PROGRAMMATIC SECTION 4(f) EVALUATION

Thurmond Bridge Rehabilitation Project

Fayette County, West Virginia

State Project: S310-25/2-0.10, Federal Project: BR-0252(001)D

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Federal Highway Administration

West Virginia Department of Transportation

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Attachments

Attachment 1. State Historic Preservation Office Letters dated August 18, 2014 and December 31, 2014

Attachment 2. Bridge Renovation Study, 2013

Attachment 3. National Park Service Letters dated June 6, 2014 and August 19, 2014

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Attachment 5. U.S. Fish and Wildlife Service Letter dated July 17, 2014

Attachment 6. Memorandum of Agreement By and Among the WV State Historic Preservation Officer and WVDOH, dated November 2015

Attachment 7. Advisory Council on Historic Preservation Letter dated August 6, 2015

A. Introduction

The Thurmond Bridge carries the single-track Dunloup Branch Railroad as well as the narrow (11-foot wide) single-lane Fayette County Route 25/2 (Route 25/2) over the New River to the Town of Thurmond, WV (Fig 1). The railroad is owned by the R. J. Corman Railroad Group LLC. Route 25/2 is part of the West Virginia Department of Transportation Division of Highways (WVDOH) system. The vehicular portion of the bridge was attached to the railroad bridge in 1921. The Route 25/2 vehicular bridge is the principal roadway connection to the Town of Thurmond. Additionally, the vehicular bridge is utilized by pedestrians as access to the National Park Service's Interpretive Center located in Thurmond, WV.

WVDOH, in cooperation with the Federal Highway Administration (FHWA), is proposing to renovate the Thurmond Bridge. This renovation will require replacement of historic components of the bridge and will add pedestrian "refuge" bays to the WVDOH's vehicular bridge to address safety concerns. (See detailed description of proposed project in Section D.)

The Thurmond Bridge is eligible for listing on the National Register of Historic Places (NRHP) (Attachment 1), making the bridge a historic property. The proposed action will result in a use of the historic property. In accordance with 23 CFR 774, the following evaluation demonstrates that there are no feasible and prudent alternatives to the use of the bridge and the proposed action includes all possible planning to minimize harm to the historic bridge resulting from such use.

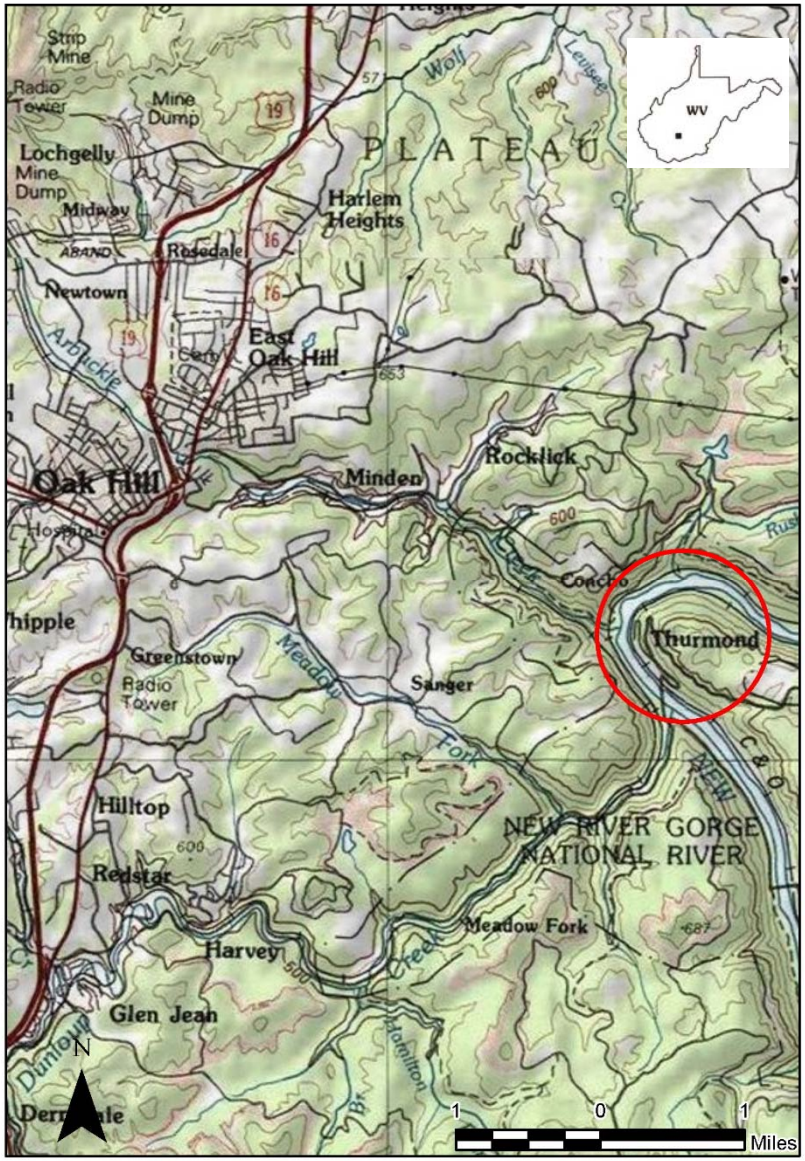

Figure 1. Project location in Fayette County, WV. The Thurmond Bridge crosses the New River.

Figure 2. Photo of Thurmond Bridge showing the R. J. Corman Railroad Group LLC owned, single-track Dunloup Branch Railroad and bridge (left side of photo) as well as the WVDOH owned, narrow (11-foot wide), single-lane vehicle/pedestrian bridge (right side of photo) that carries Fayette County Route 25/2 over the New River. The National Park Service's Interpretive Center is housed in the old depot, visible across the river.

