

FEASIBILITY STUDY

NC 93 from NC 113 to US 221

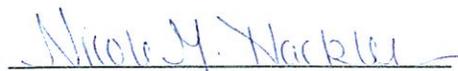
Alleghany County

Division 11

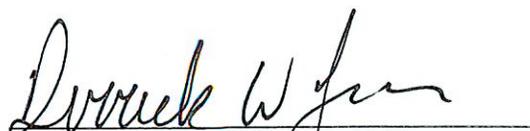
FS-9911 G



Prepared by the
Program Development Branch
N. C. Department of Transportation



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Date

**NC 93 from NC 113 to US 221
Alleghany County
Division 11
FS-9911 G**

I. General Description

This feasibility study describes roadway improvements to NC 93 from NC 113 to US 221, a distance of approximately 9.1 miles. The project location is shown on Figure 1. As part of this study, two different alternatives were investigated, the details of which are as follows:

- ◆ **ALTERNATIVE 1 (MINIMIZATION):** Upgraded two-lane shoulder section on 80' of right of way with curve straightening.
- ◆ **ALTERNATIVE 2:** Upgraded two-lane shoulder section on 100' of right of way with curve straightening.

This study is the initial step in the planning and design process for this project and is not the product of exhaustive environmental or design investigations. The purpose of this study is to describe the proposed project including costs, and to identify potential problems that may require consideration in the planning and design phases.

II. Background

The purpose of this project is to improve the traffic operations and safety of NC 93, as well as provide improved north-south access for commercial vehicles traveling on US 58 in Virginia across the state line to NC 93 near Piney Creek, and points beyond. The Alleghany County Board of Commissioners supports this project.

NC 93 is classified as a Major Collector in both the North Carolina Statewide Functional Classification System and the Region D Thoroughfare Plan. NC 93 is currently a substandard 18-foot two-lane roadway with poor horizontal alignment and narrow shoulders. The development along this road is primarily a combination of residential and agricultural.

An intersection reconfiguration at NC 93 and US 221 was completed under T.I.P. Project R-2711. This project improved safety and sight distance by realigning NC 93 and US 221 and widening the intersection.

III. Traffic and Safety

The current year Average Daily Traffic (ADT) along NC 93 within the project limits ranges from 2440 vehicles per day (vpd) at the east end of the project to 750 vpd at the west end. For the design year 2025, the estimated traffic volumes on NC 93 will range from 4680 vehicles per day (vpd) at the east end of the project to 1400 vpd at the west end. Truck traffic is estimated to make up approximately four percent of daily traffic on the project.

Currently, NC 93 is operating at a Level of Service (LOS) "B". If no improvements are made, NC 93 will operate at a LOS "C" in design year (DY) 2025, with an average travel speed (ATS) of only 35.3 miles per hour. If the proposed road widening and curve straightening improvements are made to the corridor, NC 93 will still operate at a LOS "C" in design year but the ATS will increase substantially to 45.1 miles per hour. This significant improvement is due to the proposed roadway being less constrained as a result of the improved cross section and horizontal curvature, and thus more effective in its operation.

During the three-year period from January 1st 2001 to December 31st 2003, there were twenty-three (23) accidents reported within the project limits. There were nine (9) injury accidents and two (2) fatalities as a result of these incidents. The accident rate for this 9.1 mile portion of roadway is 180.82 accidents per 100 million vehicle miles of travel (acc/100mvm), which is lower than the 2000 to 2002 statewide rate of 182.95 accidents/100mvm for two-lane rural North Carolina Routes. The accident trend within the project limits showed 65% of the crashes were with fixed objects such as embankments, fences, poles or trees. The 2 fatalities occurred at once when a single unit truck, which was stopped in the road, was struck by a van. These kinds of accidents are indicative of a narrow roadway with poor horizontal alignment and narrow shoulders. With the proposed improvements to both the horizontal alignment and shoulder widths, the likelihood of these types of accidents should be significantly reduced.

