of the alignment on the east side of County Route (CR) 20/6 to avoid any potential impacts to site 46Su158. .

The two newly discovered sites 46Su696 and 46Su697 are within the vicinity of site 46Su18, a prehistoric village with two stone mounds. The Phase I Survey indicated 46Su18 is located outside of the PAA alignment. Intact and disturbed soil profiles were encountered during surveys in the vicinity of 46Su18 and the recently identified 46Su696 and 46Su697. The Corps will require monitoring by a qualified archeologist be performed during construction in the vicinity of the aforementioned areas. Monitoring will also be performed in the vicinity of Bass Lake during the construction period. The West Virginia Division of History and Culture (WVDHC) concurred with the Corps' monitoring requirements.

Redesign was also performed to relocate a pump station's location in order to avoid potential impacts to site 46Su112 and the viewshed of Camp Brookside. The pump station was originally scheduled to be installed near existing facilities at Camp Brookside. Under the original PAA layout the location of the pump station and its presence would impact the viewshed and aesthetic value of Camp Brookside. Stafford Consultants, Inc. met with NPS staff to alleviate the issue and an alternative location was agreed upon. The pump station will now be located in an area to the north of the camp previously disturbed by a waterline installation. The new area was also assessed during the Phase I Survey and all test pits concluded negative findings. The new location will not negatively impact the viewshed of Camp Brookside or any documented archeological sites. Native shrubbery will be planted around the perimeter of the pump station to hide its presence.

Coordination with the WVDHC was conducted for the PAA. On July 8, 2010 the Corps received correspondence from WVDHC regarding the PAA. After revision and layout

modifications, the aforementioned Phase I Survey satisfactorily addressed the concerns of the WVDHC. The WVDHC confirmed that no archaeological sites listed in or eligible for the National Register of Historic Places (NRHP) will be affected by the proposed project. The coordination letter is located in Appendix E. The WVDHC also indicated no further consultation with respect to architectural or structural resources is required and that previous recommendations are satisfied.

As a result of several modifications the final design of the PAA is not anticipated to impact any historic structural resources or archeological sites. Monitoring has been prescribed and required in various areas as a precautionary measure. If such resources are discovered during construction and cannot be avoided, work will be suspended at that location until further coordination is completed. The NAA would not impact cultural resources due to no ground disturbance or construction taking place.

3.7 Economic Resources

A basic breakdown of the socioeconomic conditions within Summers County can be found in Section 1.6 above in this document. The implementation of the PAA would have no significant adverse impact on the economic resources of Summers County and surrounding areas. Implementation of the PAA is unlikely to adversely impact traffic, housing, or public safety resources in the affected areas. The post-construction project would have a positive and long-term impact by providing a reliable and adequate wastewater collection and treatment system for the communities of Brooks and Barksdale. Additionally, the implemented project will aid in improving the water quality of the Lower New River Watershed, which is a significant economic resource to the region. Residents, businesses, and public service providers seek establishment in areas with sufficient electric, water, and wastewater utility systems. Having a commercial wastewater collection and treatment system in place can make an area more appealing and can elevate potential for economic gains in such areas. Improvement to the socioeconomic environment is also a possibility under the PAA. The NAA would offer no improved means of wastewater disposal and any improvements to the socioeconomic environment of the area are not likely to result.

3.8 Environmental Justice

Under Executive Order (EO) 12898 "Federal Action to Address Environmental Justice in Minority Populations and Low Income Populations," Federal agencies are directed to identify, address, and avoid disproportionately high and adverse human health or environmental effects on minority and low income populations.

Minority populations are extremely low in Summers County compared to the Caucasian population (96.6%), according to the U.S. Census Bureau (2000). The percentage of persons living in poverty in Summers County (24.4%) is somewhat higher than 2004 statewide average for West Virginia (16.2%).

The P AA would create a positive impact for the community and would benefit everyone equally as the new wastewater collection system would be available to all residents in the area. No residential structures within the study area will be adversely affected as a result of the proposed project. No positive socioeconomic impacts would result under the NAA and the NAA is not desired by residents of the area.

3.9 Noise

During the implementation of the PAA, the primary source of short-term noise impacts will be construction related activities. Peak outdoors noise levels ranging from 83-100 dBa could occur during the time in which equipment is directly in front of or in close proximity to homes (within 50 feet). Construction equipment would be operated during the daytime (7am-6pm).

To dig the trenches and install the waterline, two diesel excavators and one diesel front-end loader would be required. The average range of noise for a diesel excavator can be between 72 and 93 dBa as measured at 50 feet (USEPA 1971). If all three pieces of equipment are operated at the same time between 83 and 100 dBa of noise would be produced (NYDEC 2001). The noise projections do not account for screening objects, such as trees, outbuildings, or other objects that muffle and reduce the noise emitted.

The project site was evaluated during field visits as being a typical rural residential area with no observed sources of outstanding noise production. During the site evaluation of the proposed project it was found that the majority of the project area is within close proximity of WV Route 20 thus already exposing the residents to car and truck traffic noise. There are a number of residences within the project area located less than 50 feet away from proposed areas of construction. The project site possesses elements that will influence the noise levels experienced by local residents. Vegetation and steep changes in elevation will help reduce sound levels for some, while open grassy fields and paved areas will do little to change noise levels encountered by other local residents.

The PAA will not result in long-term adverse noise impacts. Once the construction phase is completed, the only noise associated with the operation of the sewer lines will be the operation of the pumping stations and the mechanical equipment associated with the new plant headworks. The pumps at the stations are submersible, providing noise levels are hardly detectable beyond the pump station site. The proposed headworks equipment is totally enclosed in the headworks building and will create no discernable increase in noise at the existing plant. There would be no noise impacts as a result of the NAA.

3.10 Hazardous, Toxic, and Radioactive Waste (HTRW)

A reconnaissance phase assessment of potential hazardous, toxic, and radioactive waste (HTRW) was performed in accordance with ER 1165-2-132 (USACE, 1992) by Stafford Consultants, Inc. and is directed toward proposed activities within the project area. This assessment included a search of Federal and state environmental databases, the review of historic aerial photographs and historic topographic maps, and a site reconnaissance visit. Results of the Phase I HTRW do not suggest the presence of hazardous, toxic, or radioactive wastes within the project area or conditions and/or activities that would likely result in environmental impairment within the project area. On July 1, 2009 the U.S. Army Corps of Engineers Environmental Remediation Section provided a memorandum indicating all requirements were satisfied and no further HTRW investigation was warranted. The copy of the memorandum is located in Appendix G.

The proposed project will involve the excavation of native and previously disturbed soils. Sewer lines will be placed in excavated trenches and soils will be returned to trenches to cover piping and return ground surface to preexisting contours. Limited information is available with respect to the physical and chemical properties of these soils. There is no documented evidence soils were contaminated by any prior activities in the area. Contamination, if present, would

most likely be limited to residual petroleum products of probable low concentrations and limited occurrence. If contamination is encountered, construction will cease in the vicinity of the contaminated area until the type and extent of contamination is determined, and an appropriate containment or disposal plan is developed. .

Results of the Phase I HTRW report for the PAA do not suggest the presence of hazardous, toxic, or radioactive wastes within the project area or conditions and/or activities that would likely result in environmental impairment within the project area. There are no significant HTRW concerns presented by the PAA or NAA.

3.11 Floodplain and Flood Hazard Areas

Executive Order 11988 requires Federal agencies to avoid to the extent possible the long and short-term adverse impacts associated with the occupancy and modification of floodplains and to avoid direct and indirect support of floodplain development wherever there is a practicable alternative.

The Federal Emergency Management Agency (FEMA) publishes Flood Insurance Rate Maps (FIRMs) and is coordinating an ongoing process of making FIRMs available in digital/electronic format as they are updated. The most recent FIRM maps were reviewed for the extent of the proposed project area. Map number 54089C0110C for Summers County, WV corresponds to the project area. The map was published in February of 2010 and condensed versions of the map can be viewed in Exhibit 6 of Appendix A.

Portions of the project area are located within the 100-year floodplain (1% annual chance of flood). These areas are often classified as Zone A and Zone AE on the FEMA FIRMs. Areas with Zone A classification are deemed to be in the 100-year floodplain, but base flood elevations for such areas have not been determined. Zone AE areas are also in the 100-year floodplain and have determined base flood elevations.

A moderate amount of residences associated with the PAA are located within the 100-year floodplain. The remainder of the project area falls under Zone X classification and is considered to be outside of the 100-year floodplain. Review of the most recent FIRM cited above verified floodplain status for a majority of structures associated with the PAA.

Portions of the alignment for the PAA would be located in Zone AE designated areas, mainly the western portion of the project situated closest to the New River. No fill will be associated with the PAA and once piping is installed the area will be returned to pre-project conditions and contours. The PAA will not impact or alter the hydrology of the area and inundation limits of the 100-year floodplain. The PAA satisfies requirements set forth by Executive Order 11988, Floodplain Management (EPA Floodplain Management, 2008). The PAA is designed to provide wastewater collection services to residents presently occupying the area. However, potential exists for implementation of the PAA to encourage development in the future. Future development should be regulated and regulations and policies of the National Flood Insurance Program (NFIP) should be adhered to by the County. Summers County participates in the NFIP and is the regulating body for floodplain management and development within unincorporated areas of the county. The Summers County floodplain coordinator should be contacted and made aware of the PAA by the installation contractor prior to engaging in construction. Permits for construction activities within designated flood hazard areas are required under NFIP regulations. The contractor will be responsible for obtaining all necessary

floodplain permits prior to construction of the PAA. No impacts to the floodplain would occur as a result of the NAA.

3.12 Prime Farmland

The Farmland Protection Policy Act (FPPA) is intended to minimize the impact Federal programs have on the unnecessary and irreversible conversion of farmland to nonagricultural uses. It assures, to the extent possible, Federal programs are administered to be compatible with state and local units of government, and private programs and policies to protect farmland. For the purpose of FPPA, farmland includes prime farmland, unique farmland, and land of statewide or local importance. Farmland subject to FPPA requirements does not have to be currently used for cropland.

The proposed project will serve residential areas located along the New River, adjacent to U.S. Route 20. From a physical observation of the proposed wastewater line routing, no agricultural activity other than small family gardens occurs in the project area. The narrow river valley and rugged adjacent terrain severely limit agricultural practices within the area.

A copy of the soil survey prepared by the Soil Conservation Service in 1984 for the project area is included in Exhibit 7 of Appendix A. The predominant soils within the project area are the Chagrin Loam (Cm) located along the New River and Calvin, high base substratum - Barks shady silt loams (CbC) located above the floodplain along Route 20. The Cm soil is described to have high natural fertility and is well suited to cultivate crops.

However, within the project area, the land is currently developed in residential lots or other non-farm uses. The CbC soil is described to have low natural fertility, and the hazard of erosion is severe in unprotected areas. Since no farmland exists in or adjacent to the project area, the PAA will not impact prime and statewide important farmland.

Although the project does not impact prime and statewide important farmlands, mitigation measures will be employed as part of this project to protect soils and woodlands encountered. Erosion and sediment control structures will be employed to prevent loss of organic soils. Seeding and mulching will take place as soon as possible so as to return the affected properties to their pre-existing condition. Clearing required for construction will be limited to the minimum required necessary for the construction to minimize impacts to land and water resources. There would be no impact to Prime Farmlands under the NAA.

3.13 Transportation

The proposed project area lies in an area of rural residential houses mainly along U. S. Route 20. Current traffic patterns primarily consist of local residents accessing driveways of private homes. During construction, normal traffic patterns will be maintained as closely as possible. On single and two lane roads, traffic lights and or flag persons will be used to keep the flow of traffic as efficient as possible. Though the project may result in some increase in residential growth over time, no significant long-term impacts on transportation are expected. Any construction generated mud and debris will be cleaned from roadways on a daily basis. Additionally, measures will be implemented to control fugitive dust generated by the PAA.

The impacts on transportation in the direct vicinity of the PAA are anticipated to be temporary and minor. There would be no impacts to transportation within the project area as a result of the NAA.

3.14 Aesthetics

The PAA is located in an area that has experienced moderate residential development, near a major state highway. Vegetated state right-of-way, small woodlot parcels, mowed residential lawns, and various impervious land cover categories such as driveways and roadways exist within the project area. Camp Brookside is the most unique aesthetic land resource within the project area with its variety of vegetative cover and unique setting. The New River borders the western perimeter of the project area.

During construction of the PAA the aesthetic quality of the area will be temporarily impacted. Equipment will be stored onsite afterhours, and will be operating during normal daylight work hours. The constant presence of equipment during the duration of the project will impact the aesthetics of the project area. Excavated portions of the alignment will also create temporary aesthetic impacts. However, the vast majority of infrastructure associated with the proposed project will be located below the surface and will essentially be unnoticed once vegetation reestablishes in excavated areas. The exception will be aboveground features associated with pump stations. The required pump stations will be located in a manner to limit aesthetic impacts. The location of the pump station at Camp Brookside was coordinated with input from the NPS to minimize impacts to the property. Once the appropriate piping infrastructure is installed, excavated areas will be returned to preexisting elevations and seeded with native grasses. Furthermore, the subsurface horizontal directional drilling employed within Camp Brookside will limit aesthetic impacts. The developed nature of the project area, combined with the limited disturbance associated with the project, will result in minor and temporary aesthetic impacts. Under the NAA undesirable odors from straight pipe discharges and failing septic leach fields will continue. The undesirable visual appearance created by the straight pipe discharges will also continue with the NAA.

3.15 Cumulative Impacts

The Corps of Engineers must consider the cumulative effects of the proposed project on the environment as stipulated in NEPA. Cumulative effects are “the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such actions” Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time (40 CFR Part 1508.7 Council on Environmental Quality [CEQ] Regulations).

The cumulative effects analysis qualitatively presented below is based on the potential effects of the proposed project when added to similar impacts from other projects in the region. An inherent part of the cumulative effects analysis is the uncertainty surrounding actions that have not yet been fully developed. The CEQ regulations provide for the inclusion of uncertainties in the analysis and states that “when an agency is evaluating reasonably foreseeable significant adverse effects on the human environment….and there is incomplete or unavailable information, the agency shall always make clear that such information is lacking” (40 CFR 1502.22). The CEQ regulations do not state that the analysis cannot be performed if the information is lacking.

Temporal and geographical limits for this project must be established in order to frame the analysis. These limits can vary by the resources that are affected. The installation of a

wastewater collection lines and improvements to the regional wastewater treatment facility will have temporary and insignificant impacts of the environment. The only resource that would show long term effects would be water quality. The temporal limits for assessment of this impact would initiate in 1972 with the passage of the Clean Water Act and end in 2015 or five years after completion of this project. The geographical extent would be the Lower New River. Past and present impacts on water quality within this area are primarily development driven in the form of construction, roads and effluents from the human community. The same stressors are anticipated in the reasonably foreseeable future. On the positive side, the Clean Water Act established regulatory controls over development at both the federal and state levels. These regulatory controls aim to achieve attainment of water quality standards to support different uses of the water. The designation of this stretch of river as non-attainment and the development of TMDLs provide tangible goals for restoration within a regulatory framework. The establishment of the New River National Recreation Area and the designation of the river as a Scenic River provides additional regulatory requirements for any new development in the areal extent of the project. Finally, the availability of federal funds through programs such as the 340 Program to assist communities with wastewater treatment is an additional benefit.

The significance of this action on water quality will be both minimal and positive. Given the current programs that are in place for the foreseeable future, there is expected to be a positive cumulative effect on water quality.

Section 4 – Required Coordination

4.1 Public Involvement

The Draft Environmental Assessment for the Brooks/Barksdale Wastewater Treatment Plant Improvements and Collection System Extension Section 340 Project will be made available to environmental resource agencies, project stakeholders, and the general public for a 30-day review period as required by the National Environmental Policy Act (NEPA).

The following agencies were consulted on various resources and the potential impacts posed on them by the PAA.

- U.S. Fish and Wildlife Service
- West Virginia Department of Environmental Protection
- West Virginia Division of Culture and History
- U.S. Army Corps of Engineers, Regulatory Branch
- West Virginia Division of Natural Resources

A Notice of Availability (NOA) was prepared and published in the Hinton News concerning this document. A copy of the NOA can be found in Appendix H. Comments and recommendations received during the 30-day review period will be taken into consideration and included in the Final Environmental Assessment document. A copy of the mailing list can be found in Appendix I.

4.2 Statutory Compliance

Table 1 below provides a summary of applicable Federal Statutes and other pertinent statutes for the PAA, along with the compliance status for each listed.

Table 3: Compliance Status of PAA

FEDERAL STATUTES	Compliance Status FC = Fully Compliant NC = Not Compliant PC= Partially Compliant
Archeological and Historic Preservation Act as amended, 16 U.S.C. 469, et seq.	FC
Clean Air Act as amended, 42 U.S.C. 7401, et seq.	FC
Clean Water Act (Federal Water Pollution Control Act) as amended, 336 U.S.C. 1251, et seq.	FC
Endangered Species Act as amended, 16 U.S.C. 1531, et seq.	FC
Fish and Wildlife Coordination Act as amended, 16 U.S.C. 661, et seq.	FC
National Environmental Policy Act as amended, 42 U.S.C. 4321, et seq.	PC
National Historic Preservation Act as amended, 16 U.S.C. 470a, et seq.	FC
Rivers and Harbors Act, 33 U.S.C. 403, et seq.	FC
Wild and Scenic Rivers Act as amended, 16 U.S.C. 1271, et seq.	FC
EXECUTIVE ORDERS, MEMORANDA, ETC.	
Floodplain Management (E.O. 11988)	FC
Protection of Wetlands (E.O. 11990)	FC
Environmental Justice in Minority Populations and Low-Income Populations (E.O.12898)	FC
Analysis of Impacts on Prime and Unique Farmland	FC

Section 5 – Conclusions

The primary benefits of the proposed action would include an adequate and improved means of wastewater conveyance and treatment for the communities of Brooks and Barksdale. Additionally, the project would aid in improving the overall water quality in and adjacent to the project area, as well as the Lower New River Watershed. The PAA would likely have positive socioeconomic impacts to the communities served and Summers County. The ecological footprint of the project was minimized through the evaluation of alternatives and consultation with the NPS by Stafford Consultants, Inc.

Major points derived from review of the anticipated environmental impacts are as follows: (1) One wetland approximately ½ acre in size occurs within the project area but will be

avoided, and therefore not impacted; (2) Species listed on the Federal List of Endangered and Threatened Species will not be impacted; (3) The project will not adversely impact any known archeological, cultural, or historic sites in the areas where work is to be performed; (4) Water quality will not be significantly or permanently affected; (5) Natural resource mitigation will not be required and (6) Coordination with Federal, state and local agencies did not result in any unresolved issues. The NAA would not provide positive socioeconomic conditions for the two communities and the failing septic systems and straight piping would continue to occur within the project area. The NAA would not aid in improving water quality within the watershed as it would fail to alleviate fecal coliform loading occurring under present conditions.

Table 4: Summary of Potential Impacts to Resources

Feature	Estimated Impacts
Brooks Branch	Temporary and minor impacts are anticipated, BMPs and permit conditions will limit impact.
Owens Branch	Temporary and minor impacts are anticipated, BMPs and permit conditions will limit impact.
Other unnamed tributaries	Temporary and minor impacts are anticipated, BMPs and permit conditions will limit impact.
Backwater Channel of New River	No impacts are anticipated
100-year Floodplain	No impacts are anticipated
Terrestrial Resources	No impacts are anticipated
HTRW Resources	No impacts are anticipated
Cultural Resources	No impacts are anticipated
Endangered Species	No impacts are anticipated
Air Quality and Noise	Only temporary impacts will occur. No long term impacts are anticipated.
Socioeconomics	No impacts are anticipated
Aesthetics	No impacts are anticipated
Transportation	Temporary and minor impacts are anticipated but would be confined period of construction.

Section 6 – References

Federal Emergency Management Agency, Map Service Center. Summers County, West Virginia Map Number 54089C0110C. February 3, 2010. Available online: http://www.msc.fema.gov/webapp/wcs/stores/servlet/CategoryDisplay?catalogId=10001&storeId=10001&categoryId=12001&langId=-1&userType=G&type=1&future=false

Hinton, West Virginia Website. Brief History of Hinton, WV. Available online: http://hintonwva.com/history.html

NYDEC. New York State Department of Environmental Conservation. 2001. Assessing and Mitigating Noise Impacts Conservation. Available online: http://dec.ny.gov/doc/permits_ej_operations_pdf/noise200.pdf

R.E.I. Consultants, Inc. Brooks/Barksdale Wastewater Project Summers County, West Virginia: Proposed Stream Crossings Assessment. August 22, 2008.

R.E.I. Consultants, Inc. Brooks/Barksdale Wastewater Project Summers County, West Virginia: Wetland Determination and Delineation. August 20, 2008.

Stafford Consultants, Inc. City of Hinton, Brooks/Barksdale WWTP Improvements and Collection System Extension: Environmental Report. August 2009.

Stafford Consultants, Inc. City of Hinton, Brooks/Barksdale WWTP Improvements and Collection System Extension: Limited Phase I Hazardous, Toxic, and Radioactive Waste (HTRW) Assessment. November 2008.

U.S. Army Corps of Engineers. Nationwide Permits for the State of West Virginia, Public Notice 2008-6-Mod. June 20, 2008. Available Online: http://www.lrh.usace.army.mil/_kd/Items/actions.cfm?action=Show&item_id=14410&destination=ShowItem

U.S. Census Bureau. State and County QuickFacts. 2010. Summers County, West Virginia. Available online: http://quickfacts.census.gov/qfd/states/54/54089.html

U.S. Environmental Protection Agency. Green Book – Nonattainment by County by Year. Available online: http://epa.gov/airquality/greenbk/multipol.html

U.S. Environmental Protection Agency. Level III and IV Ecoregions of the Continental United States. 2010. Available online: http://www.epa.gov/wed/pages/ecoregions/level_iii_iv.htm#Level%20III

U.S. Environmental Protection Agency. "Noise from Construction Equipment and Operations, Building Equipment, and Home Appliances," NJID 300.1, December 31, 1971.

U.S. Fish & Wildlife Service, West Virginia Field Office. Known and Potential Distribution of Federally-listed Endangered, Threatened, and Candidate Species in West Virginia. March 13, 2010. Available online: http://www.fws.gov/westvirginiafieldoffice/endangered_species.html

Vanderhorst, J.P., J. Jeuck, and S.C. Gawler. 2007. Vegetation Classification and Mapping of New River Gorge National River, West Virginia. Technical Report NPS/NER/NRTR – 2007/092. National Park Service.

Vosick, Jamie. October 2008. A Phase I Archeological Literature Review and Reconnaissance Survey for the Proposed Brooks-Barksdale Wastewater Line, Pump Stations, and Staging Area Project in the New River Gorge Region, Summers County, West Virginia. Archeological Consultants of the Midwest, Inc.

West Virginia Department of Environmental Protection. 2008 TMDL Report for Upper and Lower New River Watershed, Appendix A Lower New River Watershed. Available online: http://www.dep.wv.gov/WWE/watershed/TMDL/grpd/Documents/Upper%20and%20Lower%20New%202008/A_Lower%20New_Appendix_6-25-08.pdf

West Virginia Department of Environmental Protection. Division of Water and Waste Management, 2006 Integrated Water Quality Monitoring and Assessment Report. Available Online: http://www.dep.wv.gov/WWE/watershed/IR/Documents/WV_IR_2006_EPA_Approved_Final_Narrative_Supplement.pdf

WorkForce West Virginia. Unemployment Data by County. 2010. Available online: http://www.workforcewv.org/

World Climate. Climate Data for Hinton, West Virginia. 2008. Available online: http://www.worldclimate.com/cgi-bin/grid.pl?gr=N37W080

APPENDICES

Appendix A – Exhibits

Appendix B – PAA Layout/Drawings

Appendix C – Stream Crossing Report (REIC)

Appendix D – Nationwide Permit #12 Conditions

Appendix E – Agency Correspondence

Appendix F – Wetland Determination and Delineation (REIC)

Appendix G – Limited Phase I HTRW Clearance Letter (Corps)

Appendix H – Notice of Availability

Appendix I – Mailing List

Appendix J – NPS Plant Community Technical Report

Appendix K - Correspondence/Feedback from 30-day Review Period

ENVIRONMENTAL ASSESSMENT

BROOKS/BARKSDALE WASTEWATER TREATMENT PLANT IMPROVEMENTS
AND COLLECTION SYSTEM EXTENSION
SECTION 340 PROJECT

SUMMERS COUNTY

WEST VIRGINIA

APPENDIX A – EXHIBITS

U.S. ARMY CORPS OF ENGINEERS

HUNTINGTON DISTRICT

HUNTINGTON, WEST VIRGINIA

OCTOBER 2010

ENVIRONMENTAL ASSESSMENT

BROOKS/BARKSDALE WASTEWATER TREATMENT PLANT IMPROVEMENTS
AND COLLECTION SYSTEM EXTENSION
SECTION 340 PROJECT

SUMMERS COUNTY

WEST VIRGINIA

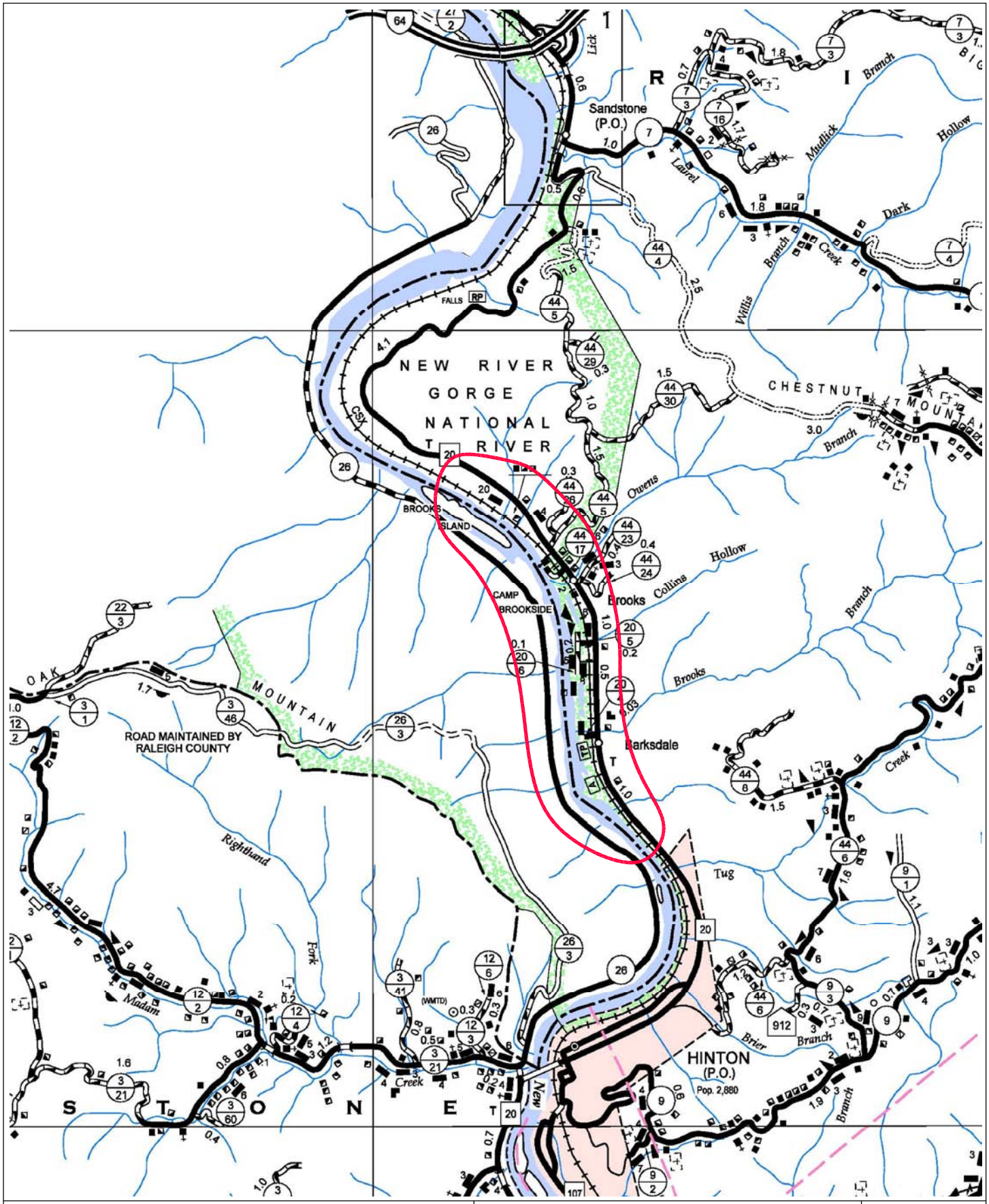
Exhibit 1 – (Stafford Consultants, Inc.) General Proximity Map of Project Area

U.S. ARMY CORPS OF ENGINEERS

HUNTINGTON DISTRICT

HUNTINGTON, WEST VIRGINIA

OCTOBER 2010



STAFFORD CONSULTANTS INCORPORATED

ENGINEERING DESIGN AND CONSULTING

PRINCETON, WEST VIRGINIA

HINTON BROOKS/BARKSDALE

PROJECT LOCATION MAP

DRWN. BY	MCM
DATE	3-09
SCALE	NONE
DWG. NO.	APPENDIX A EXHIBIT 1
JOB NO	7060.40

ENVIRONMENTAL ASSESSMENT

BROOKS/BARKSDALE WASTEWATER TREATMENT PLANT IMPROVEMENTS
AND COLLECTION SYSTEM EXTENSION
SECTION 340 PROJECT

SUMMERS COUNTY

WEST VIRGINIA

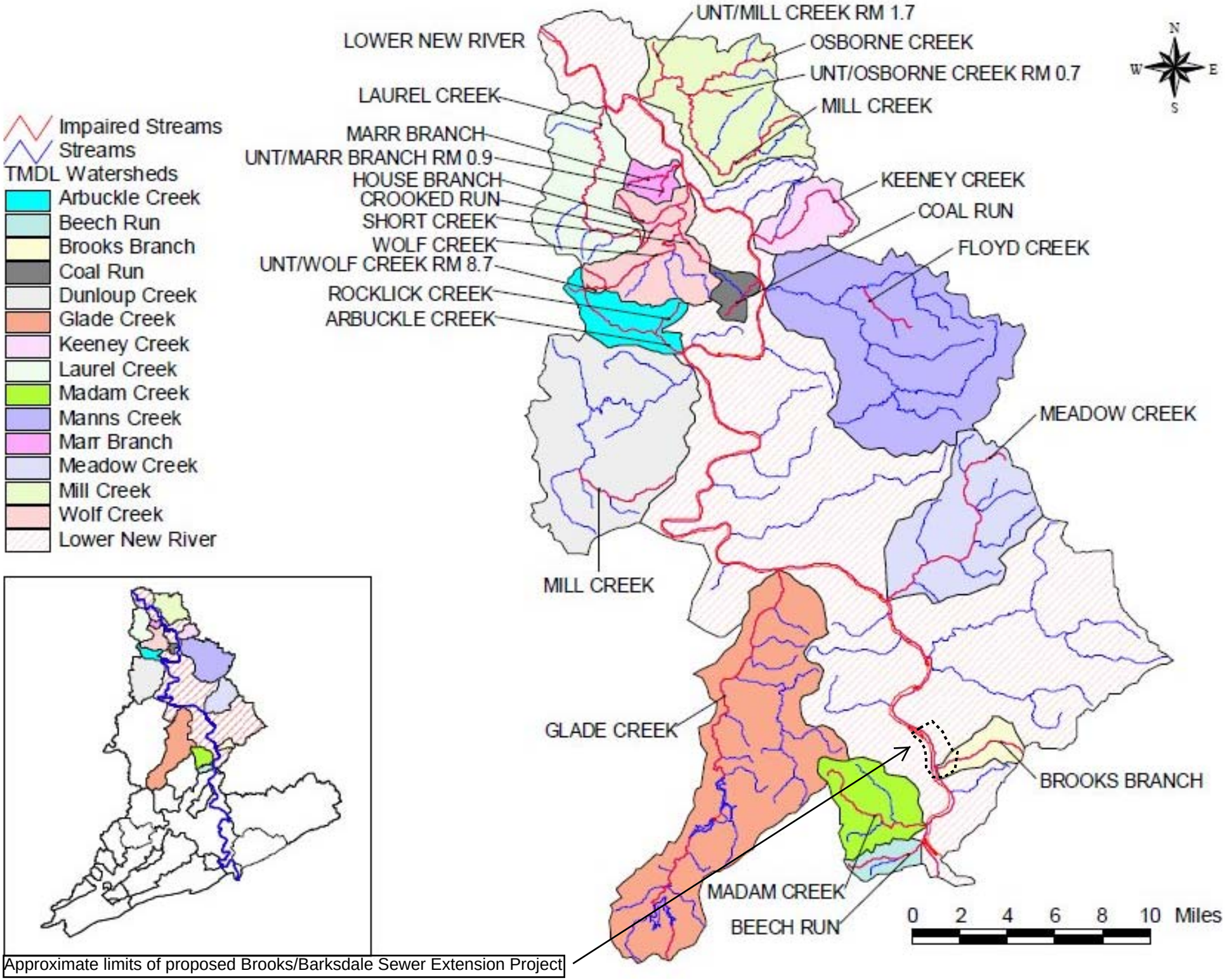
Exhibit 2 – Map of Fecal Coliform Impaired Streams in Lower New Watershed from 2008 TMDL Report

U.S. ARMY CORPS OF ENGINEERS

HUNTINGTON DISTRICT

HUNTINGTON, WEST VIRGINIA

OCTOBER 2010


Impaired Streams
Streams
TMDL Watersheds
Arbuckle Creek
Beech Run
Brooks Branch
Coal Run
Dunloup Creek
Glade Creek
Keeney Creek
Laurel Creek
Madam Creek
Manns Creek
Marr Branch
Meadow Creek
Mill Creek
Wolf Creek
Lower New River
UNT/MILL CREEK RM 1.7
LOWER NEW RIVER
OSBORNE CREEK
UNT/OSBORNE CREEK RM 0.7
LAUREL CREEK
MILL CREEK
MARR BRANCH
UNT/MARR BRANCH RM 0.9
HOUSE BRANCH
CROOKED RUN
SHORT CREEK
WOLF CREEK
UNT/WOLF CREEK RM 8.7
ROCKLICK CREEK
ARBUCKLE CREEK
KEENEY CREEK
COAL RUN
FLOYD CREEK
MEADOW CREEK
MILL CREEK
GLADE CREEK
BROOKS BRANCH
MADAM CREEK
BEECH RUN
N
W
E
S
0 2 4 6 8 10 Miles
Approximate limits of proposed Brooks/Barksdale Sewer Extension Project

ENVIRONMENTAL ASSESSMENT

BROOKS/BARKSDALE WASTEWATER TREATMENT PLANT IMPROVEMENTS
AND COLLECTION SYSTEM EXTENSION
SECTION 340 PROJECT

SUMMERS COUNTY

WEST VIRGINIA

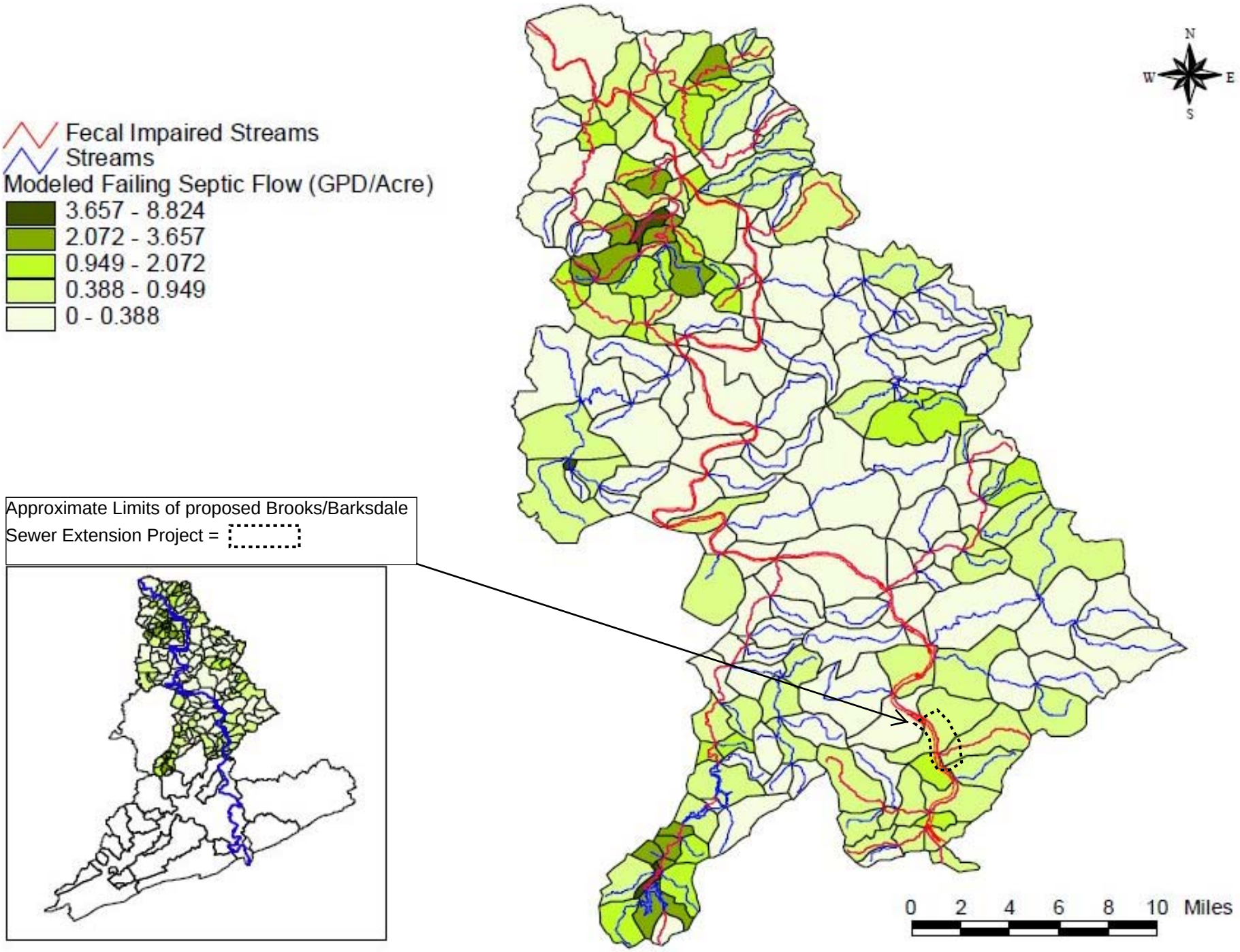
Exhibit 3 – Septic Loading Modeling in Lower New Watershed from 2008 New River TMDL Report

U.S. ARMY CORPS OF ENGINEERS

HUNTINGTON DISTRICT

HUNTINGTON, WEST VIRGINIA

OCTOBER 2010


Fecal Impaired Streams
Streams
Modeled Failing Septic Flow (GPD/Acre)
3.657 - 8.824
2.072 - 3.657
0.949 - 2.072
0.388 - 0.949
0 - 0.388
Approximate Limits of proposed Brooks/Barksdale Sewer Extension Project =
N
W
E
S
0 2 4 6 8 10 Miles

ENVIRONMENTAL ASSESSMENT

BROOKS/BARKSDALE WASTEWATER TREATMENT PLANT IMPROVEMENTS
AND COLLECTION SYSTEM EXTENSION
SECTION 340 PROJECT

SUMMERS COUNTY

WEST VIRGINIA

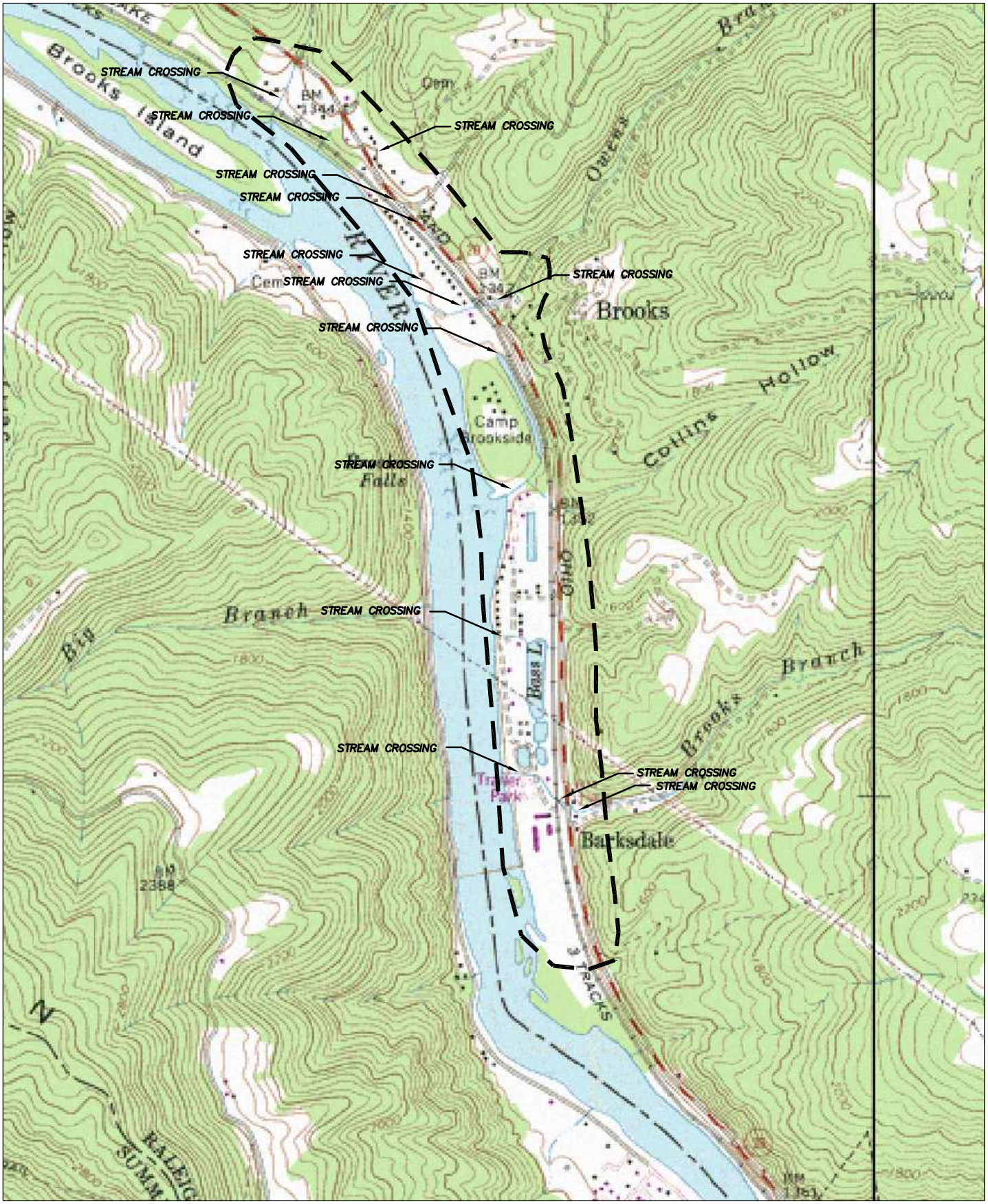
Exhibit 4 – (Stafford Consultants, Inc.) Stream Crossing Location Map

U.S. ARMY CORPS OF ENGINEERS

HUNTINGTON DISTRICT

HUNTINGTON, WEST VIRGINIA

OCTOBER 2010



STAFFORD CONSULTANTS INCORPORATED

ENGINEERING DESIGN AND CONSULTING

PRINCETON, WEST VIRGINIA

HINTON BROOKS/BARKSDALE

STREAM CROSSING LOCATIONS

DRWN. BY	MCM
DATE	3-09
SCALE	NONE
DWG. NO.	APPENDIX A EXHIBIT 5
JOB NO	7060.