B. Section 4(f) Regulations

B.1 Use

Under Section 4(f) of the Department of Transportation Act of 1966 (49 USC Section 303 and 23 CFR Part 774), FHWA may not approve the "use" of land from a significant publicly-owned public park, recreation area, or wildlife and waterfowl refuge, or any significant historic site unless a determination is made that:

1) **There is no feasible and prudent alternative to the use of land from the property; and**
2) **The action includes all possible planning to minimize harm to the property resulting from such use.**

A "use" under Section 4(f) can be any of the following:

- a direct use – property is permanently incorporated into the transportation project;
- a temporary use – property is temporarily occupied in a way that is adverse to the property's purpose; or
- a constructive use – occurs when "the transportation project does not incorporate land from a Section 4(f) property, but the project's proximity impacts are so severe that the protected activities, features, or attributes that qualify the property for protection under Section 4(f) are substantially impaired. Substantial impairment occurs only when the protected activities, features, or attributes of the property are substantially diminished." (23 CFR Section 774.15(a).

For rehabilitation of historic bridges, a special determination of "use" has been described by FHWA as follows:

> *"For the purpose of this programmatic Section 4(f) evaluation [which is described in Section B.2 below], a proposed action will 'use' a bridge that is on or eligible for inclusion on the National Register of Historic Places when the action will impair the historic integrity of the bridge either by rehabilitation or demolition. Rehabilitation that does not impair the historic integrity of the bridge as determined by procedures implementing the national Historic Preservation Act of 1966, as amended (FHWA), is not subject to Section 4(f)."*
> (FHWA, 1983)

As determined through correspondence with the SHPO (Attachment 1), the proposed rehabilitation will impair the historic integrity of the Thurmond Bridge, which is listed on the NRHP, and thus will cause a "use" of the bridge.

B.2 Applicability of Programmatic Section 4(f) Evaluation and Approval

In 1983, FHWA issued a Programmatic Section 4(f) Evaluation and Approval that could be applied to projects that were proposing to use a historic bridge if certain criteria were met. The complete "Programmatic Section 4(f) Evaluation and Approval for FHWA Projects that Necessitate the Use of Historic Bridges" can be found at the FHWA website (https://www.environment.fhwa.dot.gov/4f/4fbridge.asp).

If a project meets the criteria of the Programmatic Section 4(f) Evaluation, an individual (more extensive) evaluation is not required. Five criteria are used to determine the applicability of the Programmatic Section 4(f) Evaluation to a project. These criteria are listed below, along with a review of applicability to the proposed project.

1) **The bridge is to be replaced or rehabilitated with Federal funds.**

   This criterion is applicable to the proposed project. The Thurmond Bridge Rehabilitation Project involves the rehabilitation of the bridge with federal funds.

2) **The project will require the use of a historic bridge structure which is on or is eligible for listing on the National Register of Historic Places.**

   This criterion is applicable to the proposed project as described above under "Use."

3) **The bridge is not a National Historic Landmark.**

   This criterion is applicable to the proposed project. The Thurmond Bridge is not a National Historic Landmark.

4) **The FHWA Division Administrator determines that the facts of the project match those set forth in the Programmatic Section 4(f) Evaluation for assessing alternatives, findings, and measures to minimize harm.**

   This criterion is applicable to the proposed project. Sections C through F of this document detail how the facts of the project match those set forth in the Programmatic Section 4(f) Evaluation for assessing alternatives, findings, and measures to minimize harm.

5) **Agreement among the FHWA, the State Historic Preservation Officer (SHPO), and the Advisory Council on Historic Preservation (ACHP) has been reached through procedures pursuant to Section 106 of the National Historic Preservation Act.**

   This criterion is applicable to the proposed project. Section F of this document details agreements with the SHPO and ACHP.

With commitment to implement the mitigation measures reviewed herein, FHWA will have completed the Section 4(f) process for impact to the Thurmond Bridge.

C. Description of the Section 4(f) Resource

C.1 Physical Description

The Thurmond Bridge is an uncommon and distinctive railroad structure with a cantilevered roadway supporting vehicular and pedestrian traffic. An overall stability analysis conducted as part of the 2013 Bridge Renovation Study found that the bridge lacked stability and that uplift was occurring at the downstream girder bearings under dead load. Further, it found that the bearings were corroded and cannot support the predicted uplift. Finally, the report recommended that WVDOH consider closing the bridge temporarily to vehicle traffic and/or take other precautions until proper tie-downs can be installed at the bearings; those repairs have since been made. The final recommendation of the report was that "a rehabilitation of the bridge appears to be a practical long-term solution." (Burgess & Niple, 2013; Attachment 2)