IV. Description of Alternatives

It is proposed to improve NC 93 from NC 113 to US 221, a distance of approximately 9.1 miles. The project location is shown on Figure 1. Two alternatives were studied for this project, the details of which are as follows:

ALTERNATIVE 1 (MINIMIZATION): Two-lane shoulder section with 12' travel lanes in each direction and 8' outside shoulders (4' of which shall be paved). This section is to be constructed on 80' of right of way in order to minimize impacts to adjacent properties. Curve straightening over the length of the project is reflected in the cost, and is shown in Figure 2.

This option includes bridge widening over Elk Creek, complete with 54" high bicycle-safe railings in order to accommodate the designation of NC 93 as a North Carolina bicycling highway.

In addition to the bridge widening, there are two existing culverts which will be replaced with new bridge structures. The first bridge will be located at SR 1319 (Piney Post Office Road) which crosses a trout stream named Potato Creek, and the second will be where Rock Creek crosses NC 93, approximately 0.6 miles northwest of the US 221 junction. Both of these new bridge structures will also include 54" high bicycle-safe railings in order to accommodate the designation of NC 93 as a North Carolina bicycling highway.

One additional trout stream at SR 1334, which is an unnamed tributary of Potato Creek, is currently piped. With the roadway realignment proposed in this area, a new open-bottom arch steel culvert will be installed.

In order to support the modifications to NC 93, it was also necessary to include section improvements at ten intersecting roadways along the length of the project, with seven of these locations needing realignment as well. All Y-Line modifications for Alternative 1 (Minimization) are to be two-lane shoulder sections with 12' traveled lanes in each direction on 80' of right of way. Realignment of the Y-line constitutes a new tie-in to NC 93 at a right angle, or as close to a right angle as possible. The areas which will be improved and the proposed modifications are as follows (see Figure 2 for locations):

- SR 1325 – realignment and intersection upgrade
- SR 1320 – intersection upgrade
- SR 1334 – intersection upgrade
- SR 1337 – realignment and intersection upgrade
- SR 1338 – realignment and intersection upgrade
- SR 1336 – intersection upgrade
- SR 1341 – realignment and intersection upgrade
- SR 1335 – realignment and intersection upgrade
- SR 1340 – realignment and intersection upgrade
- SR 1346 – realignment and intersection upgrade.

The costs for these additional Y-Line upgrades, as well as all other aforementioned improvements, have been included in the estimate.

With this proposed cross-section, it is anticipated there will be five (5) residences and one (1) business relocated due to this project. The total cost of this alternative, including construction and right-of-way, is estimated to be \$ 19,800,000

Construction.....	\$ 18,200,000
Right-of-Way.....	\$ 1,600,000
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Total Project Cost (Alternative 1).....	\$ 19,800,000

ALTERNATIVE 2: Two-lane shoulder section with 12' travel lanes in each direction and 8' outside shoulders (4' of which shall be paved). This section is to be constructed on 100' of right of way. Curve straightening over the length of this project is reflected in the cost, and is shown in Figure 2.

The bridge widening over Elk Creek, the two new bridge structures at Potato Creek and Rock Creek, and the open-bottom arch steel culvert at SR 1334 are included in this alternative as well. The specifications for these bridges/culverts are identical to those in Alternative 1 (Minimization).

In order to support the modifications to NC 93, it was also necessary to include section improvements at ten intersecting roadways along the length of the project, with seven of these locations needing realignment as well. All Y-Line modifications for Alternative 2 are to be two-lane shoulder sections with 12' traveled lanes in each direction on 100' of right of way. Realignment of the Y-line constitutes a new tie-in to NC 93 at a right angle, or as close to a right angle as possible. The areas which will be improved and the proposed modifications are identical to those previously listed in Alternative 1, with the exception that the Y-line improvements will be constructed on 100' of right of way, rather than the 80' used in the minimization option above (see Figure 2 for locations).

The costs for these additional Y-Line upgrades, as well as all other aforementioned improvements, have been included in the estimate.