ENVIRONMENTAL ASSESSMENT

BROOKS/BARKSDALE WASTEWATER TREATMENT PLANT IMPROVEMENTS
AND COLLECTION SYSTEM EXTENSION
SECTION 340 PROJECT

SUMMERS COUNTY

WEST VIRGINIA

Exhibit 5 – USFWS Wetlands Mapper Map of Project Area

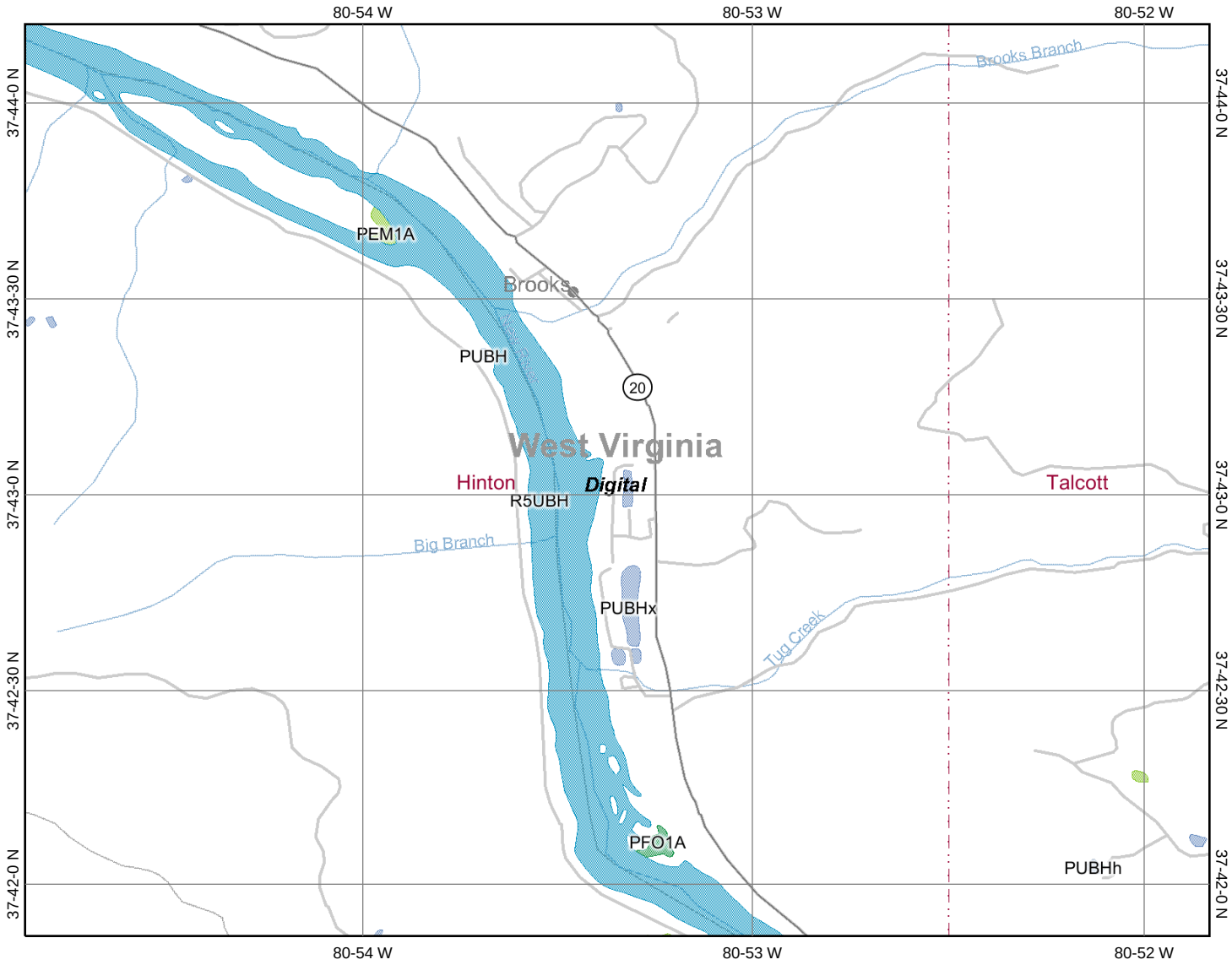
U.S. ARMY CORPS OF ENGINEERS

HUNTINGTON DISTRICT

HUNTINGTON, WEST VIRGINIA

OCTOBER 2010

Wetlands



Map center: 37° 43' 2" N, 80° 53' 21" W

Legend

- Interstate
- Major Roads
- Other Road
- Interstate
- State highway
- US highway
- Roads
- Cities
- USGS Quad Index 24K
- Lower 48 Wetland Polygons
- Estuarine and Marine Deepwater
- Estuarine and Marine Wetland
- Freshwater Emergent Wetland
- Freshwater Forested/Shrub Wetland
- Freshwater Pond
- Lake
- Other
- Riverine
- Lower 48 Available Wetland Data
- Non-Digital
- Digital
- No Data
- Scan
- NHD Streams
- Counties 100K
- States 100K
- South America
- North America

N

Scale: 1:30,289

This map is a user generated static output from an Internet mapping site and is for general reference only. Data layers that appear on this map may or may not be accurate, current, or otherwise reliable. THIS MAP IS NOT TO BE USED FOR NAVIGATION.

ENVIRONMENTAL ASSESSMENT

BROOKS/BARKSDALE WASTEWATER TREATMENT PLANT IMPROVEMENTS
AND COLLECTION SYSTEM EXTENSION
SECTION 340 PROJECT

SUMMERS COUNTY

WEST VIRGINIA

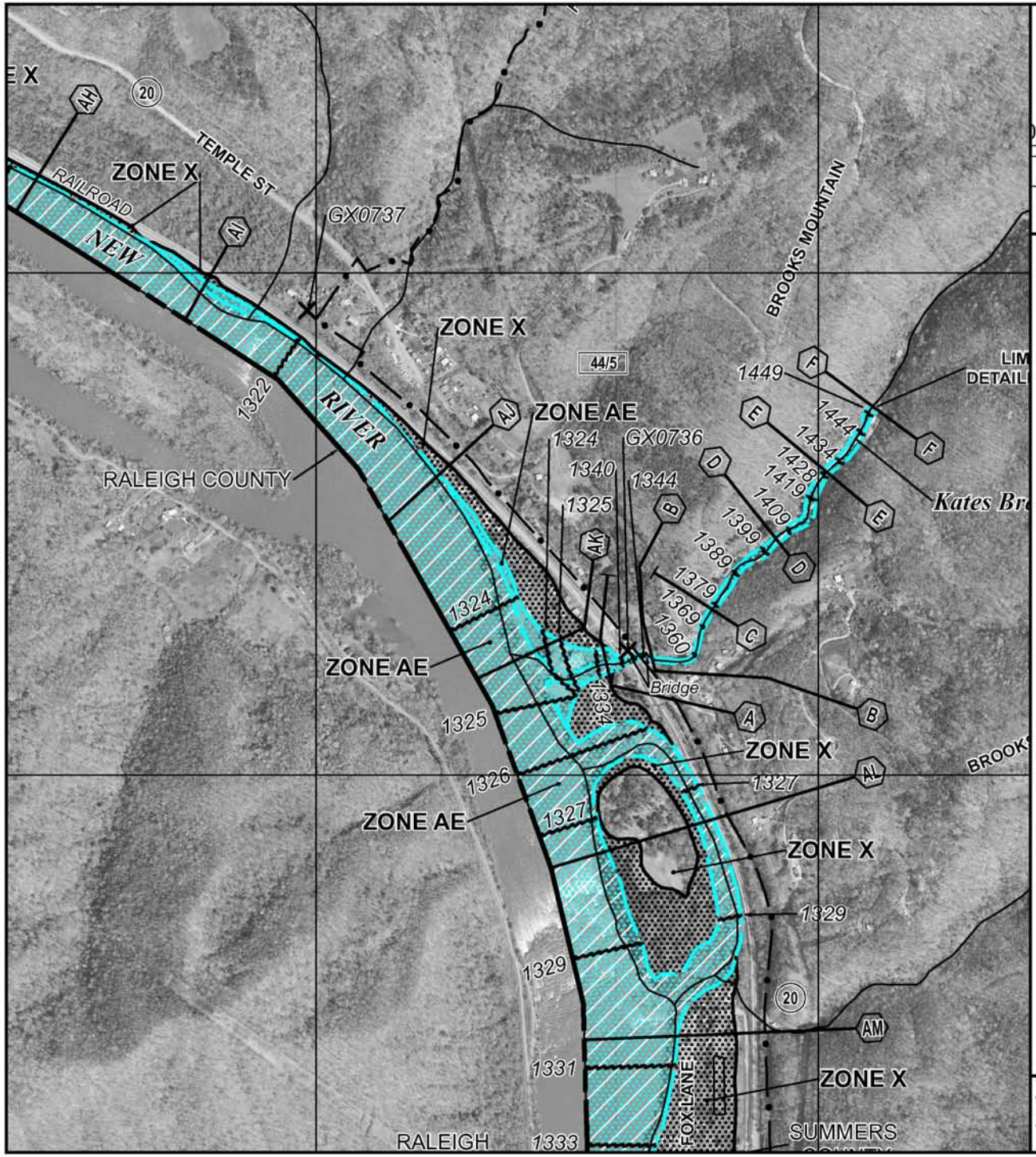
Exhibit 6 – FIRMETTES of Project Area
Source: FEMA Map Service Center Website

U.S. ARMY CORPS OF ENGINEERS

HUNTINGTON DISTRICT

HUNTINGTON, WEST VIRGINIA

OCTOBER 2010



MAP SCALE 1" = 1000'

00 0 1000 2000 FEET

NFIP

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0110C

FIRM
FLOOD INSURANCE RATE MAP

SUMMERS COUNTY, WEST VIRGINIA
AND INCORPORATED AREAS

PANEL 110 OF 325

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
HINTON, CITY OF	540187	0110	C
SUMMERS COUNTY	540186	0110	C

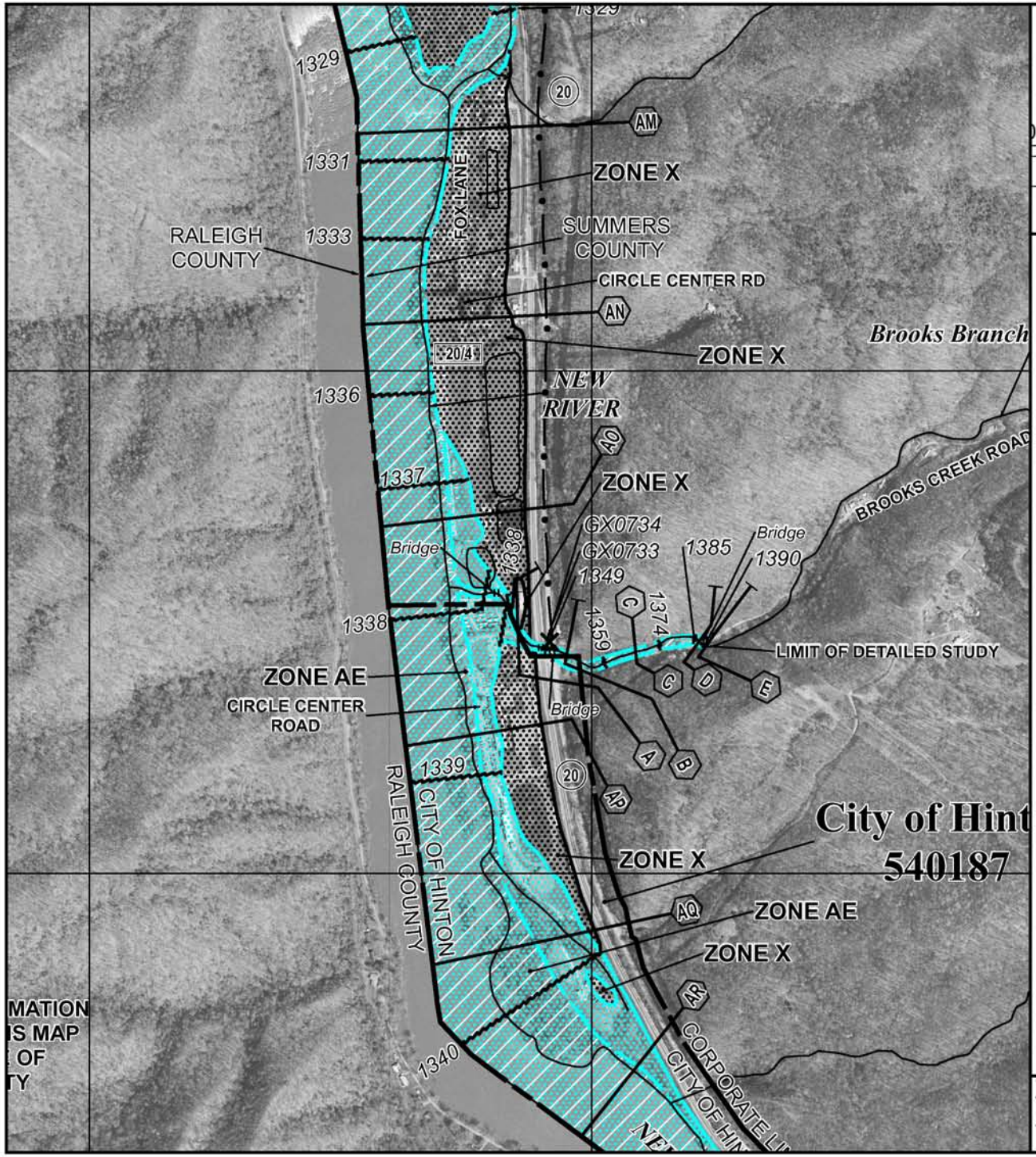
Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

MAP NUMBER
54089C0110C

EFFECTIVE DATE
FEBRUARY 3, 2010

Federal Emergency Management Agency

This is an official copy of a portion of the above referenced flood map. It was extracted using F-MIT On-Line. This map does not reflect changes or amendments which may have been made subsequent to the date on the title block. For the latest product information about National Flood Insurance Program flood maps check the FEMA Flood Map Store at www.msc.fema.gov



MAP SCALE 1" = 1000'

00 0 1000 2000 FEET

NFIP

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0110C

FIRM
FLOOD INSURANCE RATE MAP

SUMMERS COUNTY, WEST VIRGINIA
AND INCORPORATED AREAS

PANEL 110 OF 325

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
HINTON, CITY OF	540187	0110	C
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ENVIRONMENTAL ASSESSMENT

BROOKS/BARKSDALE WASTEWATER TREATMENT PLANT IMPROVEMENTS
AND COLLECTION SYSTEM EXTENSION
SECTION 340 PROJECT

SUMMERS COUNTY

WEST VIRGINIA

Exhibit 7 – Soil Survey Map of Project Area

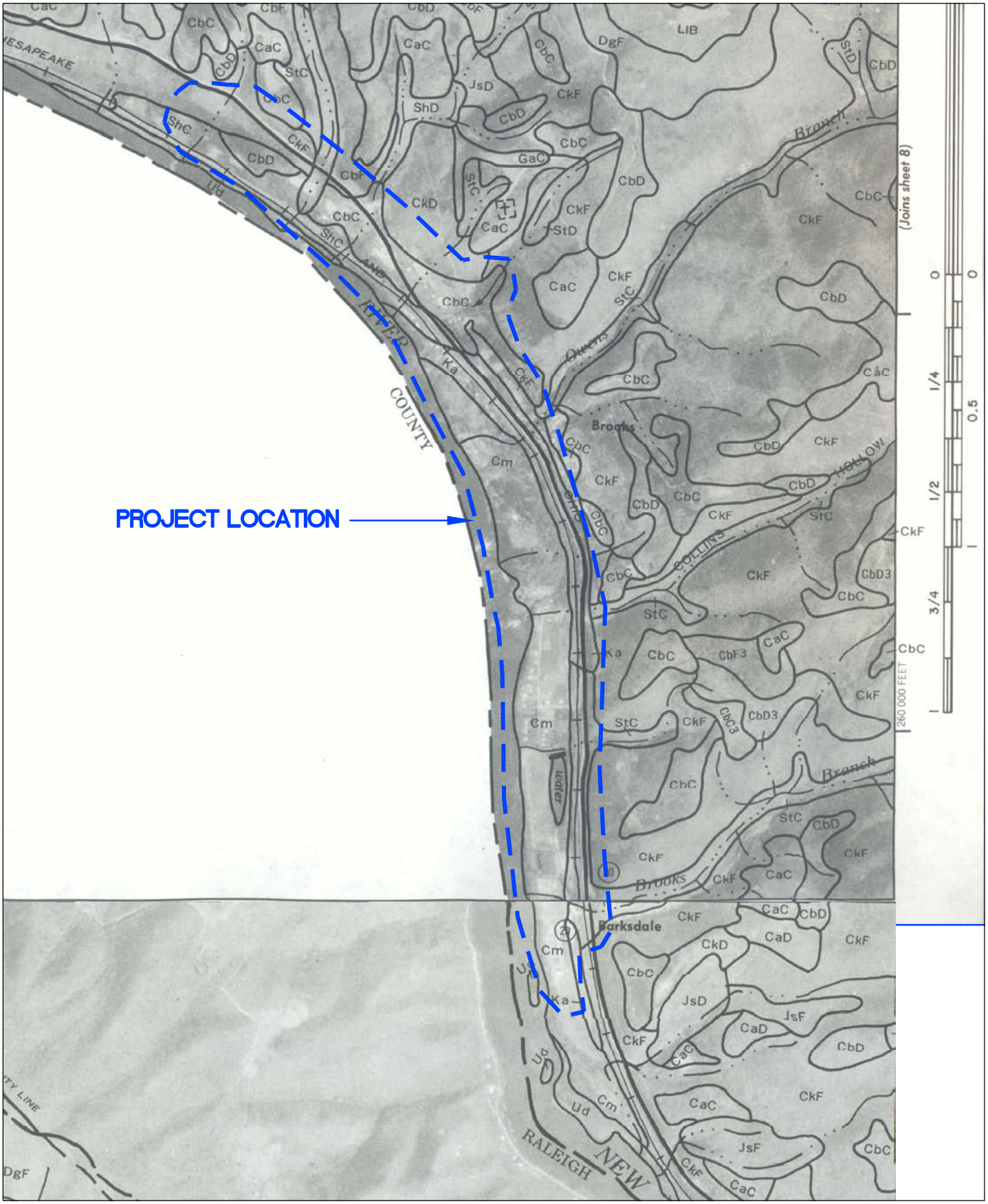
Source: Stafford Consultants, Inc. Environmental Report for Brooks/Barksdale WWTP Improvements and Collection System Extension

U.S. ARMY CORPS OF ENGINEERS

HUNTINGTON DISTRICT

HUNTINGTON, WEST VIRGINIA

OCTOBER 2010



STAFFORD CONSULTANTS INCORPORATED

ENGINEERING DESIGN AND CONSULTING

PRINCETON, WEST VIRGINIA

HINTON BROOKS/BARKSDALE

SOILS MAP

SOIL SURVEY OF SUMMERS COUNTY

SOIL CONSERVATION SERVICE

SUMMERS COUNTY, WEST VIRGINIA

DRWN. BY	MCM
DATE	3–09
SCALE	NONE
DWG. NO.	APPENDIX A EXHIBIT 2
JOB NO	7060.40

ENVIRONMENTAL ASSESSMENT

BROOKS/BARKSDALE WASTEWATER TREATMENT PLANT IMPROVEMENTS
AND COLLECTION SYSTEM EXTENSION
SECTION 340 PROJECT

SUMMERS COUNTY

WEST VIRGINIA

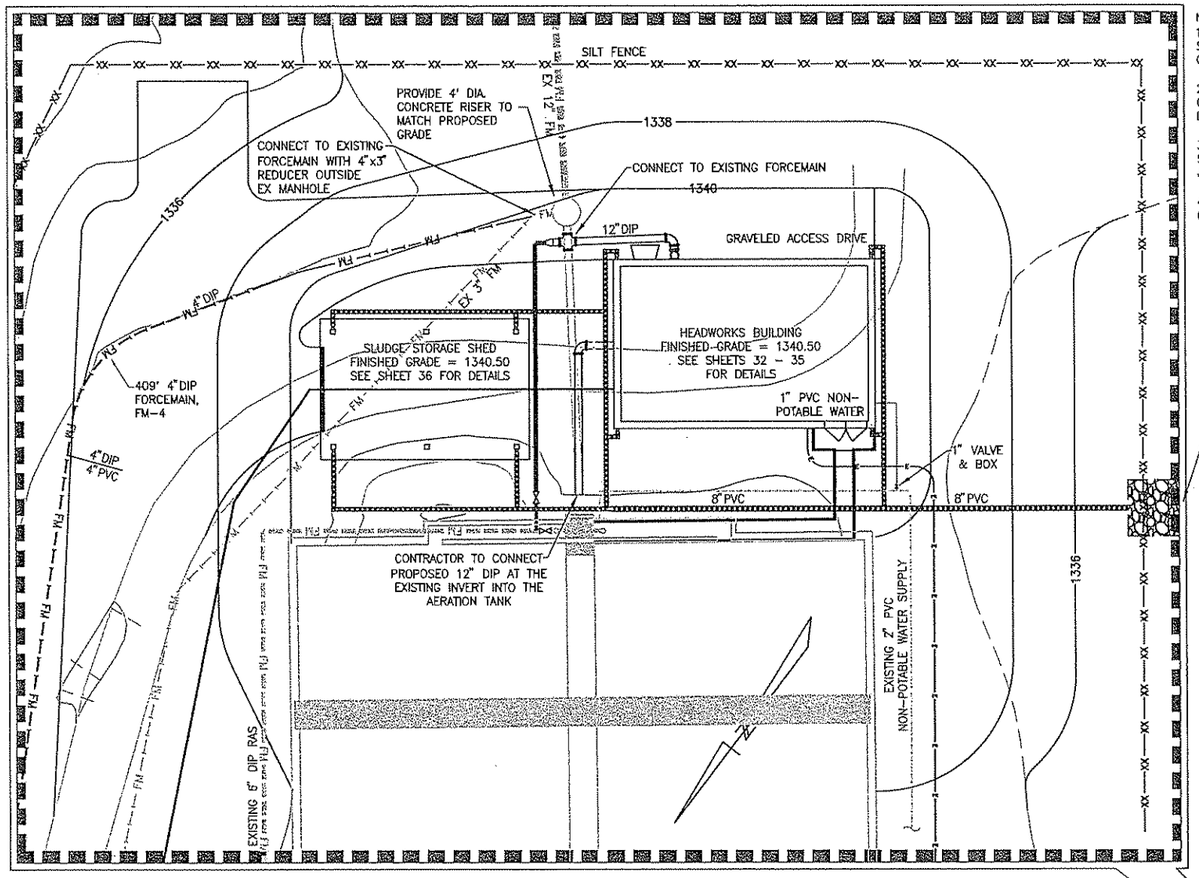
APPENDIX B – PAA LAYOUT/DRAWINGS

U.S. ARMY CORPS OF ENGINEERS

HUNTINGTON DISTRICT

HUNTINGTON, WEST VIRGINIA

OCTOBER 2010



1/3 HEADWORKS SITE PLAN
1"=10'

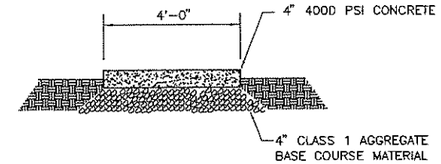
NOTES:
1) PROVIDE 6" ALUMINUM GUTTER AND DOWNSPOUT. TIE TO SDR 35 PVC STORM DRAIN AT A MINIMUM OF 1% SLOPE TO OUTLET AS SHOWN.

2) GRAVEL ACCESS ROAD SHALL BE MINIMUM OF 6" COMPACTED CRUSHED STONE BASE, WV DOT CLASS 1. SEE DETAIL BELOW.

3) ALL NEW SEWER PIPING SHALL BE A MINIMUM OF CLASS 50 DIP, RESTRAINED JOINT BELOW GRADE AND FLANGED JOINTS ABOVE GRADE.

4) ALL STORM DRAINAGE SHALL BE 6" SDR 35 UNLESS OTHERWISE LABELED ON THIS PLAN.

CONTRACTOR TO DAYLIGHT 8" SDR 35 STORM DRAIN PIPE. CONTRACTOR SHALL PROVIDE AN 8'x8'x1' DEEP RIP RAPPED AREA AT DISCHARGE.



TYPICAL SIDEWALK DETAIL
SECTION A-A

NTS

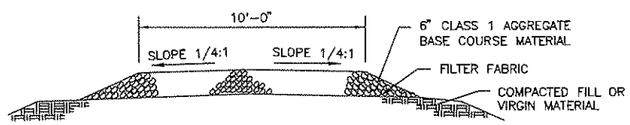
MAINTENANCE SCHEDULE FOR EROSION AND SEDIMENT CONTROL STRUCTURES:

ALL SEDIMENT AND EROSION CONTROL DEVICES SHALL BE INSPECTED EVERY SEVEN CALENDER DAYS AND WITHIN 24 HOURS OF ANY RAINFALL EVENT GENERATING 0.5" OF RUNOFF OR GREATER.

ALL DAMAGED EROSION AND SEDIMENT CONTROL DEVICES SHALL BE REPAIRED IMMEDIATELY.

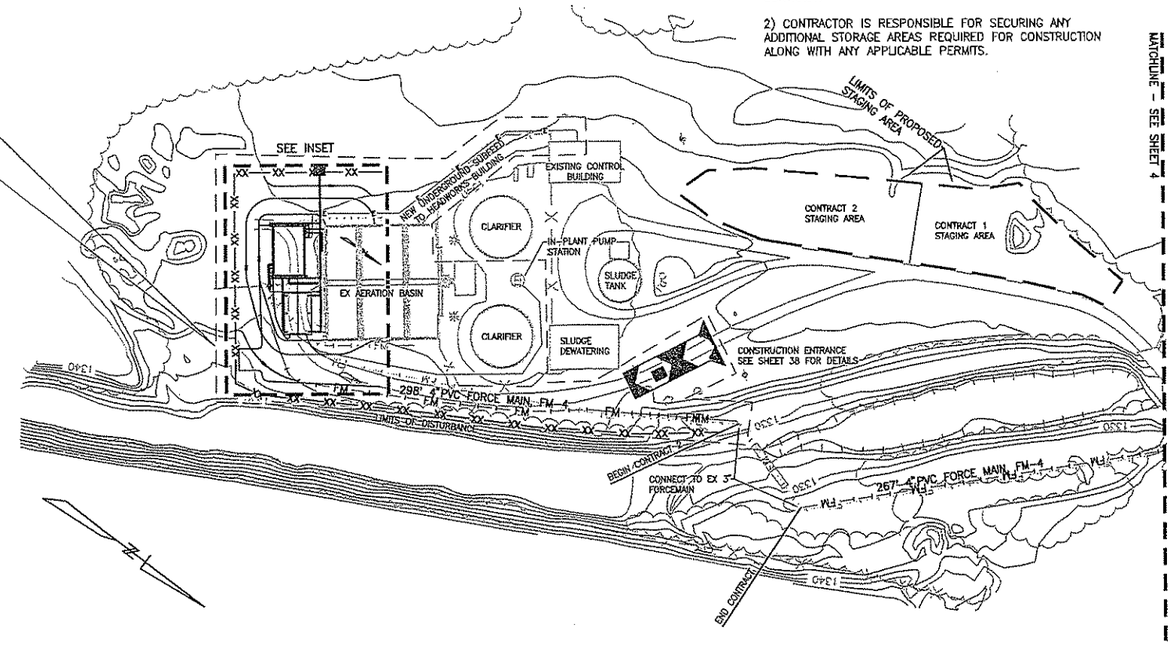
STAGING AREA NOTES:
1) STAGING AREA IS AVAILIBLE FOR CONTRACTOR USE. CONTRACTOR IS RESPONSIBLE FOR EROSION CONTROL, SECURITY, AND RESTORATION UPON COMPLETION OF THE CONTRACT.

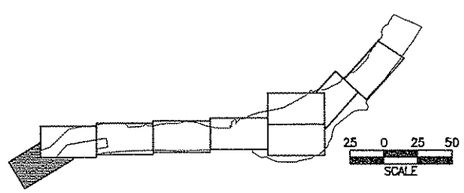
2) CONTRACTOR IS RESPONSIBLE FOR SECURING ANY ADDITIONAL STORAGE AREAS REQUIRED FOR CONSTRUCTION ALONG WITH ANY APPLICABLE PERMITS.



GRAVELED ACCESS ROAD SECTION
SECTION A-A

NTS





SEE SHEET 24A FOR PROFILE OF FORCEMAIN FM-4

NO.	REVISIONS	DATE	BY

CITY OF HINTON

STAFFORD CONSULTANTS INCORPORATED
ENGINEERING DESIGN AND CONSULTING
PRINCETON, WEST VIRGINIA

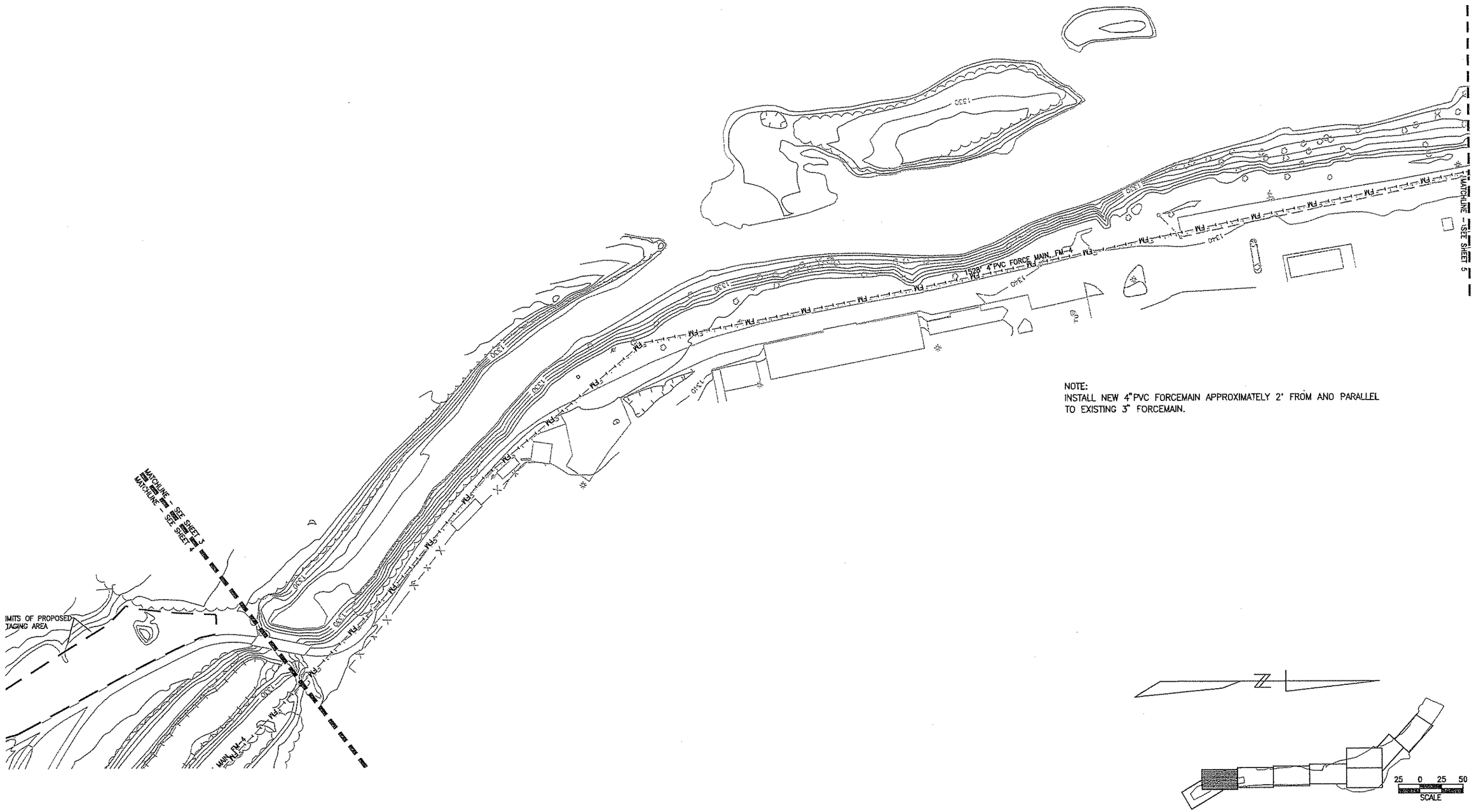
WASTEWATER COLLECTION SYSTEM EXPANSION

SCALE: SHOWN	APPROVED BY	CHECKED BY	DRAWN BY CLP
DATE: 5-09	CDU	CLP	

SEWER LAYOUT PLAN

DWG: S:\PROJECTS\7050 - Hinton - Brooks Barksdale\7050D1.dwg

DRAWING NUMBER 3



NOTE:
INSTALL NEW 4" PVC FORCEMAIN APPROXIMATELY 2' FROM AND PARALLEL TO EXISTING 3" FORCEMAIN.

SEE SHEET 24A FOR PROFILE OF FORCEMAIN FM-4

NO.	REVISIONS	DATE	BY

CITY OF HINTON

STAFFORD CONSULTANTS INCORPORATED
ENGINEERING DESIGN AND CONSULTING
PRINCETON, WEST VIRGINIA

WASTEWATER COLLECTION SYSTEM EXPANSION

SCALE: SHOWN	APPROVED BY	CHECKED BY	DRAWN BY CLP
DATE: 5-09	CDU	CLP	

SEWER LAYOUT PLAN

DWG: S:\PROJECTS\7060 - Hinton - Brooks Barksdale\7060201.dwg

DRAWING NUMBER 4

NOTE:
100-YEAR FLOOD LEVEL
PER FEMA MAP = 1338.50'

PROPOSED PUMP STATION NO. 1
SEE SHEET 27 FOR SITE PLAN
SEE SHEET 27 FOR DETAILS
STATION 0+00, LINE 1

NEW RIVER

EXISTING PUMP STATION
(INV. OF EX PUMP STATION=1321.33)

MH 1-1A
STA 0+66

45 LF 8" PVC

66 LF 8" PVC

145' 4" PVC FORCE MAIN FM-4

GRAVELED ACCESS, SEE DETAIL ON SHEET 28

MH 1-1
STA 0+00, LINE 1
STA 1+11, LINE 2

MH 1-2
STA 3+11

200 LF 8" PVC

37' LF 6" PVC

MH 2-1
STA 0+00, LINE 3
STA 1+37, LINE 2

LINE 3

148 6" PVC

C.O. 3-1
STA 1+48

130' 6" PVC

C.O. 4-1
STA 1+30

LINE 4

MH 2-2
STA 0+00, LINE 4
STA 3+20, LINE 2

140 LF 8" PVC

MH 2-3
STA 4+00

MH 2-4
STA 5+40

CSX RT. OF WAY

125 LF RAILROAD CROSSING

200 LF 8" DIP

WV DOH R.O.W.

CSX RT. OF WAY

MH 2-5
STA 7+40

SUMMERS COUNTY HIGH SCHOOL

VACANT

CSX RAILWAY

WV ROUTE 20

200 LF 8" DIP

40 LF STREAM CROSSING
STEEL CASING
(OPEN CUT)

LINE 1

MH 1-3
STA 5+11

400 LF 8" PVC

MH 1-4
STA 9+11

400 LF 6" PVC

BASS LAKE CAMP GROUND

NOTE:
PROVIDE THREE 6" SERVICE CONNECTIONS
- FIELD LOCATE TO CONNECT
EXISTING FACILITIES.

31-28

34-3

34-1

MATCHLINE - SEE SHEET 4

MATCHLINE - SEE SHEET 6

SEE SHEET 14 FOR PROFILE OF LINE 2
SEE SHEET 21 FOR PROFILE OF LINE 1
SEE SHEET 23 FOR PROFILE OF LINE 3
SEE SHEET 24 FOR PROFILE OF LINE 4
SEE SHEET 24A FOR PROFILE OF FORCEMAIN FM-4

25 0 25 50
SCALE

NO.	REVISIONS	DATE	BY

CITY OF HINTON

STAFFORD CONSULTANTS INCORPORATED
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PRINCETON, WEST VIRGINIA

WASTEWATER COLLECTION SYSTEM EXPANSION

SCALE: SHOWN	APPROVED BY	CHECKED BY	DRAWN BY CLP
DATE: 5-09	CDU	CLP	

SEWER LAYOUT PLAN

DWG: S:\PROJECTS\7060 - Hinton - Brooks Barksdale\7060201.dwg

DRAWING NUMBER 5

NEW RIVER

N

BASS LAKE CAMP GROUND

NOTE:
PROVIDE THREE 6" SERVICE CONNECTIONS
– FIELD LOCATE TO CONNECT
EXISTING FACILITIES.

MH 1-5
STA 13+13

400 LF 8" PVC

170 LF 8" PVC

MH 1-5A
STA 17+11

MH 1-6
STA 18+81, LINE 1
STA 18+83, FM-1

MH 5-6
STA 15+59, LINE 5

250 LF 8" DIP

MH 5-5
STA 13+09

ARCHEOLOGICALLY
SENSITIVE AREA

173 LF 8" DIP

NOTE:
ALL SERVICE CROSSING
ROADWAY ARE OPEN CUT.
PROVIDE 1" ASPHALT
OVERLAY FOR ROADWAY.