C.2 Significance of the Section 4(f) Property

The Thurmond Bridge was designed and constructed in 1915-1916 by the Chesapeake & Ohio Railway Corporation to replace a ca. 1890 bridge that was destroyed by flooding in 1908. The Thurmond Bridge contributes to the Dunloup Branch Railroad, which is significant under Criterion A, and to the Thurmond Historic District, which is significant under Criteria A and C. "As an individual structure, Thurmond Bridge is significant under Criterion C as a representative example of a Warren through truss and deck plate girder railroad bridge with the uncommon feature of a cantilevered vehicular and pedestrian roadway. The main Warren through truss span retains its character-defining features such as its inclined end posts, diagonal configuration, floor beams, stringers, riveted connections, and portal bracing. The seven riveted deck plate girder spans are less significant from an engineering perspective than the Warren truss main span. Because the plate girder spans are riveted, they are an example of historic fabrication techniques and contribute to the overall historic feeling of the bridge. The cantilevered roadway support brackets are not of a design that is intrinsically notable or rare. Such brackets were commonly used in contemporary bridges to support sidewalks. In the early twentieth century, it was commonplace to have 10'-wide sidewalks, so the 11'-11" cantilevered roadway is not unusually wide. What is remarkable about the Thurmond Bridge is the fact that it is a railroad bridge with a secondary vehicular roadway. The existence and survival of this roadway is a testament to the isolation and topographic characteristics of its setting. In a more populous or accessible region, such a roadway configuration would have been quickly made obsolete with the dawn of the automobile age. Thus, the Thurmond Bridge's railroad/vehicular-pedestrian configuration is historically significant as a rare survivor of its type" (Michael Baker Jr., Inc., 2014). The Thurmond Bridge's NRHP Boundary is limited to the footprint of the bridge and contains approximately 0.75 acres.

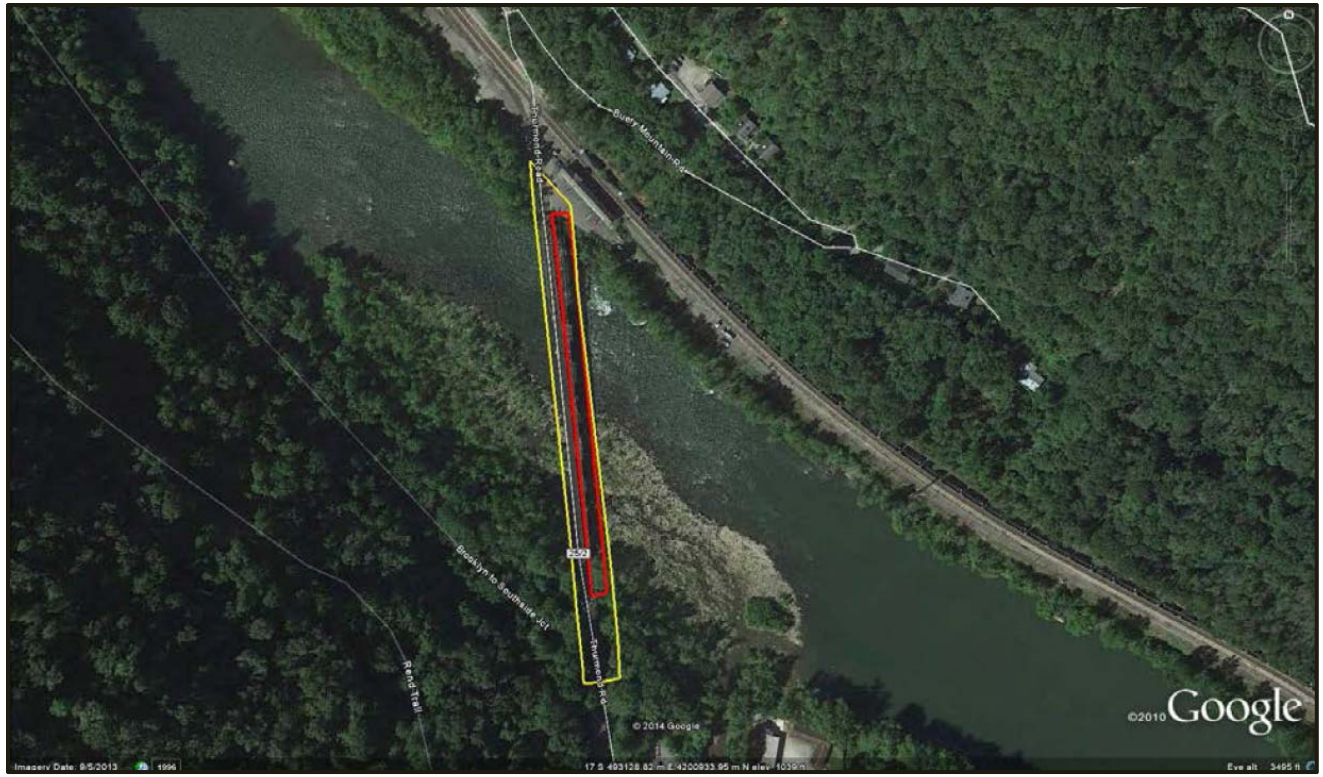

Figure 3. Thurmond Bridge Area of Project Effect outlined in yellow (outer line); NRHP Boundary outlined in red (inner line).

C.3 Effects on the Historic Resource

Following the completion and submittal of a Section 106 Criteria of Effects Report, the SHPO determined that the project "will result in an adverse effect to the Thurmond Bridge" (Attachment 1, letter dated December 31, 2014).

D. Proposed Project

D.1 Project Need

D.1.1 Rehabilitation

In 2012, the Thurmond Bridge was thoroughly inspected (Burgess & Niple, 2012), and it was found that the condition of the bridge was critical because of dislodged truss bearings. Stability analysis results indicated that the bridge lacked stability, and that uplift was occurring at the downstream girder bearings under dead load. It was recommended that WVDOH consider closing the bridge temporarily to vehicle traffic and/or take other precautions until proper tie-downs could be installed at the bearings. WVDOH responded by reducing the load limit of the bridge to 3 tons and beginning temporary repairs. Those temporary repairs were completed in 2013, and subsequently the load limit was raised to 10 tons.