With this proposed cross-section, it is anticipated there will be twelve (12) residences and one (1) business relocated due to this project. The total cost of this alternative, including construction and right-of-way, is estimated to be \$ 20,900,000.

Construction.....	\$ 18,600,000
Right-of-Way.....	\$ 2,300,000
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Total Project Cost (Alternative 2).....	\$ 20,900,000

V. Community Issues

A detailed investigation was not conducted for this feasibility study, however no impacts to schools, parks, recreation areas, community facilities, historic or archaeological sites are anticipated with this project.

VI. Natural Environment Issues

A detailed environmental study was not conducted for this report, however based on maps from the Department of Environment Health and Natural Resources – National Heritage Section, two endangered fish species were identified in the project corridor. They are Phenacobius Teretulus (Kanawha Minnow) and Etheostoma Kanawhae (Kanawha Darter). In addition, two trout streams were identified within the project limits.

VII. Recommendations

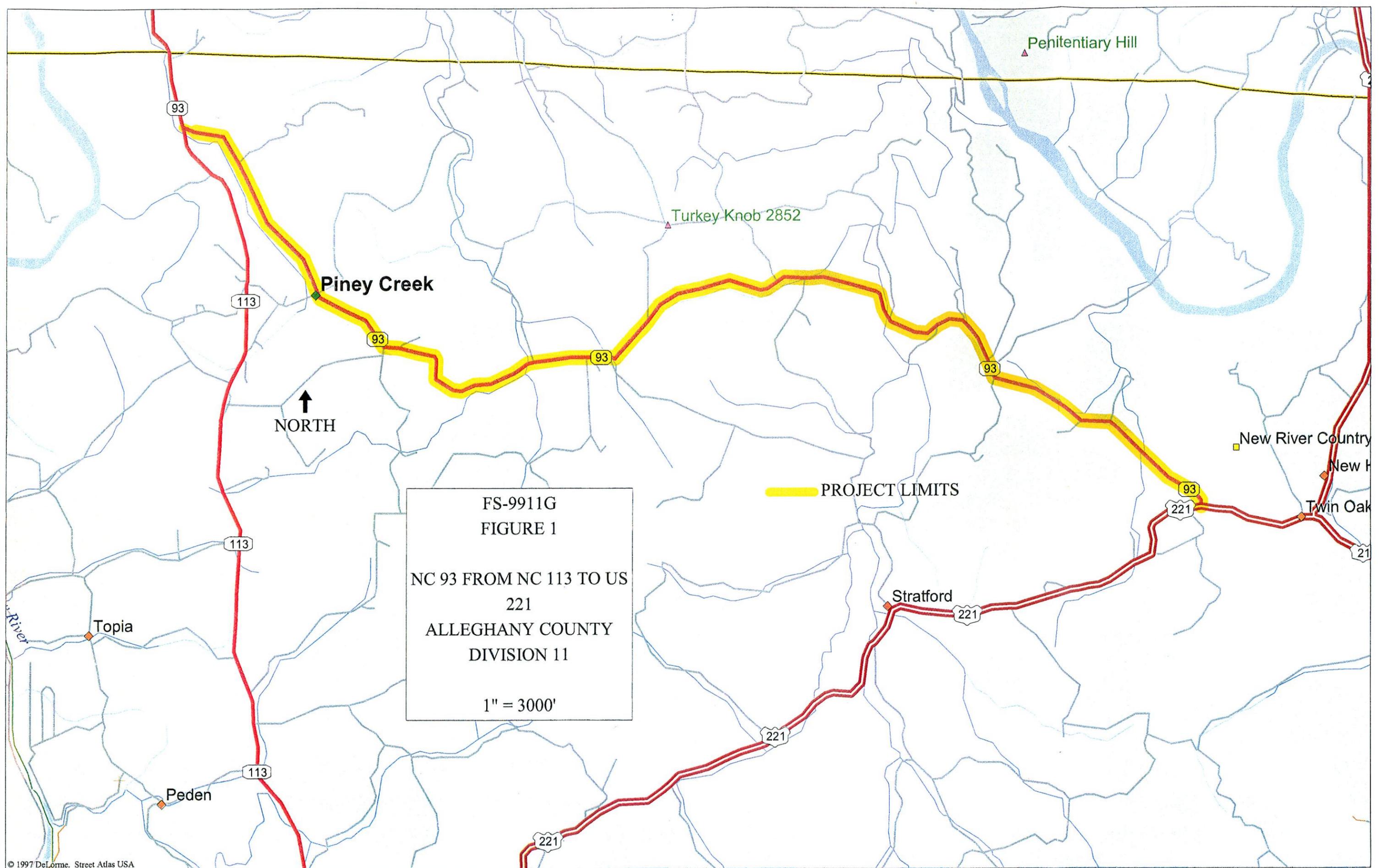
NO BUILD: Although analysis showed a NO BUILD scenario in Design Year 2025 would operate at a LOS "C", this alternative was NOT recommended due to safety concerns. With a majority of the accidents on this stretch of road being fixed object collisions, an increase in the future traffic volumes would likely cause both the severity and the number of these types of accidents to rise. Since two recent fatalities were also recorded in this area, it was felt as though improvements to NC 93 were desirable for the continued safe and effective operation of the roadway.