MH 5-4
STA 11+36

MH 5-3A
STA 10+80
LINE 5

344 LF 8" PVC

1168' 3" PVC FORCE MAIN FM-1

MH 5-3
STA 7+36

W/BASEMENT

302 LF 8" PVC

102 LF 8" PVC

MH 7-1
STA 3+09

230 LF 8" PVC

MH 8-1
STA 2+30, LINE 8

1ST FLOOR
SERVICE ONLY

265 LF 8" PVC

MH 7-3
STA 6+69

MH 7-2
STA 4+04

RAILWAY

WV ROUTE 20

ROUTE 20

MATCHLINE – SEE SHEET 5

MATCHLINE – SEE SHEET 7

25 0 25 50
SCALE

SEE SHEET 21 FOR PROFILE OF LINES 1 AND 5
SEE SHEET 13 FOR PROFILE OF LINES 7 AND 8

NO.	REVISIONS	DATE	BY

CITY OF HINTON

STAFFORD CONSULTANTS INCORPORATED
ENGINEERING DESIGN AND CONSULTING
PRINCETON, WEST VIRGINIA

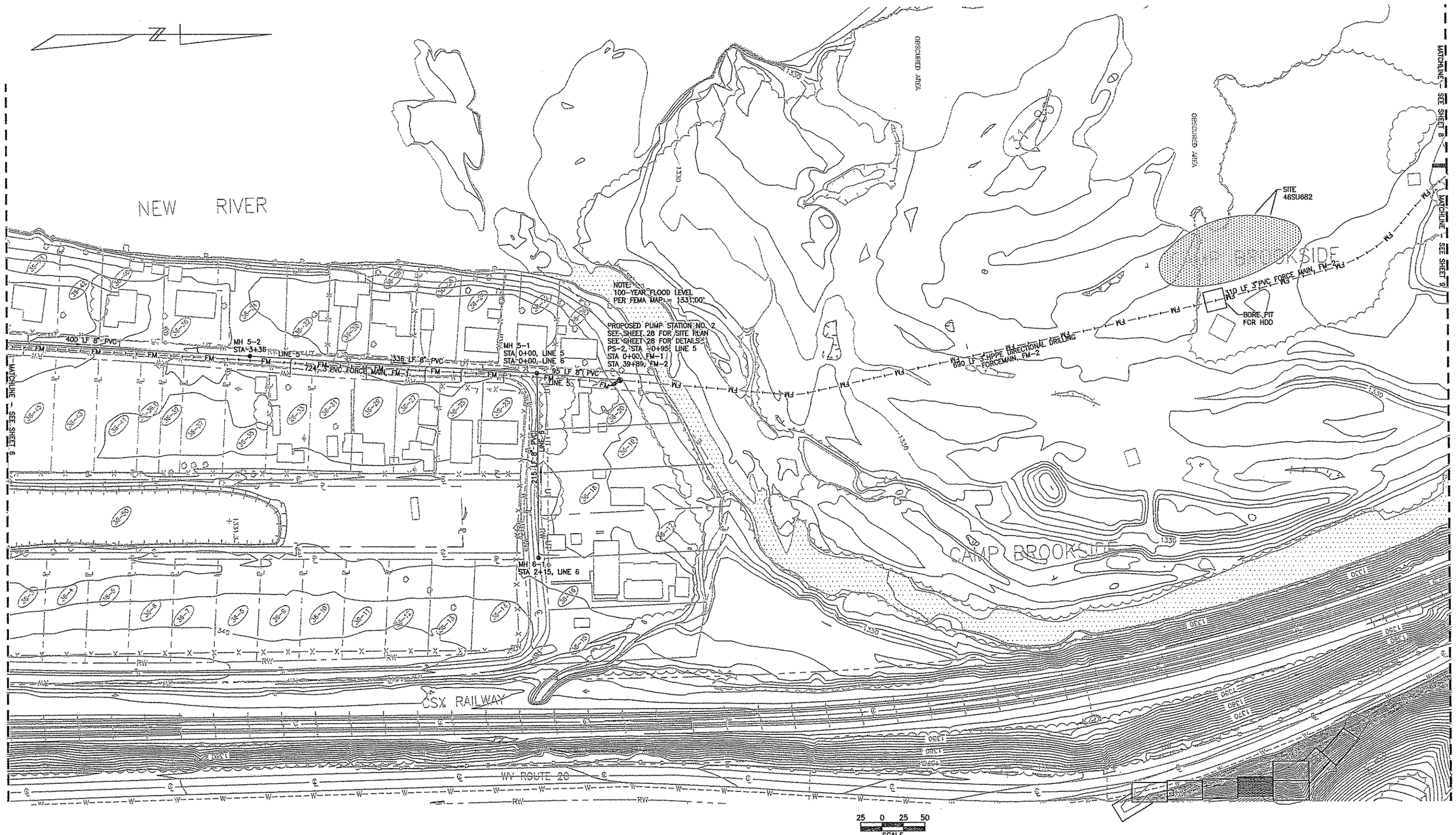
WASTEWATER COLLECTION SYSTEM EXPANSION

SCALE: SHOWN	APPROVED BY	CHECKED BY	DRAWN BY CLP
DATE: 5-09	CDU	CLP	

SEWER LAYOUT PLAN

DWG: S:\PROJECTS\7060 – Hinton – Brooks Berkeddale\7060201.dwg

DRAWING NUMBER 6



SEE SHEET 13 FOR PROFILE OF LINES 5 AND 6
SEE SHEET 15 FOR PROFILE OF FORCEMAIN FM-2

NO.	REVISIONS	DATE	BY

CITY OF HINTON

STAFFORD CONSULTANTS INCORPORATED
ENGINEERING DESIGN AND CONSULTING
PRINCETON, WEST VIRGINIA

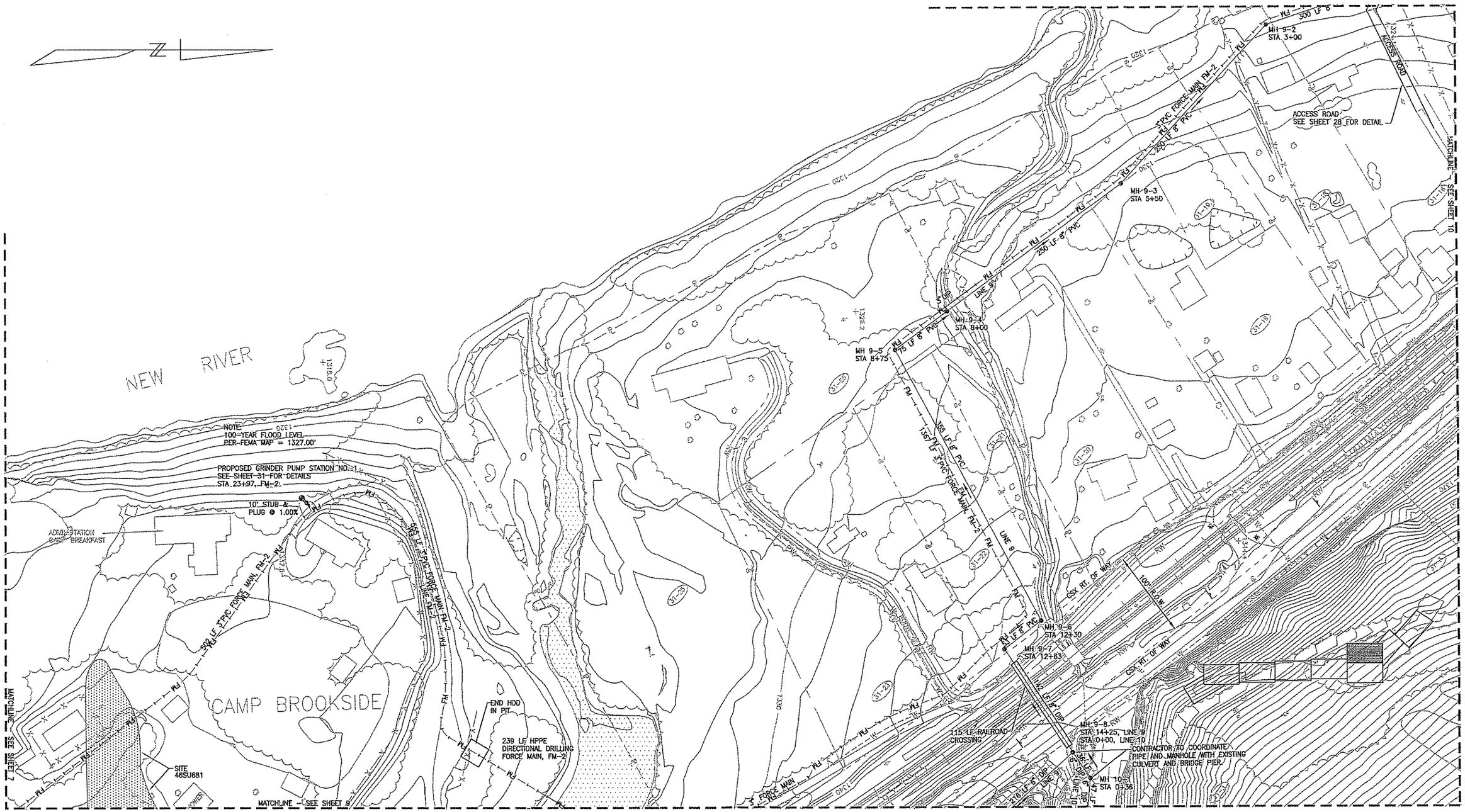
WASTEWATER COLLECTION SYSTEM EXPANSION

SCALE: SHOWN	APPROVED BY: CDU	CHECKED BY: CLP	DRAWN BY: CLP
DATE: 5-09			

SEWER LAYOUT PLAN

DWG: S:\PROJECTS\7060 - Hinton - Brooks Borksdale\7060201.dwg

DRAWING NUMBER: 7



SEE SHEET 19 FOR PROFILE OF LINE 9
SEE SHEET 17 FOR PROFILE OF LINE 10

NO.	REVISIONS	DATE	BY

CITY OF HINTON

STAFFORD CONSULTANTS INCORPORATED
ENGINEERING DESIGN AND CONSULTING
PRINCETON, WEST VIRGINIA

WASTEWATER COLLECTION SYSTEM EXPANSION

SCALE: SHOWN	APPROVED BY	CHECKED BY	DRAWN BY CLP
DATE: 5-09	CDU	CLP	

SEWER LAYOUT PLAN

DWG: S:\PROJECTS\7060 - Hinton - Brooks Barbadoes\7060201.dwg

DRAWING NUMBER 8

SEE SHEETS 18 AND 19 FOR PROFILE OF LINE 4
SEE SHEET 17 FOR PROFILE OF LINE 10

NO.	REVISIONS	DATE	BY

CITY OF HINTON

STAFFORD CONSULTANTS INCORPORATED
ENGINEERING DESIGN AND CONSULTING
PRINCETON, WEST VIRGINIA

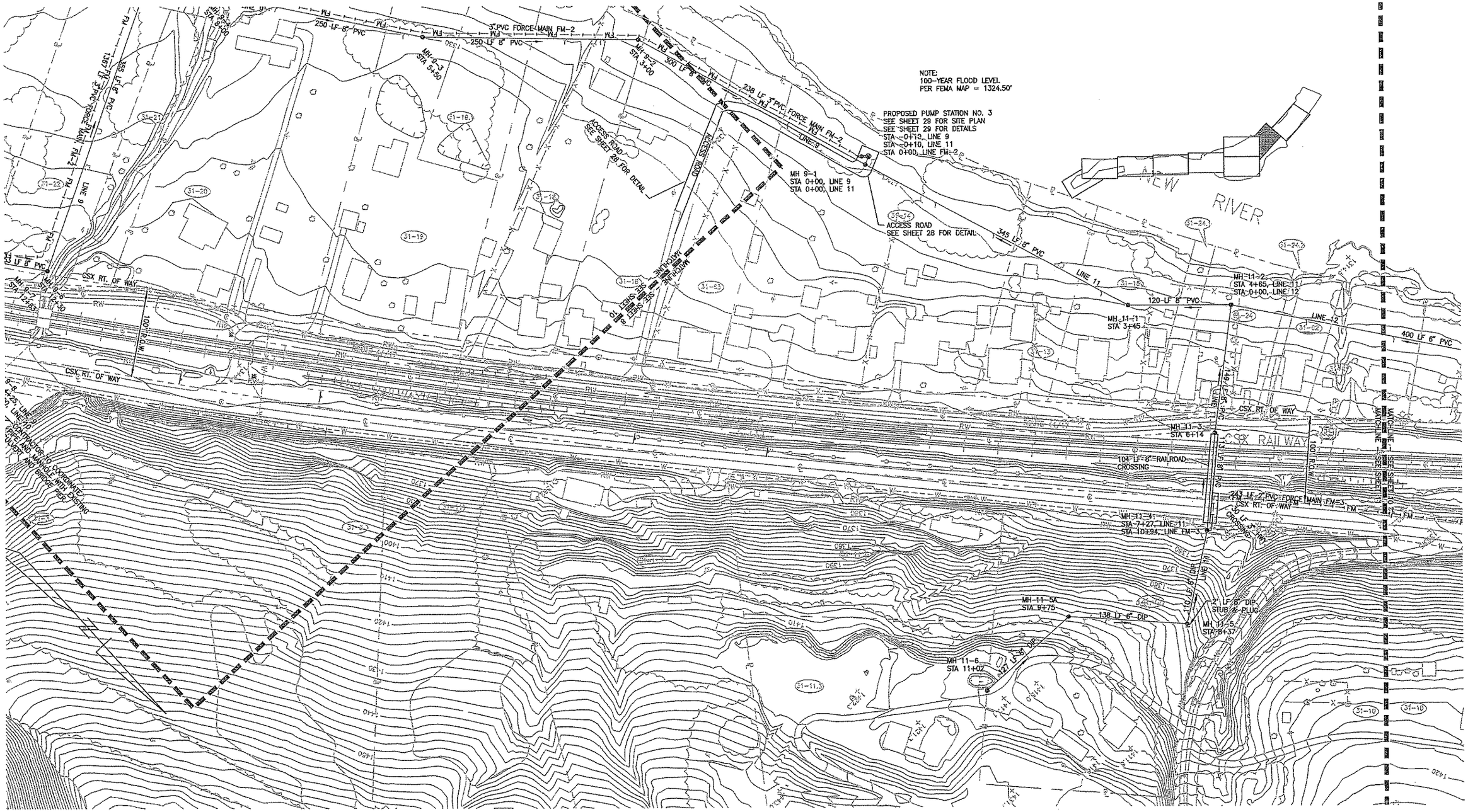
WASTEWATER COLLECTION SYSTEM EXPANSION

SCALE: SHOWN	APPROVED BY CDU	CHECKED BY CLP	DRAWN BY CLP
DATE: 5-09			

SEWER LAYOUT PLAN

DWG: S:\PROJECTS\7060 - Hinton - Brooks Barksdale\7060201.dwg

DRAWING NUMBER 9



SEE SHEETS 14 AND 20 FOR PROFILE OF LINE 11
SEE SHEET 17 FOR PROFILE OF LINE 12

NO.	REVISIONS	DATE	BY

CITY OF HINTON

STAFFORD CONSULTANTS INCORPORATED
ENGINEERING DESIGN AND CONSULTING
PRINCETON, WEST VIRGINIA

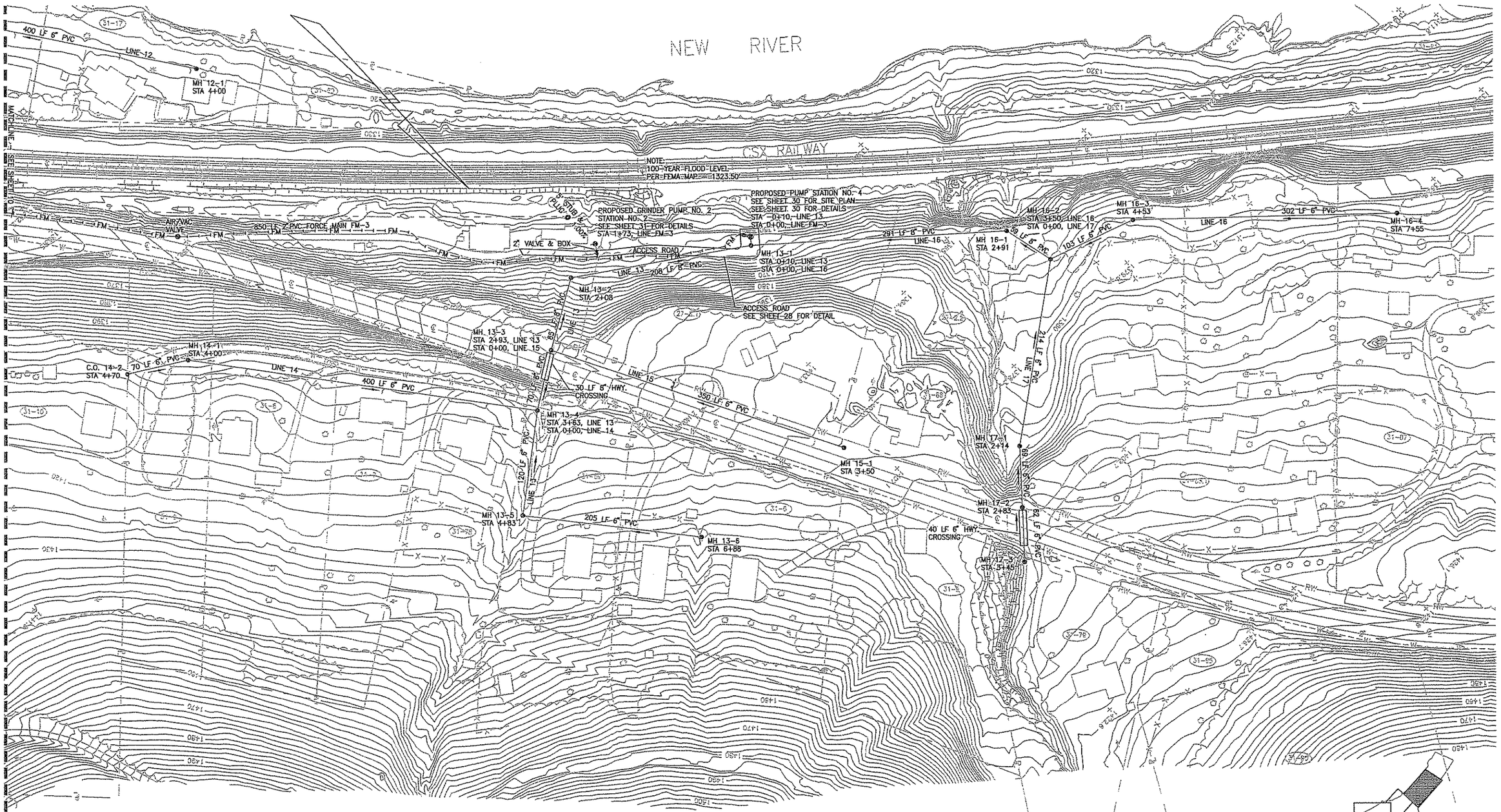
WASTEWATER COLLECTION SYSTEM EXPANSION

SCALE: SHOWN	APPROVED BY	CHECKED BY	DRAWN BY CLP
DATE: 5-09	CDU	CLP	

SEWER LAYOUT PLAN

DWG: S:\PROJECTS\7060 - Hinton - Brooks Barksdale\7060201.dwg

DRAWING NUMBER 10



SEE SHEET 17 FOR PROFILE OF LINE 12
SEE SHEET 12 FOR PROFILE OF LINES 13 AND 16
SEE SHEET 14 FOR PROFILE OF LINE 15
SEE SHEET 24 FOR PROFILE OF LINE 14
SEE SHEET 17 FOR PROFILE OF LINE 17

25 0 25 50
SCALE

NO.	REVISIONS	DATE	BY

CITY OF HINTON

STAFFORD CONSULTANTS INCORPORATED
ENGINEERING DESIGN AND CONSULTING
PRINCETON, WEST VIRGINIA

WASTEWATER COLLECTION SYSTEM EXPANSION

SCALE: SHOWN	APPROVED BY	CHECKED BY	DRAWN BY CLP
DATE: 5-09	CDU	CLP	

SEWER LAYOUT PLAN

DWG: S:\PROJECTS\7060 - Hinton - Brooks Barksdale\7060201.dwg

DRAWING NUMBER 11

ENVIRONMENTAL ASSESSMENT

BROOKS/BARKSDALE WASTEWATER TREATMENT PLANT IMPROVEMENTS
AND COLLECTION SYSTEM EXTENSION
SECTION 340 PROJECT

SUMMERS COUNTY

WEST VIRGINIA

APPENDIX C – STREAM CROSSING REPORT
(REIC)

U.S. ARMY CORPS OF ENGINEERS

HUNTINGTON DISTRICT

HUNTINGTON, WEST VIRGINIA

OCTOBER 2010

Proposed Stream Crossings Assessment

Brooks/Barksdale
Wastewater Project
Summers County, WV

Conducted for:

Stafford Consultants Incorporated
1105 Mercer Street
Princeton, WV 24740

Performed by:

R.E.I. Consultants, Inc.
225 Industrial Park Drive
Beaver, WV 25813

August 22, 2008

Executive Summary

I. The Hinton Sanitary Board is proposing a wastewater project (Brooks/Barksdale Wastewater Project), near the town of Hinton, in Green Sulphur District, Summers County, WV. Stafford Consultants Incorporated , of Princeton, WV contracted Research Environmental Industrial Consultants, Inc (REIC) of Beaver, WV to perform an assessment of the stream channels that are proposed to have wastewater line crossings.

II. The stream channel was assessed at each proposed stream crossing. There are a total of 14 proposed stream crossings. The proposed stream crossings are located on Brooks Branch, Owens Branch, and Unnamed Tributaries of the New River. Cross sections, photos, and coordinates of the stream channel were obtained at each of the proposed stream crossings.

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3.0 1st UT of New River Stream Crossings 8

4.0 Backwater of New River/Collins Hollow Stream Crossings 9

5.0 Owens Branch Stream Crossings 11

6.0 2nd UT of New River Stream Crossings 13

7.0 3rd UT of New River Stream Crossings 14

8.0 4th UT of New River Stream Crossings 16

9.0 5th UT of New River Stream Crossings 18

Appendix A – Figures

1.0 Narrative

Stafford Consultants Incorporated, of Princeton, WV contracted REI Consultants, Inc.(REIC), of Beaver, WV, to perform an assessment of the stream channels at the wastewater pipe crossings for the proposed Brooks/Barksdale Wastewater Project , near the town of Hinton, in Green Sulphur District, Summers County, WV, approximately at (N 37° 42' 27.5", W 80° 53' 18.4") (Appendix A, Figure 1-2). Mr. Dean Upton of Stafford Consultants contacted Ed Kirk and Justin Elkins of REI Consultants, Inc., and requested that a Stream Crossing Assessment and Wetland Determination and Delineation be performed for the project area, entailing a 50 ft. corridor of the proposed wastewater line path, so that precise locations of all waters of the United States could be documented within the corridor. Scientists from REIC (Justin Elkins, Project Manager and J.D. Bennett, Field Technician) performed the field work on August 13, 2008, and noticed that one area appeared to have characteristics of a wetland. Scientists from REIC (Ed Kirk, Director of Biological Division; and Justin Elkins, Project Manager) returned to this suspected wetland area on August 15, 2008, in order to evaluate the wetland status of the area. These findings can be found in a separate document entitled "Wetland Determination and Delineation for the Proposed Brooks/Barksdale Wastewater Project, August 2008".

The Stream Crossing Assessment entailed 14 proposed crossings for the wastewater line pathway. At Stream Crossing 4 there was a mussel shell located in the channel. This stream was observed to be intermittent and would not support a mussel population. There were several dead mussel shells located at Stream Crossing 5 and downstream of the crossing. These shells were washouts from the New River at high flow periods, the channel flow regime and substrate would not support a mussel population. Table A below shows the stream name, crossing number, designation and GPS for each of the crossings. Detailed information for the crossings can be found in Sections 2-9 within this document.

Table A. Stream Crossings identification

Stream Name	Stream Crossing	Stream Designation	GPS
Railroad Track drainage ditch	1	ephemeral	37° 42' 30.2" 80° 53' 16.5"
Brooks Branch	2	perennial	37° 42' 29.7" 80° 53' 17.2"
	3	perennial	37° 42' 33.1" 80° 53' 23.6"
1st UT of New River	4	intermittent	37° 42' 48.5" 80° 53' 23.0"
backwater of New River/Collins Branch	5	perennial	37° 43' 06.3" 80° 53' 22.1"
backwater of New River	6	perennial	37° 43' 21.3" 80° 53' 25.0"
Owens Branch	7	perennial	37° 43' 27.8" 80° 53' 26.1"
	8	perennial	37° 43' 25.0" 80° 53' 32.8"
2nd UT of New River	9	ephemeral	37° 43' 29.7" 80° 53' 34.8"
3rd UT of New River	10	intermittent	37° 43' 37.5" 80° 53' 41.1"
	11	intermittent	37° 43' 38.2" 80° 53' 39.2"
4th UT of New River	12	ephemeral	37° 43' 43.6" 80° 53' 46.8"
	13	ephemeral	37° 43' 45.6" 80° 53' 42.7"
5th UT of New River	14	intermittent	37° 43' 47.2" 80° 53' 49.4"

2.0 Brooks Branch Stream Crossings

There are two proposed stream crossings for Brooks Branch (Stream Crossing 2 and 3) and one crossing on a railroad track drainage ditch that flows into Brooks Branch (Stream Crossing 1). Below are typical cross sections of the stream channel and photos at the proposed wastewater crossing. Stream crossing locations can be found on the map in Appendix A, Figure 3.

A cross section of the stream channel was taken at Stream Crossing 2 (37° 59' 29.4" 81° 57' 36.2") on Brooks Branch. This stream section was observed to be perennial. The bankful width is 21.1 ft., and the Thalweg depth is 2.3 ft.

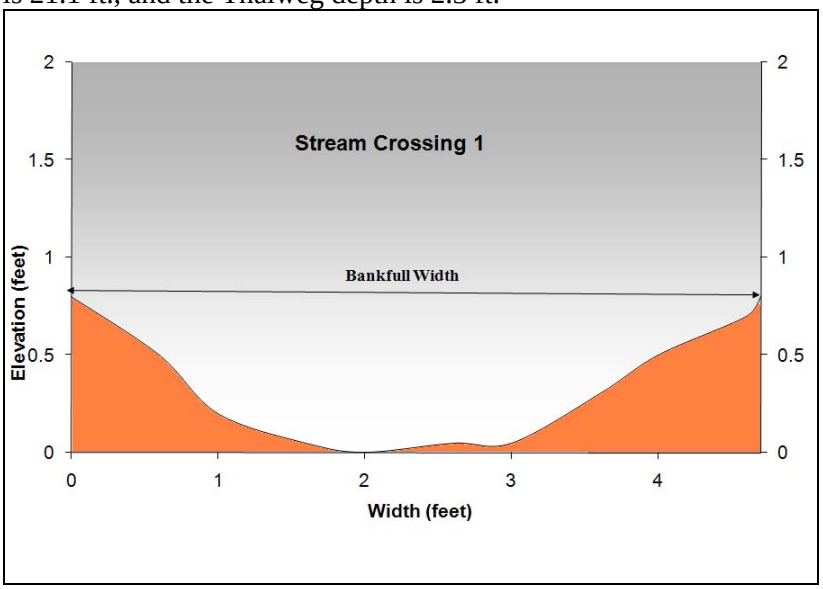


Photo of channel at Stream Crossing 2.

A cross section of the stream channel was taken at Stream Crossing 3 (37° 59’ 29.4” 81° 57’ 36.2”) on Brooks Branch. This stream section was observed to be perennial. The bankful width is 23.6 ft., and the Thalweg depth is 1.35 ft.

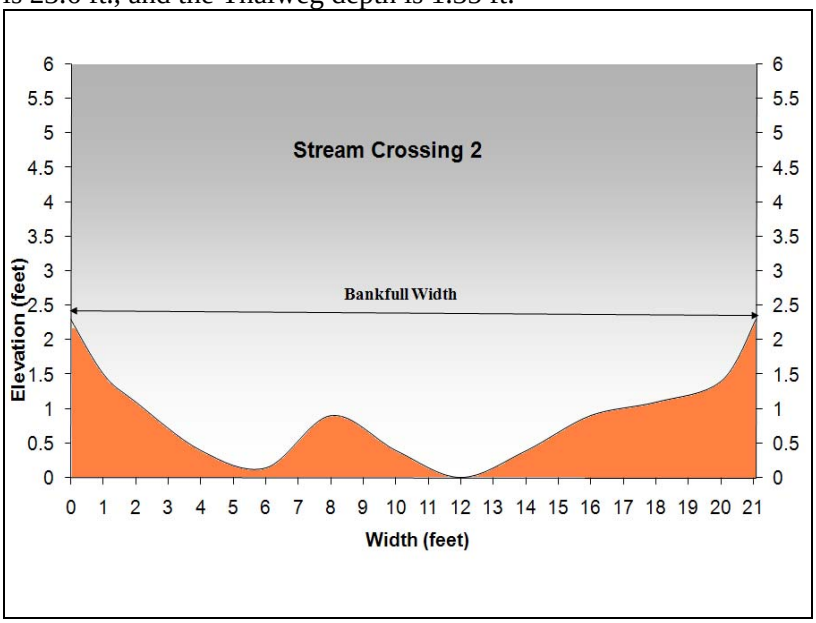


Photo of channel at Stream Crossing 3.

A cross section of the stream channel was taken at Stream Crossing 1 (37° 59’ 29.4” 81° 57’ 36.2”). This stream section was observed to be ephemeral. The bankful width is 4.7 ft., and the Thalweg depth is 0.8 ft.

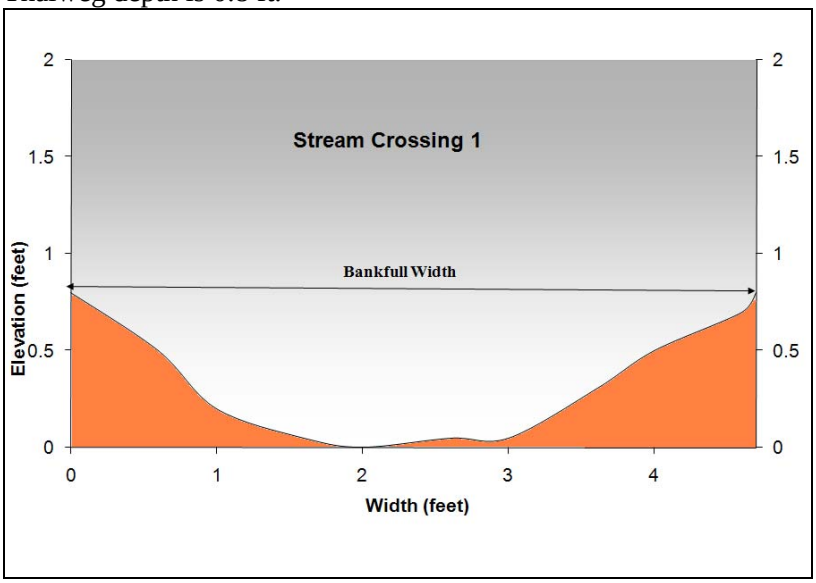


Photo of channel at Stream Crossing 1.

3.0 1st UT of New River Stream Crossings

There is one proposed stream crossings for the 1st UT of New River (Stream Crossing 4). Below is a typical cross sections of the stream channel and photo at the proposed wastewater crossing. Stream crossing locations can be found on the map in Appendix A, Figure 4.

A cross section of the stream channel was taken at Stream Crossing 4 (37° 59' 29.4" 81° 57' 36.2"). This stream section was observed to be intermittent. The bankful width is 5.3 ft., and the Thalweg depth is 1.0 ft.

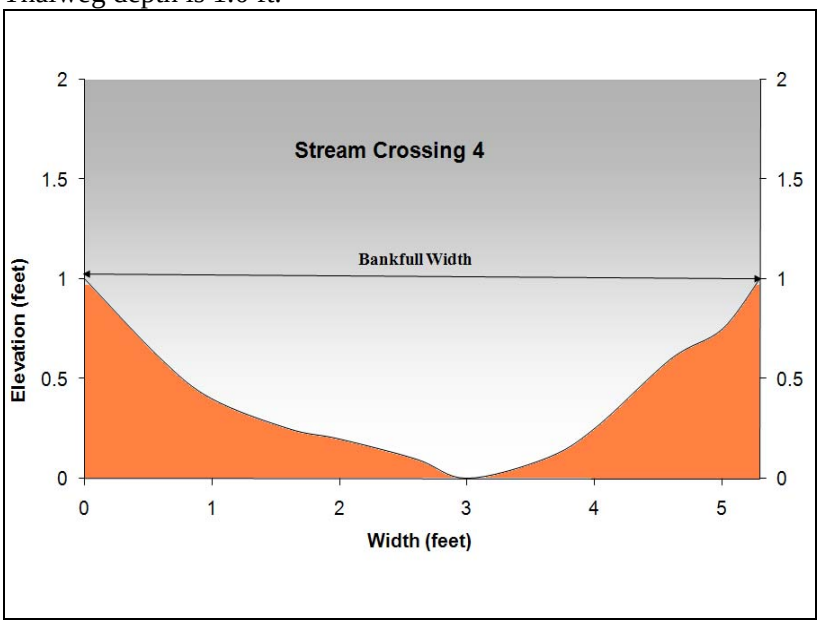


Photo of channel at Stream Crossing 4.

4.0 Backwater of New River/Collins Hollow Stream Crossings

There are two proposed stream crossings for a section of backwater of the New River/Collins Hollow (Stream Crossing 5 and 6). Below are typical cross sections of the stream channel and photos at the proposed wastewater crossing. Stream crossing locations can be found on the map in Appendix A, Figure 5.

A cross section of the stream channel was taken at Stream Crossing 5 (37° 59' 29.4" 81° 57' 36.2"). This stream section was observed to be perennial. The bankful width is 67.6 ft., and the Thalweg depth is 1.6 ft.

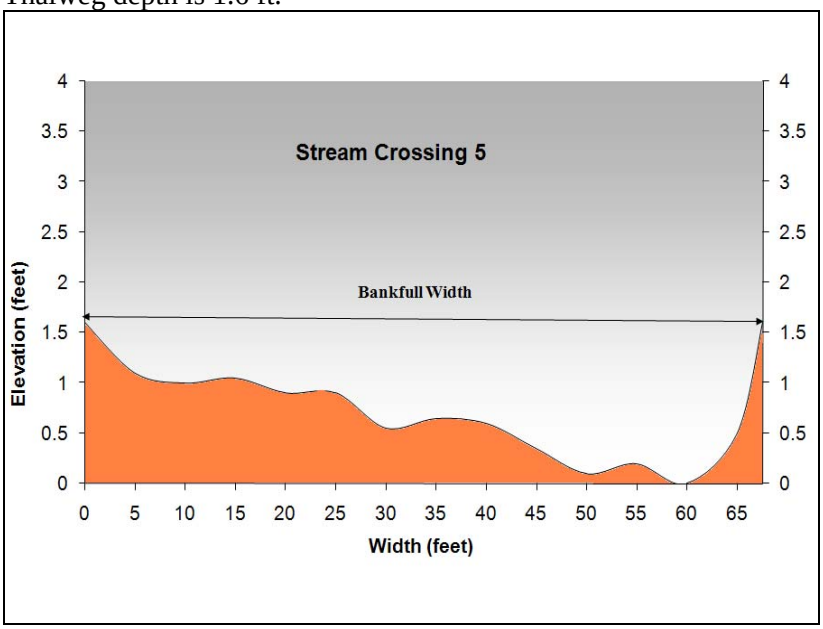


Photo of channel at Stream Crossing 5.

A cross section of the stream channel was taken at Stream Crossing 6 (37° 59’ 29.4” 81° 57’ 36.2”). This stream section was observed to be perennial. The bankful width is 88.4 ft., and the Thalweg depth is 1.55 ft.

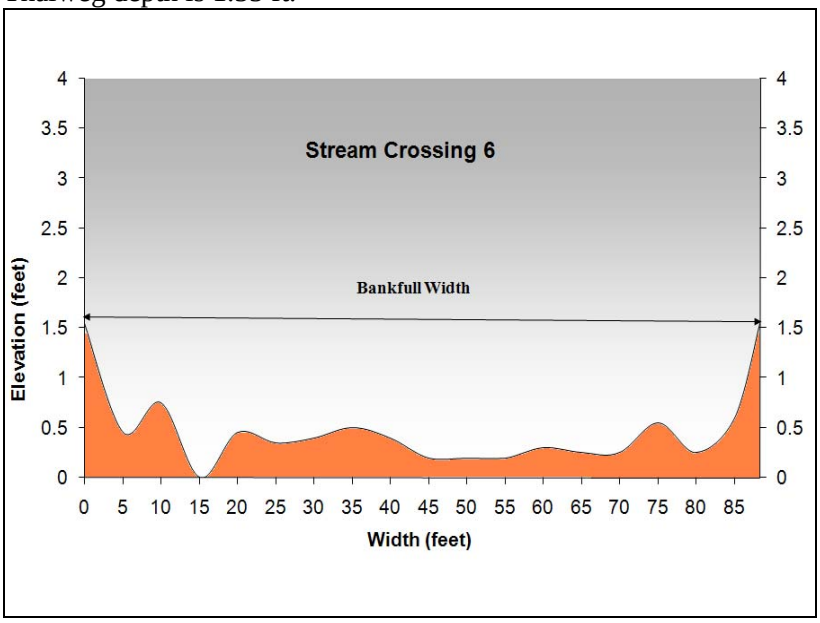


Photo of channel at Stream Crossing 6.

5.0 Owens Branch Stream Crossings

There are two proposed stream crossings on Owens Branch (Stream Crossing 7 and 8). Below are typical cross sections of the stream channel and photos at the proposed wastewater crossing. Stream crossing locations can be found on the map in Appendix A, Figure 5.

A cross section of the stream channel was taken at Stream Crossing 7 (37° 59' 29.4" 81° 57' 36.2"). This stream section was observed to be perennial. The bankful width is 12.7 ft., and the Thalweg depth is 1.55 ft.

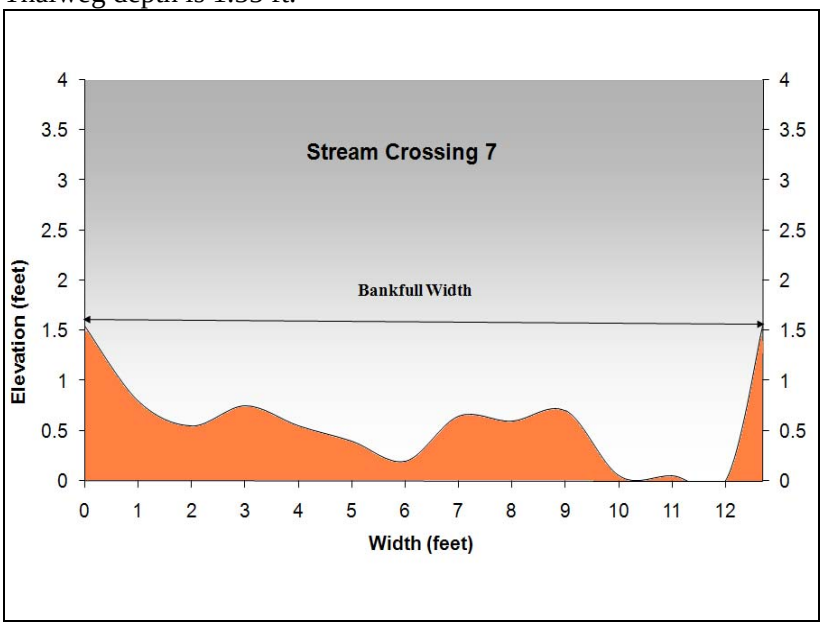


Photo of channel at Stream Crossing 7.

A cross section of the stream channel was taken at Stream Crossing 8 (37° 59’ 29.4” 81° 57’ 36.2”). This stream section was observed to be perennial. The bankful width is 17.8 ft., and the Thalweg depth is 0.95 ft.

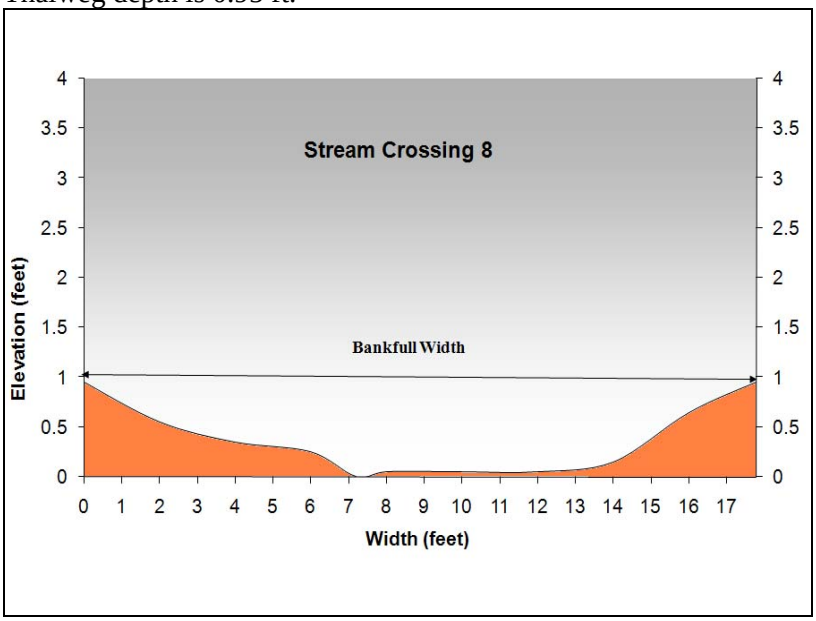


Photo of channel at Stream Crossing 8.

6.0 2nd UT of New River Stream Crossings

There is one proposed stream crossings on 2nd UT of New River (Stream Crossing 9). Below is a typical cross section of the stream channel and photo at the proposed wastewater crossing. Stream crossing locations can be found on the map in Appendix A, Figure 5.

A cross section of the stream channel was taken at Stream Crossing 9 (37° 59' 29.4" 81° 57' 36.2"). This stream section was observed to be ephemeral. The bankful width is 2.7 ft., and the Thalweg depth is 0.75 ft.

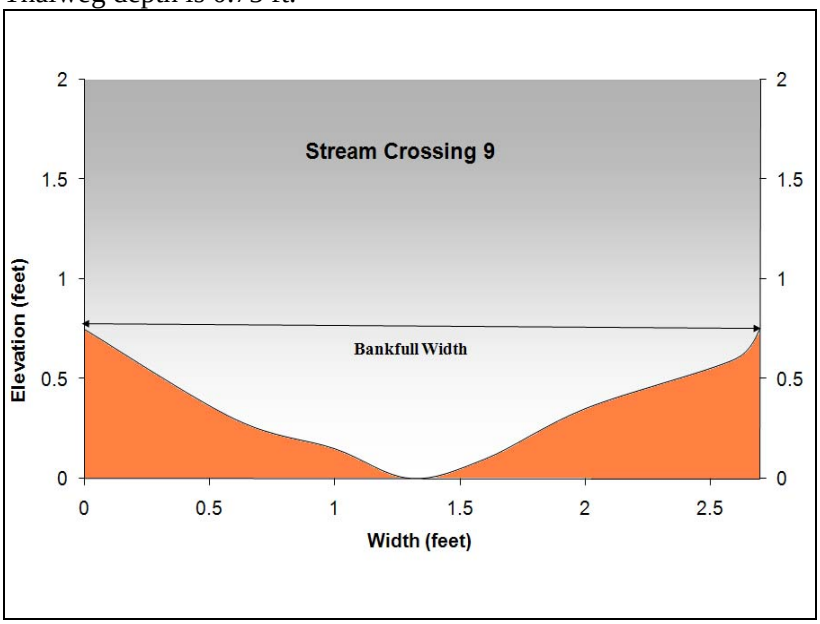


Photo of channel at Stream Crossing 9.

7.0 3rd UT of New River Stream Crossings

There are two proposed stream crossings on 3rd UT of New River (Stream Crossing 10 and 11). Below is a typical cross section of the stream channel and photo at the proposed wastewater crossing. Stream crossing locations can be found on the map in Appendix A, Figure 6.

A cross section of the stream channel was taken at Stream Crossing 10 (37° 59' 29.4" 81° 57' 36.2"). This stream section was observed to be intermittent. The bankful width is 5.7 ft., and the Thalweg depth is 0.85 ft.

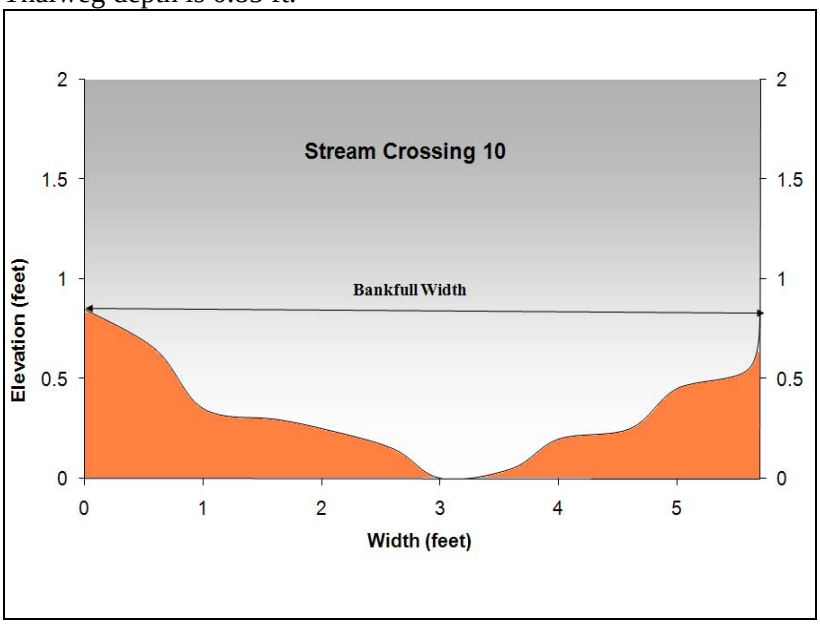


Photo of channel at Stream Crossing 10.