However, those temporary repairs did not offer long-term solutions to all of the issues affecting the bridge's ability to remain in service. As stated in a Phase I Bridge Renovation Study completed in August of 2013 (WVDOH, 2013; Attachment 2), "The most serious deficiencies include the dislocated truss bearings; decaying wingwalls; deterioration of the concrete substructures; undermining of girder bearings, corroded anchor bolts, and areas of advanced section loss to steel members." Only the girder bearing problem was addressed in 2013.

If the needs for renovation are not addressed, the bridge will have to be closed. This would necessitate a long detour to reach the town of Thurmond, disrupting the lives of residents and the use of the Thurmond District as a cultural resource. Residents and visitors to the Thurmond Historic District with the NPS Interpretive Center would have to travel far south around Highland Mountain to access the town (Figure 4).

D.1.2 Safety for Pedestrians

Improving safety for pedestrians is a priority with this project because 1) pedestrian use of the bridge is an important component of the bridge's historic integrity, as documented in Section C.2 above, 2) pedestrian use of the bridge is anticipated to increase, and 3) the National Park Service wants to improve pedestrian safety on this bridge, which crosses one of the parks under their jurisdiction and serves as an access point for their Interpretive Center.

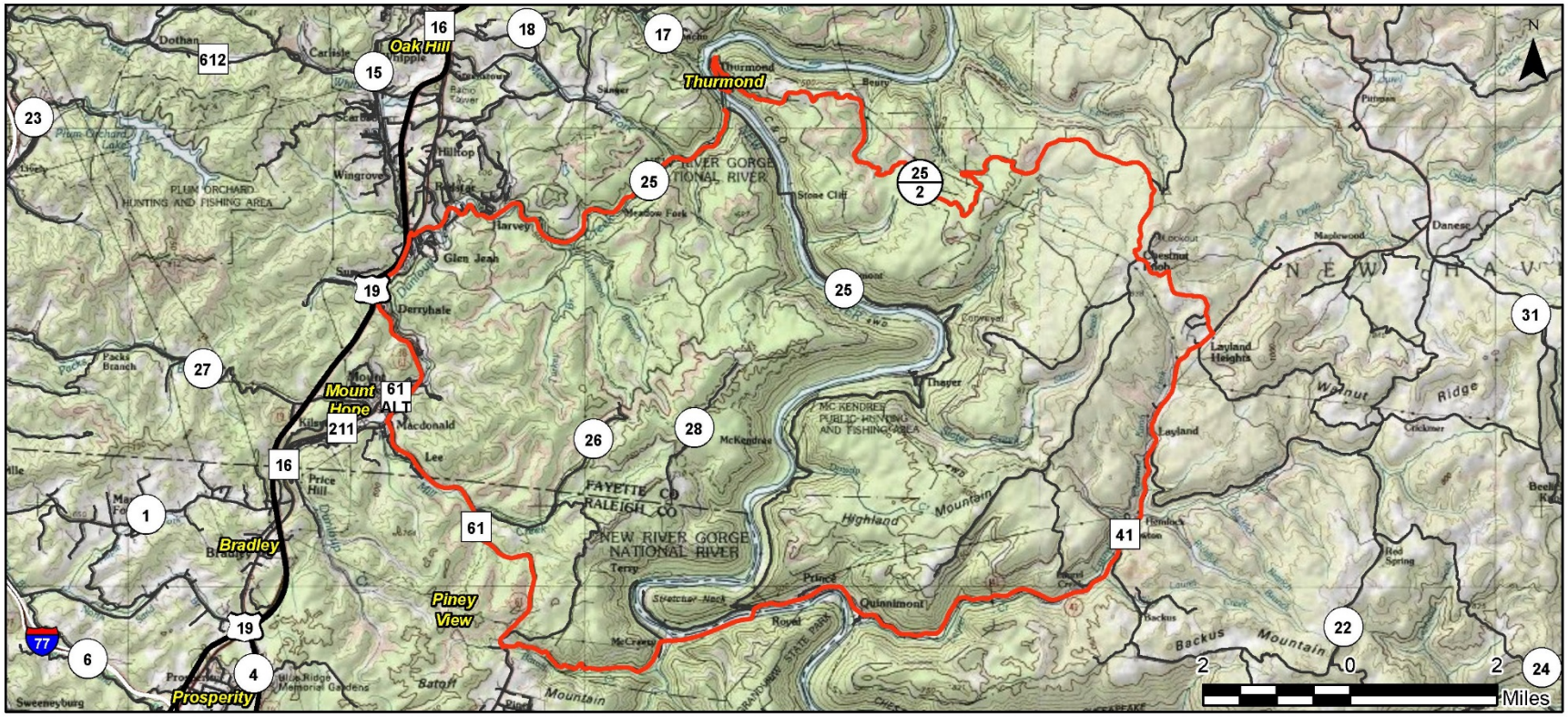

Figure 4. Detour required if the vehicular portion of the Thurmond Bridge were closed. From the southern side of the bridge, this detour would require over 40 miles and approximately and hour and a half to drive west to Glen Jean and around the southern border of Highland Mountain to approach the bridge from the north.

The National Park Service anticipates growth in the number of visitors to the historic area. The Town of Thurmond, WV is listed as a Historic District on the NRHP, and its former downtown area is being developed by the National Park Service as a historic interpretive area within the New River Gorge National River Park (see Figure 5). The Thurmond Railroad Depot was restored as an Interpretive Center by the National Park Service in 1995. There are over twenty other structures in Thurmond that are owned by the National Park Service and are in various stages of rehabilitation. The National Park Service began a stabilization program in 2003, including repairs to preserve buildings until the time that they can be rehabilitated or restored. People wishing to visit the Interpretive Center park vehicles on the south side of the New River in a National Park Service parking lot and walk across the Thurmond Bridge using the WVDOH's vehicular bridge that carries Route 25/2.