ALTERNATIVE 1 (MINIMIZATION): The analyses for the improved two-lane shoulder section showed if the roadway were widened to 12' travel lanes in each direction with 8' outside shoulders (4' of which would be paved) on 80' of right of way the facility would also operate at a LOS "C" in Design Year 2025. However, this alternative also provided a significant improvement in the average travel speed (ATS), increasing the ATS from 35.3 miles per hour to 45.1 mph due to the improved cross section and betterment of current constraints. In addition, the proposed curve straightening would greatly improve the safety and sight distance of this facility. Since this scenario was considered a minimization option, a condensed right of way width was used in order to reduce the impacts to adjacent properties and yet still allow significant improvements to the roadway itself. This minimized right of way width afforded the least amount of impact to the area at a minimized cost, while providing the greatest amount of improvement on the facility. It was felt as though this option struck an important

balance between necessary safety improvements and excessive property impacts, providing the best solution for both the motoring public and the landowners in the area. For these reasons, **Alternative 1 (Minimization) was selected as the preferred option for this project.**

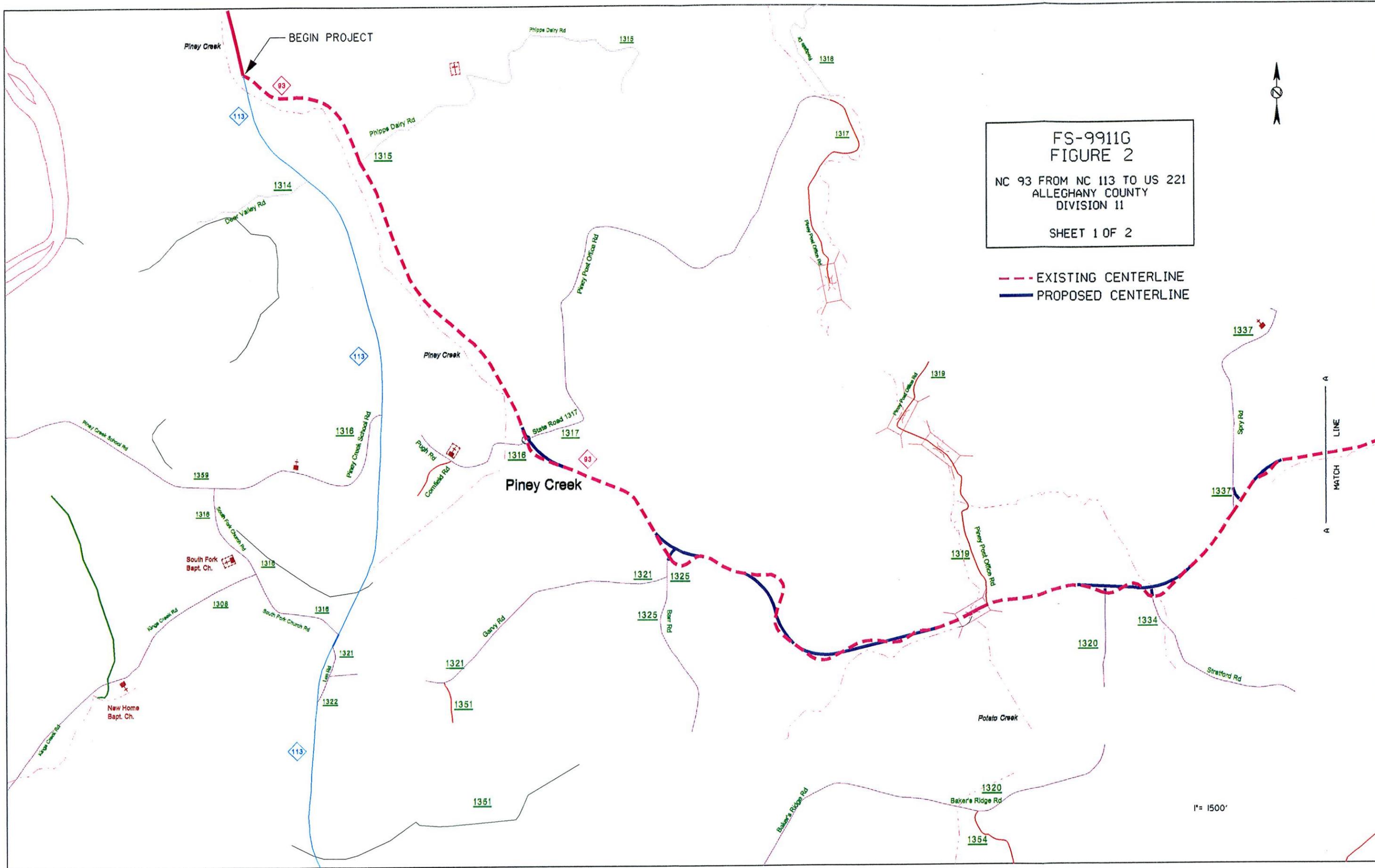
ALTERNATIVE 2: The analyses for the improved two-lane shoulder section showed if the roadway were widened to 12' travel lanes in each direction with 8' outside shoulders (4' of which would be paved) on 100' of right of way the facility would also operate at a LOS "C" in Design Year 2025. However, the number of properties impacted with this alternative versus the minimization option would rise from five (5) residential relocations to twelve (12) residential relocations. The cost of this alternative was also \$1.1 million dollars more than Alternative 1. Since there was virtually no difference in improvement on the facility from 80' to 100' of right of way, this alternative was NOT chosen since more landowners would be effected at a greater cost, while achieving the same results as the minimization option above.

The total project cost of the recommended Alternative 1 (Minimization) option with a two-lane shoulder section, 12' travel lanes in each direction and 8' outside shoulders (4' of which would be paved) on 80' of right of way is \$ 19,800,000.



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FIGURE 1
NC 93 FROM NC 113 TO US
221
ALLEGHANY COUNTY
DIVISION 11
1" = 3000'