A cross section of the stream channel was taken at Stream Crossing 11 (37° 59’ 29.4” 81° 57’ 36.2”). This stream section was observed to be intermittent. The bankful width is 7.4 ft., and the Thalweg depth is 1.4 ft.

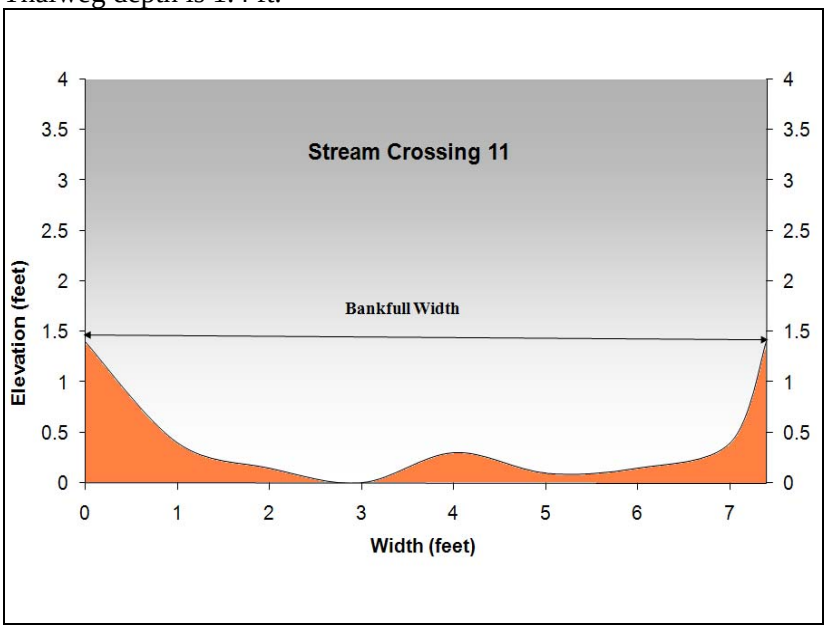


Photo of channel at Stream Crossing 11.

8.0 4th UT of New River Stream Crossings

There are two proposed stream crossings on 4th UT of New River (Stream Crossing 12 and 13). Below is a typical cross section of the stream channel and photo at the proposed wastewater crossing. Stream crossing locations can be found on the map in Appendix A, Figure 6.

A cross section of the stream channel was taken at Stream Crossing 12 (37° 59' 29.4" 81° 57' 36.2"). This stream section was observed to be ephemeral. The bankful width is 3.0 ft., and the Thalweg depth is 0.7 ft.

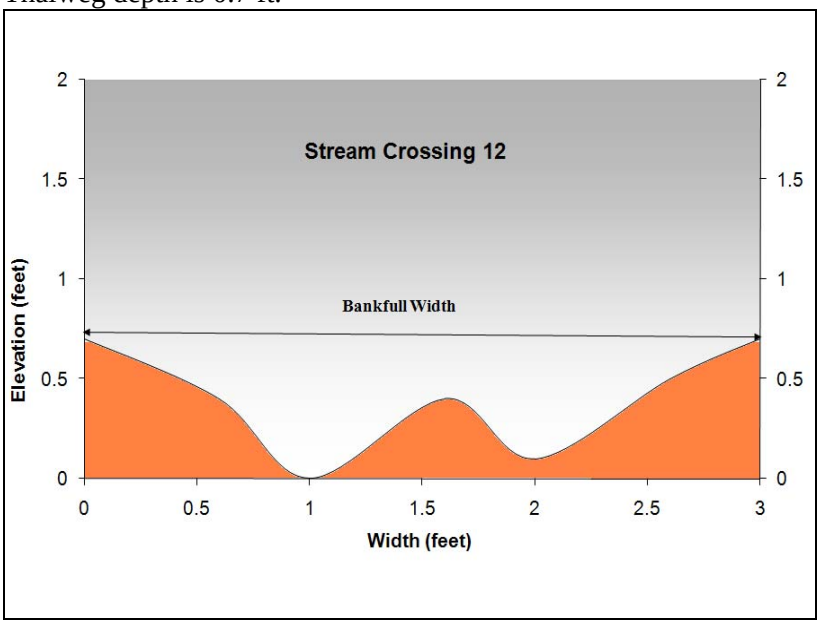


Photo of channel at Stream Crossing 12.

A cross section of the stream channel was taken at Stream Crossing 13 (37° 59’ 29.4” 81° 57’ 36.2”). This stream section was observed to be ephemeral. The bankful width is 2.8 ft., and the Thalweg depth is 1.3 ft.

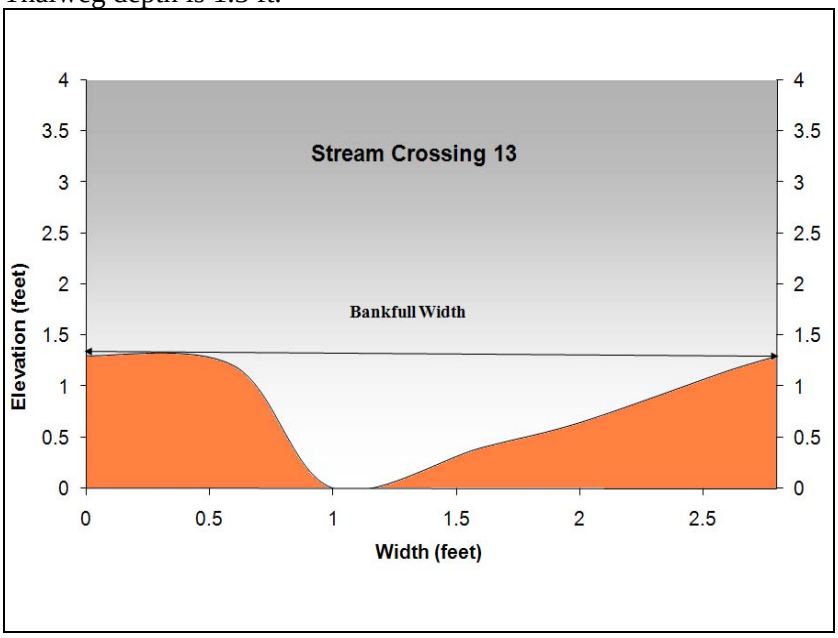


Photo of channel at Stream Corssing 13.

9.0 5th UT of New River Stream Crossings

There one proposed stream crossings on 5th UT of New River (Stream Crossing 14). Below is a typical cross section of the stream channel and photo at the proposed wastewater crossing. Stream crossing locations can be found on the map in Appendix A, Figure 6.

A cross section of the stream channel was taken at Stream Crossing 14 (37° 59' 29.4" 81° 57' 36.2"). This stream section was observed to be intermittent. The bankful width is 10.2 ft., and the Thalweg depth is 1.4 ft.

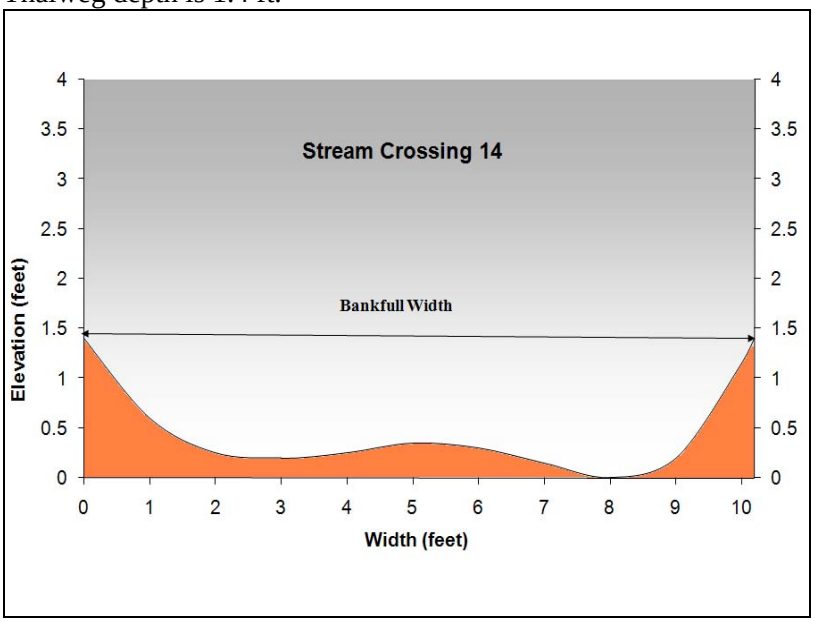


Photo of channel at Stream Crossing 14.

Appendix A

Figures

List of Figures

Figure 1. Terrain Navigator map with proposed project area shown in red, located near the town of Hinton, Summers County, West Virginia. REI Consultants, Inc., August 2008..... 3

Figure 2. Overview map for the Brooks/Barksdale Wastewater Project, located near the town of Hinton, Summers County, West Virginia. REI Consultants, Inc., August 2008. (Please See Insert)..... 4

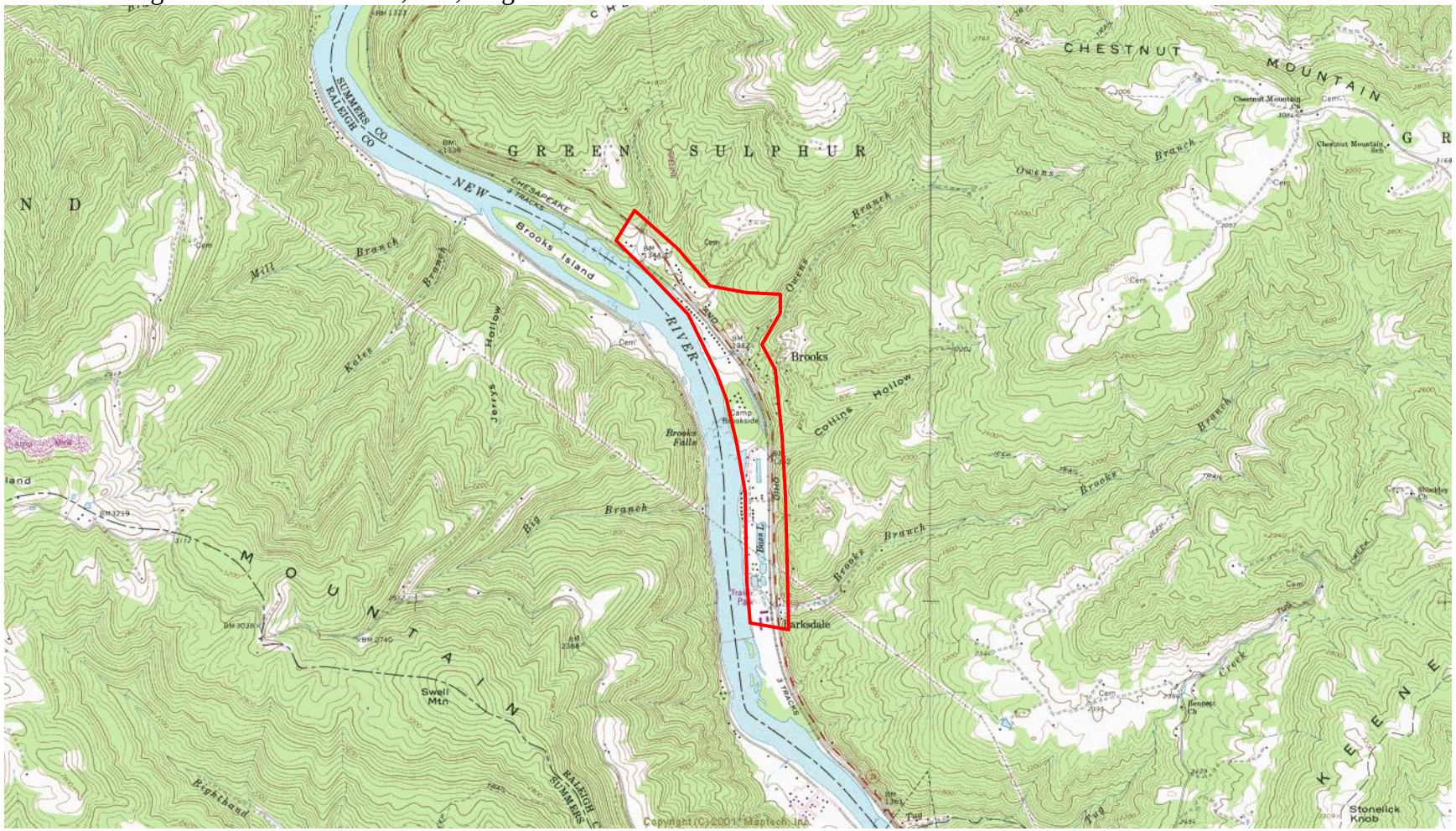
Figure 3. AutoCAD map Sheet 1 of 4 for the Brooks/Barksdale Wastewater Project, located near the town of Hinton, Summers County, West Virginia. REI Consultants, Inc., August 2008. (Please See Insert) 5

Figure 4. AutoCAD map Sheet 2 of 4 for the Brooks/Barksdale Wastewater Project, located near the town of Hinton, Summers County, West Virginia. REI Consultants, Inc., August 2008. (Please See Insert) 6

Figure 5. AutoCAD map Sheet 3 of 4 for the Brooks/Barksdale Wastewater Project, located near the town of Hinton, Summers County, West Virginia. REI Consultants, Inc., August 2008. (Please See Insert) 7

Figure 6. AutoCAD map Sheet 4 of 4 for the Brooks/Barksdale Wastewater Project, located near the town of Hinton, Summers County, West Virginia. REI Consultants, Inc., August 2008. (Please See Insert) 8

Figure 1. Terrain Navigator map with proposed project area shown in red, located near the town of Hinton, Summers County, West Virginia. REI Consultants, Inc., August 2008.



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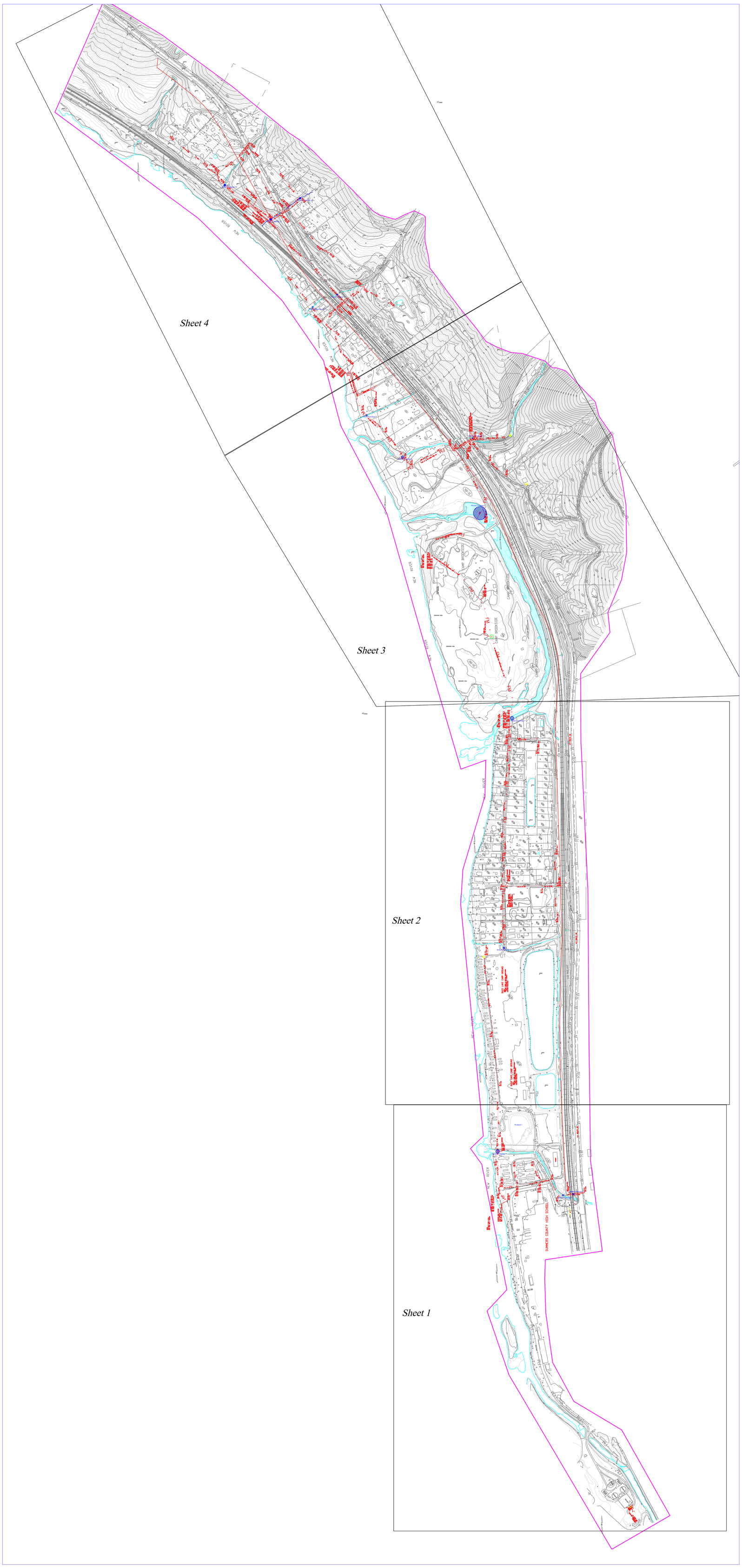

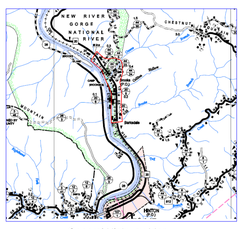

General Highway Map
NPDES: Article 3:
Nearest P.O., Hinton, WV
Green Sulphur Distirct, Summers County, WV
Hinton Quad.
37° 42' 27.5" 80° 53' 18.4"

Legend

- Stream
- Wetland
- Wastewater Line
- Area of Interest
- Stream Crossing

GPS Table

Stream Name	Stream Crossing	Stream Designation	GPS
Railroad Track drainage ditch	1	ephemeral	37° 42' 30.2" 80° 53' 16.5"
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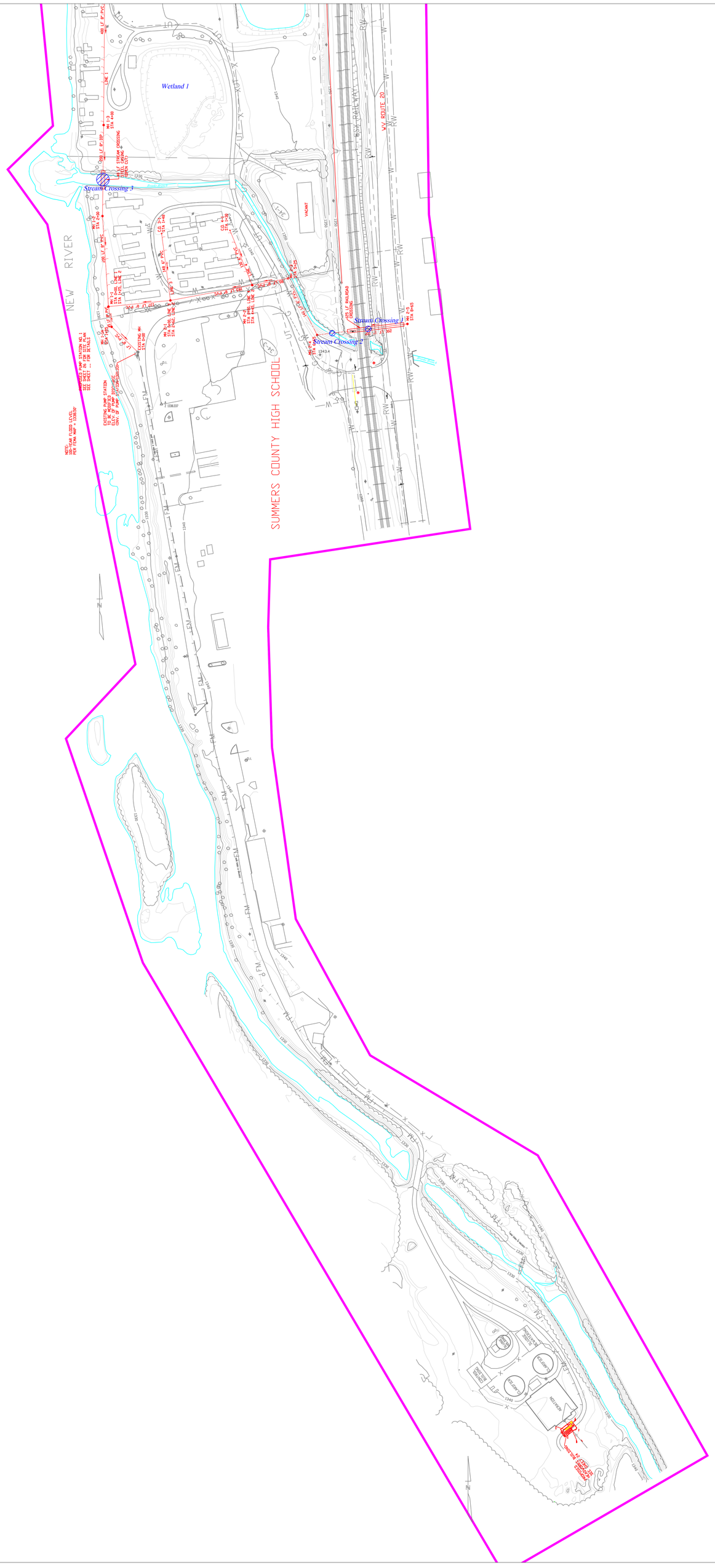
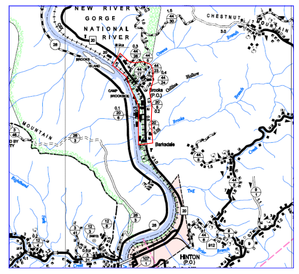
Beaver, WV 25813

NPDES: Article 3 No.

Overview Map
Brooks/Barksdale Wastewater Project
Stafford Consultants Incorporated





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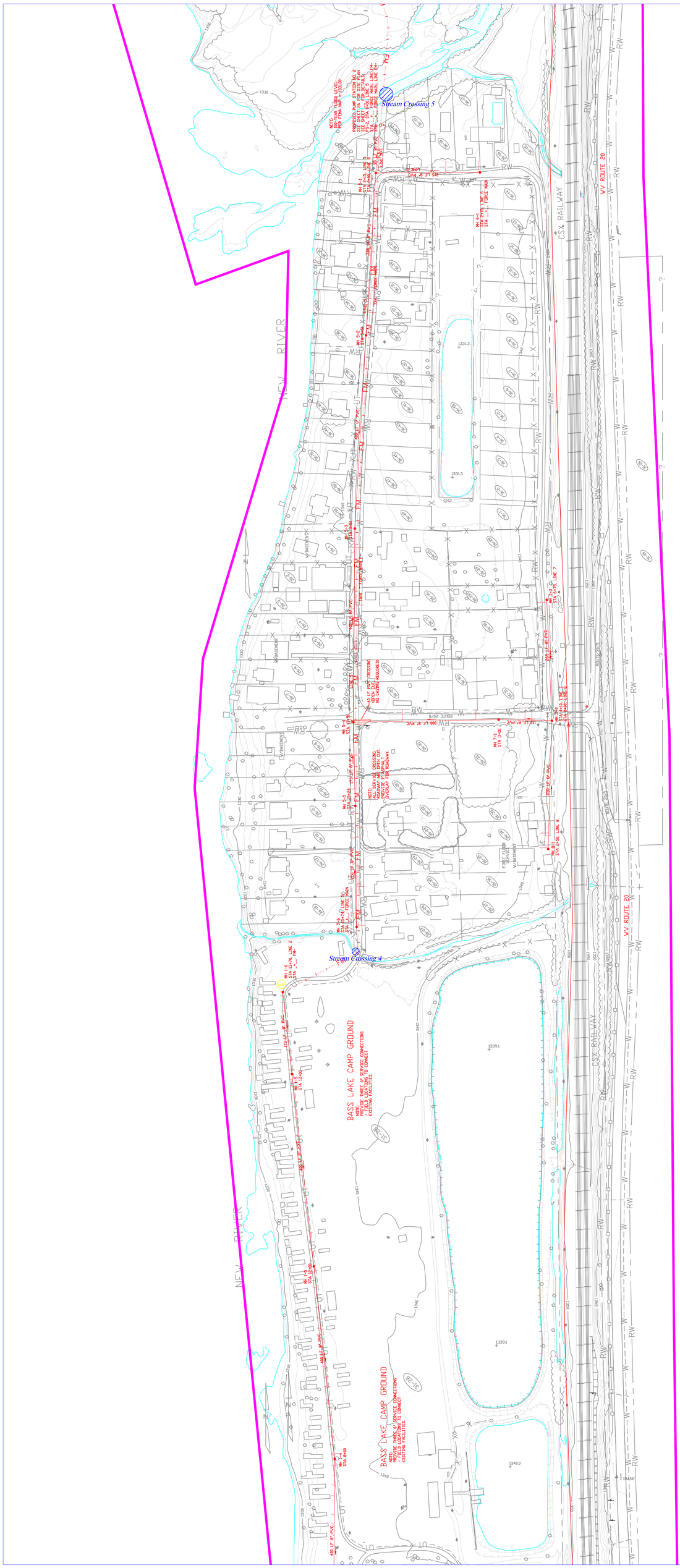
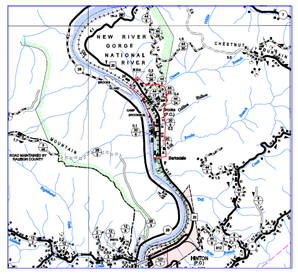
Sheet 1 of 4
Brooks/Barksdale Wastewater Project
Stafford Consultants Incorporated





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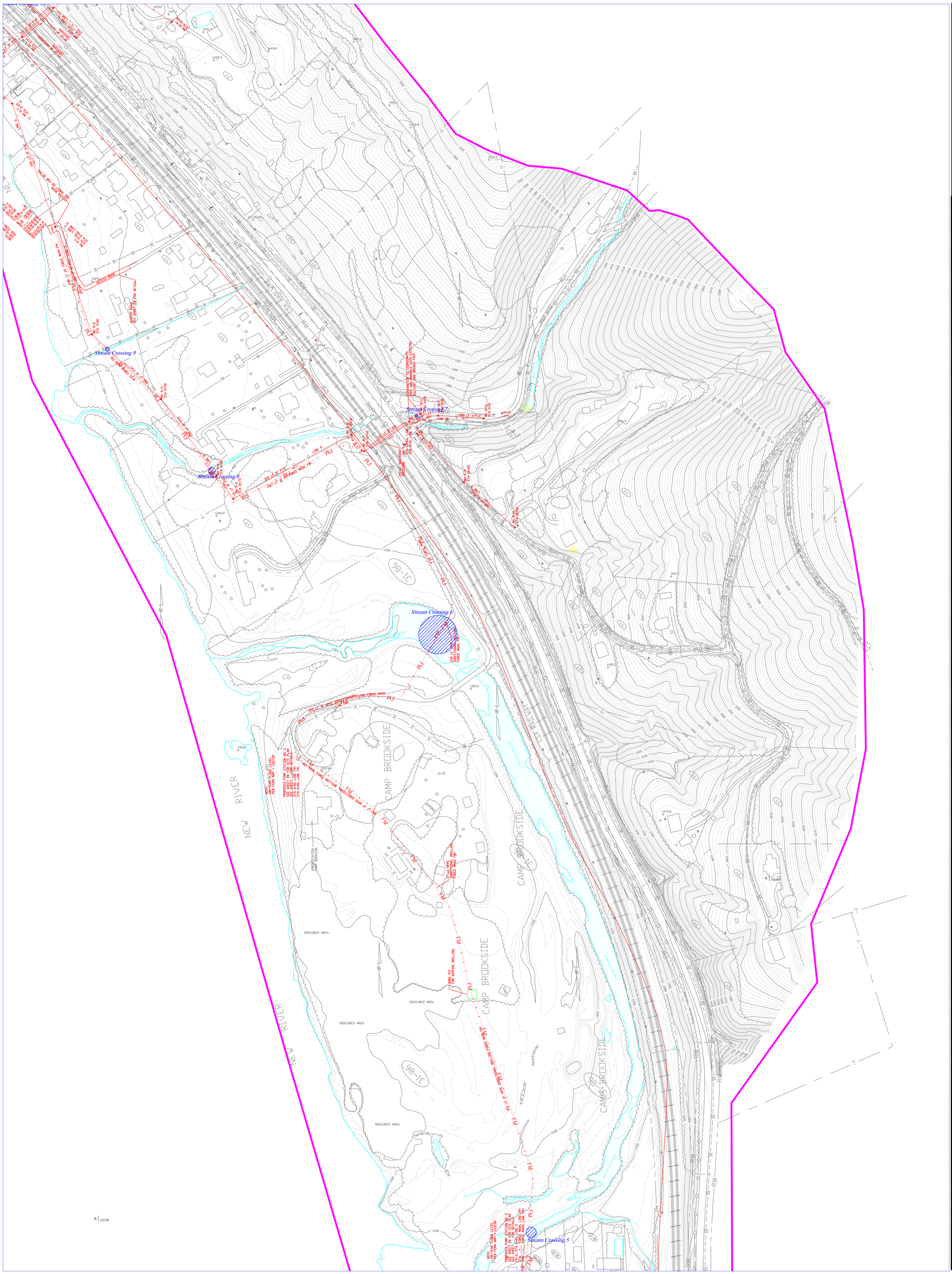
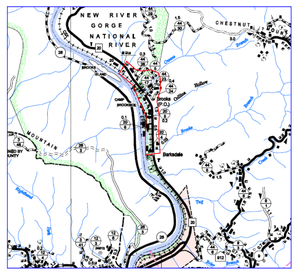
Sheet 2 of 4
Brooks/Barksdale Wastewater Project
Stafford Consultants Incorporated





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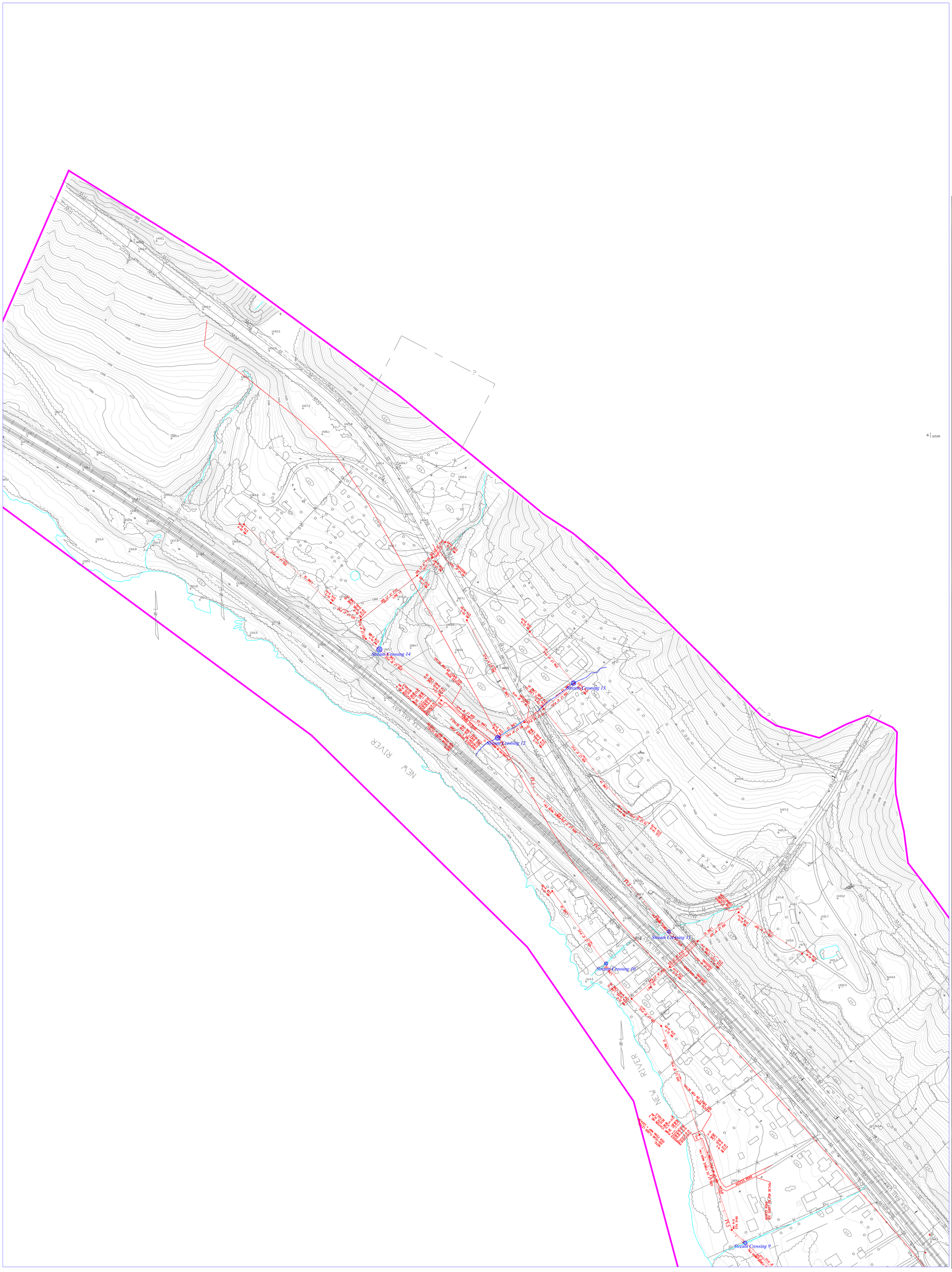
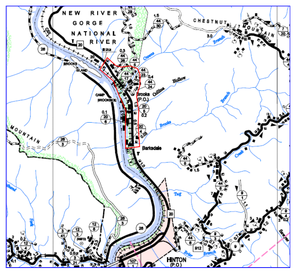
NPDES: Article 3 No.

Sheet 3 of 4
Brooks/Barksdale Wastewater Project
Stafford Consultants Incorporated





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Beaver, WV 25813

NPDES: Article 3 No.

Sheet 4 of 4
Brooks/Barksdale Wastewater Project
Stafford Consultants Incorporated

ENVIRONMENTAL ASSESSMENT

BROOKS/BARKSDALE WASTEWATER TREATMENT PLANT IMPROVEMENTS
AND COLLECTION SYSTEM EXTENSION
SECTION 340 PROJECT

SUMMERS COUNTY

WEST VIRGINIA

APPENDIX D – NATIONWIDE PERMIT #12 CONDITIONS

U.S. ARMY CORPS OF ENGINEERS

HUNTINGTON DISTRICT

HUNTINGTON, WEST VIRGINIA

OCTOBER 2010

Nationwide Permit General Conditions

General Condition #3 – **Spawning Areas** – Activities in spawning areas during spawning seasons must be avoided to the maximum extent possible. Activities that result in the physical destruction (e.g., through excavation, fill, or downstream smothering by substantial turbidity) of an important spawning area are not authorized.

General Condition #9 – **Management of Water Flows** – To the maximum extent practicable, the pre-construction course, condition, capacity, and location of open waters must be maintained for each activity, including stream channelization and storm water management activities, except as provided below. The activity must be constructed to withstand expected high flows. The activity must not restrict or impede the passage of normal or high flows, unless the primary purpose of the activity is to impound water or manage high flows. The activity may alter the pre-construction course, condition, capacity, and location of open waters if it benefits the aquatic environment (e.g., stream restoration or relocation activities).

General Condition #12 – **Soil Erosion and Sediment Controls** – Appropriate soil erosion and sediment controls must be used and maintained in effective operating condition during construction, and all exposed soil and other fills, as well as any work below the ordinary high water mark or high tide line, must be permanently stabilized at the earliest practicable date. Permittees are encouraged to perform work within waters of the United States during periods of low-flow or no-flow.
General Condition #13 – **Removal of Temporary Fills** – Temporary fills must be removed in their entirety and the affected areas returned to pre-construction elevations. The affected areas must be revegetated, as appropriate.

Nationwide Permit #12 Specific Regional Conditions

- The maximum allowable timeframe for temporary work in waters of the U.S. is limited to one year, unless the permittee receives written approval from the Corps of Engineers granting a time extension.

West Virginia 401 Water Quality Certification Special Conditions

A. Points of ingress and egress to streams for equipment shall be within the work site. Location of ingress and egress outside the immediate work area requires prior approval of the West Virginia Department of Environmental Protection Division of Water and Waste Management with concurrence from the West Virginia Division of Natural Resources.

B. Certification is limited to pipelines 36 inches or less in diameter. Individual stream crossings must be completed in a continuous, progressive manner and within 72 hours under normal (normal or below stream flow) conditions. Crossings on the Ohio, Kanawha, New and Monongahela Rivers, and the Little Kanawha River, below the confluence with Hughes River, are exempt from the 72-hour requirements, as are stream crossings requiring blasting. Whatever the situation, all stream activities shall be conducted in a continuous, progressive manner and be completed as rapidly as possible.

C. Shoreline restoration will be completed and stabilized in accordance with standard condition 5. Equipment tracking in wetlands will utilize protective mats when practical. Restoration of the disturbed areas will be completed within 72 hours of the completion of pipeline installation across the watercourse.

D. Surface disturbance will not extend beyond the right-of-way limits. Stream crossings will be conducted as close to a right angle to the watercourse as practical and the area of disturbance will be limited to reduce in stream activity.

E. Dredging for backfill material is not allowed

F. Submarine-type pipeline crossings must be designed and constructed to prevent flotation and the possibility of leakage or rupture and the top of pipelines must be buried a minimum of three (3) feet below the stream bottom.

West Virginia 401 Water Quality Certification Conditions for Nationwide Permits

Condition #2 – Excavation, dredging or filling in the watercourse will be done only to the extent necessary to achieve the project's purpose.

Condition #3 – Spoil materials from the watercourse or onshore operations, including sludge deposits, will not be dumped in the watercourse, or deposited in wetlands or other areas where the deposit may adversely affect the surface or ground waters of the state.

Condition #4 – The permittee will employ measures to prevent or control spills from fuels, lubricants or any other materials used in connection with construction and restrict them from entering the watercourse. Storage areas for chemicals, explosives, lubricants, equipment fuels, etc., as well as equipment refueling areas, must include containment measures (e.g., liner systems, dikes, etc.) to ensure that spillage of any material will not contact surface or ground waters. Storage areas and refueling areas shall be a minimum distance of 100 feet from any surface water body. Storage and refueling areas must be located outside the West Virginia Division of Health's established wellhead protection zone when domestic water supply wells are present. All spills shall be promptly reported to the State Center for Pollution, Toxic Chemical and Oil Spills, 1-800-642-3074.

Condition #5 – Upon completion of earthwork operations, all fills in the watercourse or onshore and all other areas onshore disturbed during construction will be properly stabilized to prevent soil erosion. Where possible, stabilization shall incorporate revegetation using bioengineering as an alternative to rip rap. If rip rap is utilized, it is to be of such weigh and size that bank stress or slump conditions will not be created due to its placement. Fill is to be clean, nonhazardous and of such composition that it will not adversely affect the biological, chemical or physical properties of the receiving waters. To reduce potential slope failure and/or erosion behind the material, fill containing concrete must be of such weight and size that promotes stability during expected high flows. Loose large slab placement of concrete sections from demolition projects

greater than thirty-six inches in its longest dimension and tires are prohibited. Rebar or wire in concrete should not extend further than one (I) inch. All activities require the use of clean and coarse non-erodible materials with 15% or less fines that are properly sized to withstand expected high flows.

Condition #7 – Land disturbances, which are integral to the completion of the permitted activity and are one (1) acre or greater in total area, must comply with the National Pollutant Discharge Elimination System stormwater permit requirements as established by the West Virginia Department of Environmental Protection, Division of Water and Waste Management. Best Management Practices for Sediment and Erosion Control, as described in the West Virginia Department of Environmental Protections Erosion and Sediment Control Best Management Practice Manual, 2006, or similar documents prepared by the West Virginia Division of Highways, U.S. Department of Agriculture, Natural Resource Conservation Service (NRCS), or West Virginia Department of Environmental Protection's, Division of Mines and Reclamation may be used. These handbooks are available from the respective agency offices.

Condition #9 – In stream work in warm water fishery streams and their adjacent tributaries during the fish spawning season, April - June and trout waters and their adjacent tributaries during the trout water fish spawning season September 15 - February 28 requires a spawning season waiver from the West Virginia Division of Natural Resources, Wildlife Resources Section. For infom1ation about specific streams contact Wildlife Resources Section, Trout Fisheries Program at 304-637-0245 or Warm Water fisheries Program 304-558- 2771. In stream work may occur during the respected spawning season in waters not considered fisheries without a waiver if all reasonable measures are taken to minimize turbidity and sedimentation downstream associated with the proposed project and the in stream work is less than one (1) day in duration.

Condition #10 – Removal of mature riparian vegetation not directly associated with the project construction is prohibited. Disturbance and removal of vegetation from project construction area is to be avoided, where possible, and minimized when necessary. Removal of vegetation shall not be allowed where stream bank stability under normal flow conditions would be compromised.

Condition #11 – Operation of equipment in stream is to be minimized and accomplished during low flow periods when practical. Ingress and egress for equipment shall be within the work site. Location of ingress and egress outside the immediate work area requires prior approval of the West Virginia Department of Environmental Protection, Division of Water and Waste Management in concurrence with the West Virginia Division of Natural Resources.

Condition #12 – The permittee will comply with water quality standards as contained in the West Virginia Code of State Regulations, Requirements Governing Water Quality Standards, Title 47, Series 2.

Condition #13 - Stream activities permitted under the Nationwide Permit Program require that a West Virginia Public Lands Corporation Right of Entry be obtained. Application for this authorization should be made to the West Virginia Division of Natural Resources, Office of Real

Estate Management, Capitol Complex, Building 3, Room 643, Charleston, West Virginia 25305. Any activity within the 100-year floodplain requires approval from the appropriate Floodplain Manager. The following website provides a statewide listing of Floodplain Managers in West Virginia: www.wvdhsem.gov/fplain_mgtl.htm.