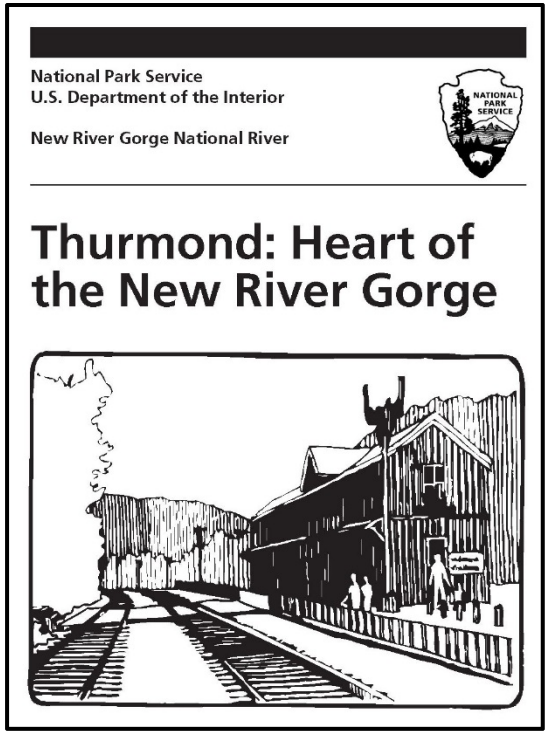

Figure 5. National Park Service brochure for the Thurmond Historic District (left), and historic train depot (right) which now serves as the National Park Service's Interpretive Center for the Thurmond Historic District.

According to National Park Service data on visitations to the Thurmond Interpretive Center (accessed through: https://irma.nps.gov/Stats/Reports/Park), there was an average of approximately 6,600 visitations per year for the last five years (2010-2014). As might be expected, visitations to the Thurmond Historic District and the Interpretive Center vary by month, with the summer months' having the highest number of visitors (Table 1).

Table 1. Number of visitations by Month to the NPS Interpretive Center

Month	Visitations - 2014	Visitations- 2013
January	0	50
February	0	62
March	0	60
April	0	60
May	551	60
June	1473	1406
July	2173	2072
August	2173	1670
September	742	720
October	78	632
November	0	150
December	0	125

Source: National Park Service, 2015.

WVDOH traffic data reported that the average daily vehicular traffic on the bridge (Route 25/2) in 2006 was approximately 200. In their letter dated August 19, 2014 (Attachment 3), the National Park Service claimed the Average Daily Traffic (ADT) has likely risen since 2006 because of efforts to host more events and group tours in Thurmond throughout the year. Assuming that the largest percentage of vehicular traffic occurs during daylight hours, an ADT of even just 200 would mean that approximately 15-20 vehicles use the bridge/hour during those hours. There are no data on the number of pedestrians that use the bridge daily. However, it seems reasonable to assume that the vast majority of visitations to the Thurmond Interpretive Center shown in Table 1, were pedestrians that utilized the bridge. Thus, particularly in the summer months, there is a potentially unsafe mix of pedestrian and vehicular traffic moving along the narrow (11-foot wide) bridge carrying Route 25/2. Figure 6 shows a pedestrian's view along the bridge with an oncoming vehicle.

In correspondence with WVDOH regarding the proposed project, the National Park Service expressed support for WVDOH's efforts to improve pedestrian access across the Thurmond Bridge and also suggested that a full length walkway to separate pedestrians from vehicle traffic may be warranted because of the anticipated increase in visitors (Attachment 3). Full length sidewalk design options were considered in the alternatives analysis, as discussed later.

With increased need for access to Thurmond, problems with the footing along the bridge become more of a problem. WVDOH has received complaints about the roadway's grating. The walking surface is dominated by a grating with large holes that can be a hazard (e.g., catching shoelaces and heels), hinder wheelchair access, and deter visitors from using the bridge (Figure 6).

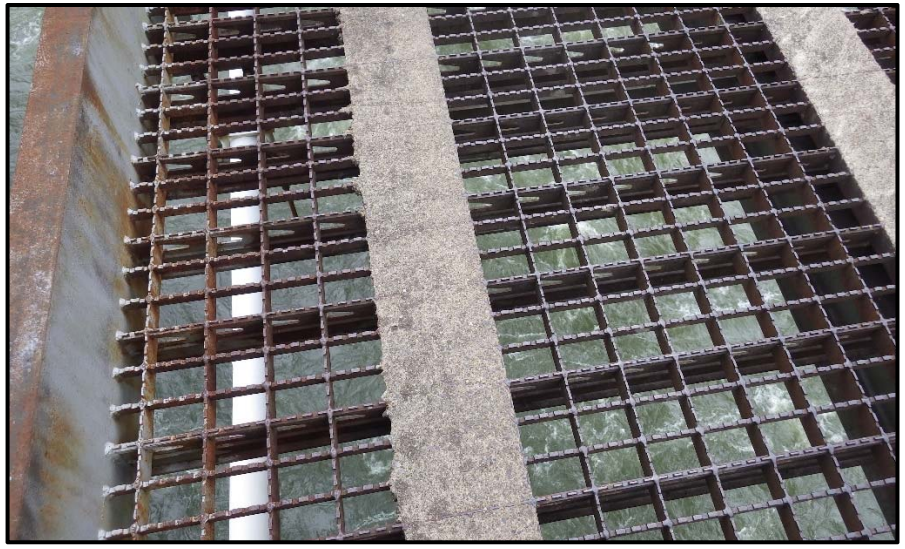

Figure 6. A pedestrian's view north along the Thurmond Bridge with an on-coming car (left). Close-up of the roadway's grating, which poses a challenge for pedestrians and wheelchairs (right).