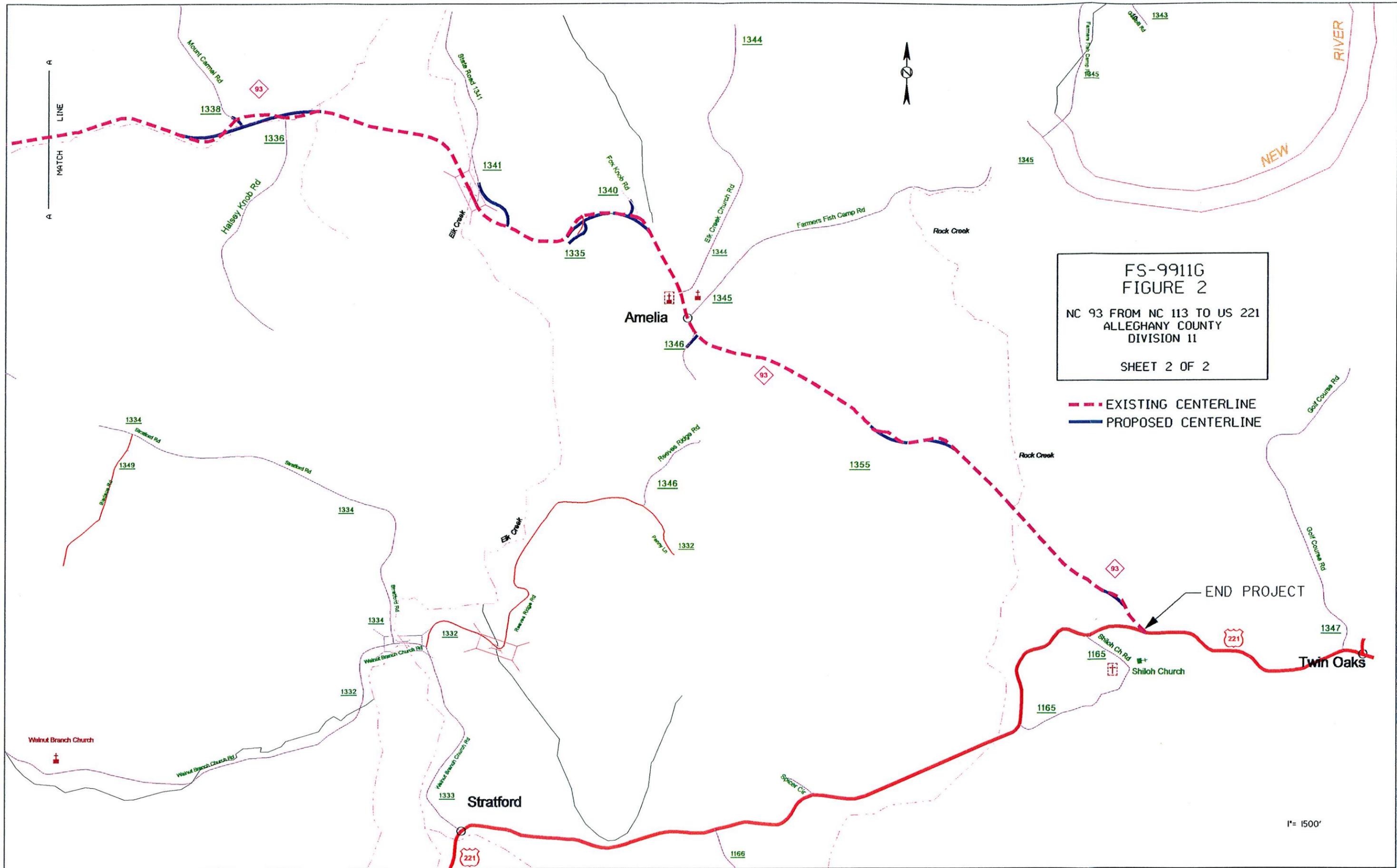
PROJECT LIMITS



FS-9911G
 FIGURE 2
 NC 93 FROM NC 113 TO US 221
 ALLEGHANY COUNTY
 DIVISION 11
 SHEET 1 OF 2

--- EXISTING CENTERLINE
 — PROPOSED CENTERLINE

1" = 1500'



FS-9911G
 FIGURE 2
 NC 93 FROM NC 113 TO US 221
 ALLEGHANY COUNTY
 DIVISION 11
 SHEET 2 OF 2

- - - EXISTING CENTERLINE
 — PROPOSED CENTERLINE

END PROJECT

1" = 1500'