ENVIRONMENTAL ASSESSMENT

BROOKS/BARKSDALE WASTEWATER TREATMENT PLANT IMPROVEMENTS
AND COLLECTION SYSTEM EXTENSION
SECTION 340 PROJECT

SUMMERS COUNTY

WEST VIRGINIA

APPENDIX E – WETLAND DETERMINATION AND DELINEATION (REIC)

U.S. ARMY CORPS OF ENGINEERS

HUNTINGTON DISTRICT

HUNTINGTON, WEST VIRGINIA

OCTOBER 2010

Wetland Determination and Delineation

Proposed Brooks/Barksdale
Wastewater Project
Summers County, WV

Conducted for:

Stafford Consultants Incorporated
1105 Mercer Street
Princeton, WV 24740

Performed by:

R.E.I. Consultants, Inc.
225 Industrial Park Drive
Beaver, WV 25813

August 20, 2008

Executive Summary

I. The Hinton Sanitary Board is proposing a wastewater project (Brooks/Barksdale Wastewater Project), near the town of Hinton, in Green Sulphur District, Summers County, WV. Stafford Consultants Incorporated , of Princeton, WV contracted Research Environmental Industrial Consultants, Inc (REIC) of Beaver, WV to perform a Wetland Determination and Delineation, entailing a 50 ft. corridor of the proposed wastewater line path, so that precise locations of all wetlands of the United States could be documented for the project area.

II. The project area was assessed for possible wetland areas. Wetlands were determined and delineated following the Corps of Engineers Wetland Delineation Manual (Technical Report Y-87-1). Wetland delineations included one wetland. The wetland delineated totaled 0.4930 acres.

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1.0 Introduction 4

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2.1 Delineation of Wetlands 6

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4.0 Descriptions of Wetlands Identified 8
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5.0 Wetland Functions and Values 9

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APPENDIX B – PHOTOGRAPHS

APPENDIX C – WETLAND FUNCTION AND VALUE SHEETS

APPENDIX D – FIELD DATA FORMS

1.0 Introduction

Stafford Consultants Incorporated, of Princeton, WV contracted REI Consultants, Inc.(REIC), of Beaver, WV, to perform a Wetland Determination and Delineation for the proposed Brooks/Barksdale Wastewater Project , near the town of Hinton, in Green Sulphur District, Summers County, WV, approximately at (N 37° 42' 27.5", W 80° 53' 18.4") (Appendix A, Figure 1-2). Mr. Dean Upton of Stafford Consultants contacted Ed Kirk and Justin Elkins of REI Consultants, Inc., and requested that a standard Wetland Determination and Delineation be performed for the project area, entailing a 50 ft. corridor of the proposed water line path, so that precise locations of all wetlands of the United States could be documented within the corridor. Scientists from REIC (Justin Elkins, Project Manager and J.D. Bennett, Field Technician) performed the field reconnaissance on August 13, 2008, and noticed an area that appeared to have wetland characteristics. Scientists from REIC (Ed Kirk, Director of Biological Division) returned to this suspected wetland area on August 19, 2008, in order to evaluate the wetland status of the area.

Under Section 404 of the Clean Water Act and Section 10 of the River and Harbors Act of 1899, the United States Army Corps of Engineers (USACE) regulates the discharge of dredged or fill material into waters of the United States, including jurisdictional wetlands. The USACE has the only authority to define "waters of the United States" as it applies to the jurisdictional limits under the Clean Water Act (33 CFR Part 328.3). The limit of USACE jurisdiction for non-tidal waters of the United States is the ordinary high water mark (OHWM). The "ordinary high water mark" is defined by the USACE as the line on the shore established by the fluctuations of water and indicated by physical characteristics such as clear, natural line impressed on the bank, shelving, changes in the character in soil, destruction of terrestrial vegetation, the presence of litter and debris, or other appropriate means that consider the characteristics of surrounding areas.

Accordingly, the project area must first be delineated to determine the location and boundaries of jurisdictional waters of the United States, including adjacent wetlands, and navigable waters of the United States at or near the project area. For this specific project, this process included the delineation of potential wetlands of the United States.

Included in the definition of "waters of the United States" are all surface waters, including perennial, intermittent, and ephemeral channels, and their tributaries. As defined by the United States Geological Survey (USGS), a stream is a "body of flowing water in a natural channel", which has been shown to be aided by the pull of gravity. Streams in natural channels are classified as ephemeral, intermittent, or perennial. An ephemeral channel is defined as "a stream which flows only in direct response to precipitation or in response to the melting of snow or ice, and which has a channel bottom that is always above the local water table". As defined by the USCAE (2005), ephemeral channels have flowing water only during and for a short duration after, precipitation events in a typical year. Groundwater is not a water source of ephemeral

channels and runoff from rainfall is the primary source of water for flow. An intermittent channel is defined in part as "a reach of a channel that is below the local water table for at least some part of the year, and obtains its flow from both surface runoff and groundwater discharge (38CSR2-2.69). An intermittent channel is also defined as "a stream which has no flow during substantial periods of no precipitation, and which does not support life whose life history requires residence in flowing waters for a continuous period of at least six months" (46CSR1-2.09). Perennial channels are primarily effluent, have flowing water year-round during a typical year, including during dry periods (Gordon et al. 1992). The water table is located above the stream bed for most of the year. Groundwater is the primary source of water for flow. Runoff from rainfall is a supplemental source of water for perennial flow (USACE JD Guidance Report, 2005).

The interaction of hydrology, vegetation, and soil results in the development of characteristics unique to wetlands. The USACE (Federal Register 1982) and the Environmental Protection Agency (Federal Register 1980) jointly define wetlands as: Those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas.

Wetlands have the following general diagnostic environmental characteristics:

(1) Vegetation: The prevalent vegetation consists of macrophytes that are typically adapted to areas having hydrophytic species, due to morphological, physiological, and/or reproductive adaptations, have the ability to grow, effectively compete, reproduce, and/or persist in anaerobic soil conditions.

(2) Soil: Soils are present and have been classified as hydric, or they possess characteristics that are associated with reducing soil conditions.

(3) Hydrology: The area is inundated either permanently or periodically at mean water depths ≤6.6 feet, or the soil is saturated to the surface at some time during the growing season of the prevalent vegetation.

According to the Corps of Engineers Wetland Delineation Manual (Technical Report Y-87-1), except in certain rare situations, evidence of a minimum of one positive wetland indicator from each parameter (hydrology, soil, and vegetation) must be found in order to make a positive wetland determination.

2.0 Methods of Investigation

The wetland determination and delineation was conducted for Stafford Consultants Incorporated, in order to determine the extent of jurisdictional waters (particularly wetlands) within a specific, suspicious, area observed during field reconnaissance performed by Justin Elkins and J.D. Bennett of REI Consultants, Inc. Ed J. Kirk, Biological Division Director; analyzed the vegetation, hydrology, and soils located within the suspected wetland area on August 19, 2008.

Should specific questions arise about the project background, property ownership, or property access, Mr. Dean Upton, Stafford Consultants, may be contacted by phone at (304) 425-9555. REI Consultants, Inc. should be contacted with concerns about the results and conclusions of this particular study. REI Consultant personnel can be reached at P.O. Box 286, Beaver, West Virginia 25813, or by phone at (304) 255-2500.

The weather conditions (obtained from www.weatherunderground.com) recorded from Beckley, WV on the sampling date is summarized in the table below.

Sampling Dates	**Actual High/Low Temperature (^{o}F)**	**Actual Precipitation (in)**
8-19-08	79 / 53	0.0

2.1 Delineation of Wetlands

A modified Level II wetland determination for the areas of concern was performed. The Level II surveys involved both soil probe samples and soil pits for evidence of mottling or gleying. Soil pits were dug to a depth of at least one foot (where possible), were photographed, and GPS located. The soil probes are taken in rows perpendicular from the water's edge, if present, and retreated towards the upland's edge until a depth of 1-foot from the surface level to saturated conditions was reached. Some of the existing areas in question did not contain standing water, therefore, the soil probes were taken in rows perpendicular from within the aquatic vegetation's boundaries, and retreated away from the wetland vegetation.

In addition to the soil examinations, at each sampled site, the dominant vegetation within each available vegetation layer (trees, saplings/shrubs, herbs, and woody vines) was identified within a 30-foot diameter perimeter. Dominant vegetation was considered those species which contributed at least 50% of each vegetation layer, plus any additional species comprising 20% or more of the total dominance measure for the stratum (The 50/20 Rule). Next, the wetland indicator status was then researched for each of the dominant taxa identified.

Lastly, the hydrology of the area was also observed and described, and the determination of the area's status (wetland or non-wetland) was then made. If the

suspected area was determined to be a wetland, then the wetland border was flagged and/or staked, and GPS located around the perimeter, and measured. The sites, including soil pits were then photographed.

3.0 General Description of Soils

The soils located within the study area belong to eight mapped groups. The soils found in this area were CeC, CeD, ChF, Cm, Ka, ShC, StC, and U2 series. CeC is the Cateache-Berks series with channery silt loams and 3 to 15 percent slopes. CeD is the Cateache-Berks series with channery silt loams and 15 to 30 percent slopes. ChF is the Cateache-Berks series with channery silt loams, 30 to 70 percent slopes, and is very stony. Cm is the Chagrin loam series, which is nearly level and well drained. Ka is the Kanawha fine sandy loam series, which is nearly level and well drained. ShC is the Shouns silt loam series with 8 to 15 percent slopes. StC is the Shouns silt loam series with 3 to 15 percent slopes and is very stony. U2 is the udorthent smooth series and consists mostly of mixed soil material and rock fragments from areas that have been excavated, graded , or filled (USDA Soil Survey for Mercer and Summers Counties).

These soils listed were found throughout the project area, were mapped as such in the USDA Soil Survey for Mercer and Summers Counties, and are not on the hydric soils list for West Virginia. A soil map obtained from the USDA NRCS (www.websoilsurvey.com), with an approximate polygon of the proposed project area can be found in Appendix A, Figure 3.

The soil associated with Wetlands #1 is Ka. Soils in this series are generally level and well drained. These soils can also eventually acquire layers of organic material once vegetation becomes established. These soils are not on the hydric soils list for West Virginia.

4.0 Descriptions of Wetlands Identified

There was one potential wetland area investigated within the project area. The area was determined to be a true wetland based on the Corps of Engineers Wetland Delineation Manual (Technical Report Y-87-1), and was delineated using a modified Level II wetland determination. The study area was primarily located along the New River, just north of the town of Hinton, in Summers County, West Virginia (Appendix A, Figure 2). An USGS Soil Survey of Summers County, West Virginia indicated that the soil series located within the study area were of the CeC, CeD, ChF, Cm, Ka, ShC, StC, and U2 series. The dominant soil present within the wetland area was Kanawha loam (Ka). This soil generally consists of mixed soil material and rock fragments. The one wetland identified was 0.4930 acres, which was designated as a wet meadow wetland (Appendix A, Table 2). Below is a description of the wetland delineated at the project site as well as description of the soil pit. Field data forms and field notes can be found in Appendix D.

Wetland #1 (Wet Meadow Wetland, PML1)

Wetland #1 (Appendix B, Photos 1 and 2) was located within the Bass Lake camping area. There are several constructed fishing ponds on the property. This wetland was located in what appeared to be an old fishing pond that was drained. There was no inlet or outlet for this wetland observed.

Soil Pit #1 (Appendix B, Photos 3-4) was located within Wetland #1 at approximately (N 37° 42’ 35.4”, W 80° 53’ 20.2”). Matrix color was 10YR 3/2 and mottle color was 10YR 4/6 from 0 – 10” with very small oxidized root channels. Matrix color was 10YR 3/2 and mottle color was 10YR 4/6 from 10-12” with large, moderately distinct mottles. A 2” ribbon was produced, soil was moist, clayey, but not wet. Soils were mapped as Kanawha loamy (Ka).

Dominant species within the vegetative layers were *Scirpus rubricosus*, *Carex lurida, and Leersia oryzoides.* All of the dominant vegetation was considered hydrophytic. A secondary hydrology indicator; oxidized root channels in the upper 12 inches and was present, and recorded (Appendix D, Table 1A). A FAC-Neutral test was positive because more of the dominant plant species have a wetland indicator category that is wetter than FAC. This wetland is mapped on the National Wetland Inventory as a Palustrine system (shallow ponds, marshes, swamps, sloughs). This site was determined to be a wet meadow wetland (PML1) due to the presence of three secondary indicators. The wetland did not have any observed inlet or outlet channels. Wetland #1 has an area of 0.4930 ac. (Appendix A, Table 2).

5.0 Wetland Functions and Values

The functions and values of the wetland were assessed. The following functions were evaluated using the established USACE Wetland Functions and Values Descriptive Approach (USACE, 1999) for each of the jurisdictional wetlands, and are summarized in Appendix A, Table 1 and detailed in Appendix C.

Groundwater Recharge: This function considers the potential for a wetland to serve as a groundwater recharge and/or discharge area. It refers to the fundamental interaction between wetlands and aquifers, regardless of the size or importance of either. Some parameters assessed include the existence or potential existence of public or private wells downstream of the wetland, the occurrence of fragipan, impervious soils, or bedrock within the wetland, whether the wetland is underlain by stratified drift, and if gravel or sandy soils were present in or adjacent to the wetlands.

Floodflow Alteration: This function considers the effectiveness of the wetland in reducing flood damage by water retention for prolonged periods following precipitation events and the gradual release of floodwaters. It adds to the stability of the wetland ecological system or its buffering characteristics and provides social or economic value to erosion and/or flood prone areas. Some parameters assessed include the size of the wetland relative to the watershed, the existence of hydric soils to absorb water, and if during flood events, the wetland could retain higher volumes of water than under normal or average rainfall conditions.

Fish and Shellfish Habitat: This function considers the effectiveness of seasonal or permanent watercourses associated with the wetland in question for fish and shellfish habitat. Some parameters assessed include whether forest was dominant in the watershed above the wetland, and if abundance of cover vegetation was present. If the wetland is associated with a watercourse then the ability of the wetland to support large fish and shellfish populations was assessed, along with presence of spawning habitat, and if food was available within the wetland for the fish and/or shellfish.

Sediment/Toxicant/Pathogen Retention: This function reduces or prevents degradation of water quality. It relates to the effectiveness of the wetland as a trap for sediments, toxicants, or pathogens in runoff water from surrounding uplands, or upstream eroding wetland areas. Some parameters assessed include the existence of sources of excess sediment within the watershed above the wetland, known sources of toxicants within the watershed above the wetland, and if long duration water retention time was present in the wetland.

Nutrient Removal/Retention/Transformation: This function considers the effectiveness of the wetland as a trap for nutrients in runoff water from surrounding uplands or contiguous wetlands and the ability of the wetland to process these nutrients into other forms or trophic levels. One aspect of this function is to prevent ill effects of nutrients entering aquifers or surface waters such as ponds, lakes, streams, rivers, or estuaries.

Some parameters assessed include if deep water or open water habitat existed within the wetland, the potential for sediment trapping within the wetland, if deep organic or sediment deposits were present, if dense vegetation was present, and if the aquatic and/or vegetation diversity and abundance was sufficient to utilize nutrients.

Production Export: This function evaluates the effectiveness of the wetland to produce food or usable products for man or other living organisms. Some parameters assessed were if evidence of wildlife was found within the wetland, if fish or shellfish develop or occur in the wetland, if wetland contained flowering plants which could be used by nectar-gathering insects, and if the wetland exhibited a high degree of plant community structure/species diversity.

Sediment/Shoreline Stabilization: This function considers the effectiveness of a wetland to stabilize stream banks and shorelines against erosion. Some parameters assessed include if indications of erosion and siltation were present, if a topographical gradient was present in the wetland, if potential sediment sources were present up-slope of the wetland, and if high flow velocities occur in the wetland.

Wildlife Habitat: This function considers the effectiveness of the wetland to provide various types and populations of animals typically associated with wetlands and the wetland edge. Both resident and/or migrating species are considered. Some parameters that were assessed include: if the wetland was contiguous with other wetland systems connected by a watercourse, if wildlife food sources were present within the wetland or were nearby, and if three or more acres of shallow permanent open water including streams in or adjacent to wetland were present.

Recreation: This value considers the suitability of the wetland and associated watercourses to provide recreational opportunities such as hiking, canoeing, boating, fishing, hunting, and other active or passive recreational activities. Some parameters assessed include if the wetland was a part of a recreation area, park, forest, or refuge, if fishing was available within of from the wetland, if hunting was permitted in the wetland, if hiking occurred within the wetland, and if there was access at this potential recreation site for boating, canoeing, or fishing.

Educational/Scientific Value: This value considers the suitability of the wetland as a site for an “outdoor classroom” or as a location for scientific study or research. Some parameters that were assessed were if the wetland contained known threatened, rare, or endangered species, if the potential education site was disturbed and had easy access, if the potential education site was within safe walking distance or a short drive to schools, and if there were signs of wildlife enhancement present such as birdhouses and/or nesting houses within or near the wetland.

Uniqueness/Heritage: This value considers the effectiveness of the wetland or its associated waterbodies to provide certain special values. These may include archaeological sites, critical habitat for endangered species, its overall health and

appearance, its role in the ecological system of the area, and its relative importance as a typical wetland class for this geographic location. These functions are wetland attributes relative to aspects of public health, recreation, and habitat diversity. Some parameters assessed include if the upland surrounding the wetland was urban, if more than three acres of shallow permanent open water occurred in the wetland, if three or more wetland classes were present, and if the site had easy access with a general unpolluted appearance.

Visual Quality/Aesthetics: This value considers the visual and aesthetic quality or usefulness of the wetland. Some parameters that were assessed included if multiple wetland classes were visible from primary viewing locations, if the wetland was dominated by flowering plants, or plants that turn vibrant colors in different seasons, if the wetland had easy access, and if the visible surroundings contrasted with the wetland.

Endangered Species Habitat: This value considers the suitability of the wetland to support Threatened or Endangered species (TE species). The two parameters assessed were if the wetland contained known TE species and if the wetland contained critical habitat for a state or federally listed TE species.

6.0 Discussions and Conclusions

There was one area investigated that exhibited wetland characteristics and determined to be a true wetland. This area did meet the criteria established within the Corps of Engineers Wetland Delineation Manual (Technical Report Y-87-1).

One wetland was delineated for the Brooks/Barksdale Wastewater Project, along the New River, near the town of Hinton, in Summers County, West Virginia. The wetland was delineated as a wet meadow and GPS located (Appendix A, Figure 2).

Wetland #1 was considered to be an isolated, wet meadow (PML1) wetland and had a total calculated area of 21,479 ft^2 (0.4930 acres) (Appendix A, Table 2). Oxidized root channels in the upper 12 inches, a FAC-neutral test, and listing on the National Wetland Inventory indicate that this is a true wetland. Soils displayed mottles and were considered hydric. Additionally, more than 50% of the dominant vegetation was considered to be hydrophytic. The wetland did not have any observed inlet or outlet channels. This wetland was determined to have the following wetland functions/values: Recreation (Appendix A, Table 1).

References

CSR, Coal Safety Rule. Legislative Rule. West Virginia Department of Environmental Protection: Division of Mining and Reclamation.

Fassett, Norman C. 1957. A Manual of Aquatic Plants. University of Wisconsin Press, Madison, WI.

Gordon, N.D., McMahon, T.A., and B.L. Finlayson. 1992. Stream Hydrology: An Introduction for Ecologists, John Wiley and Sons, Ltd., West Sussex, England.

Little, Elbert A. 1980. The Audubon Society Field Guide to North American Trees, Eastern Region. Alfred A. Knopf, Publisher, New York.

Munsell Color, 1975. Munsell Soil Color Charts. Kollmorgan Corporation, Baltimore, MD.

Newcomb, L., 1977. Newcomb=s Wildflower Guide. Little, Brown and Company Limited, Publishers, Boston, New York, Toronto, and London.

Peterson, R.T. and M. McKenny, 1968. A Field Guide to Wildflowers of Northeastern and North-central North America. Houghton Mifflin Company, Boston, Massachusetts.

Richard Chinn Environmental Training, Inc., Wetland Delineation & Management Training Manual and Workbook. Brandon, FL

Rosgen, D.L. 1993. Applied Fluvial Geomorphology, Training Manual. River Short Course, Wildland Hydrology, Pagosa Springs, CO.: 450 pp.

Rosgen, D.L. 1994. A classification of natural rivers. Catena 22, pp169 - 199.

Rosgen, D.L. 1996. Applied River Morphology. Wildland Hydrology, Pagosa Springs, CO.

Rosgen, D.L. 2002. River morphology and applications: field manual. Wildland Hydrology, Pagosa Springs, CO.

Strausbaugh, P.D. and Earl L. Core, 1978. Flora of West Virginia, Second Edition. Seneca Books, Publishers, Morgantown, WV.

USACE. 1987. United States Army Corps of Engineers Wetland Delineation Manual. Wetlands Research Program Technical Report Y-87-1.

References (Cont.).

USACE. 1999. The Highway Methodology Workbook Supplement. Wetland Functions and Values; A Descriptive Approach. United States Army Corps of Engineers, New England District.

USDA. NRCS. Web Soil Survey of Summers County, West Virginia. http://websoilsurvey.nrcs.usda.gov/app/WebSoilSurvey.aspx

USDA. 1975. Soil Survey of Mercer and Summers Counties, West Virginia. Soil Conservation Service, Washington D.C.

USFWS. 1988. National List of Plant Species That Occur in Wetlands; Northwest Region.

WVDEP. 1999. Permit Handbook: Section 33: Drainage, Sediment Control and Water Monitoring, Guidance for Delineation of Ephemeral/Intermittent Streams. October 26, 1999.

STATEMENT OF QUALIFICATIONS

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Director - Biological Division

Master of Science, Wildlife and Fisheries Resources 1992
West Virginia University, Morgantown, WV
Bachelor of Science, Biology
1988
West Virginia University, Morgantown, WV

Professional Training/Organizations:

Dave Rosgen's River Restoration & Natural Channel Design Course, August 2006.
Dave Rosgen's River Assessment & Monitoring Course, March 2005.
Dave Rosgen's River Morphology & Applications Course, June 2002.
Dave Rosgen's Applied Fluvial Geomorphology Course, January 2001.
Richard Chinn's USCOE Certified Wetland Delineation and Training, July 2002.
Wetland Training Institute's Identifying Plants, Methods, Skills, July 2008
Wetland Training Institute's Wetland Delineation with Emphasis on Soils and Hydrology course, August 2007.
Wetland Training Institute's Planning, Site Selection, and Hydrology Models for Constructed Wetlands, April 2006.
Mid-Atlantic Stream Restoration Workshop, Nov/Dec 2004.
Mid-Atlantic Stream Restoration Workshop, Nov/Dec 2005.
Mid-Atlantic International Erosion Control Association Workshop & Trade Exposition, Oct/Nov 2004.
American Fisheries Society - Virginia Chapter member
Society of Wetland Scientists member
NABS member

Appendix A

Figures and Tables

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(Please See Insert)..... 4

Figure 3. Soil map for Summers County, WV with approximate location of project boundary (shown in dashed red) (websoilsurvey.com) 5

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TABLE 2. Summary of wetland types, soil colors, acreages, and approximate GPS locations of wetlands associated with the Brooks/Barksdale Wastewater Project. REI Consultants, Inc., August 2008. 7

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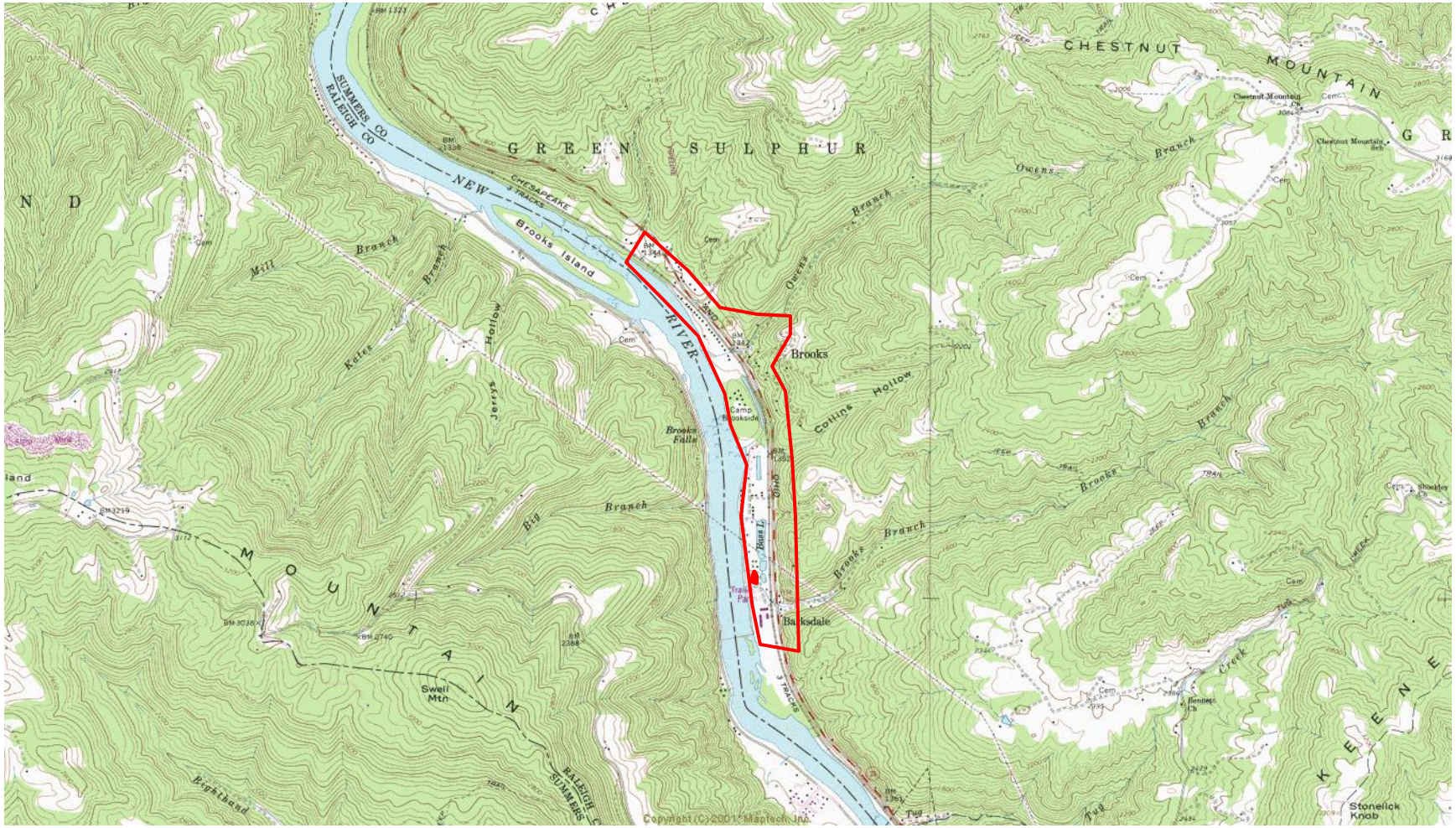

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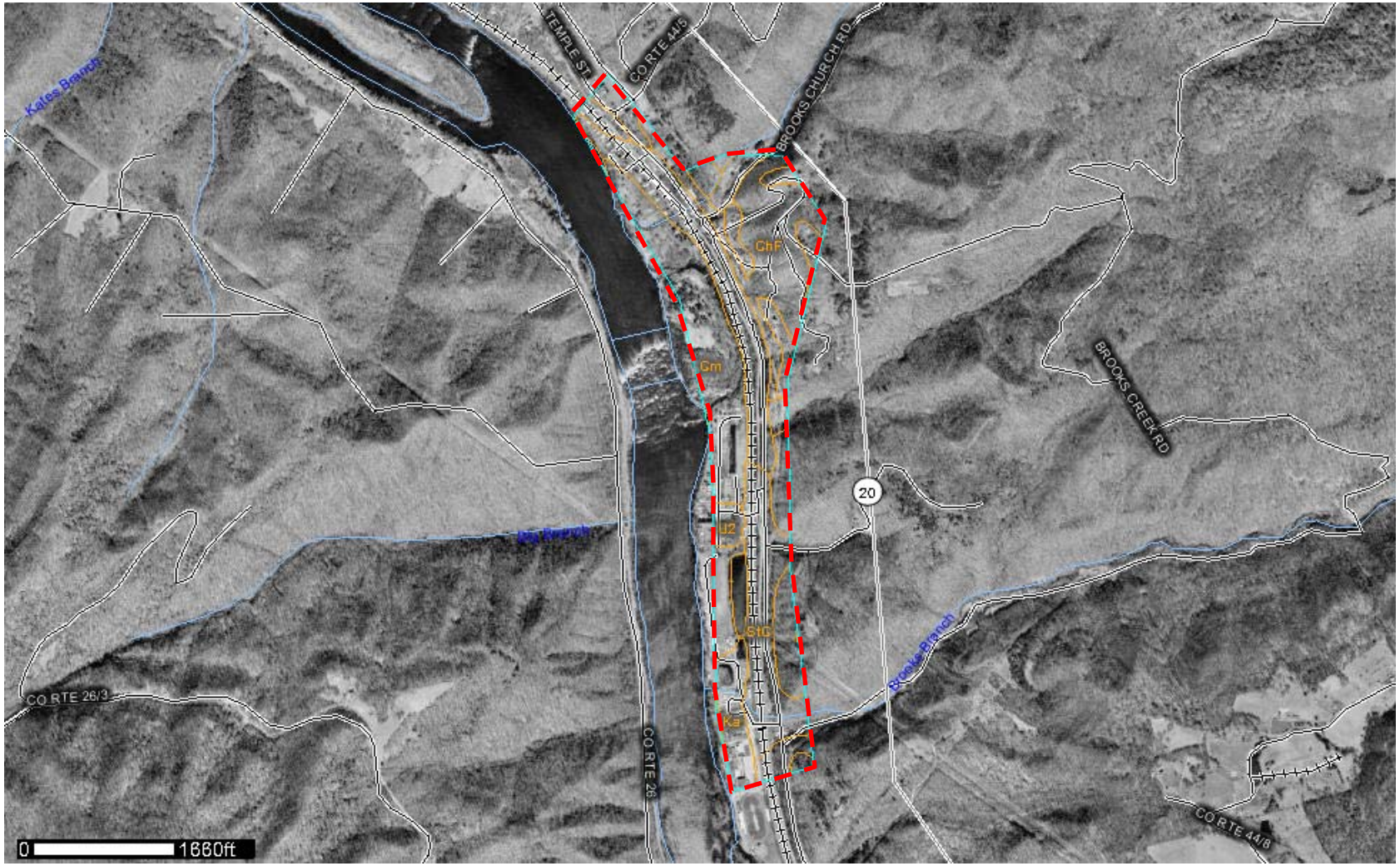


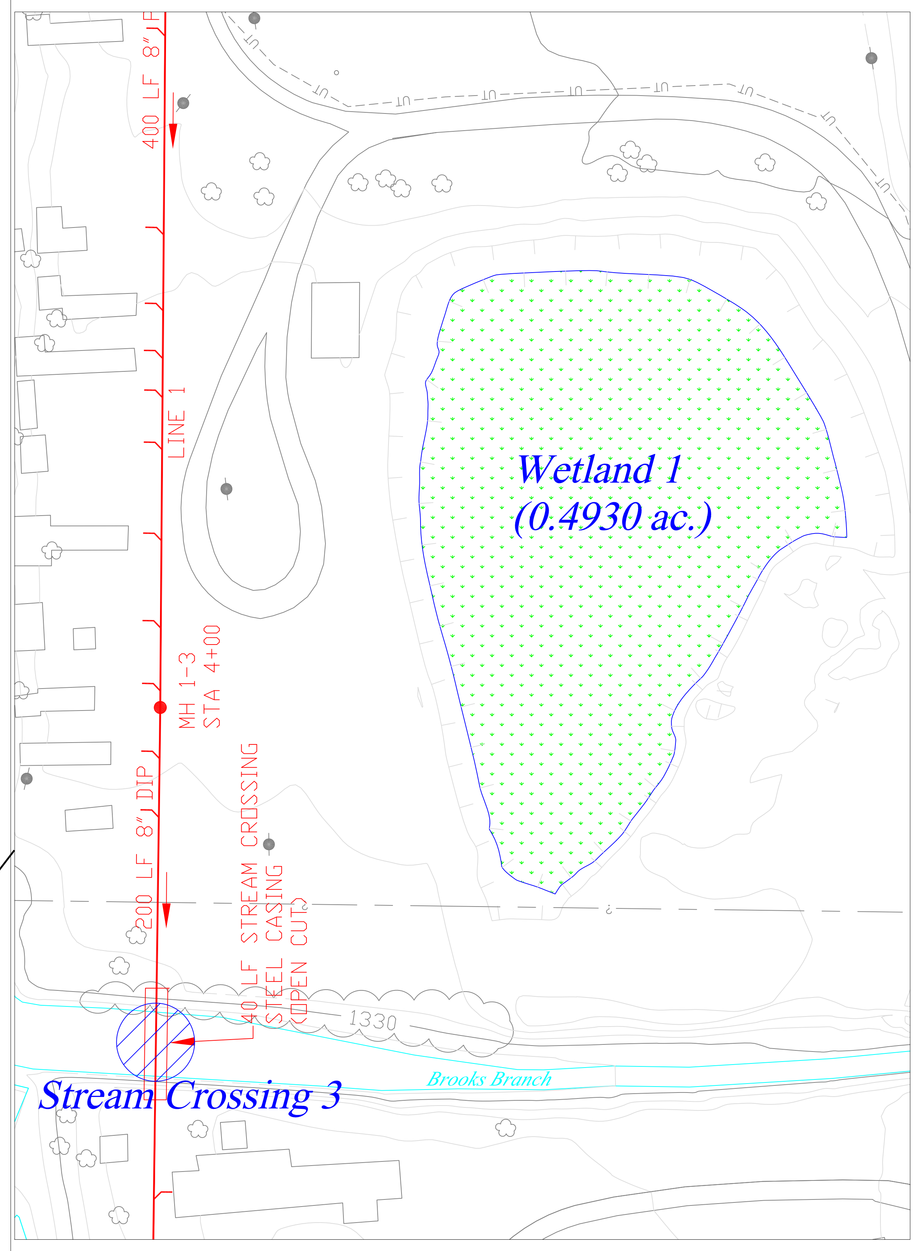
TABLE 1. Summary of functional values associated with wetlands delineated for the Brooks/Barksdale Wastewater Project area, near Hinton, West Virginia. REI Consultants, Inc., August 2008.

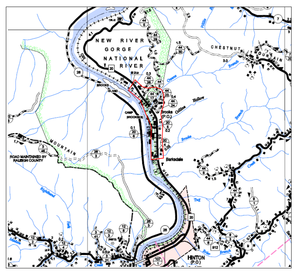
FUNCTION/VALUE	
	Wetland #1
Groundwater Recharge/Discharge	No
Floodflow Alteration	No
Fish and Shellfish Habitat	No
Sediment/Toxicant Retention	No
Nutrient Removal	No
Production Export	No
Sediment/Shoreline Stabilization	No
Wildlife Habitat	No
Recreation	Yes
Educational/Scientific Value	No
Uniqueness/Heritage	No
Visual Quality/Aesthetics	No
Endangered Species Habitat***	No

TABLE 2. Summary of wetland types, soil colors, acreages, and approximate GPS locations of wetlands associated with the Brooks/Barksdale Wastewater Project. REI Consultants, Inc., August 2008.

Wetland Name	Wetland Type	Soil Information			Wetland Size	GPS
		Matrix	Mottle	Gley		
Wetland #1	Wet Meadow	10YR 3/2 10YR 3/2	10YR 4/6 10YR 4/6	----	21,479 ft^2 (0.4930 ac.)	37° 42’ 35.4” 80° 53’ 20.2”

Total Wet Meadow Wetland	21,479 ft^2 = 0.4930 acres
Total Wetlands	21,479 ft^2 = 0.4930 acres





General Highway Map
NPDES: Article 3:
Nearest P.O., Hinton, WV
Green Sulphur Distirct, Summers County, WV
Hinton Quad.
37° 42' 27.5" 80° 53' 18.4"

Legend

- Stream
- Wetland
- Wastewater Line
- Area of Interest
- Stream Crossing

Wetland Table

Wetland Name	Wetland Type	Soil Information			Wetland Size	GPS
		Matrix	Mottle	Gley		
Wetland #1	Wet Meadow	10YR 3/2 10YR 3/2	10YR 4/6 10YR 4/6	----	21,479 ft^2 (0.4930 ac.)	37° 42' 35.4" 80° 53' 20.2"

Total Wet Meadow Wetland	21,479 ft^2 = 0.4930 acres
Total Wetlands	21,479 ft^2 = 0.4930 acres

Research Environmental & Industrial Consultants, Inc
PO Box 286
Beaver, WV 25813

NPDES: Article 3 No.

Wetland Delineation Map
Brooks/Barksdale Wastewater Project
Stafford Consultants Incorporated

Appendix B

Photographs

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PHOTO 2. Wetland #1, near Hinton, in Summers County, WV, and associated with the Brooks/Barksdale Wastewater Project. REI Consultants, Inc., August 2008..... 3

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PHOTO 4. Soil Pit #1, located within Wetland #1, Brooks/Barksdale Wastewater Project. REI Consultants, Inc., August 2008. 4

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PHOTO 3. Soil Pit #1, located within Wetland #1, Brooks/Barksdale Wastewater Project. REI Consultants, Inc., August 2008.