D.2 Project Purpose

Based on the discussions above, there is a clear need to renovate the current Thurmond Bridge as well as to improve the safety of pedestrians accessing the Town of Thurmond and the NPS Interpretive Center via the WVDOH's vehicular/pedestrian bridge attached to Thurmond Bridge (Route 25/2). Because of the close tie between the bridge and the National River Park, the needs of the National Park Service must also be met by the project. Therefore, the project purpose is to rehabilitate the Thurmond Bridge with a structure that continues to provide vehicular and pedestrian access to Thurmond, WV and its National Park Service resources and that provides increased safety for pedestrians utilizing the bridge.

D.3 Summary of Proposed Action

WVDOH has determined that the following "suite of repairs" is necessary in order to allow the vehicular/pedestrian bridge to meet the design standards for this bridge (i.e., a 12-ton load limit), to maintain it for the foreseeable future, and to meet the project's purpose and need.

- Replacement of deteriorated timber ties and planking.
- Jacking and temporarily support the truss and girders while the bearings are replaced.
- Bearing replacement.

- Extensive concrete patching, crack sealing, and seat re-construction.
- Wingwall reconstruction.
- Structural repairs to the deteriorated steel members and connections, including:
  - Plating of the truss low chords at a few areas of heavy loss;
  - Replacement of several truss lateral gusset plates and cap plates with heavy loss;
  - Plating of several girder flanges, stiffeners and lateral gussets that exhibit significant loss with through holing;
  - Strengthening of roadway brackets 2, 5, 8 and 27-31 and several connection repairs to the bottom flanges;
  - Repairs to strengthen truss gusset plates; and
  - Stringer strengthening repairs.
- Replacement of deteriorated rivets with bolts.
- Cleaning, sealing, and painting.
- Installing refuge bays on the upstream side of the bridge. Considering the ADT is low, a full length sidewalk may not be essential to provide safe pedestrian access. The installation of refuge (or observation) bays would provide the following benefits:
  - Allows pedestrians to move clear of oncoming vehicles;
  - Provides unique vantage points;
  - Aesthetically pleasing;
  - Less cost since only located at 200’ intervals; and
  - Easier to support than full length walkway access.
- Paving a portion of the decking to provide safer pedestrian passage.

The refuge bays will be positioned on the shorter span stringers which have excess weight capacity. Strengthening of the brackets at the refuge bay locations will be needed to accommodate the additional loads. Adding refuge bays will result in a minor increase in the uplift at the downstream bearings. The proposed tie-down anchorages will be sized to accommodate the additional uplift. Lightweight materials, such as timber, fiber-reinforced polymer (FRP), and aluminum, will be considered to reduce the load effect. A rendering of the renovated bridge with pedestrian refuge bays is presented in Figure 7.

Figure 7. Graphic depiction of renovated vehicular and pedestrian bridge with pedestrian refuge bays and concrete-filled strip of the roadway. (Rendering by Michael Baker International.)

E. Alternatives and Findings

As stated in the Programmatic Section 4(f) Evaluation for Historic Bridges, the following alternatives avoid any use of the historic bridge:

1) **Do nothing.**
2) **New location alternatives** (i.e., build a new structure at a different location without affecting the historic integrity of the old bridge, as determined by procedures implementing the NHPA).
3) **Rehabilitation alternatives** (i.e., rehabilitate the historic bridge without affecting the historic integrity of the structure, as determined by procedures implementing the NHPA).

For each of these alternatives, the Programmatic Evaluation stipulates a list of findings that must apply in order to select a different alternative for the project. An assessment of each of these findings is presented below in Sections E.1 through E.3.

E.1 Do Nothing Alternative

The following conditions must be met by a project in order to use the Programmatic Section 4(f) Evaluation.

- ***The Do Nothing Alternative has been studied:***

The Do Nothing Alternative has been studied for the proposed project. A "No-Build" Alternative was included in both the bridge renovation and the earlier bridge replacement studies conducted for this project (Attachment 2 and Attachment 4), and has been incorporated into the Environmental Assessment prepared for this project.

- ***The Do Nothing Alternative ignores the basic transportation need:***

The Do Nothing Alternative involves taking no action other than routine maintenance activities, allowing the deterioration of the bridge to continue, which will eventually result in posting additional weight restrictions on the bridge and ultimately its permanent closure. The Do Nothing Alternative does not provide a structure that meets current design standards and is not able to maintain or improve the services that the bridge currently provides travelers. Therefore, the Do Nothing Alternative does not meet the basic transportation purpose and need and is not a prudent and feasible alternative.

- ***For the following reasons the Do Nothing Alternative is not feasible and prudent:***

a. *Maintenance - The do nothing alternative does not correct the situation that causes the bridge to be considered structurally deficient or deteriorated. These deficiencies can lead to sudden collapse and potential injury or loss of life. Normal maintenance is not considered adequate to cope with the situation.*

As detailed in Section D.1.1, the most recent inspection of the bridge (Burgess & Niple, 2012) concluded that the general overall condition of the bridge is critical, and 2013 temporary repairs did not correct all conditions that cause the bridge to be considered structurally deficient or deteriorated. The deteriorating conditions, regardless of normal maintenance, will eventually lead to the permanent closure of the bridge.

b. Safety - The do nothing alternative does not correct the situation that causes the bridge to be considered deficient. Because of these deficiencies the bridge poses serious and unacceptable safety hazards to the traveling public or places intolerable restriction on transport and travel.