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Table 1. Wetland 1, GROUNDWATER RECHARGE/DISCHARGE

GROUNDWATER RECHARGE/DISCHARGE			
This function considers the potential for a wetland to serve as a groundwater recharge and/or discharge area. It refers to the fundamental interaction between wetlands and aquifers, regardless of the size or importance of either.			
No.	**CONSIDERATIONS/QUALIFIERS**	**YES**	**NO**
1	Public or private wells occur downstream of the wetland.		**x**
2	Potential exists for public or private well downstream of the wetland.	**x**	
3	Wetland is underlain by stratified drift.		**x**
4	Gravel or sandy soils present in or adjacent to the wetland.	**x**	
5	Fragipan does not occur in the wetland.	**x**	
6	Fragipan, impervious soils, or bedrock does occur in the wetland.		**x**
7	Wetland is associated with a perennial or intermittent watercourse.		**x**
8	Signs of groundwater recharge are present or piezometer data demonstrates recharge.		**x**
9	Wetland is associated with a watercourse but lacks a defined outlet or contains a constricted outlet.	**x**	
10	Wetland contains only an outlet, no inlet.		**x**
11	Groundwater quality of stratified drift aquifer within or downstream of wetland meets drinking water standards.		**x**
12	Quality of the water associated with the wetland is high.		**x**
13	Signs of groundwater discharge are present (e.g., springs).		**x**
14	Water temperature suggests it's a discharge site.		**x**
15	Wetland shows signs of variable water levels.		**x**
16	Piezometer data demonstrates discharge.		**x**
17	Other		
		4	**12**
		No	

Table 2. Wetland 1, FLOODFLOW ALTERATION

FLOODFLOW ALTERATION (Storage & Desynchronization)			
This function considers the effectiveness of the wetland in reducing flood damage by water retention for prolonged periods following precipitation events and the gradual release of floodwaters. It adds to the stability of the wetland ecological system or its buffering characteristics and provides social or economic value relative to erosion and/or flood prone areas			
No.	**CONSIDERATIONS/QUALIFIERS**	**YES**	**NO**
1	Area of this wetland is large relative to its watershed.		**X**
2	Wetland occurs in the upper portions of its watershed.		**X**
3	Effective flood storage is small or non-existent upslope of or above the wetland.		**X**
4	Wetland watershed contains a high percent of impervious surfaces.		**X**
5	Wetland contains hydric soils which are able to absorb and detain water.	**X**	
6	Wetland exists in a relatively flat area that has flood storage potential.	**x**	
7	Wetland has intermittent outlet, ponded water, or signs are present of variable water level.		**X**
8	During flood events, this wetland can retain higher volumes of water than under normal or average rainfall conditions.		**X**
9	Wetland receives and retains overland or sheet flow runoff from surrounding uplands.		**X**
10	In the event of a large storm, this wetland may receive and detain excessive flood water from a nearby watercourse.	**x**	
11	Valuable properties, structures, or resources are located in or near the floodplain downstream from the wetland.		**X**
12	The watershed has a history of economic loss due to flooding.		**x**
13	This wetland is associated with one or more watercourses.		**x**
14	This wetland watercourse is sinuous or diffuse.		**X**
15	The wetland outlet is constricted.		**X**
16	Channel flow velocity is affected by this wetland.		**X**
17	Land uses downstream are protected by this wetland.		**X**
18	This wetland contains a high density of vegetation.	**x**	

Table 3. Wetland 1, FISH AND SHELLFISH HABITAT

FISH AND SHELLFISH HABITAT			
This function considers the effectiveness of seasonal or permanent watercourses associated with the wetland in question for fish and shellfish habitat.			
No.	**CONSIDERATIONS/QUALIFIERS**	**YES**	**NO**
1	Forestland is dominant in the watershed above this wetland.	**X**	
2	Abundance of cover vegetation present.		**x**
STOP HERE IF THIS WETLAND IS NOT ASSOCIATED WITH A WATERCOURSE			
3	Size of this wetland is able to support large fish/shellfish populations.		
4	Wetland is part of a larger, contiguous watercourse.		
5	Wetland has sufficient size and depth in open water areas so as not to freeze solid and retains some open water during winter		
6	Stream width (bank to bank) is more than 50 feet.		
7	Quality of the watercourse associated with this wetland is able to support healthy fish/shellfish populations		
8	Streamside vegetation provides shade for the watercourse.		
9	Spawning areas are present (submerged vegetation or gravel beds).		
10	Food is available to fish/shellfish populations within this wetland.		
11	Barrier(s) to anadramous fish (such as dams, including beaver dams, waterfalls, road crossing, etc.) are absent from the stream reach associated with this wetland.		
12	Evidence of fish is present		
13	Wetland is stocked with fish.		
14	The watercourse is perennial		
15	Man-made streams are absent.		
16	Water velocities are not too excessive for fish usage		
17	Defined stream channel is present in the wetland.		
18	Other		
		1	**1**
		No	

Table 4. Wetland 1, SEDIMENT/TOXICANT/PATHOGEN RETENTION

SEDIMENT/TOXICANT/PATHOGEN RETENTION			
This function reduces or prevents degradation of water quality. It relates to the effectiveness of the wetland as a trap for sediments, toxicants, or pathogens in runoff water from surrounding uplands, or upstream eroding wetland areas.			
No.	**CONSIDERATIONS/QUALIFIERS**	**YES**	**NO**
1	Potential sources of excess sediment are in the watershed above the wetland.	**X**	
2	Potential or known sources of toxicants are in the watershed above the wetland.		**X**
3	Opportunity for sediment trapping by slow moving water or deepwater habitat is present in this wetland.		**X**
4	Mineral, fine grained, or organic soils are present.	**X**	
5	Long duration water retention time is present in this wetland	**X**	
6	Public or private water sources occur downstream.		**X**
7	The wetland edge is broad and intermittently aerobic.		**X**
8	The wetland has potentially existed for more than 50 years.		**X**
9	Drainage ditches have not been constructed in the wetland		**X**
STOP HERE IF WETLAND IS NOT ASSOCIATED WITH A WATERCOURSE			
10	Wetland is associated with an intermittent or perennial stream or lake.		
11	Channelized flows have visible velocity decreases in the wetland.		
12	Effective floodwater storage in wetland is occurring. Areas of impounded open water are present.		
13	No indicators of erosive forces are present. No high water velocities are present.		
14	Diffuse water flows are present in the wetland		
15	Wetland has a high degree of water and vegetation interspersion.		
16	Dense vegetation provides opportunity for sediment trapping and/or signs of sediment accumulation are present by dense vegetation.		
17	Other.		
		3	**6**
		No	

Table 5. Wetland 1, NUTRIENT REMOVAL/RETENTION/TRANSFORMATION

NUTRIENT REMOVAL/RETENTION/TRANSFORMATION			
This function considers the effectiveness of the wetland as a trap for nutrients in runoff water from surrounding uplands or contiguous wetlands and the ability of the wetland to process these nutrients into other forms or trophic levels. One aspect of this function is to prevent ill effects of nutrients entering aquifers or surface waters such as ponds, lakes, streams, rivers or estuaries.			
No.	**CONSIDERATIONS/QUALIFIERS**	**YES**	**NO**
1	Wetland is large relative to the size of its watershed		**X**
2	Deep water or open water habitat exists.		**X**
3	Overall potential for sediment trapping exists in the wetland.		**X**
4	Potential sources of excess nutrients present in the watershed above the wetland.		**X**
5	Wetland saturated for most of the season. Pounded water is present in the wetland.		**x**
6	Deep organic/sediment deposits are present		**x**
7	Slowly drained mineral, fine grained, or organic soils are present.	**X**	
8	Dense vegetation is present.	**x**	
9	Emergent vegetation and/or dense woody stems are dominant		**X**
10	Aquatic diversity/abundance sufficient to utilize nutrients.		**X**
11	Opportunity for nutrient attenuation exists.		**X**
12	Vegetation diversity/abundance sufficient to utilize nutrients.	**X**	
STOP HERE IF WETLAND IS NOT ASSOCIATED WITH A WATERCOURSE			
13	Waterflow through this wetland is diffuse.		
14	Constricted outlet or thick vegetation increases water retention/detention time in this wetland.		
15	Water moves slowly through this wetland.		
16	Other.		
		3	9
		No	

Table 6. Wetland 1, PRODUCTION EXPORT

PRODUCTION EXPORT			
(Nutrient)			
This function evaluates the effectiveness of the wetland to produce food or usable products for man or other living organisms.			
No.	**CONSIDERATIONS/QUALIFIERS**	**YES**	**NO**
1	Wildlife food sources grow within this wetland.	**x**	
2	Detritus development is present within this wetland.	**X**	
3	Economically or commercially used products found in this wetland		**X**
4	Evidence of wildlife use found within this wetland.		**x**
5	Higher trophic levels consumers are utilizing this wetland.		**X**
6	Fish of shellfish develop or occur in this wetland.		**X**
7	High vegetation density is present.	**x**	
8	Wetland exhibits high degree of plant community structure/species diversity		**X**
9	High aquatic diversity/abundance is present.		**X**
10	Nutrients exported in wetland watercourses (permanent outlet present).		**X**
11	"Flushing" of relatively large amounts of organic plant material occurs from this wetland		**X**
12	Wetland contains flowering plants, which are used by nectar-gathering insects	**X**	
13	Indications of export are present		**X**
14	High production levels occurring however, no visible signs of export (assumes export is attenuated).		**X**
15	Other.		
		4	**10**
		No	

Table 7. Wetland 1, SEDIMENT/SHORELINE STABILIZATION

SEDIMENT/SHORELINE STABILIZATION			
This function considers the effectiveness of a wetland to stabilize stream banks and shorelines against erosion.			
No.	**CONSIDERATIONS/QUALIFIERS**	**YES**	**NO**
1	Indications of erosion, siltation present.		**X**
2	Topographical gradient is present in wetland.		**X**
3	Potential sediment sources are present up-slope.	**X**	
4	No distinct shoreline or bank is evident between the water body and the wetland or upland.		**x**
5	A distinct step between the open water body or stream and the adjacent land exists (i.e. sharp bank) with dense roots throughout.	**x**	
6	Wide wetland (>10) bordering watercourse, lake or pond.		**X**
7	High flow velocities in the wetland.		**X**
8	Potential sediment sources present upstream.	**X**	
9	Open water fetch is present.		**X**
10	Boating activity is present		**X**
11	Dense vegetation is bordering watercourse, lake or pond.		**X**
12	High percentage of energy absorbing emergents and/or shrubs bordering watercourse, lake or pond.		**X**
13	Vegetation comprised of large trees and shrubs, which withstand major flood events or erosive incidents and stabilize the shoreline on a large scale (feet).		**X**
14	Vegetation comprised of dense resilient herbaceous layer, which stabilizes sediments and the shoreline on a large scale (feet).		**X**
15	Other.		
		3	**11**
		No	

Table 8. Wetland 1, WILDLIFE HABITAT

WILDLIFE HABITAT			
This function considers the effectiveness of the wetland to provide various types and populations of animals typically associated with wetlands and the wetland edge. Both resident and/or migrating species must be considered			
No.	**CONSIDERATIONS/QUALIFIERS**	**YES**	**NO**
1	Wetland is not degraded by human activity.		**x**
2	Water quality of the watercourse, pond, or lake associated with this wetland meets or exceeds Class A or B standards.		**X**
3	Wetland if not fragmented by development	**X**	
4	Upland surrounding this wetland is undeveloped.		**X**
5	More than 50% of this wetland edge is bordered by upland wildlife habitat (e.g. brushland, woodland, active farmland, or idle hand) at least 500 feet in width.	**x**	
6	Wetland contiguous with other wetland systems connected by watercourse or lake.		**X**
7	Wildlife overland access to other wetlands is present.	**X**	
8	Wildlife food sources are within this wetland or are nearby.	**X**	
9	Wetland exhibits a high degree of interspersion of vegetation classes and/or open water.		**X**
10	Two or more islands or inclusions of upland within the wetland are present.		**X**
11	More than three acres of shallow permanent open water (less than 6.6 feet deep), including streams in or adjacent to wetland are present.		**X**
12	Density of wetland vegetation is high.	**x**	
13	Wetland exhibits a high degree of plant species diversity.		**X**
14	Wetland exhibits a high degree of diversity in the plant community structure (e.g.tree/shrub/vine/grasses/mosses/etc.)		**X**
15	Animal signs observed (tracks, scats, nesting areas, etc.)		**X**
16	Seasonal uses vary for wildlife, and wetland appears to support varied population diversity/abundance during different seasons.	**x**	
17	Wetland contains or has potential to contain a high insect population.	**X**	
18	Wetland contains or has potential to contain large amphibian populations.		**x**
19	Wetland has a high avian utilization or its potential.		**X**
20	Indications of less disturbance-tolerant species present.		**X**
21	Signs of wildlife habitat enhancement present (birdhouses, nesting boxes, food sources, etc.)		**X**
22	Other		
		7	**14**
		No	

Table 9. Wetland 1, RECREATION

RECREATION			
(Consumptive and Non-Consumptive)			
This value considers the suitability of the wetland and associated watercourses to provide recreational opportunities such as hiking, canoeing, boating, fishing, hunting and other active passive recreational activities. Consumptive opportunities consume or diminish the plants, animals, or other resources that are intrinsic to the wetland. Non-consumptive opportunities do not consume or diminish these resources of the wetland.			
No.	**CONSIDERATIONS/QUALIFIERS**	**YES**	**NO**
1	Wetland is part of a recreation area, park, forest, or refuge.	**x**	
2	Fishing is available within or from the wetland.		**x**
3	Hunting is permitted in the wetland.		**x**
4	Hiking occurs or has potential to occur within the wetland.	**x**	
5	Wetland is a valuable wildlife habitat.		**x**
6	The watercourse, pond, or lake, associated with the wetland is unpolluted.		**x**
7	High visual/aesthetic quality of this potential recreation site.	**x**	
8	Access to water is available at this potential recreation site for boating, canoeing, or fishing.	**x**	
9	The watercourse associated with this wetland is wide and deep enough to accommodate canoeing and/or non-powered boating.	**x**	
10	Off-road public parking available at the potential recreation site.	**x**	
11	Accessibility and travel ease is present at this site.	**x**	
12	The wetland is within a short drive or safe walk from highly populated public and private areas.	**x**	
13	Other.		
		8	**4**
		Yes	

Table 10. Wetland 1, EDUCATIONAL/SCIENTIFIC VALUE

EDUCATIONAL/SCIENTIFIC VALUE			
This value considers the suitability of the wetland as a site for an "outdoor classroom" or as a location for scientific study or research.			
No.	**CONSIDERATIONS/QUALIFIERS**	**YES**	**NO**
1	Wetland contains or is known to contain threatened, rare, or endangered species.		**X**
2	Little or no disturbance is occurring in this wetland.	**X**	
3	Potential educational site contains a diversity of wetland classes that are accessible or potentially accessible.		**X**
4	Potential educational site is undisturbed and natural.		**X**
5	Wetland is considered to be a valuable wildlife habitat.		**X**
6	Wetland is located within a natural preserve or wildlife management area.		**X**
7	Signs of wildlife habitat enhancement present (birdhouses, nesting boxes, food sources, etc.)		**X**
8	Off-road parking at potential educational site suitable for school bus access in or near wetland.	**x**	
9	Potential educational site is within safe walking distance or a short drive to schools.	**x**	
10	Potential educational site is within safe walking distance to other plant communities.		**x**
11	Direct access to perennial stream at potential educational site available.	**x**	
12	Direct access to pond or lake at potential educational site.	**x**	
13	No known safety hazards are within the potential educational site.		**X**
14	Public accessibility is available.	**x**	
15	Site is currently used for educational or scientific purposes.		**X**
16	Other.		
		6	**9**
		No	

Table 11. Wetland 1, UNIQUENESS/HERITAGE

UNIQUENESS/HERITAGE			
This value considers the effectiveness of the wetland or its associated waterbodies to provide certain special values. These may include archaeological sites, critical habitat for endangered species, its overall health and appearance, its role in the ecological system of the area, and its relative importance as a typical wetland class for this geographic location. These functions are clearly valuable wetland attributes relative to aspects of public health, recreation, and habitat diversity.			
No.	**CONSIDERATIONS/QUALIFIERS**	**YES**	**NO**
1	Upland surrounding wetland primarily urban.		**X**
2	Upland surrounding wetland developing rapidly.		**X**
3	More than 3 acres of shallow permanent open water occur in wetlands (less than 6.6 feet deep) including streams.		**X**
4	Three or more wetland classes present.		**X**
5	High degree of interspersion of vegetation and/or open water occurring in this wetland.		**X**
6	Well-vegetated stream corridor (15 feet on each side of the stream) occurs in this wetland.		**x**
7	Potential educational site is within a short drive or a safe walk from schools.	**x**	
8	Off-road parking at potential recreational site is suitable for school buses.	**x**	
9	No known safety hazards exist within this potential educational site.		**X**
10	Direct access to perennial stream or lake at potential educational site.		**X**
11	Two or more wetland classes visible from primary viewing locations.		**X**
12	Low-growing wetlands (marshes, scrub-shrub, bogs, open water) visible from primary viewing locations.		**X**
13	Half an acre of open water or 200 feet of stream is visible from primary viewing locations.		**X**
14	Large area of wetland is dominated by flowering plants, or plants, which turn vibrant colors in different seasons.		**X**
15	General appearance of this wetland visible from primary viewing locations is unpolluted and/or undisturbed.		**X**
16	Overall view of the wetland is available from the surrounding upland.	**x**	
17	Quality of water associated with the wetland is high.		**X**
18	Historical buildings occur within the wetland.		**X**
19	Presence of pond or pond site and the remains of a dam occur within the wetland.		**X**
20	Visible stone or earthen foundations, berms, dams, standing structures or associated features occur within the wetland.	**x**	
21	Wetland contains critical habitat for a state or federally listed threatened or endangered species.		**X**
22	Wetland is known to be a study site for scientific research.		**X**
23	Wetland is a natural landmark or recognized by the state natural heritage inventory authority as an exemplary natural community.		**X**
24	Wetland has local significance because it serves several functional values.		**X**
25	Wetland has local significance because it has biological, geological, or other features, which are locally rare or unique.		**X**
26	Wetland is known to contain an important archaeological site.		**X**
27	Wetland is hydrologically connected to a state or federally designated scenic river.		**X**
28	Wetland is located in an area experiencing a high wetland loss rate.		**X**
29	Other.		
		4	**24**
		No	

Table 12. Wetland 1, VISUAL QUALITY/AESTHETICS

VISUAL QUALITY/AESTHETICS			
This value considers the visual and aesthetic quality or usefulness of the wetland.			
No.	**CONSIDERATIONS/QUALIFIERS**	**YES**	**NO**
1	Multiple wetland classes visible from primary viewing locations.		**X**
2	Emergent vegetation and/or open water visible from primary viewing locations.		**X**
3	Diversity of vegetation species visible from primary viewing locations.		**X**
4	Wetland dominated by flowering plants, or plants that turn vibrant colors in different seasons.		**X**
5	Land use surrounding the wetland is undeveloped as seen from primary viewing locations.		**X**
6	Visible surrounding land use form contrasts with wetland.	**x**	
7	Wetland views absent of trash, debris, and signs of disturbance.	**X**	
8	Wetland is considered to be a valuable wildlife habitat.		**X**
9	Wetland is easily accessed.	**x**	
10	Low noise level at primary viewing locations.		**X**
11	Unpleasant odors absent at primary viewing locations.	**X**	
12	Relatively unobstructed sight line exists through wetland.	**X**	
13	Other.		
		5	**7**
		No	

Table 13. Wetland 1, ENDANGERED SPECIES HABITAT

ENDANGERED SPECIES HABITAT			
This value considers the suitability of the wetland to support threatened or endangered species.			
No.	**CONSIDERATIONS/QUALIFIERS**	**YES**	**NO**
1	Wetland contains or is known to contain threatened or endangered species.		**X**
2	Wetland contains critical habitat for a state or federally listed threatened or endangered species.		**X**
3	Other.		
		0	**2**
		No	

Appendix D

Field Data Sheets

List of Tables

TABLE 1A. Wetland #1 Field Data Form. Brooks/Barksdale Wastewater Project. Wetland determination and delineation conducted for Stafford Consultants, Incorporated, by REI Consultants, Inc., August 2008..... 3

TABLE 1A. Continued..... 4

TABLE 1A. Wetland #1 Field Data Form. Brooks/Barksdale Wastewater Project. Wetland determination and delineation conducted for Stafford Consultants, Incorporated, by REI Consultants, Inc., August 2008

Project/Site: Brooks/Barksdale Wastewater Project			Date: 08/17/2008
Applicant/Owner: Stafford Consultants Inc.			County: Summers
Investigator: Ed J. Kirk			State: WV
	Yes	No	
Do Normal Circumstances exist on the site?	X		Community ID: Bass lake
Is the site significantly disturbed (atypical area)?		X	Transect ID:
Is the area a potential Problem Area?		X	Plot ID: Wetland #1
If needed, explain on reverse:			

VEGETATION

Dominant Plant Species	Stratum	Indicator	Dominant Plant Species	Stratum	Indicator
Scirpus rubricosus	H	FACW+			
Carex lurida.	H	FACW+			
Leersia orysoides	H	OBL			
Percent of Dominant Species that are OBL, FACW, or FAC (excluding FAC-) = 100% ; Hydrophytic vegetation present.					

HYDROLOGY

Recorded Data (Describe in Remarks):	Wetland Hydrology Indicators:
Stream, Lake, or Tide Guage	Primary Indicators:
Aerial Photographs	Inundated
Other	Saturated in Upper 12 inches
X No Recorded Data Available	Water Marks
	Drift Lines
Field Observations:	Sediment Deposits
Depth of Surface Water: 0”	Drainage Patterns in Wetlands
	Secondary Indicators (2 or more required)
Depth to Free Water in Pit: < 12”	X Oxidized Root Channels in Upper 12 “
	Water stained leaves
Depth to Saturated Soil: <12”	Local Soil Survey Data
	X FAC-Neutral Test
	Other (Explain in Remarks)
Remarks: hydrology present	

TABLE 1A. Continued

SOILS

Map Unit Name (Series and Phase): Ud (Udorthents)
Taxonomy (Subgroup):

Drainage Class: well drained
Field Observations: confirmed as such
Confirm Mapped Type? Yes

Profile Description:

Depth (Inches)	Horizon	Matrix Colors (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Size/Contrast	Texture, Concretions, Structure, etc.
0 – 10”		10YR 3/2	10YR 4/6	very, small oxidized root channels	clayey loam
10 -12”		10YR 3/2	10YR 4/6	large, moderately distinct	gravelly

Hydric Soil Indicators:

Histosol	Concretions
Histic Epipedon	High Organic Content in Surface Layer in Sandy Soils
Sulfidic Odor	
X Aquitic Moisture Regime	Organic Streaking in Sandy Soils
X Reducing Conditions	Listed on Local Hydric Soils List
X Gleyed or Low-Chroma Colors	Listed on National Hydric Soils List
	Other (Explain in Remarks)

Remarks: 2” ribbon, sticky soil (clayey), moist, not wet. Many very fine/fine root fibers 0-2.5”

WETLAND DETERMINATION

Hydrophytic Vegetation Present? Yes	Is this Sampling Point Within a wetland? Yes
Wetland Hydrology Present? Yes	
Hydric Soils Present? Yes	
Remarks: Site determined to be a true wetland of the Wet Meadow classification.	

ENVIRONMENTAL ASSESSMENT

BROOKS/BARKSDALE WASTEWATER TREATMENT PLANT IMPROVEMENTS
AND COLLECTION SYSTEM EXTENSION
SECTION 340 PROJECT

SUMMERS COUNTY

WEST VIRGINIA

APPENDIX F – AGENCY CORRESPONDENCE

U.S. ARMY CORPS OF ENGINEERS

HUNTINGTON DISTRICT

HUNTINGTON, WEST VIRGINIA

OCTOBER 2010

STAFFORD CONSULTANTS INCORPORATED

Engineering, Design, and Consulting
Planning and Environmental Services

July 31, 2008

File: 06-7060.40/B

Ms. Barbara Sargent
DNR - Wildlife Resources Section
Route 219, 250 South - Ward Road
P.O. Box 67
Elkins, WV 26241

Dear Ms. Sargent:

RE: City of Hinton
Brooks / Barksdale Sewer

We are in the process of preparing a wastewater utilities design for the City of Hinton, which is to serve approximately 90 customers in the Brooks / Barksdale area. We are notifying your office of the location of the proposed project. A copy of the proposed wastewater extension is enclosed for your reference.

Please provide us with information and comments regarding the potential impact of this proposed project on rare, threatened and endangered (RTE) species and wetlands.

Your prompt response will be greatly appreciated. If you have any questions, please let me know.

Sincerely,

C. Dean Upton, P.E.
President

CDU/mcm

Enclosure

cc: Cleo Mathews
Bill Pence
Sherry Adams

1105 Mercer Street • Post Office Box 5849 • Princeton, West Virginia 24740
Telephone (304) 425-9555 • Fax (304) 425-9557

DIVISION OF NATURAL RESOURCES
Wildlife Resources Section
Operations Center
P.O. Box 67
Elkins, West Virginia 26241-3235
Telephone (304) 637-0245
Fax (304) 637-0250

Joe Manchin III
Governor

Frank Jezioro
Director

RECEIVED
AUG 14 2008
STAFFORD CONSULTANTS

August 12, 2008

Mr. C. Dean Upton
Stafford Consultants, Inc.
P.O. Box 5849
Princeton, WV 24740

Dear Mr. Upton:

We have reviewed our files for information on rare, threatened and endangered (RTE) species and sensitive habitats for the area of the proposed Brooks/Barksdale sewer project for the City of Hinton in Mercer County, WV.

We have no known records of any RTE species or sensitive habitats within the project area. The Wildlife Resources Section knows of no surveys that have been conducted in the area for rare species or rare species habitat. Consequently, this response is based on information currently available and should not be considered a comprehensive survey of the area under review.

The information provided above is the product of a database search and retrieval. This information does not satisfy other consultation or permitting requirements for disturbances to the natural resources of the state. If your project will directly impact the waters of the state or cause a "take" of fish and/or wildlife, consultation may be required. Requests for WV wildlife agency consultation should be directed to Mr. Roger Anderson at the address given in the letterhead or by email at rogeranderson@wvdnr.gov. Database requests for information on RTE species and sensitive habitats should still be directed to me.

Thank you for your inquiry, and should you have any questions please feel free to contact me at the above number, extension 2048. Enclosed please find an invoice.

Sincerely,

Barbara Sargent
Environmental Resources Specialist
Natural Heritage Program

enclosure

S:\Monthly\Barb\Invoices\Stafford.doc

STAFFORD CONSULTANTS INCORPORATED

Engineering, Design, and Consulting
Planning and Environmental Services

July 31, 2008

File: 06-7060.40/B

Mr. John Benedict
WV Division of Environmental Protection
Division of Air Quality
601 57th Street
Charleston, WV 25304

Dear Mr. Benedict:

RE: City of Hinton
Brooks / Barksdale Sewer

We are in the process of preparing a wastewater utilities design for the City of Hinton, which is to serve approximately 90 customers in the Brooks / Barksdale area. We are notifying your office of the location of the proposed project. A copy of the proposed wastewater extension is enclosed for your reference.

Please provide us with information and comments regarding the potential impact of this proposed project on air quality and pollution control levels.

Your prompt response will be greatly appreciated. If you have any questions, please let me know.

Sincerely,

C. Dean Upton, P.E.
President

CDU/mcm

Enclosure

cc: Cleo Mathews
Bill Pence
Sherry Adams

1105 Mercer Street • Post Office Box 5849 • Princeton, West Virginia 24740
Telephone (304) 425-9555 • Fax (304) 425-9557

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AUG - 7 2008
STAFFORD CONSULTANTS

west virginia department of environmental protection

Division of Air Quality
601 57th Street SE
Charleston, WV 25304
Phone: 304 926 0475 • FAX: 304 926 0479

Joe Manchin, III, Governor
Stephanie R. Timmermeyer, Cabinet Secretary
www.wvdep.org

August 5, 2008

C. Dean Upton, P.E.
President
Stafford Consultants Incorporated
1105 Mercer Street
Princeton, WV 24740

RE: City of Hinton, Brooks/Barksdale Sewer

Dear Mr. Upton:

This letter responds to your correspondence of July 31, 2008 concerning the project referenced above.

Based upon current regulatory requirements, the project referenced above as outlined in your letter does not appear to require any pre-construction permits, authorizations, or air quality analyses by WVDAQ except to the extent either of the following apply:

1. It is necessary to burn land clearing debris in order to complete the project; in which case, approval by the WVDEP Secretary or his or her authorized representative is required to conduct such burning (see 45CSR6) or;

2. The project entails the renovation, remodeling, or demolition, either partially or totally, of a structure, building, or installation, irrespective of the presence or absence of asbestos-containing materials, and is subject to 45CSR15 (the asbestos National Emission Standards for Hazardous Air Pollutants (NESHAP) at 40CFR61, Subpart M). If such is the case, a formal Notification of Abatement, Demolition, or Renovation must be completed and timely filed with the WVDEP Secretary's authorized representative and approval received before commencement of the activities addressed in the Notification.

If the project involves demolition, and/or excavation and transportation of soil/aggregates or the handling of materials that can cause problems such as nuisance dust emissions or entrainment or creation of objectionable odors, adequate air pollution control measures must be applied to prevent statutory air pollution problems as addressed by 45CSR4 and 45CSR17. Copies of all of the WVDAQ rules cited in this letter may be reviewed on the agency's website at http://www.wvdep.org/daq. To review the rules click on "Summary of Regulations" after accessing the website.

You may obtain the latest published air quality data summaries and statistics for the WV Division of Air Quality's ambient air monitoring sites on our website (shown above). Simply click on the image for the Air Quality Annual Report. You may also find a document summarizing, in some detail, the attainment status of the 55 counties in West Virginia relative to National Ambient Air Quality Standards (NAAQS) on our website by clicking on the link for West Virginia Attainment Status for NAAQS.

As of August 1, 2008 both Mercer county and Summers county are designated as attainment areas for all NAAQS.

If you have any questions or need further assistance or information, please contact this office at (304) 926-0475.

Sincerely Yours,

Dee Smith

Dee Smith
Planning Section

DAS/dw

STAFFORD CONSULTANTS INCORPORATED

Engineering, Design, and Consulting
Planning and Environmental Services

July 31, 2008

File: 06-7060.41/B

Chad Meador
Summers County Health Department
P.O. Box 898
Hinton, WV 25951

Dear Mr. Meador

RE: City of Hinton
Brooks / Barsdale Sewer

We are in the process of preparing a wastewater utilities design for the City of Hinton, which is to serve approximately 90 customers in the Brooks / Barksdale area. We are notifying your office of the location of the proposed project. A copy of the proposed wastewater extension is enclosed for your reference.

Please provide us with any information you may have concerning chemicals acquired, stored, or used within project limits or on adjacent areas or any other hazardous materials in the project area.

Your prompt response will be greatly appreciated. If you have any questions, please let me know.

Sincerely,

C. Dean Upton, P.E.
President

CDU/mcm

Enclosure

cc: Cleo Mathews
Bill Pence
Sherry Adams

1105 Mercer Street • Post Office Box 5849 • Princeton, West Virginia 24740
Telephone (304) 425-9555 • Fax (304) 425-9557

Summers County Board of Health
151 Pleasant Street
PO Box 898, Hinton, WV 25951
(304) 466-3388
Fax: (304) 466-1230
E-mail: chadmeador@wvdhhr.org

RECEIVED
AUG - 5 2008
STAFFORD CONSULTANTS

August 4, 2008

C. Dean Upton, P.E., President
Stafford Consultants Inc.
1105 Mercer Street
Princeton, WV 24740

Dear Mr. Upton,

Thank you for providing this office with a copy of the proposed schematic relating to the Brooks/Barksdale wastewater extension project.

This office does not deal with hazardous materials. I would suggest contacting the WV Department of Environmental Protection (WVDEP). WVDEP handles hazardous material issues.

I do not have any official records, but I do believe that the husband of the current owner of Bass Lake Park had a rat poison business several years ago in one of the buildings close to Rt. 20, which falls within the proposed project. This business is not currently in operation. You would have to contact Ms. Jo Ann Fox, Bass Lake Campground Owner, for any official details. She can be reached at (304) 466-1057.

If I can be of any other service to you, please do not hesitate to contact this office.

Sincerely,

Chad E. Meador, R.S.

Chad E. Meador, R.S.

STAFFORD CONSULTANTS INCORPORATED

Engineering, Design, and Consulting
Planning and Environmental Services

July 31, 2008

File: 06-7060.40/B

U.S. Fish and Wildlife
Jeffrey K. Towner, Supervisor
U.S. Department of Interior - WV Field Office
P.O. Box 1278
Elkins, WV 26241

Dear Mr. Towner:

RE: City of Hinton
Brooks / Barksdale Sewer

We are in the process of preparing a wastewater utilities design for the City of Hinton, which is to serve approximately 90 customers in the Brooks / Barksdale area. We are notifying your office of the location of the proposed project. A copy of the proposed wastewater extension is enclosed for your reference.

Please provide us with information and comments regarding the potential impact of this proposed project on wetlands and federally listed endangered and threatened species.

Your prompt response will be greatly appreciated. If you have any questions, please let me know.

Sincerely,

C. Dean Upton, P.E.
President

CDU/mcm

Enclosure

cc: Cleo Mathews
Bill Pence
Sherry Adams

1105 Mercer Street • Post Office Box 5849 • Princeton, West Virginia 24740
Telephone (304) 425-9555 • Fax (304) 425-9557

United States Department of the Interior

FISH AND WILDLIFE SERVICE

West Virginia Field Office
694 Beverly Pike
Elkins, West Virginia 26241

RECEIVED
OCT - 6 2008
STAFFORD CONSULTANTS

September 30, 2008

Mr. C. Dean Upton, P.E.
Stafford Consultants Incorporated
1105 Mercer Street
Post Office Box 5849
Princeton, West Virginia 24740

Re: City of Hinton, Brooks/Barksdale Sewer System, Mercer County, West Virginia

Dear Mr. Upton:

This responds to your information request of July 31, 2008 regarding the potential impacts of a proposed project on wetlands and federally listed endangered and threatened species and species of concern. The City of Hinton proposes construction of the Brooks/Barksdale sewer system in Mercer County, West Virginia. These comments are provided pursuant to the Endangered Species Act (87 Stat. 884, as amended; 16 U.S.C. 1531 et seq.).

No federally listed endangered and threatened species are expected to be impacted by the project. Therefore, no biological assessment or further section 7 consultation under the Endangered Species Act is required with the Fish and Wildlife Service. Should project plans change, or if additional information on listed and proposed species becomes available, this determination may be reconsidered.

Definitive determinations of the presence of waters of the United States, including wetlands, in the project area and the need for permits, if any, are made by the U.S. Army Corps of Engineers. They may be contacted at: Huntington District, Regulatory Branch, 502 Eighth Street, Huntington, West Virginia 25701, telephone (304)399-5710.

If you have any questions regarding this letter, please contact this office at (304) 636-6586, or at the letterhead address.

Sincerely,

Laura Hill
for Thomas R. Chapman
Field Supervisor

STAFFORD CONSULTANTS INCORPORATED

Engineering, Design, and Consulting
Planning and Environmental Services

	CDU		HB
	ELS		
	JRB		
	KRC		
	CP		

August 6, 2008

File: 06-7060.40/B

Ms. Susan Pierce
Deputy State Historic Preservation Officer
WV Division of History and Culture
The Cultural Center
1900 Kanawha Boulevard, East
Charleston, WV 25305-0300

Dear Ms. Wilson:

RE: City of Hinton
Brooks / Barksdale Sewer

We are in the process of preparing a wastewater utilities design for the City of Hinton, which is to serve approximately 90 customers in the Brooks / Barksdale area. We are notifying your office of the location of the proposed project. A copy of the proposed wastewater extension, wastewater treatment plant photos and pump station site photos along with a U.S.G.S topographical map showing the pump station site locations is enclosed for your reference.

Please provide us with information and comments regarding the potential impact of this proposed project on historic or archaeological resources.

Your prompt response will be greatly appreciated. If you have any questions, please let me know.

Sincerely,

C. Dean Upton, P.E.
President

CDU/mcm

Enclosure

cc: Cleo Mathews
Bill Pence
Sherry Adams

1105 Mercer Street • Post Office Box 5849 • Princeton, West Virginia 24740
Telephone (304) 425-9555 • Fax (304) 425-9557

WEST VIRGINIA
DIVISION OF
CULTURE & HISTORY

The Cultural Center
1900 Kanawha Blvd., E.
Charleston, WV
25305-0300

Phone 304.558.0220
Fax 304.558.2779
TDD 304.558.3562
www.wvculture.org
EEO/AA Employer

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SEP 11 2008
STAFFORD CONSULTANTS

September 4, 2008

Mr. C. Dean Upton, PE
President
Stafford Consultants, Inc.
1105 Mercer Street
P.O. Box 5849
Princeton, WV 24740

RE: City of Hinton, Brooks/Barksdale Sewer
FR#: 08-1025-SU

We have reviewed the above referenced project to determine potential effects to cultural resources. As required by Section 106 of the National Historic Preservation Act, as amended, and its implementing regulations, 36 CFR 800: "Protection of Historic Properties," we submit our comments.

According to submitted project information, the City of Hinton is proposing to undertake a wastewater collection and treatment system expansion project in the Brooks/Barksdale area of Summers County that will involve the installation of the following: a headworks building at the existing wastewater treatment plant, four pump stations, force main lines, and sanitary sewer lines.

Architectural Resources:
In our opinion, there are no architectural or structural resources located within the proposed project area or viewshed that are eligible for or listed in the National Register of Historic Places. No further consultation is necessary with respect to architectural or structural resources.

Archaeological Resources:
A search of office site files located 46Su156, 46Su112, 46Su681, 46Su682, 46Su158, 46Su155, 46Su609, 46Su18, and 46Su79 within and/or immediately adjacent to the project area. Our records also indicate that there are over thirty additional archaeological sites within a one mile radius. It is our understanding that a Phase I archaeological survey is being conducted in the project area at the request of the U.S. Army Corps of Engineers. We will provide additional comment upon receipt of the Phase I archaeological survey technical report.

We appreciate the opportunity to be of service. *If you have questions regarding our comments or the Section 106 process, please contact Ginger Williford, Structural Historian, or Carolyn Kender, Archaeologist, in the Historic Preservation Office at (304) 558-0240.*

Sincerely,

Susan M. Pierce

Susan M. Pierce
Deputy State Historic Preservation Officer

SMP/GW/CMK

STAFFORD CONSULTANTS INCORPORATED

Engineering, Design, and Consulting
Planning and Environmental Services

July 31, 2008

File: 06-7060.40/B

Mr. Dave Cole, Executive Director
Region I Planning and Development Council
1439 East Main St.
Suite 5
Princeton, WV 24740

Dear Mr. Cole:

RE: City of Hinton
Brooks / Barksdale Sewer

We are in the process of preparing a wastewater utilities design for the City of Hinton, which is to serve approximately 90 customers in the Brooks / Barksdale area. We are notifying your office of the location of the proposed project. A copy of the proposed wastewater extension is enclosed for your reference.

Please provide us with a clearinghouse review of this project as soon as possible.

Your prompt response will be greatly appreciated. If you have any questions, please let me know.

Sincerely,

C. Dean Upton, P.E.
President

CDU/mcm

Enclosure

cc: Cleo Mathews
Bill Pence
Sherry Adams

1105 Mercer Street • Post Office Box 5849 • Princeton, West Virginia 24740
Telephone (304) 425-9555 • Fax (304) 425-9557

Region I Planning & Development Council

1439 East Main Street, Suite #5
Princeton, WV 24740

(304) 431-7225
Fax (304) 431-7235
regionone@regiononepdc.org

August 14, 2008

RECEIVED
AUG 19 2008
STAFFORD CONSULTANTS

C. Dean Upton, P. E., President
Stafford Consultants, Incorporated
P. O. Box 5849
Princeton, WV 24740

REF: INTERGOVERNMENTAL REVIEW #8823: CITY OF HINTON BROOKS/BARKSDALE SEWER PROJECT

Dear Mr. Upton:

This letter is to inform you that the Region I Planning and Development Council staff has completed its review of the above referenced application.

Our review of the above referenced application shows that it meets with the overall goals and objectives as set forth by the Region I Planning and Development Council. Therefore, this letter is to serve as official notification of compliance with the State of West Virginia's Intergovernmental Review Process.

Sincerely,

David N. Cole
Executive Director

DC: fmp

Copy: Robert D. Lewis, WVDO

ENVIRONMENTAL ASSESSMENT

BROOKS/BARKSDALE WASTEWATER TREATMENT PLANT IMPROVEMENTS
AND COLLECTION SYSTEM EXTENSION
SECTION 340 PROJECT

SUMMERS COUNTY

WEST VIRGINIA

APPENDIX G – CORPS HTRW CLEARANCE MEMORANDUM

U.S. ARMY CORPS OF ENGINEERS

HUNTINGTON DISTRICT

HUNTINGTON, WEST VIRGINIA

OCTOBER 2010

CELRH-EC-CE (1110)

01 July 2009
Wolfe/5327
gw

MEMORANDUM FOR CELRH-PM-PP-P, ATTN: Sherry Adams

SUBJECT: Addendum 1, dated June 2009, to the May 2009 Limited Phase I Hazardous, Toxic, and Radioactive Waste (HTRW) Assessment, City of Hinton Brooks/Barksdale Wastewater Treatment Plant Improvements and Collection System Extension, Hinton, WV.

1. The above referenced addendum was reviewed by EC-CE and was determined to be acceptable. This completes the HTRW investigation of the above referenced project. No further HTRW investigation is necessary at this time.

2. If you have any questions or further comments, please contact Janet Wolfe at x5327.

WYATT H. KMEN
Chief, Environmental and Remediation Section

CF: EC-CE (file copy)

ENVIRONMENTAL ASSESSMENT

BROOKS/BARKSDALE WASTEWATER TREATMENT PLANT IMPROVEMENTS
AND COLLECTION SYSTEM EXTENSION
SECTION 340 PROJECT

SUMMERS COUNTY

WEST VIRGINIA

APPENDIX H – NOTICE OF AVAILABILITY

U.S. ARMY CORPS OF ENGINEERS

HUNTINGTON DISTRICT

HUNTINGTON, WEST VIRGINIA

OCTOBER 2010

NOTICE OF AVAILABILITY
DRAFT ENVIRONMENTAL ASSESSMENT
BROOKS/BARKSDALE WASTEWATER TREATMENT PLANT IMPROVEMENTS
AND COLLECTION SYSTEM EXTENSION
SECTION 340 PROJECT
SUMMERS COUNTY, WEST VIRGINIA

The U.S. Army Corps of Engineers, Huntington District, by this Notice of Availability (NOA), advises the public that the Draft Environmental Assessment (DEA) for the Brooks/Barksdale Wastewater Treatment Plant Improvements and Collection System Extension Section 340 Project is complete and available for public review. The project is located in Summers County, West Virginia. A Finding of No Significant Impact (FONSI) is anticipated for the proposed project. A Draft FONSI is included with the DEA for public review.

In compliance with the National Environmental Policy Act (NEPA) and 40 CFR 1501.4, the DEA and Draft FONSI must be available to the public in the affected area for thirty (30) days for review and comment. Final determination regarding the need for additional NEPA documentation will be made after the public review period, which begins on or about December 06, 2010. Copies of the documents may be viewed at the following location.

Summers County Public Library
201 Temple Street
Hinton, WV 25951-2330

In addition to the hard-copies available at the location listed above the DEA and its appendices can be viewed online at the following link under the Brooks/Barksdale 340 heading:
http://www.lrh.usace.army.mil/projects/review/

Copies of the DEA and Draft FONSI may be obtained by contacting Huntington District Office of the Corps of Engineers at 304-399-5276. Comments pertaining to the documents should be directed by letter to:

Mr. Jonathan J. Aya-ay, Chief
Environmental Analysis Section, Planning Branch
Huntington District Corps of Engineers
502 Eighth Street
Huntington, West Virginia 25701-2070

ENVIRONMENTAL ASSESSMENT

BROOKS/BARKSDALE WASTEWATER TREATMENT PLANT IMPROVEMENTS
AND COLLECTION SYSTEM EXTENSION
SECTION 340 PROJECT

SUMMERS COUNTY

WEST VIRGINIA

APPENDIX I – MAILING LIST

U.S. ARMY CORPS OF ENGINEERS

HUNTINGTON DISTRICT

HUNTINGTON, WEST VIRGINIA

OCTOBER 2010

Elected Officials

Honorable Earl Ray Tomblin
Governor of West Virginia
1900 Kanawha Boulevard, E.
Charleston, West Virginia 25305

Honorable Nick J. Rahall II
Representative in Congress
845 Fifth Street
Huntington, WV 25701

Honorable Joe Manchin
United States Senate
311 Hart Senate Office Building
Washington, D.C. 20510

Honorable John D. Rockefeller IV
United States Senate
531 Hart Senate Office Building
Washington, D.C. 20510

Federal Agencies

Mr. Thomas Chapman, Field Supervisor
U.S. Fish and Wildlife Service
West Virginia Field Office
694 Beverly Pike
Elkins, West Virginia 26241

Mr. Robert N. Pate, Area Resource Soil Scientist
U.S. Department of Agriculture (USDA)
Natural Resources Conservation Service (NRCS)
465 Ragland Road
Beckley, West Virginia 25801

Mr. John Forren NEPA/404 Coordinator
U.S. Environmental Protection Agency
Region III Office of Environmental Programs
1650 Arch Street
Philadelphia, Pennsylvania 19103-2029

Mr. David Fuerst, Cultural Resource Manager
U.S. National Park Service (NPS)
New River Gorge National River
104 Main Street
Glen Jean, WV 25846

Mr. Richard Segars, Historical Architect
U.S. National Park Service (NPS)
New River Gorge National River
104 Main Street
Glen Jean, WV 25846

Mr. Scott Stonum
Chief Resource Management & Planning
U.S. National Park Service (NPS)
New River Gorge National River
104 Main Street
Glen Jean, WV 25846

State Agencies

Mr. Lyle Bennett
WV Department of Environmental Protection
Division of Water and Waste Management
601 – 57th Street
Charleston, West Virginia 25304

Mr. Frank Jezioro, Director
WV Division of Natural Resources
Capitol Complex, Building 3, Room 669
Charleston, West Virginia 26241

Ms. Susan Pierce
Deputy State Historic Preservation Officer
State Historic Preservation Office
1900 Kanawha Boulevard, E.
Charleston, West Virginia 25305-0300

Mr. Paul A. Mattox, Jr., P.E.
West Virginia Department of Transportation
Building 5
1900 Kanawha Boulevard, E.
Charleston, West Virginia 25305

WV Department of Environmental Protection
Division of Air Quality
601 57th Street
Charleston, West Virginia 25304

County Government

Summers County Commissioners
518 Chestnut Street
Hinton, WV 25951

Summers County Health Department
Post Office Box 898
Hinton, West Virginia 25951

City of Hinton Sanitary Board
322 Summers St
Hinton, WV 25951-2309

Mr. David Dent, County Floodplain Manager
P.O. Box 97
Hinton, WV 25951

Public Libraries

Summers County Public Library
201 Temple Street
Hinton, WV 25951-2330

Engineering Consultants

Mr. Dean Upton
Stafford Consultants, Inc.
1105 Mercer Street
P.O. Box 5849
Princeton, West Virginia 24740

ENVIRONMENTAL ASSESSMENT

BROOKS/BARKSDALE WASTEWATER TREATMENT PLANT IMPROVEMENTS
AND COLLECTION SYSTEM EXTENSION
SECTION 340 PROJECT

SUMMERS COUNTY

WEST VIRGINIA

APPENDIX J – NPS PLANT COMMUNITY TECHNICAL REPORT

U.S. ARMY CORPS OF ENGINEERS

HUNTINGTON DISTRICT

HUNTINGTON, WEST VIRGINIA

OCTOBER 2010

COMMON NAME (PARK-SPECIFIC): SYCAMORE - ASH FLOODPLAIN FOREST

SYNONYMS

NVC English Name: **Sycamore - Green Ash / American Hornbeam / Wingstem Forest**

NVC Scientific Name: ***Platanus occidentalis - Fraxinus pennsylvanica / Carpinus caroliniana / Verbesina alternifolia* Forest**

NVC Identifier: **CEGL006458**

LOCAL INFORMATION

Environmental Description: This association occurs in small to medium-sized patches (<0.1-13 ha) on floodplains of the New River. The best developed stands occur on the wider floodplains which are associated with point bars along the inside bends of large river meanders. It also occurs on alluvial fans at the mouths of tributaries, and at knickpoints created by rapids and waterfalls. These positions are temporarily inundated by low- to medium-energy floods which may occur at any time of year but are more frequent in the winter and spring. Flooding frequency varies by relative elevation but is likely to occur at least annually throughout most of this community. Evidence of flooding includes fluvial microtopography, flotsam piles, and lack of thick litter layers and organic soil horizons. Substrates are alluvium, including boulders, cobbles, gravel, and sand. Soils in plots are described as well-drained, slightly acidic to neutral sand and sandy loam. Soil chemistry analyzed from 5 plots indicates slightly acidic soils (mean pH = 5.92) with relatively low levels of organic matter, S, Al, K, and P, and relatively high levels of Ca, Cu, Mg, and Zn. Slopes range from level to steep (mapping unit values range from 0 to 35 degrees, mean = 8 degrees). Elevations of mapped stands range from 259 to 418 m. Adjacent communities include *Platanus occidentalis - (Betula nigra, Salix* (willow) spp.) Temporarily Flooded Woodland (CEGL003725), which occurs closer to the rivershore in positions subject to higher energy flooding, and *Quercus (alba, rubra, velutina) / Halesia tetraptera* Forest (CEGL006462), which occurs on higher floodplain terraces which are infrequently flooded.