The Do Nothing Alternative does not correct the situation that mixes pedestrian and vehicular traffic causing a potential for a pedestrian accident. The Do Nothing Alternative also does not improve access for wheelchairs.

E.2 Build on New Location without Using the Old Bridge

The following conditions must be met by a project in order to use the Programmatic Section 4(f) Evaluation.

- ***Investigations have been conducted to construct a bridge on a new location or parallel to the old bridge (allowing for a one-way couplet):***

Investigations of new location alternatives were conducted and documented in both a Preliminary Design Report (GAI, 2000) and an Amended Bridge Replacement Study (WVDOH, 2001; Attachment 4). The studies developed and analyzed eight (8) build alternatives, including six (6) new location alternatives that might avoid use of the historic Thurmond Bridge. Two of the alternatives were located directly adjacent and parallel to the existing bridge.

- ***For one or more of the following reasons, this alternative is not feasible and prudent:***

a. Terrain - The present bridge structure has already been located at the only feasible and prudent site, i.e., a gap in the land form, the narrowest point of the river canyon, etc. To build a new bridge at another site will result in extraordinary bridge and approach engineering and construction difficulty or costs or extraordinary disruption to established traffic patterns.

Based on the information contained in the 2003 planning study, terrain issues will not preclude construction of a new location alternative and therefore a new terrain alternative is feasible. However, all new location alternatives require the direct use of Section 4(f) resources that are located under or adjacent to the Thurmond Bridge. These include the NRHP-listed Thurmond Historic District and the New River Gorge National River. Therefore, none of the new location alternatives is prudent.

b. Adverse Social, Economic, or Environmental Effects - Building a new bridge away from the present site would result in social, economic, or environmental impact of extraordinary magnitude. Such impacts as extensive severing of productive farmlands, displacement of a significant

number of families or businesses, serious disruption of established travel patterns, and access and damage to wetlands may individually or cumulatively weigh heavily against relocation to a new site.

All new location alternatives require the direct use of Section 4(f) resources that are located under or adjacent to the Thurmond Bridge. These include the NRHP-listed Thurmond Historic District and the New River Gorge National River.

Impacts to the river are an important consideration not only because it is part of a park, but also because of its habitat value. During consultation for this proposed project (Attachment 5), the U.S. Fish and Wildlife Service (the "Service") stated that "the Service and the West Virginia Division of Natural Resources (WVDNR) identified the New River Gorge as a nationally significant and unique wildlife ecosystem." The Service explained that the New River Gorge National River is afforded protection as a Resource Category 1, and therefore has a mitigation goal of "no loss of existing habitat value." Further, the river is designated by the U.S. Environmental Protection Agency as both an American Heritage River and an Aquatic Resource of National Importance.

Any of the new location alternatives would impact Section 4(f) resources and habitat within the New River Gorge National River; therefore, none of the new location alternatives is prudent.

c. *Engineering and Economy - Where difficulty associated with the new location is less extreme than those encountered above, a new site would not be feasible and prudent where cost and engineering difficulties reach extraordinary magnitude. Factors supporting this conclusion include significantly increased roadway and structure costs, serious foundation problems, or extreme difficulty in reaching the new site with construction equipment. Additional design and safety factors to be considered include an ability to achieve minimum design standards or to meet requirements of various permitting agencies such as those involved with navigation, pollution, and the environment.*

The cost of construction of a new pedestrian, vehicular or combination bridge on new location would be more than the proposed renovation with pedestrian refuge bays, but because of the effects to Section 4(f) resources and the New River Gorge National River (see reason "b" above), the cost consideration is moot.

d. *Preservation of Old Bridge – It is not feasible and prudent to preserve the existing bridge, even if a new bridge were to be built at a new location. This could occur when the historic bridge is beyond rehabilitation for a transportation or an alternative use, when no responsible party can be located to maintain and preserve the bridge, or when a permitting authority, such as the Coast Guard requires removal or demolition of the old bridge.*

This reason does not apply to the proposed project. As described above, it is not feasible and prudent to construct a new bridge on a new location, and the Thurmond Bridge cannot be preserved in its current condition while fulfilling its transportation function. An alternative that uses the existing bridge location is required.

E.3 Bridge Rehabilitation Alternatives

The following conditions must be met by a project in order to use the Programmatic Section 4(f) Evaluation.

- ***Studies have been conducted of rehabilitation measures:***

WVDOH commissioned investigations of bridge rehabilitation alternatives which were presented in a 2013 report (Burgess & Niple, 2013). The study developed and analyzed six (6) renovation alternatives, in addition to consideration for the No Build Alternative (Alternative 1) and a bridge replacement alternative (Alternative 8). A summary of the renovation alternatives is provided below, and the complete report is included as Attachment 2.

For all rehabilitation alternatives, WVDOH included the following basic repair and renovation elements to address the first part of the project's purpose and need (rehabilitation in order to maintain a river crossing):

- Replacement of deteriorated timber ties and planking.
- Jacking and temporarily support the truss and girders while the bearings are replaced.
- Bearing replacement.
- Extensive concrete patching, crack sealing, and seat re-construction.
- Wingwall reconstruction.
- Structural repairs to the deteriorated steel members and connections, including:
  - Plating of the truss low chords at a few areas of heavy loss;
  - Replacement of several truss lateral gusset plates and cap plates with heavy loss;
  - Plating of several girder flanges, stiffeners and lateral gussets that exhibit significant loss with through holing;
  - Strengthening of roadway brackets 2, 5, 8 and 27-31 and several connection repairs to the bottom flanges;
  - Repairs to strengthen truss gusset plates; and
  - Stringer strengthening repairs.
- Replacement of deteriorated rivets with bolts.
- Cleaning, sealing, and painting.