Vegetation Description: This association represents closed-canopy deciduous floodplain forests along the New River. The tree canopy is usually tall (20-35 m) with cover in plots ranging from 40 to 80% dominated by *Platanus occidentalis* (sycamore), *Fraxinus pennsylvanica* (green ash), and *Liriodendron tulipifera* (tuliptree). Additional important trees in the canopy include *Betula nigra* (river birch), *Fraxinus americana* (white ash), *Juglans nigra* (black walnut), *Nyssa sylvatica* (blackgum), *Quercus rubra* (northern red oak), *Robinia pseudoacacia* (black locust), *Ulmus americana* (American elm), and *Ulmus rubra* (slippery elm). Subcanopy cover ranges from 10 to 80% and may include canopy species and *Acer saccharum var. saccharum* (sugar maple), *Carpinus caroliniana ssp. virginiana* (American hornbeam), *Cercis canadensis* (eastern redbud), *Chionanthus virginicus* (white fringetree), *Cornus florida* (flowering dogwood), *Halesia tetraptera* (mountain silverbell), *Sassafras albidum* (sassafras), and *Zanthoxylum americanum* (common pricklyash). Cover in the tall-shrub layer of plots ranges from 10 to 80%; cover in the short-shrub layer ranges from 10 to 50%. Additional species in the shrub layers not included in the canopy include *Asimina triloba* (pawpaw), *Campsis radicans* (trumpet creeper), *Dirca palustris* (eastern leatherwood), *Hamamelis virginiana* (American witchhazel), *Lindera benzoin* (northern spicebush), *Toxicodendron radicans* (eastern poison ivy), and *Viburnum recognitum* (southern arrowwood). Cover in the diverse herb layer of plots ranges from 20 to 90%. Herbs with highest constancy and/or cover in plots include *Ageratina altissima* (white snakeroot), *Allium cernuum* var. *cernuum* (nodding onion), *Amphicarpaea bracteata*

(American hogpeanut), *Arabis laevigata* (smooth rockcress), *Aristolochia macrophylla* (pipevine), *Asarum canadense* (Canadian wildginger), *Boehmeria cylindrica* (smallspike false nettle), *Brachyelytrum erectum* (bearded shorthusk), *Cardamine impatiens* (narrowleaf bittercress), *Chasmanthium latifolium* (Indian woodoats), *Cinna arundinacea* (sweet woodreed), *Cryptotaenia canadensis* (Canadian honewort), *Dichanthelium clandestinum* (deertongue), *Dioscorea villosa* (wild yam), *Elymus hystrix* (eastern bottlebrush grass), *Elymus virginicus* (Virginia wildrye), *Eurybia divaricata* (white wood aster), *Festuca subverticillata* (nodding fescue), *Galium aparine* (stickywilly), *Iris cristata* (dwarf crested iris), *Laportea canadensis* (Canadian woodnettle), *Lysimachia ciliata* (fringed loosestrife), *Maianthemum racemosum* ssp. *racemosum* (feathery false lily of the valley), *Packera aurea* (golden ragwort), *Parthenocissus quinquefolia* (Virginia creeper), *Phlox paniculata* (fall phlox), *Pilea pumila* var. *pumila* (Canadian clearweed), *Polygonatum biflorum* (smooth Solomon's seal), *Polygonum virginianum* (jumpseed), *Polystichum acrostichoides* (Christmas fern), *Rudbeckia laciniata* var. *laciniata* (cutleaf coneflower), *Sanicula odorata* (clustered blacksnakeroot), *Sedum ternatum* (woodland stonecrop), *Silene stellata* (widowsfrill), *Silphium perfoliatum var. connatum* (cup plant), *Solidago flexicaulis* (zigzag goldenrod), *Symphyotrichum cordifolium* (common blue wood aster), *Tradescantia virginiana* (Virginia spiderwort), *Verbesina alternifolia* (wingstem), *Verbesina occidentalis* (yellow crownbeard), *Viola striata* (striped cream violet), *Zizia aptera* (meadow zizia), *Zizia aurea* (golden zizia), and *Zizia trifoliata* (meadow alexanders). Exotic plant species which invade this community include *Alliaria petiolata* (garlic mustard), *Glechoma hederacea* (ground ivy), *Lonicera japonica* (Japanese honeysuckle), *Microstegium vimineum* (Nepalese browntop), *Polygonum cuspidatum* (Japanese knotweed), *Prunella vulgaris* (common selfheal), and *Rosa multiflora* (multiflora rose). Vascular plant species richness in the 16 sampled plots ranges from 26 to 70 (mean = 53.2).

Most Abundant Species:

Stratum	Lifeform	Species
Tree (canopy & subcanopy)	Broad-leaved deciduous tree	*Fraxinus pennsylvanica* (green ash), *Liriodendron tulipifera* (tuliptree), *Platanus occidentalis* (sycamore)
Tree subcanopy	Broad-leaved deciduous tree	*Carpinus caroliniana* ssp. *virginiana* (American hornbeam)

Characteristic Species: *Acer saccharum* (sugar maple), *Ageratina altissima* (white snakeroot), *Allium cernuum* var. *cernuum*, *Amphicarpaea bracteata* (American hogpeanut), *Arabis laevigata* (smooth rockcress), *Aristolochia macrophylla* (pipevine), *Asarum canadense* (Canadian wildginger), *Asimina triloba* (pawpaw), *Betula nigra* (river birch), *Boehmeria cylindrica* (smallspike false nettle), *Brachyelytrum erectum* (bearded shorthusk), *Campsis radicans* (trumpet creeper), *Cardamine impatiens* (narrowleaf bittercress), *Cercis canadensis* (eastern redbud), *Chasmanthium latifolium* (Indian woodoats), *Chionanthus virginicus* (white fringetree), *Cinna arundinacea* (sweet woodreed), *Cornus florida* (flowering dogwood), *Cryptotaenia canadensis* (Canadian honewort), *Dichanthelium clandestinum* (deertongue), *Dioscorea villosa* (wild yam), *Dirca palustris* (eastern leatherwood), *Elymus hystrix* (eastern bottlebrush grass), *Elymus virginicus* var. *virginicus* (Virginia wildrye), *Eurybia divaricata* (white wood aster), *Festuca subverticillata* (nodding fescue), *Fraxinus americana* (white ash), *Galium aparine* (stickywilly), *Halesia tetraptera* (mountain silverbell), *Hamamelis virginiana* (American witchhazel), *Iris cristata* (dwarf crested iris), *Juglans nigra* (black walnut), *Laportea canadensis* (Canadian woodnettle), *Lindera benzoin* (northern spicebush), *Lysimachia ciliata* (fringed

loosestrife), *Maianthemum racemosum* ssp. *racemosum* (feathery false lily of the valley), *Nyssa sylvatica* (blackgum), *Packera aurea* (golden ragwort), *Parthenocissus quinquefolia* (Virginia creeper), *Phlox paniculata* (fall phlox), *Pilea pumila* var. *pumila* (Canadian clearweed), *Polygonatum biflorum* (smooth Solomon's seal), *Polygonum virginianum* (jumpseed), *Polystichum acrostichoides* (Christmas fern), *Quercus rubra* (northern red oak), *Robinia pseudoacacia* (black locust), *Rudbeckia laciniata* (cutleaf coneflower), *Sanicula odorata* (clustered blacksnakeroot), *Sassafras albidum* (sassafras), *Sedum ternatum* (woodland stonecrop), *Silene stellata* (widowsfrill), *Solidago flexicaulis* (zigzag goldenrod), *Symphyotrichum cordifolium* (common blue wood aster), *Toxicodendron radicans* (eastern poison ivy), *Tradescantia virginiana* (Virginia spiderwort), *Ulmus americana* (American elm), *Ulmus rubra* (slippery elm), *Verbesina alternifolia* (wingstem), *Verbesina occidentalis* (yellow crownbeard), *Viburnum recognitum* (southern arrowwood), *Viola striata* (striped cream violet), *Zanthoxylum americanum* (common pricklyash), *Zizia aptera* (meadow zizia), *Zizia aurea* (golden zizia), *Zizia trifoliata* (meadow alexanders).

Other Noteworthy Species:

Species	GRank	Type	Note
Cardamine flagellifera (Blue Ridge bittercress)	G3	plant	state-rare (S1S2)
Silphium perfoliatum var. *connatum* (cup plant)	G5T3?	plant	state-rare (S1)

Subnational Distribution with Crosswalk Data:

State	SRank	Rel	Conf	SName	Reference
WV	SNR	=	1	[gname]	WVNHP unpubl. data b

Local Range: This association occurs in patches along the New River throughout its length in the park.

Classification Comments: Spatially and compositionally, this association is intermediate to *Platanus occidentalis - (Betula nigra, Salix* (willow) spp.) Temporarily Flooded Woodland (CEGL003725), which is usually a woodland and occurs in lower positions subject to more frequent, higher energy flooding, and *Quercus (alba, rubra, velutina) / Halesia tetraptera* Forest (CEGL006462), which occurs in higher positions subject to less frequent, lower energy floods. Suiter (1995) considered the floodplain forests along the New River to be part of the mesic upland forest.

Other Comments: Information not available.

Local Description Authors: J. P. Vanderhorst.

Plots: NERI.3, NERI.5, NERI.54, NERI.79, NERI.127, NERI.129, NERI.130, NERI.140, NERI.141, NERI.141, NERI.269, NERI.270, NERI.307, NERI.324, NERI.327, NERI.355, NERI.361.

New River Gorge National River Inventory Notes: Information not available.

GLOBAL INFORMATION

NVC CLASSIFICATION

Physiognomic Class	Forest (I)
Physiognomic Subclass	Deciduous forest (I.B.)
Physiognomic Group	Cold-deciduous forest (I.B.2.)
Physiognomic Subgroup	Natural/Semi-natural cold-deciduous forest (I.B.2.N.)
Formation	Temporarily flooded cold-deciduous forest (I.B.2.N.d.)
Alliance	Platanus occidentalis - (Liquidambar styraciflua, Liriodendron tulipifera) Temporarily Flooded Forest Alliance (A.289)

Alliance (English name)	Sycamore - (Sweetgum, Tuliptree) Temporarily Flooded Forest Alliance
Association	*Platanus occidentalis - Fraxinus pennsylvanica / Carpinus caroliniana / Verbesina alternifolia* Forest
Association (English name)	Sycamore - Green Ash / American Hornbeam / Wingstem Forest
Ecological System(s):	Information not available.

GLOBAL DESCRIPTION

Concept Summary: This association is currently only known and described from New River Gorge, West Virginia. It occurs in small to medium-sized patches (<0.1-13 ha) on floodplains of the New River. The best developed stands occur on the wider floodplains which are associated with point bars along the inside bends of large river meanders. It also occurs on alluvial fans at the mouths of tributaries, and at knickpoints created by rapids and waterfalls. These positions are temporarily inundated by low- to medium-energy floods which may occur at any time of year but are more frequent in the winter and spring. Substrates are alluvium, including boulders, cobbles, gravel, and sand. Soils are well-drained, slightly acidic to neutral sand and sandy loam. Elevations of mapped stands range from 259 to 418 m. This association represents closed-canopy deciduous floodplain forests along the New River. The tree canopy is dominated by *Platanus occidentalis* (Sycamore), *Fraxinus pennsylvanica* (green ash), and *Liriodendron tulipifera* (tuliptree). Additional important trees in the canopy include *Betula nigra* (river birch), *Fraxinus americana* (white ash), *Juglans nigra* (black walnut), *Nyssa sylvatica* (blackgum), *Quercus rubra* (northern red oak), *Robinia pseudoacacia* (black locust), *Ulmus americana* (American elm), and *Ulmus rubra* (slippery elm). The subcanopy includes canopy species and *Acer saccharum* (sugar maple), *Carpinus caroliniana ssp. virginiana* (American hornbeam), *Cercis canadensis* (eastern redbud), *Chionanthus virginicus* (white fringetree), *Cornus florida* (flowering dogwood), *Halesia tetraptera* (mountain silverbell), *Sassafras albidum* (sassafras) and *Zanthoxylum americanum* (common pricklyash). Species in the shrub layers not included in the canopy include *Asimina triloba* (pawpaw), *Campsis radicans* (trumpet creeper), *Dirca palustris* (eastern leatherwood), *Hamamelis virginiana* (American witchhazel), *Lindera benzoin* (northern spicebush), *Toxicodendron radicans* (eastern poison ivy), and *Viburnum recognitum* (southern arrowwood). Cover in the diverse herb layer ranges from 20 to 90%.

Environmental Description: This association occurs in small to medium-sized patches (<0.1-13 ha) on floodplains of the New River. The best developed stands occur on the wider floodplains which are associated with point bars along the inside bends of large river meanders. It also occurs on alluvial fans at the mouths of tributaries, and at knickpoints created by rapids and waterfalls. These positions are temporarily inundated by low- to medium-energy floods which may occur at any time of year but are more frequent in the winter and spring. Substrates are alluvium, including boulders, cobbles, gravel, and sand. Soils in plots are described as well-drained, slightly acidic to neutral sand and sandy loam. Soil chemistry analyzed from 5 plots at New River Gorge indicates slightly acidic soils (mean pH = 5.92) with relatively low levels of organic matter, S, Al, K, and P, and relatively high levels of Ca, Cu, Mg, and Zn. Slopes range from level to steep (mapping unit values range from 0 to 35 degrees, mean = 8 degrees). Elevations of mapped stands range from 259 to 418 m.

Vegetation Description: This association represents closed-canopy deciduous floodplain forests along the New River. The tree canopy is usually tall (20-35 m) with cover in plots ranging from 40 to 80% dominated by *Platanus occidentalis* (American sycamore), *Fraxinus pennsylvanica* (green ash), and *Liriodendron tulipifera* (tuliptree). Additional important trees in

the canopy include *Betula nigra* (river birch), *Fraxinus americana* (white ash), *Juglans nigra* (black walnut), *Nyssa sylvatica* (blackgum), *Quercus rubra* (northern red oak), *Robinia pseudoacacia* (black locust), *Ulmus americana* (American elm), and *Ulmus rubra* (slippery elm). Subcanopy cover ranges from 10 to 80% and may include canopy species and *Acer saccharum* (sugar maple), *Carpinus caroliniana ssp. virginiana* (American hornbeam), *Cercis canadensis* (eastern redbud), *Chionanthus virginicus* (white fringetree), *Cornus florida* (flowering dogwood), *Halesia tetraptera* (mountain silverbell), *Sassafras albidum* (sassafras) and *Zanthoxylum americanum* (common pricklyash). Cover in the tall-shrub layer of plots ranges from 10 to 80%, and cover in the short-shrub layers ranges from 10 to 50%. Additional species in the shrub layers not included in the canopy include *Asimina triloba* (pawpaw), *Campsis radicans* (trumpet creeper), *Dirca palustris* (eastern leatherwood), *Hamamelis virginiana* (American witchhazel), *Lindera benzoin* (northern spicebush), *Toxicodendron radicans* (eastern poison ivy), and *Viburnum recognitum* (southern arrowwood). Cover in the diverse herb layer of plots ranges from 20 to 90%. Herbs with highest constancy and/or cover in plots include *Ageratina altissima* (white snakeroot), *Allium cernuum* (nodding onion), *Amphicarpaea bracteata* (American hogpeanut), *Arabis laevigata* (smooth rockcress), *Aristolochia macrophylla* (pipevine), *Asarum canadense* (Canadian wildginger), *Boehmeria cylindrica* (smallspike false nettle), *Brachyelytrum erectum* (bearded shorthusk), *Cardamine impatiens* (narrowleaf bittercress), *Chasmanthium latifolium* (Indian woodoats), *Cinna arundinacea* (sweet woodreed), *Cryptotaenia canadensis* (Canadian honewort), *Dichanthelium clandestinum* (deertongue), *Dioscorea villosa* (wild yam), *Elymus hystrix* (eastern bottlebrush grass), *Elymus virginicus* (Virginia wildrye), *Eurybia divaricata* (white wood aster), *Festuca subverticillata* (nodding fescue), *Galium aparine* (stickywilly), *Iris cristata* (dwarf crested iris), *Laportea canadensis* (Canadian woodnettle), *Lysimachia ciliata* (fringed loosestrife), *Maianthemum racemosum* (feathery false lily of the valley), *Packera aurea* (golden ragwort), *Parthenocissus quinquefolia* (Virginia creeper), *Phlox paniculata* (fall phlox), *Pilea pumila* (Canadian clearweed), *Polygonatum biflorum* (smooth Solomon's seal), *Polygonum virginianum* (jumpseed), *Polystichum acrostichoides* (Christmas fern), *Rudbeckia laciniata* (cutleaf coneflower), *Sanicula odorata* (clustered blacksnakeroot), *Sedum ternatum* (woodland stonecrop), *Silene stellata* (widowsfrill), *Silphium perfoliatum var. connatum* (cup plant), *Solidago flexicaulis* (zigzag goldenrod), *Symphyotrichum cordifolium* (common blue wood aster), *Tradescantia virginiana* (Virginia spiderwort), *Verbesina alternifolia* (wingstem), *Verbesina occidentalis* (yellow crownbeard), *Viola striata* (striped cream violet), *Zizia aptera* (meadow zizia), *Zizia aurea* (golden zizia), and *Zizia trifoliata* (meadow alexanders). Exotic plant species which invade this community include *Alliaria petiolata* (garlic mustard), *Glechoma hederacea* (ground ivy), *Lonicera japonica* (Japanese honeysuckle), *Microstegium vimineum* (Nepalese browntop), *Polygonum cuspidatum* (Japanese knotweed), *Prunella vulgaris* (common selfheal), and *Rosa multiflora* (multiflora rose). Vascular plant species richness in the 16 sampled plots ranges from 26 to 70 (mean = 53.2).

Most Abundant Species:

Stratum	Lifeform	Species
Tree (canopy & subcanopy)	Broad-leaved deciduous tree	*Fraxinus pennsylvanica* (green ash), *Liriodendron tulipifera* (tuliptree), *Platanus occidentalis* (Sycamore)
Tree subcanopy	Broad-leaved deciduous tree	*Carpinus caroliniana* ssp. *virginiana* (American hornbeam)

Characteristic Species: *Ageratina altissima* (white snakeroot), *Allium cernuum* (nodding onion), *Amphicarpaea bracteata* (American hogpeanut), *Arabis laevigata* (smooth rockcress), *Aristolochia macrophylla* (pipevine), *Asarum canadense* (Canadian wildginger), *Asimina triloba* (pawpaw), *Betula nigra* (river birch), *Boehmeria cylindrica* (smallspike false nettle), *Brachyelytrum erectum* (bearded shorthusk), *Campsis radicans* (trumpet creeper), *Cardamine impatiens* (narrowleaf bittercress), *Cercis canadensis* (eastern redbud), *Chasmanthium latifolium* (Indian woodoats), *Chionanthus virginicus* (white fringetree), *Cinna arundinacea* (sweet woodreed), *Cornus florida* (flowering dogwood), *Cryptotaenia canadensis* (Canadian honewort), *Dichanthelium clandestinum* (deertongue), *Dioscorea villosa* (wild yam), *Dirca palustris* (eastern leatherwood), *Elymus hystrix* (eastern bottlebrush grass), *Elymus virginicus* (Virginia wildrye), *Eurybia divaricata* (white wood aster), *Festuca subverticillata* (nodding fescue), *Fraxinus americana* (white ash), *Galium aparine* (stickywilly), *Halesia tetraptera* (mountain silverbell), *Hamamelis virginiana* (American witchhazel), *Iris cristata* (dwarf crested iris), *Juglans nigra* (black walnut), *Laportea canadensis* (Canadian woodnettle), *Lindera benzoin* (northern spicebush), *Lysimachia ciliata* (fringed loosestrife), *Maianthemum racemosum* (feathery false lily of the valley), *Nyssa sylvatica* (blackgum), *Packera aurea* (golden ragwort), *Parthenocissus quinquefolia* (Virginia creeper), *Phlox paniculata* (fall phlox), *Pilea pumila* (Canadian clearweed), *Polygonatum biflorum* (smooth Solomon's seal), *Polygonum virginianum* (jumpseed), *Polystichum acrostichoides* (Christmas fern), *Quercus rubra* (northern red oak), *Robinia pseudoacacia* (black locust), *Rudbeckia laciniata* (cutleaf coneflower), *Sanicula odorata* (clustered blacksnakeroot), *Sassafras albidum* (sassafras), *Sedum ternatum* (woodland stonecrop), *Silene stellata* (widowsfrill), *Solidago flexicaulis* (zigzag goldenrod), *Symphyotrichum cordifolium* (common blue wood aster), *Toxicodendron radicans* (eastern poison ivy), *Tradescantia virginiana* (Virginia spiderwort), *Ulmus americana* (American elm), *Ulmus rubra* (slippery elm), *Verbesina alternifolia* (wingstem), *Verbesina occidentalis* (yellow crownbeard), *Viburnum recognitum* (southern arrowwood), *Viola striata* (striped cream violet), *Zanthoxylum americanum* (common pricklyash), *Zizia aptera* (meadow zizia), *Zizia aurea* (golden zizia), *Zizia trifoliata* (meadow alexanders).
Other Noteworthy Species: Information not available.
USFWS Wetland System: Not applicable.

DISTRIBUTION
Range: This association is currently documented from the New River in West Virginia but is presumably wider ranging.
States/Provinces: WV.
Federal Lands: NPS (New River Gorge).

CONSERVATION STATUS
Rank: GNR (2-Aug-2006).
Reasons: Information not available.

CLASSIFICATION INFORMATION
Status: Standard.
Confidence: 3 - Weak.
Comments: Information not available.

Similar Associations:

- *Platanus occidentalis - Acer negundo - Juglans nigra / Asimina triloba / Mertensia virginica* Forest (CEGL004073)--occurs on richer floodplains in the central Appalachians, usually on calcareous substrates.
- *Platanus occidentalis - Acer saccharinum - Juglans nigra - Ulmus rubra* Forest (CEGL007334)--occurs on richer floodplains in the southern Appalachians, Cumberlands, and adjacent regions, usually on calcareous substrates.
- *Platanus occidentalis - Liquidambar styraciflua / Carpinus caroliniana - Asimina triloba* Forest (CEGL007340)--has Coastal Plain affinity.

Related Concepts:

- *Platanus occidentalis - Fraxinus pennsylvanica / Carpinus caroliniana* riparian forest (Vanderhorst 2001b) =
- mesic upland forest (Suiter 1995) B

SOURCES

Description Authors: J. P. Vanderhorst.

References: Eastern Ecology Working Group n.d., Suiter 1995, Vanderhorst 2001b, Vanderhorst et al. 2007.

COMMON NAME (PARK-SPECIFIC): **EASTERN RED-CEDAR - VIRGINIA PINE FLATROCK WOODLAND**

SYNONYMS

NVC English Name:	**Eastern Red-cedar - Virginia Pine - Post Oak / Running Serviceberry / Poverty Oatgrass - Two-flower Melicgrass Woodland**
NVC Scientific Name:	***Juniperus virginiana* var. *virginiana* - *Pinus virginiana* - *Quercus stellata* / *Amelanchier stolonifera* / *Danthonia spicata* - *Melica mutica* Woodland**
NVC Identifier:	**CEGL008449**

LOCAL INFORMATION

Environmental Description: This association occurs in small patches along the New River on flat bedrock of Stony Gap sandstone of the Hinton Formation (Mauch Chunk group). These exposures, which occur beside the river at two major waterfalls, are rarely flooded but are hypothesized to have been subjected to catastrophic floods in the past. The natural flooding regime of the New River was altered by construction of Bluestone Dam in 1949. Some areas of this association are still subject to flooding, but maximum flows and energy have been reduced since the dam was built. Soils are shallow, rapidly drained sands and sandy loams over bedrock. Soils are extremely acidic (pH = 3.9) with high organic matter content and low levels of major nutrients (Mitchem 2004). Soil moisture regime is relatively xeric. Slopes range from level to moderate (mapping unit values range from 0 to 13 degrees, mean = 4 degrees). Elevations of mapped stands range from 379 to 402 m. Although it is similar to other types which have fire ecologies, fire was probably not an important part of the natural disturbance regime of this association. Despite this, in 2002 a controlled burn was conducted in this community at Camp Brookside with the objective of maintaining conifer dominance (Gellerstedt and Johnson 2005). Fires have also occurred at Sandstone Falls where they were related to unregulated camping and other forms of recreation. This community continues to be subject to trampling by recreational visitors.

Vegetation Description: Although this association is currently known only within the boundaries of New River Gorge National River, and thus the park vegetation is the same as the global vegetation, additional information is presented here which is not covered in the global description. The exotic *Rubus phoenicolasius* (wine raspberry) was found in the shrub layer of one plot at Sandstone Falls in 1999 and has since become abundant in this community at Camp Brookside, apparently in positive response to the controlled burn conducted in 2002. Vascular plant species richness in the 5 sampled plots ranges from 19 to 53 (mean = 36.4). Rare plants tracked by West Virginia Natural Heritage Program which have been documented in this community by past surveys include *Aristida purpurascens var. purpurascens* (arrowfeather threeawn), *Carex woodii* (pretty sedge), *Commelina erecta var. angustifolia* (whitemouth dayflower), *Coreopsis pubescens var. robusta* (star tickseed) (in ecotone with mowed field), *Galactia volubilis* (downy milkpea), *Hypericum virgatum* (coppery St. Johnswort), *Melica mutica* (twoflower melicgrass), and *Piptochaetium avenaceum* (blackseed speargrass) Additional details on the composition, structure, and dynamics of the vegetation at Camp Brookside are provided in Mitchem and Johnson (2001) and Mitchem (2004).

Most Abundant Species:

Stratum	Lifeform	Species
Tree (canopy & subcanopy)	Needle-leaved tree	*Juniperus virginiana* var. *virginiana* (eastern redcedar), *Pinus virginiana* (Virginia pine)

Characteristic Species: *Amelanchier stolonifera* (running serviceberry), *Andropogon virginicus* var. *virginicus* (broomsedge bluestem), *Celtis occidentalis* (common hackberry), *Cercis canadensis* (eastern redbud), *Chionanthus virginicus* (white fringetree), *Cladina subtenuis* (reindeer lichen), *Cladonia furcata* (cup lichen), *Cladonia grayi* (Gray's cup lichen), *Cladonia robbinsii* (Robbins' cup lichen), *Cladonia strepsilis* (cup lichen), *Danthonia spicata* (poverty oatgrass), *Dicranum condensatum* (condensed dicranum moss), *Dicranum scoparium* (dicranum moss), *Fraxinus americana* (white ash), *Grimmia pilifera* (grimmia dry rock moss), *Hedwigia ciliata* (ciliate hedwigia moss), *Hypericum gentianoides* (orangegrass), *Hypnum imponens* (hypnum moss), *Isopterygium tenerum* (isopterygium moss), *Krigia virginica* (Virginia dwarfdandelion), *Leersia virginica* (whitegrass), *Leucobryum glaucum* (leucobryum moss), *Melica mutica* (twoflower melicgrass), *Parmotrema hypotropum*, *Piptochaetium avenaceum* (blackseed speargrass), *Plagiomnium ciliare* (plagiomnium moss), *Polytrichum juniperinum* (juniper polytrichum moss), *Punctelia rudecta*, *Quercus stellata* (post oak), *Rhus copallinum* var. *latifolia* (winged sumac), *Rosa carolina* var. *carolina* (Carolina rose), *Thuidium delicatulum* (delicate thuidium moss), *Ulmus americana* (American elm), *Viburnum prunifolium* (blackhaw).

Other Noteworthy Species:

Species	GRank	Type	Note
Aristida purpurascens var. *purpurascens* (arrowfeather threeawn)	-	plant	state-rate (S1)
Carex woodii (pretty sedge)	-	plant	state-rare (S1)
Commelina erecta var. *angustifolia* (whitemouth dayflower)	-	plant	state-rare (S2)
Coreopsis pubescens var. *robusta* (star tickseed)	-	plant	state-rare (S2)
Galactia volubilis (downy milkpea)	-	plant	state-rare (S1)
Hypericum virgatum (coppery St. Johnswort)	-	plant	state-rare (S1)

Subnational Distribution with Crosswalk Data:

State	SRank	Rel	Conf	SName	Reference
WV	SNR	=	1	[gname]	Vanderhorst 2001b

Local Range: This association is confined to two sites, Sandstone Falls and Camp Brookside (Brooks Falls) in the southern section of the park.

Classification Comments: This community was described by Rouse and McDonald (1986) as a part of the "Appalachian river flatrock" community, by McDonald and Trianosky (1995) as sub-mesic Virginia pine woodland, and by Suiter (1995) and Suiter and Evans (1999) as *Pinus virginiana - Juniperus virginiana - Quercus stellata* woodland. It is similar to associations in the *Juniperus virginiana-Quercus (stellata, velutina, marilandica)* Forest Alliance (A.383), but differs by its history of flooding as opposed to fire disturbance and by its floristic composition. McDonald and Trianosky (1995) identified communities described from other eastern states which are superficially similar to the community described here, but their ecology is related to fire and/or edaphic regimes rather than flooding. They suggested this community may be most similar to xeric *Pinus virginiana* (Virginia pine) woodlands in the vicinity of Great Falls on the Potomac River in Maryland. The community at Great Falls has been described as *Pinus*

virginiana - Carya glabra - Quercus (rubra, stellata) / Chasmanthium latifolium (Thomson et al.1999) and *Pinus virginiana - Quercus stellata / Vaccinium pallidum / Helianthus divaricatus* Forest (Lea 2000). In a previous report (Vanderhorst 2001b), this association was divided into a woodland type and a sparsely vegetated type, however, floristic similarities, small size of openings, and constant co-occurrence of these physiognomic expressions support recognition of just one woodland association in the IVC. Two separate community types within this association at Camp Brookside were also recognized and described by Mitchem (2004).
Other Comments: Information not available.
Local Description Authors: J. P. Vanderhorst.
Plots: NERI.17, NERI.20, NERI.24, NERI.25, NERI.77.
New River Gorge National River Inventory Notes: Information not available.

GLOBAL INFORMATION

NVC CLASSIFICATION

Physiognomic Class	Woodland (II)
Physiognomic Subclass	Evergreen woodland (II.A.)
Physiognomic Group	Temperate or subpolar needle-leaved evergreen woodland (II.A.4.)
Physiognomic Subgroup	Natural/Semi-natural temperate or subpolar needle-leaved evergreen woodland (II.A.4.N.)
Formation	Conical-crowned temperate or subpolar needle-leaved evergreen woodland (II.A.4.N.b.)
Alliance	*Juniperus virginiana* Woodland Alliance (A.545)
Alliance (English name)	Eastern Red-cedar Woodland Alliance
Association	*Juniperus virginiana* var. *virginiana - Pinus virginiana - Quercus stellata / Amelanchier stolonifera / Danthonia spicata - Melica mutica* Woodland
Association (English name)	Eastern Red-cedar - Virginia Pine - Post Oak / Running Serviceberry / Poverty Oatgrass - Two-flower Melicgrass Woodland
Ecological System(s):	Information not available.

GLOBAL DESCRIPTION

Concept Summary: This woodland occupies areas of flat sandstone bedrock along the New River in West Virginia. It has an open to nearly closed canopy dominated by a mixture of evergreen conifer and deciduous tree species over a diverse understory of shrubs and herbs often with heavy ground cover by mosses and lichens. The open canopy is dominated by about equal amounts of *Juniperus virginiana var. virginiana* (eastern redcedar) and *Pinus virginiana* (Virginia pine). Associated deciduous tree species include *Quercus stellata* (post oak), *Fraxinus americana* (white ash), *Celtis occidentalis* (common hackberry), *Ulmus americana* (American elm), and *Cercis canadensis* (eastern redbud). The dense shrub layer includes *Amelanchier stolonifera* (running serviceberry), *Rhus copallinum* (flameleaf sumac), *Rosa carolina* (Carolina rose), and *Viburnum prunifolium* (blackhaw). Vines include *Toxicodendron radicans* (eastern poison ivy), *Parthenocissus quinquefolia* (Virginia creeper), and *Vitis aestivalis* (summer grape). The exotics *Ligustrum vulgare* (European privet), *Rubus phoenicolasius* (wine raspberry), *Lonicera japonica* (Japanese honeysuckle), and *Rosa multiflora* (multiflora rose) may also be present. The herbaceous layer has high representation of grasses; species include *Andropogon virginicus* (broomsedge bluestem), *Danthonia spicata* (poverty oatgrass), *Leersia virginica*

(whitegrass), *Melica mutica* (twoflower melicgrass), and *Piptochaetium avenaceum* (blackseed speargrass). The fern ally *Selaginella rupestris* (northern selaginella) may also contribute significant ground cover. Cover by mosses and lichens is variable and may approach 90%.
Environmental Description: This community occupies areas of flat sandstone bedrock along the New River Gorge National River (Camp Brookside and Sandstone Falls), West Virginia. These areas are above the normal river floodplain but are hypothesized to have been impacted by catastrophic floods in the late 1800s resulting in establishment of primary successional species on the scoured bedrock (McDonald and Trianosky 1995). The soils are shallow with considerable areas of exposed rock. Soils are extremely acidic (pH = 3.9) with high organic matter content and low levels of major nutrients (Mitchem 2004). Soil moisture regime is relatively xeric. Slopes range from level to moderate (mapping unit values range from 0 to 13 degrees, mean = 4 degrees). Elevations of mapped stands range from 379 to 402 m.
Vegetation Description: This woodland has an open to nearly closed canopy (40-75% total cover) dominated by a mixture of evergreen conifer and deciduous tree species over a diverse understory of shrubs and herbs often with heavy ground cover by mosses and lichens. The open canopy is dominated by about equal amounts of *Juniperus virginiana var. virginiana* (eastern redcedar) and *Pinus virginiana* (Virginia pine). Associated deciduous tree species occurring in lesser amounts include *Quercus stellata* (post oak), *Fraxinus americana* (white ash), *Celtis occidentalis* (common hackberry), *Chionanthus virginicus* (white fringetree), *Ulmus americana* (American elm), *Gleditsia triacanthos* (honeylocust), *Ostrya virginiana* (hophornbeam), and *Cercis canadensis* (eastern redbud). In addition to saplings of tree species, the dense shrub layer (60% total cover) layer includes *Amelanchier stolonifera* (running serviceberry), *Rhus copallinum* (flameleaf sumac), *Rosa carolina* (Carolina rose), and *Viburnum prunifolium* (blackhaw). The exotics *Ligustrum vulgare* (European privet) and *Rosa multiflora* (multiflora rose) may also be present. Vines (5% total cover) include *Toxicodendron radicans* (eastern poison ivy), *Parthenocissus quinquefolia* (Virginia creeper), and *Vitis aestivalis* (summer grape). The invasive exotics *Lonicera japonica* (Japanese honeysuckle) and *Rubus phoenicolasius* (wine raspberry) may invade this stratum as well. The herbaceous layer (20-40% cover) has high representation of grasses compared to most woodland communities in this region; species include *Andropogon virginicus* (broomsedge bluestem), *Danthonia spicata* (poverty oatgrass), *Leersia virginica* (whitegrass), *Melica mutica* (twoflower melicgrass), and *Piptochaetium avenaceum* (blackseed speargrass). Unusually high cover by the small fern *Asplenium platyneuron* (ebony spleenwort) has been noted in examples of this community; in addition, the fern ally *Selaginella rupestris* (northern selaginella) may contribute significant ground cover (Suiter 1995). Additional characteristic species in the herb layer include *Hypericum gentianoides* (orangegrass), *Krigia virginica* (Virginia dwarfdandelion), *Lespedeza virginica* (slender lespedeza), *Potentilla simplex* (common cinquefoil), *Salvia lyrata* (lyreleaf sage), *Symphyotrichum patens* (late purple aster), and *Toxicodendron radicans* (eastern poison ivy). Vascular plant species richness in the 5 sampled plots at New River Gorge ranges from 19 to 53 (mean = 36.4). Cover by mosses and lichens is variable, though typically high, approaching 90%. Mosses identified in plots include *Dicranum condensatum* (condensed dicranum moss), *Dicranum scoparium* (dicranum moss), *Grimmia pilifera* (grimmia dry rock moss), *Hedwigia ciliata* (ciliate hedwigia moss), *Hypnum imponens* (hypnum moss), *Isopterygium tenerum* (isopterygium moss), *Leucobryum glaucum* (leucobryum moss), *Plagiomnium ciliare* (plagiomnium moss), *Polytrichum juniperinum* (juniper polytrichum moss), and *Thuidium delicatulum* (delicate thuidium moss). Lichens in the plots include *Cladonia furcata* (cup lichen),

Cladonia grayi (Gray's cup lichen), *Cladonia robbinsii* (Robbins' cup lichen), *Cladonia strepsilis* (cup lichen), *Cladina subtenuis* (reindeer lichen), *Parmotrema hypotropum*, and *Punctelia rudecta*.

Most Abundant Species:

Stratum	Lifeform	Species
Tree (canopy & subcanopy)	Needle-leaved tree	*Juniperus virginiana* (eastern redcedar), *Pinus virginiana* (Virginia pine)

Characteristic Species: *Amelanchier stolonifera* (running serviceberry), *Andropogon virginicus* (broomsedge bluestem), *Celtis occidentalis* (common hackberry), *Chionanthus virginicus* (white fringetree), *Danthonia spicata* (poverty oatgrass), *Dicranum condensatum* (condensed dicranum moss), *Dicranum scoparium* (dicranum moss), *Fraxinus americana* (white ash), *Grimmia pilifera* (grimmia dry rock moss), *Hypericum gentianoides* (orangegrass), *Krigia virginica* (Virginia dwarfdandelion), *Leersia virginica* (whitegrass), *Leucobryum glaucum* (leucobryum moss), *Melica mutica* (twoflower melicgrass), *Piptochaetium avenaceum* (blackseed speargrass), *Polytrichum juniperinum* (juniper polytrichum moss), *Quercus stellata* (post oak), *Rhus copallinum* (flameleaf sumac), *Rosa carolina* (Carolina rose), *Ulmus americana* (American elm), *Viburnum prunifolium* (blackhaw).

Other Noteworthy Species: Information not available.

USFWS Wetland System: Not applicable.

Distribution

Range: This community is currently restricted to the New River Gorge of West Virginia; more information is needed.

States/Provinces: MD?, WV.

Federal Lands: NPS (New River Gorge).

Conservation Status

Rank: G2? (25-Aug-2000).

Reasons: This community hosts several rare plant species and is itself a rare element of biodiversity. Unfortunately, its long-term persistence is uncertain due to altered flooding regime since building of Bluestone Dam in 1949. Succession of this community towards deciduous woodland has been very slow, probably due to shallow, droughty soils. Occurrences of this community are in extremely rocky areas which are protected and not vulnerable to resource extraction, conversion, or development. Currently stands of this association are probably most threatened by encroachment of exotic weeds such as *Lonicera japonica* (Japanese honeysuckle) and *Rosa multiflora* (multiflora rose).

Classification Information

Status: Standard.

Confidence: 3 - Weak.

Comments: This community was described by Rouse and McDonald (1986) as a part of the "Appalachian river flatrock" community, by McDonald and Trianosky (1995) as sub-mesic Virginia pine woodland, and by Suiter (1995) and Suiter and Evans (1999) as *Pinus virginiana - Juniperus virginiana - Quercus stellata* woodland. It is similar to associations in the *Juniperus virginiana - Quercus (stellata, velutina, marilandica)* Forest Alliance (A.383), but differs by its history of flooding, as opposed to fire disturbance, and by its floristic composition. McDonald and Trianosky (1995) identified communities described from other eastern states which are superficially similar to the community described here, but their ecology is related to fire and/or

edaphic regimes rather than flooding. They suggested this community may be most similar to xeric *Pinus virginiana* (Virginia pine) woodlands in the vicinity of Great Falls on the Potomac River in Maryland. The community at Great Falls has been described as *Pinus virginiana - Carya glabra - Quercus (rubra, stellata) / Chasmanthium latifolium* (Thomson et al. 1999) and *Pinus virginiana - Quercus stellata / Vaccinium pallidum / Helianthus divaricatus* Forest (Lea 2000). In a previous report (Vanderhorst 2001b), this association was divided into a woodland type and a sparsely vegetated type, however, floristic similarities, small size of openings, and constant co-occurrence of these physiognomic expressions support recognition of just one woodland association. Two separate community types within this association at Camp Brookside were also recognized and described by Mitchem (2004).

Similar Associations: Information not available.

Related Concepts:

- *Juniperus virginiana - Pinus virginiana - Quercus stellata / Asplenium platyneuron* woodland (Vanderhorst 2001b) =
- *Pinus virginiana - Juniperus virginiana - Quercus stellata* woodland (Suiter and Evans 1999) =
- *Pinus virginiana - Juniperus virginiana - Quercus stellata* woodland (Suiter 1995) =
- Appalachian river flatrock (Rouse and McDonald 1986) B
- sub-mesic Virginia pine woodland (McDonald and Trianosky 1995) =

SOURCES

Description Authors: M. Pyne after Vanderhorst (2000), mod. S. C. Gawler.

References: Eastern Ecology Working Group n.d., Gellerstedt and Johnson 2005, Lea 2000, McDonald and Trianosky 1995, Mitchem 2004, Mitchem and Johnson 2001, Rouse and McDonald 1986, Suiter 1995, Suiter and Evans 1999, Thomson et al. 1999, Vanderhorst 2000a, Vanderhorst 2001b, Vanderhorst et al. 2007, Vanderhorst pers. comm.

COMMON NAME (PARK-SPECIFIC): SYCAMORE - RIVER BIRCH RIVERSCOUR WOODLAND

SYNONYMS

NVC English Name: **Sycamore - (River Birch, Willow species) Temporarily Flooded Woodland**

NVC Scientific Name: ***Platanus occidentalis* - (*Betula nigra, Salix* spp.) Temporarily Flooded Woodland**

NVC Identifier: **CEGL003725**

LOCAL INFORMATION

Environmental Description: This association occurs in small patches and more often in relatively continuous linear zones along the shores of the New River in positions that are subject to frequent high-energy flooding. These floods damage and remove trees, maintaining an open canopy. The alluvial substrate is composed of boulders and cobbles with gravel and sand accumulations but no soil development. These coarse-textured substrates are potentially well-drained, but fluvial topography and proximity to the water table often results in a mixture of well-drained and poorly drained microsites, including areas of standing water, within the community. Soil (sandy alluvium) chemistry analyzed from four plots indicates relatively high pH (mean = 6.73), low levels of macronutrients (N, P, K) and organic matter, and high levels of several micronutrients (Ca, Cu, Fe, Mg, Mn, Zn). Slopes range from level to steep (mapping unit values range from 0 to 35 degrees, mean = 9 degrees). Elevations of mapped stands range from 252 to 408 m. Ecologically and spatially this association is intermediate between *Andropogon gerardii - Panicum virgatum - Baptisia australis* Herbaceous Vegetation (CEGL006283), which occurs on sites which are more severely impacted by flooding, and *Platanus occidentalis - Fraxinus pennsylvanica / Carpinus caroliniana / Verbesina alternifolia* Forest (CEGL006458), which occurs on sites less severely impacted by floods. *Salix nigra - Betula nigra / Schoenoplectus (pungens, tabernaemontani)* Wooded Herbaceous Vegetation (CEGL006463) occurs in similar riverside positions along lower energy reaches, often just downstream from rapids.

Vegetation Description: This association is a deciduous woodland or open forest typically codominated by *Platanus occidentalis* (Sycamore) and *Betula nigra* (river birch). One atypical stand has a canopy codominated by *Pinus virginiana* (Virginia pine). Additional important trees include *Acer saccharinum* (silver maple), *Catalpa speciosa* (northern catalpa), *Diospyros virginiana* (common persimmon), *Fraxinus americana* (white ash), *Fraxinus pennsylvanica* (green ash), *Robinia pseudoacacia* (black locust), *Salix nigra* (black willow), *Ulmus americana* (American elm), and *Ulmus rubra* (slippery elm). The usually short, open canopy is composed mostly of flood-battered trees. The tallest trees are often the younger ones which have not yet been subjected to damage by severe floods. Common shrubs include *Alnus serrulata* (smooth alder), *Cephalanthus occidentalis* (common buttonbush), *Chionanthus virginicus* (white fringetree), *Cornus amomum* (silky dogwood), *Hypericum prolificum* (shrubby St. Johnswort), and *Salix caroliniana* (coastal plain willow). There is often a large component of woody vines in the short-shrub layer, including *Campsis radicans* (trumpet creeper), *Toxicodendron radicans* (eastern poison ivy), and *Vitis rupestris* (sand grape). The herb layer is composed of a mixture of warm-season grasses and forbs adapted to frequent flooding and high light exposure. Characteristic herbs include *Andropogon gerardii* (big bluestem), *Apocynum cannabinum*

(Indianhemp), *Baptisia australis* (blue wild indigo), *Chasmanthium latifolium* (Indian woodoats), *Conoclinium coelestinum* (blue mistflower), *Dichanthelium clandestinum* (deertongue), *Eupatorium fistulosum* (trumpetweed), *Justicia americana* (American water-willow), *Lobelia cardinalis* (cardinalflower), *Lysimachia ciliata* (fringed loosestrife), *Panicum virgatum* (switchgrass), *Solidago juncea var. juncea* (early goldenrod), *Tripsacum dactyloides* (eastern gamagrass), and *Viola cucullata* (marsh blue violet). Rare plants tracked by West Virginia Natural Heritage Program which have been documented in this community in vegetation plots or by past surveys include *Baptisia australis* (blue wild indigo), *Carex emoryi* (Emory's sedge), *Coreopsis pubescens var. robusta* (star tickseed), *Solidago simplex var. racemosa* (Rand's goldenrod), and *Vitis rupestris* (sand grape). Vascular plant species richness in the 14 sampled plots ranges from 20 to 59 (mean = 38.7). The bryophyte layer is usually poorly developed. Crustose lichens may occur on large rocks.

Most Abundant Species:

Stratum	Lifeform	Species
Tree (canopy & subcanopy)	Broad-leaved deciduous tree	*Betula nigra* (river birch), *Platanus occidentalis* (Sycamore)

Characteristic Species: *Acer saccharinum* (silver maple), *Alnus serrulata* (smooth alder), *Andropogon gerardii* (big bluestem), *Apocynum cannabinum* (Indianhemp), *Baptisia australis* (blue wild indigo), *Campsis radicans* (trumpet creeper), *Catalpa speciosa* (northern catalpa), *Cephalanthus occidentalis* (common buttonbush), *Chasmanthium latifolium* (Indian woodoats), *Chionanthus virginicus* (white fringetree), *Cornus amomum* (silky dogwood), *Dichanthelium clandestinum* (deertongue), *Diospyros virginiana* (common persimmon), *Eupatorium coelestinum* (blue mistflower), *Eupatorium fistulosum* (trumpetweed), *Fraxinus americana* (white ash), *Fraxinus pennsylvanica* (green ash), *Hypericum prolificum* (shrubby St. Johnswort), *Justicia americana* (American water-willow), *Lobelia cardinalis* (cardinalflower), *Lysimachia ciliata* (fringed loosestrife), *Panicum virgatum* (switchgrass), *Robinia pseudoacacia* (black locust), *Salix caroliniana* (coastal plain willow), *Salix nigra* (black willow), *Solidago juncea* var. *juncea* (early goldenrod), *Toxicodendron radicans* (eastern poison ivy), *Tripsacum dactyloides* (eastern gamagrass), *Ulmus americana* (American elm), *Ulmus rubra* (slippery elm), *Viola cucullata* (marsh blue violet), *Vitis rupestris* (sand grape).

Other Noteworthy Species:

Species	GRank	Type	Note
Baptisia australis (blue wild indigo)	-	plant	state-rare (S3)
Carex emoryi (Emory's sedge)	-	plant	state-rare (S2)
Coreopsis pubescens var. *robusta* (star tickseed)	-	plant	state-rare (S2)
Solidago simplex var. *racemosa* (Rand's goldenro	G5T3?	plant	state-rare (S1)
Vitis rupestris (sand grape)	G3	plant	state-rare (S1)

Subnational Distribution with Crosswalk Data:

State	SRank	Rel	Conf	SName	Reference
WV	SNR	=	1	*Platanus occidentalis* - (Betula nigra, Salix spp.) Temporarily Flooded Woodland [Provisional]	Vanderhorst 2001b

Local Range: This association occurs in patches scattered along the New River throughout its length in the park.

Classification Comments: Within the park this association is ecologically and floristically intermediate between *Andropogon gerardii - Panicum virgatum - Baptisia australis* Herbaceous Vegetation (CEGL006283), which is more open and occurs on sites which are more severely impacted by flooding, and *Platanus occidentalis - Fraxinus pennsylvanica / Carpinus caroliniana / Verbesina alternifolia* Forest (CEGL006458), which has a more closed canopy, usually lacking *Betula nigra* (river birch), and occurs on sites less severely impacted by flooding. It is also similar to *Salix nigra - Betula nigra / Schoenoplectus (pungens, tabernaemontani)* Wooded Herbaceous Vegetation (CEGL006463), which occurs on finer textured alluvium in riverside positions along lower energy reaches. Similar vegetation was described from the New River Gorge by Suiter (1995) as the *Platanus occidentalis - Betula nigra* forest. Recent classification studies in the National Park Service National Capitol Region have shown this association to be distinct from similar vegetation in the Potomac drainage. Its relationship to riverscour woodlands along the Bluestone and Gauley rivers has not yet been analyzed.
Other Comments: Information not available.
Local Description Authors: J. P. Vanderhorst.
Plots: NERI.56, NERI.80, NERI.92, NERI.105, NERI.126, NERI.128, NERI.207, NERI.208, NERI.209, NERI.318, NERI.352, NERI.357, NERI.358, NERI.359.
New River Gorge National River Inventory Notes: Information not available.

GLOBAL INFORMATION

NVC Classification

Physiognomic Class	Woodland (II)
Physiognomic Subclass	Deciduous woodland (II.B.)
Physiognomic Group	Cold-deciduous woodland (II.B.2.)
Physiognomic Subgroup	Natural/Semi-natural cold-deciduous woodland (II.B.2.N.)
Formation	Temporarily flooded cold-deciduous woodland (II.B.2.N.b.)
Alliance	*Platanus occidentalis - (Betula nigra, Salix* spp.) Temporarily Flooded Woodland Alliance (A.633)
Alliance (English name)	Sycamore - (River Birch, Willow species) Temporarily Flooded Woodland Alliance
Association	*Platanus occidentalis - (Betula nigra, Salix* spp.) Temporarily Flooded Woodland
Association (English name)	Sycamore - (River Birch, Willow species) Temporarily Flooded Woodland
Ecological System(s):	Cumberland Riverscour (CES202.036).

Global Description

Concept Summary: These woodlands occur along high-energy Appalachian rivershores, such as the New River in West Virginia. They maintain an open canopy due to mechanical disturbance (flooding and scouring). The coarse-textured substrates are potentially well-drained, but fluvial topography and proximity to the water table often result in a mixture of well-drained and poorly drained microsites. The usually short, open canopy is composed mostly of flood-battered trees, typically codominated by *Platanus occidentalis* (Sycamore) and *Betula nigra* (river birch). The tallest trees are often the younger ones which have not yet been subjected to damage by severe floods. Additional important trees include *Acer saccharinum* (silver maple), *Catalpa speciosa* (northern catalpa), *Diospyros virginiana* (common persimmon), *Fraxinus americana* (white ash), *Fraxinus pennsylvanica* (green ash), *Robinia pseudoacacia* (black

locust), *Salix nigra* (black willow), *Ulmus americana* (American elm), and *Ulmus rubra* (slippery elm). Common shrubs include *Alnus serrulata* (smooth alder), *Cephalanthus occidentalis* (common buttonbush), *Chionanthus virginicus* (white fringetree), *Cornus amomum* (silky dogwood), *Hypericum prolificum* (shrubby St. Johnswort), and *Salix caroliniana* (coastal plain willow). There is often a large component of woody vines, including *Campsis radicans* (trumpet creeper), *Toxicodendron radicans* (eastern poison ivy), and *Vitis rupestris* (sand grape). The herb layer is composed of a mixture of warm-season grasses and forbs adapted to frequent flooding and high light exposure. Characteristic herbs include *Andropogon gerardii* (big bluestem), *Apocynum cannabinum* (Indianhemp), *Baptisia australis* (blue wild indigo), *Chasmanthium latifolium* (Indian woodoats), *Conoclinium coelestinum* (blue mistflower), *Dichanthelium clandestinum* (deertongue), *Eupatorium fistulosum* (trumpetweed), *Justicia americana* (American water-willow), *Lobelia cardinalis* (cardinalflower), *Lysimachia ciliata* (fringed loosestrife), *Panicum virgatum* (switchgrass), *Solidago juncea* (early goldenrod), *Tripsacum dactyloides* (eastern gamagrass), and *Viola cucullata* (marsh blue violet).

Environmental Description: These woodlands occur along high-energy Appalachian rivershores, such as the New River in West Virginia. They maintain an open canopy due to mechanical disturbance (flooding and scouring). This association occurs as relatively continuous linear zones (sometimes in small patches) along the shores of the New River in positions that are subject to frequent high-energy flooding. These floods damage and remove trees, maintaining an open canopy. The sandy alluvium substrate is composed of boulders and cobbles with gravel and sand accumulations but no soil development. These coarse-textured substrates are potentially well-drained, but fluvial topography and proximity to the water table often result in a mixture of well-drained and poorly drained microsites, including areas of standing water, within the community. Soil chemistry analyzed from four plots indicates relatively high pH (mean = 6.73), low levels of macronutrients (N, P, K) and organic matter, and high levels of several micronutrients (Ca, Cu, Fe, Mg, Mn, Zn). Slopes range from level to steep but are generally gentle. Known elevations range from 250 to 400 m (810-1350 feet).

Vegetation Description: This association is a deciduous woodland or open forest typically codominated by *Platanus occidentalis* (Sycamore) and *Betula nigra* (river birch). One atypical stand has a canopy codominated by *Pinus virginiana* (Virginia pine). Additional important trees include *Acer saccharinum* (silver maple), *Catalpa speciosa* (northern catalpa), *Diospyros virginiana* (common persimmon), *Fraxinus americana* (white ash), *Fraxinus pennsylvanica* (green ash), *Robinia pseudoacacia* (black locust), *Salix nigra* (black willow), *Ulmus americana* (American elm), and *Ulmus rubra* (slippery elm). The usually short, open canopy is composed mostly of flood-battered trees. The tallest trees are often the younger ones which have not yet been subjected to damage by severe floods. Common shrubs include *Alnus serrulata* (smooth alder), *Cephalanthus occidentalis* (common buttonbush), *Chionanthus virginicus* (white fringetree), *Cornus amomum* (silky dogwood), *Hypericum prolificum* (shrubby St. Johnswort), and *Salix caroliniana* (coastal plain willow). There is often a large component of woody vines in the short-shrub layer, including *Campsis radicans* (trumpet creeper), *Toxicodendron radicans* (eastern poison ivy), and *Vitis rupestris* (sand grape). The herb layer is composed of a mixture of warm-season grasses and forbs adapted to frequent flooding and high light exposure. Characteristic herbs include *Andropogon gerardii* (big bluestem), *Apocynum cannabinum* (Indianhemp), *Baptisia australis* (blue wild indigo), *Chasmanthium latifolium* (Indian woodoats), *Conoclinium coelestinum* (blue mistflower), *Dichanthelium clandestinum* (deertongue), *Eupatorium fistulosum* (trumpetweed), *Justicia americana* (American water-willow), *Lobelia*

cardinalis (cardinalflower), *Lysimachia ciliata* (fringed loosestrife), *Panicum virgatum* (switchgrass), *Solidago juncea* (early goldenrod), *Tripsacum dactyloides* (eastern gamagrass), and *Viola cucullata* (marsh blue violet). Rare plants tracked by West Virginia Natural Heritage Program which occur in this community include *Baptisia australis* (blue wild indigo), *Carex emoryi* (Emory's sedge), *Coreopsis pubescens var. robusta* (star tickseed), *Solidago simplex var. racemosa* (Rand's goldenrod), and *Vitis rupestris* (sand grape). Vascular plant species richness in the 14 sampled plots ranged from 20 to 59 (mean = 38.7). The bryophyte layer is usually poorly developed; crustose lichens may occur on large rocks.

Most Abundant Species:

Stratum	Lifeform	Species
Tree (canopy & subcanopy)	Broad-leaved deciduous tree	*Betula nigra* (river birch), *Platanus occidentalis* (Sycamore)

Characteristic Species: *Acer saccharinum* (silver maple), *Alnus serrulata* (smooth alder), *Andropogon gerardii* (big bluestem), *Apocynum cannabinum* (Indianhemp), *Baptisia australis* (blue wild indigo), *Campsis radicans* (trumpet creeper), *Catalpa speciosa* (northern catalpa), *Cephalanthus occidentalis* (common buttonbush), *Chasmanthium latifolium* (Indian woodoats), *Chionanthus virginicus* (white fringetree), *Cornus amomum* (silky dogwood), *Dichanthelium clandestinum* (deertongue), *Diospyros virginiana* (common persimmon), *Eupatorium coelestinum* (blue mistflower), *Eupatorium fistulosum* (trumpetweed), *Hypericum prolificum* (shrubby St. Johnswort), *Justicia americana* (American water-willow), *Lobelia cardinalis* (cardinalflower), *Lysimachia ciliata* (fringed loosestrife), *Panicum virgatum* (switchgrass), *Robinia pseudoacacia* (black locust), *Salix caroliniana* (coastal plain willow), *Salix nigra* (black willow), *Solidago juncea* (early goldenrod), *Toxicodendron radicans* (eastern poison ivy), *Tripsacum dactyloides* (eastern gamagrass), *Ulmus americana* (American elm), *Ulmus rubra* (slippery elm), *Viola cucullata* (marsh blue violet), *Vitis rupestris* (sand grape).

Other Noteworthy Species:

Species	GRank	Type	Note
Baptisia australis (blue wild indigo)	-	plant	WV state-rare
Carex emoryi (Emory's sedge)	-	plant	WV state-rare
Coreopsis pubescens var. *robusta* (star tickseed)	-	plant	WV state-rare
Solidago simplex var. *racemosa* (Rand's goldenrod)	G5T3?	plant	WV state-rare
Vitis rupestris (sand grape)	G3	plant	WV state-rare

USFWS Wetland System: Riverine.

DISTRIBUTION

Range: This type is being reserved for vegetation of high-energy Appalachian rivers, such as the New River in West Virginia. Its range may include Virginia as well.
States/Provinces: VA, WV.
Federal Lands: NPS (New River Gorge).

CONSERVATION STATUS

Rank: GNR (1-Dec-1997).
Reasons: Information not available.

CLASSIFICATION INFORMATION

Status: Standard.
Confidence: 2 - Moderate.

Comments: Along the New River, this association is ecologically and floristically intermediate between *Andropogon gerardii - Panicum virgatum - Baptisia australis* Herbaceous Vegetation (CEGL006283), which is more open and occurs on sites which are more severely impacted by flooding, and *Platanus occidentalis - Fraxinus pennsylvanica / Carpinus caroliniana / Verbesina alternifolia* Forest (CEGL006458), which has a more closed canopy, usually lacking *Betula nigra* (river birch), and occurs on sites less severely impacted by flooding. It is also similar to *Salix nigra - Betula nigra / Schoenoplectus pungens* Wooded Herbaceous Vegetation (CEGL006463), which occurs on finer textured alluvium in riverside positions along lower energy reaches. Similar vegetation was described from the New River Gorge by Suiter (1995) as *Platanus occidentalis - Betula nigra* forest. Recent classification studies in the National Park Service National Capitol Region have shown this association to be distinct from similar vegetation in the Potomac drainage, which is being placed in *Platanus occidentalis - Betula nigra - Salix (caroliniana, nigra)* Woodland (CEGL003896). Its relationship to riverscour woodlands along the Bluestone and Gauley rivers has not yet been analyzed.

Similar Associations:

- *Betula nigra - Platanus occidentalis* Forest (CEGL002086)--with a more-or-less closed canopy.
- *Platanus occidentalis - Betula nigra - Salix (caroliniana, nigra)* Woodland (CEGL003896).
- *Quercus bicolor - Fraxinus pennsylvanica - (Platanus occidentalis) / Chasmanthium latifolium - Dichanthelium clandestinum - Zizia aurea* Woodland (CEGL006218).
- *Salix nigra - Betula nigra / Schoenoplectus pungens* Wooded Herbaceous Vegetation [Provisional] (CEGL006463)--occurs in similar riverside positions along lower energy reaches, often just downstream from rapids.

Related Concepts:

- *Platanus occidentalis - Betula nigra / Cornus amomum* riparian woodland (Vanderhorst 2001b) =
- *Platanus occidentalis - Betula nigra* forest (Suiter 1995) ?

SOURCES

Description Authors: M. Pyne, mod. S. C. Gawler.

References: Fleming et al. 2001, Mitchem 2004, Southeastern Ecology Working Group n.d., Suiter 1995, Vanderhorst 2000b, Vanderhorst 2001b, Vanderhorst et al. 2007, Vanderhorst pers. comm.

COMMON NAME (PARK-SPECIFIC): RIVERSCOUR PRAIRIE

SYNONYMS

NVC English Name:	**Big Bluestem - Switchgrass - Tall Blue Wild Indigo Herbaceous Vegetation**
NVC Scientific Name:	***Andropogon gerardii - Panicum virgatum - Baptisia australis* Herbaceous Vegetation**
NVC Identifier:	**CEGL006283**

LOCAL INFORMATION

Environmental Description: This association occurs along the shores of the New River in positions that are subject to frequent high-energy flooding, usually within the active channel shelf along rapids. These positions are prone to dramatic restructuring by large floods, and patches of this association may be ephemeral. Floods maintain herbaceous physiognomy by damaging and removing woody vegetation. Substrates can include bedrock, boulders, and cobble, with gravel and sand accumulations but no soil development. These coarse-textured substrates are potentially well-drained, but fluvial topography and a high water table often result in a mixture of well-drained and poorly drained microsites. Occurrences on flat bedrock often develop scoured-out potholes which hold flood and rain water; vegetation is confined to cracks and sediment accumulations. Soil (sand) chemistry analyzed from one plot indicates very slight acidity (pH = 6.4) with relatively low levels of organic matter and relatively high levels of Ca, Mg, Mn, and Zn. Slopes range from nearly level to somewhat steep but are typically gentle (mapping unit values range from 0.3 to 24 degrees, mean = 7 degrees). Elevations of mapped stands range from 288 to 397 m. Adjacent positions with somewhat less severe flooding regime are usually occupied by *Platanus occidentalis - (Betula nigra, Salix* (willow) spp.) Temporarily Flooded Woodland (CEGL003725).

Vegetation Description: This association represents herbaceous or herb-shrub vegetation dominated by tall, warm-season grasses. There may be low cover (10% or less in plots) by trees, which are usually short and flood-battered, including *Betula nigra* (river birch), *Chionanthus virginicus* (white fringetree), *Diospyros virginiana* (common persimmon), *Fraxinus americana* (white ash), *Fraxinus pennsylvanica* (green ash), *Platanus occidentalis* (Sycamore), *Ulmus americana* (American elm), and *Ulmus rubra* (slippery elm). Cover in the shrub layers of plots ranges from 15 to 20%, which includes short individuals of the tree species and shrub species, including *Alnus serrulata* (smooth alder), *Cephalanthus occidentalis* (common buttonbush), *Cornus amomum* (silky dogwood), *Hypericum prolificum* (shrubby St. Johnswort), and *Salix caroliniana* (coastal plain willow). Low-growing vines with high cover and/or constancy include *Campsis radicans* (trumpet creeper), *Toxicodendron radicans* (eastern poison ivy), and *Vitis rupestris* (sand grape). Cover in the herb layer of plots ranges from 20 to 80%. Dominant grasses include *Andropogon gerardii* (big bluestem), *Panicum virgatum* (switchgrass), and *Sorghastrum nutans* (Indiangrass). Additional herbs with high cover and/or constancy include *Apocynum cannabinum* (Indianhemp), *Baptisia australis* (blue wild indigo), *Chasmanthium latifolium* (Indian woodoats), *Coreopsis tripteris* (tall tickseed), *Cyperus strigosus* (strawcolored flatsedge), *Eupatorium fistulosum* (trumpetweed), *Justicia americana* (American water-willow), *Lobelia cardinalis* (cardinalflower), *Ludwigia alternifolia* (seedbox), *Potentilla simplex* (common cinquefoil), *Rhynchospora capitellata* (brownish beaksedge), *Solidago juncea var. juncea* (early goldenrod), *Symphyotrichum laeve* (smooth blue aster), *Viola cucullata* (marsh blue violet), and

Zizia trifoliata (meadow alexanders). State-rare plants tracked by West Virginia Natural Heritage Program which have been documented in this community in vegetation plots or by past surveys include *Aristida purpurascens var. purpurascens* (arrowfeather threeawn), *Baptisia australis* (blue wild indigo), *Carex suberecta* (prairie straw sedge), *Eleocharis compressa* (flatstem spikerush), *Helianthus occidentalis ssp. occidentalis* (fewleaf sunflower), *Pycnanthemum torrei* (Torrey's mountainmint), *Rhynchospora recognita* (globe beaksedge), and *Vitis rupestris* (sand grape). Vascular plant species richness in the 7 sampled plots ranges from 23 to 66 (mean = 43.1). There may be low cover of mosses and lichens on rocks.

Most Abundant Species:

Stratum	Lifeform	Species
Herb (field)	Forb	*Baptisia australis* (blue wild indigo)
Herb (field)	Graminoid	*Andropogon gerardii* (big bluestem), *Panicum virgatum* (switchgrass), *Sorghastrum nutans* (Indiangrass)

Characteristic Species: *Alnus serrulata* (smooth alder), *Apocynum cannabinum* (Indianhemp), *Baptisia australis* (blue wild indigo), *Betula nigra* (river birch), *Campsis radicans* (trumpet creeper), *Cephalanthus occidentalis* (common buttonbush), *Chasmanthium latifolium* (Indian woodoats), *Chionanthus virginicus* (white fringetree), *Coreopsis tripteris* (tall tickseed), *Cornus amomum* (silky dogwood), *Cyperus strigosus* (strawcolored flatsedge), *Diospyros virginiana* (common persimmon), *Eupatorium fistulosum* (trumpetweed), *Fraxinus americana* (white ash), *Fraxinus pennsylvanica* (green ash), *Hypericum prolificum* (shrubby St. Johnswort), *Justicia americana* (American water-willow), *Lobelia cardinalis* (cardinalflower), *Ludwigia alternifolia* (seedbox), *Panicum virgatum* (switchgrass), *Platanus occidentalis* (sycamore), *Potentilla simplex* (common cinquefoil), *Rhynchospora capitellata* (brownish beaksedge), *Salix caroliniana* (coastal plain willow), *Solidago juncea* var. *juncea* (early goldenrod), *Sorghastrum nutans* (Indiangrass), *Symphyotrichum laeve* (smooth blue aster), *Toxicodendron radicans* (eastern poison ivy), *Ulmus americana* (American elm), *Ulmus rubra* (slippery elm), *Viola cucullata* (marsh blue violet), *Vitis rupestris* (sand grape), *Zizia trifoliata* (meadow alexanders).

Other Noteworthy Species:

Species	GRank	Type	Note
Aristida purpurascens (arrowfeather threeawn)	-	plant	state-rare (S1)
Baptisia australis (blue wild indigo)	-	plant	state-rare (S3)
Carex suberecta (prairie straw sedge)	-	plant	state-rare (S1)
Eleocharis compressa (flatstem spikerush)	-	plant	state-rare (S2)
Helianthus occidentalis ssp. *occidentalis* (fewleaf sunflower)	-	plant	state-rare (S2)
Pycnanthemum torrei (Torrey's mountainmint)	G2	plant	state-rare (S1)
Rhynchospora recognita (globe beaksedge)	-	plant	state-rare (S2)
Vitis rupestris (sand grape)	G3	plant	state-rare (S1)

Subnational Distribution with Crosswalk Data:

State	SRank	Rel	Conf	SName	Reference
WV	SNR	=	1	[gname]	Vanderhorst 2001b

Local Range: In the park, this association occurs in a few small patches along the New River from Camp Brookside downstream to Keeney's Creek Rapids. Nearby, outside the park, it is found downstream along the New River at Cotton Hill and upstream along the Greenbrier River.

Classification Comments: Riverside prairies within the park are characterized by high cover and constancy of the nominal species *Andropogon gerardii* (big bluestem) and *Baptisia australis* (blue wild indigo). Similar communities have been observed along the Greenbrier River which empties into the New River upstream from the park and which may be one source of the high levels of Ca found in substrates of this and other riparian communities in the park. Riverscour prairies along other West Virginia rivers, including the Cheat (Vanderhorst 2001a, Vanderhorst and Streets 2006), Tygart Valley, Gauley, Bluestone, Shenandoah (Vanderhorst 2000b), and Potomac, usually lack *Baptisia australis* (blue wild indigo). Prairies along the Tygart Valley and Gauley rivers share a number of species which distinguish them from this association (e.g., *Osmunda regalis* (royal fern), *Packera paupercula* (balsam groundsel), *Solidago simplex* (Mt. Albert goldenrod), *Ilex verticillata* (common winterberry)), but this vegetation has not yet been described in the IVC.
Other Comments: Information not available.
Local Description Authors: J. P. Vanderhorst.
Plots: NERI.84, NERI.102, NERI.124, NERI.202, NERI.203, NERI.317, NERI.360.
New River Gorge National River Inventory Notes: Information not available.

GLOBAL INFORMATION

NVC CLASSIFICATION

Physiognomic Class	Herbaceous Vegetation (V)
Physiognomic Subclass	Perennial graminoid vegetation (V.A.)
Physiognomic Group	Temperate or subpolar grassland (V.A.5.)
Physiognomic Subgroup	Natural/Semi-natural temperate or subpolar grassland (V.A.5.N.)
Formation	Temporarily flooded temperate or subpolar grassland (V.A.5.N.j.)
Alliance	*Andropogon gerardii - (Sorghastrum nutans)* Temporarily Flooded Herbaceous Alliance (A.1337)
Alliance (English name)	Big Bluestem - (Yellow Indiangrass) Temporarily Flooded Herbaceous Alliance
Association	*Andropogon gerardii - Panicum virgatum - Baptisia australis* Herbaceous Vegetation
Association (English name)	Big Bluestem - Switchgrass - Tall Blue Wild Indigo Herbaceous Vegetation
Ecological System(s):	Central Appalachian Stream and Riparian (CES202.609) Central Appalachian River Floodplain (CES202.608)

GLOBAL DESCRIPTION

Concept Summary: This community is found in the east-central United States along high-gradient sections of major rivers, such as in gorges and along the fall-line. It usually occupies rocky areas within the active channel shelf at an intermediate level above the low-water level and the bank-full level. Flood scouring and ice floods are powerful and ecologically important abrasive forces that shape the physiognomy and composition of this association. Soils are rapidly drained Psamments. Often, soil material is restricted to the narrow interstices of tightly packed boulders, or to small crevices in bedrock exposures. This community is characterized by a luxuriant growth of the robust grasses *Andropogon gerardii* (big bluestem), *Sorghastrum nutans* (Indiangrass), *Panicum virgatum* (switchgrass), and *Spartina pectinata* (prairie cordgrass) which resembles prairie vegetation. *Tripsacum dactyloides* (eastern gamagrass) may also occur. Many of the forbs are also typical of prairies. Characteristic species include *Baptisia australis* (blue

wild indigo), *Allium cernuum* (nodding onion), *Aristida purpurascens* (arrowfeather threeawn), *Bidens frondosa* (devil's beggartick), *Chasmanthium latifolium* (Indian woodoats), *Clematis viorna* (vasevine), *Eleocharis compressa* (flatstem spikerush), *Conoclinium coelestinum* (blue mistflower), *Eupatorium serotinum* (lateflowering thoroughwort), *Lespedeza violacea* (violet lespedeza), *Packera aurea* (golden ragwort), *Physostegia virginiana* (obedient plant), *Pycnanthemum virginianum* (Virginia mountainmint), *Solidago rupestris* (rock goldenrod), *Teucrium canadense* (Canada germander), *Veronicastrum virginicum* (Culver's root), *Zizia trifoliata* (meadow alexanders), and *Zizia aurea* (golden zizia). Scattered and flood-battered shrubs and tree saplings often occur.

Environmental Description: Stands occur along high-gradient sections of major rivers, such as in gorges and along the fall-line. They occupy rocky areas within the active channel shelf subject to frequent high-energy flooding, at an intermediate level above the low-water level and the bank-full level. These positions are prone to dramatic restructuring by large floods and patches of this association may be ephemeral. Flood scouring and ice floods are powerful and ecologically important abrasive forces that shape the physiognomy and composition of this association. Soils are rapidly drained Psamments, usually with neutral to high pH. These coarse-textured substrates are potentially well-drained, but fluvial topography and a high water table often result in a mixture of well-drained and poorly drained microsites. Occurrences on flat bedrock often develop scoured out potholes which hold flood and rain water, and vegetation is confined to cracks and sediment accumulations. Soil material is restricted to the narrow interstices of tightly packed boulders, or to small crevices in bedrock exposures. However, along the Greenbrier and New rivers in West Virginia, stands of this type occupy cobble bars rather than stabilized outcrops and boulder deposits.

Vegetation Description: This community is characterized by a luxuriant growth of the robust grasses *Andropogon gerardii* (big bluestem), *Sorghastrum nutans* (Indiangrass), *Panicum virgatum* (switchgrass), and *Spartina pectinata* (prairie cordgrass), which resembles prairie vegetation. *Tripsacum dactyloides* (eastern gamagrass) may also occur. Many of the forbs are also typical of prairies. Characteristic species include *Baptisia australis* (blue wild indigo), *Allium cernuum* (nodding onion), *Aristida purpurascens* (arrowfeather threeawn), *Bidens frondosa* (devil's beggartick), *Chasmanthium latifolium* (Indian woodoats), *Clematis viorna* (vasevine), *Eleocharis compressa* (flatstem spikerush), *Conoclinium coelestinum* (blue mistflower), *Eupatorium serotinum* (lateflowering thoroughwort), *Lespedeza violacea* (violet lespedeza), *Packera aurea* (golden ragwort), *Physostegia virginiana* (obedient plant), *Pycnanthemum virginianum* (Virginia mountainmint), *Solidago rupestris* (rock goldenrod), *Teucrium canadense* (Canada germander), *Veronicastrum virginicum* (Culver's root), *Zizia trifoliata* (meadow alexanders), and *Zizia aurea* (golden zizia). Additional herbs with high cover and/or constancy in some areas include *Apocynum cannabinum* (Indianhemp), *Coreopsis tripteris* (tall tickseed), *Cyperus strigosus* (strawcolored flatsedge), *Eupatorium fistulosum* (trumpetweed), *Helianthus occidentalis ssp. occidentalis* (fewleaf sunflower), *Justicia americana* (American water-willow), *Lobelia cardinalis* (cardinalflower), *Ludwigia alternifolia* (seedbox), *Potentilla simplex* (common cinquefoil), *Pycnanthemum torrei* (Torrey's mountainmint), *Rhynchospora capitellata* (brownish beaksedge), *Rhynchospora recognita* (globe beaksedge), *Solidago juncea* (early goldenrod), *Symphyotrichum laeve* (smooth blue aster), and *Viola cucullata* (marsh blue violet). There may be low cover (≤ by trees, which are usually short and flood-battered, including *Betula nigra* (river birch), *Chionanthus virginicus* (white fringetree), *Diospyros virginiana* (common persimmon), *Fraxinus americana* (white ash),

Fraxinus pennsylvanica (green ash), *Platanus occidentalis* (Sycamore), *Ulmus americana* (American elm), and *Ulmus rubra* (slippery elm). Cover in the shrub layer is likewise low and includes short individuals of the tree and shrub species, including *Alnus serrulata* (smooth alder), *Cephalanthus occidentalis* (common buttonbush), *Cornus amomum* (silky dogwood), *Hypericum prolificum* (shrubby St. Johnswort), and *Salix caroliniana* (coastal plain willow). Low-growing vines include *Campsis radicans* (trumpet creeper), *Toxicodendron radicans* (eastern poison ivy), and *Vitis rupestris* (sand grape). In the Potomac River drainage, *Solidago simplex var. racemosa* (Rand's goldenrod), *Helianthus occidentalis* (fewleaf sunflower), *Cerastium arvense var. velutinum* (field chickweed), and *Ceanothus herbaceus* (Jersey tea) are noteworthy components (Lea 2000). In the James River drainage, *Orbexilum pedunculatum var. psoralioides* (Sampson's snakeroot), *Silphium trifoliatum* (whorled rosinweed), *Solidago speciosa* (showy goldenrod), and *Vicia americana* (American vetch) are associated. Vascular plant species richness of sampled plots (Virginia and West Virginia sample sets) averages 43-56 taxa per 100 square meters.

Most Abundant Species:

Stratum	Lifeform	Species
Herb (field)	Graminoid	*Andropogon gerardii* (big bluestem), *Sorghastrum nutans* (Indiangrass)

Characteristic Species: *Andropogon gerardii* (big bluestem), *Apocynum cannabinum* (Indianhemp), *Baptisia australis* (blue wild indigo), *Betula nigra* (river birch), *Cornus amomum* (silky dogwood), *Desmodium glabellum* (Dillenius' ticktrefoil), *Lespedeza violacea* (violet lespedeza), *Packera aurea* (golden ragwort), *Panicum virgatum* (switchgrass), *Physostegia virginiana* (obedient plant), *Sorghastrum nutans* (Indiangrass), *Spartina pectinata* (prairie cordgrass).

Other Noteworthy Species:

Species	GRank	Type	Note
Vicia americana (American vetch)	-	plant	VA S1S2

USFWS Wetland System: Palustrine.

Distribution

Range: This community is found in the east-central United States, from Pennsylvania, Maryland, West Virginia, and Virginia, and possibly Ohio.

States/Provinces: MD, OH, PA, VA:S1, WV.

Federal Lands: NPS (C&O Canal, New River Gorge); USFS (Jefferson).

Conservation Status

Rank: G2G3 (14-Dec-1998).

Reasons: There are probably fewer than 100 occurrences of this community rangewide, depending on how an occurrence is defined. It is known from Maryland, the District of Columbia, and Virginia along the Potomac River, from the James River, Shenandoah River, and various tributaries in Virginia, and from scattered patches along about 50 miles along the Greenbrier River in West Virginia. It is also reported from the Delaware River in Pennsylvania and may also occur in Ohio. This community is threatened by invasion of exotic weeds, especially *Sorghum halepense* (Johnsongrass), *Centaurea biebersteinii* (spotted knapweed), and *Lythrum salicaria* (purple loosestrife).

Classification Information

Status: Standard.

Confidence: 2 - Moderate.

Comments: The distinctions between this community type and *Salix* (willow) spp. / *Andropogon gerardii - Sorghastrum nutans* Gravel Wash Herbaceous Vegetation (CEGL005175) and *(Salix caroliniana, Rhododendron arborescens) - Andropogon gerardii - Baptisia australis - (Solidago simplex var. randii)* Herbaceous Vegetation (CEGL008471) seem quite artificial and further study should be undertaken to determine whether these merely represent geographic subtypes of a single association. In the Central Appalachian region, the type is found predominantly on Western Allegheny Mountains (M221Be + M221Bd, Gauley M221Ca dammed).

Similar Associations:

- *(Salix caroliniana, Rhododendron arborescens) - Andropogon gerardii - Baptisia australis - (Solidago simplex* var. *randii)* Herbaceous Vegetation (CEGL008471).
- *Andropogon gerardii - Phlox subulata - Solidago simplex* var. *racemosa - Packera paupercula* Herbaceous Vegetation (CEGL004284)--sparse vegetation of less frequently flooded, xeric rock outcrops.
- *Panicum virgatum - Andropogon gerardii* Gravel Wash Herbaceous Vegetation (CEGL006477)--on gravel and cobble depositional bars along lower-gradient rivershores.
- *Salix* spp. / *Andropogon gerardii - Sorghastrum nutans* Gravel Wash Herbaceous Vegetation (CEGL005175).

Related Concepts:

- *Andropogon gerardii - Baptisia australis* riparian herbaceous vegetation (Vanderhorst 2001b) =
- *Andropogon gerardii - Panicum virgatum - Rhus radicans - Baptisia australis* Association (Rawinski et al. 1996) =
- *Cornus amomum / Andropogon gerardii - Panicum virgatum - Baptisia australis* Shrub Herbaceous Vegetation (Fleming and Coulling 2001) =
- *Fraxinus pennsylvanica / Andropogon gerardii - Panicum virgatum - Baptisia australis* Wooded Herbaceous Vegetation (Lea 2000) =
- Riverwash Grasslands (*Baptisia australis - Lespedeza violacea - Chasmanthium latifolium* Herbaceous Vegetation) (Grossman et al. 1994) ?
- Willow - Indian grass riverine shrubland (Perles et al. 2004) B

SOURCES

Description Authors: L. A. Sneddon, mod. G. Fleming and P. Coulling, mod. S. C. Gawler.

References: Eastern Ecology Working Group n.d., Fike 1999, Fleming and Coulling 2001, Fleming et al. 2001, Grossman et al. 1994, Harrison 2004, Lea 2000, Perles et al. 2004, Rawinski 1988, Rawinski et al. 1996, TDNH unpubl. data, VDNH 2003, Vanderhorst 2000b, Vanderhorst 2001a, Vanderhorst 2001b, Vanderhorst and Streets 2006, Vanderhorst et al. 2007.

ENVIRONMENTAL ASSESSMENT

BROOKS/BARKSDALE WASTEWATER TREATMENT PLANT IMPROVEMENTS
AND COLLECTION SYSTEM EXTENSION
SECTION 340 PROJECT

SUMMERS COUNTY

WEST VIRGINIA

APPENDIX K – CORRESPONDENCE/FEEDBACK FROM 30-DAY REVIEW PERIOD

U.S. ARMY CORPS OF ENGINEERS

HUNTINGTON DISTRICT

HUNTINGTON, WEST VIRGINIA

OCTOBER 2010