To address the second part of the purpose and need (increased safety), the rehabilitation alternatives provided a variety of approaches. A summary of these approaches is as follows:

- Alternative 2: No changes to the bridge other than the rehabilitation components listed above.
- Alternative 3: Addition of a strip of concrete along the roadway to improve the crossing surface for pedestrians and wheelchairs.

- Alternative 4: Addition of a strip of concrete along the roadway as well as refuge bays to improve the crossing surface for pedestrians and wheelchairs and allow pedestrians to get off the roadway (Figure 7).
- Alternative 5: Addition of a full length sidewalk along the upstream side of the bridge to allow pedestrians to get off the roadway.
- Alternative 6: Addition of a full length sidewalk along the downstream side of the bridge to allow pedestrians to get off the roadway.
- Alternative 7: Addition of overflow parking in Thurmond to reduce need for pedestrian use of bridge.

➢ ***For one or more of the following reasons, this alternative is not feasible and prudent, without causing a use of the 4(f) resource:***

a. The bridge is so structurally deficient that it cannot be rehabilitated to meet minimum acceptable load requirements without affecting the historic integrity of the bridge.

As discussed in Section B.1, the proposed rehabilitation will impair the historic integrity of the Thurmond Bridge, which is listed on the NRHP, and thus will cause a "use" of the bridge. The SHPO determined that removing portions of the bridge to conduct renovation work, changing the view of the bridge from the river, and adding materials that will weather differently from the older portions of the bridge will all cause adverse effect to the bridge (see letter dated December 31, 2014 in Attachment 1). None of the renovation alternatives, not even Alternative 2 which does not include additional pedestrian safety measures, will avoid affecting the bridge in one or more of these ways.

b. The bridge is seriously deficient geometrically and cannot be widened to meet the minimum required capacity of the highway system on which it is located without affecting the historic integrity of the bridge. Flexibility in the application of the American Association of State Highway and Transportation Officials geometric standards should be exercised as permitted in 23 CFR Part 625 during the analysis of this alternative.

Widening Route 25/2 would affect the historic integrity of the bridge. For the alternative involving the addition of refuge bays, the SHPO determined that there would be adverse effect to the historic bridge from 1) the removal of sections of the bridge, 2) changing the view of the bridge from the river, and 3) the different weathering of the new material used for the refuge bays as compared to the older portions of the bridge (see letter dated December 31, 2014 in Attachment 1). All three of these changes would occur if Route 25/2 were widened to address the project needs.

F. Measures to Minimize Harm

For the Programmatic Section 4(f) Evaluation to apply to a project, FHWA must ensure that the proposed action includes all possible planning to minimize harm. This has occurred when:

1) For bridges that are to be rehabilitated, the historic integrity of the bridge is preserved, to the greatest extent possible, consistent with unavoidable transportation needs, safety, and load requirements;

The proposed project has met this requirement as detailed in Section F.2 below.

2) ***For bridges that are to be rehabilitated to the point that the historic integrity is affected or that are to be moved or demolished, the FHWA ensures that, in accordance with the Historic American Engineering Record (HAER) standards, or other suitable means developed through consultation, fully adequate records are made of the bridge;***

The proposed project will meet this requirement as part of implementing mitigation commitments described in Section F.3 below.

3) ***For bridges that are to be replaced, the existing bridge is made available for an alternative use, provided a responsible party agrees to maintain and preserve the bridge; and***

The proposed project is a rehabilitation project; therefore, this condition does not apply.

4) ***For bridges that are adversely affected, agreement among the SHPO, ACHP, and FHWA is reached through the Section 106 process of the NHPA on measures to minimize harm and those measures are incorporated into the project. This programmatic Section 4(f) evaluation does not apply to projects where such an agreement cannot be reached.***

The proposed project has met this requirement as detailed in Section F.4 below.

F.2 Alternative Selection

WVDOH and FHWA have selected Renovation Alternative 4 as the Preferred Alternative. The various renovation alternatives are detailed in the 2013 Renovation Study included in Attachment 2 and are summarized in Section E.3.

Renovation Alternative 4 best maintains the historic integrity of the bridge while remaining a feasible alternative that fulfills the purpose and need of the project. Renovation Alternatives 2 and 3 do not fully meet the project's purpose and need because they do not address the need for providing space for pedestrians to avoid vehicles. Renovation Alternative 5 was determined not to be feasible because adding the sidewalk to the upstream side of the bridge would cause too much uplift on the downstream bearings. Renovation Alternative 7, while reducing the need for pedestrians to use the bridge, does not improve the safety of pedestrians who choose to use the bridge. As described with the review of project need in Section D.1.2, the National Park Service is trying to be more inviting and not more restrictive with access to the river.

With these considerations, Renovation Alternatives 4 and 6 remain as feasible alternatives that fulfill the project's purpose and need. Of these options, Renovation Alternative 6 would add refuge for pedestrians along the entire length of the Thurmond Bridge while Renovation Alternative 4 would only add pedestrian refuge bays at 200-foot intervals. With respect to preservation of the bridge's historic integrity, Renovation Alternative 4 is preferable because it will only disturb the upstream side of the superstructure; whereas, Renovation Alternative 6 would disturb

both the downstream side (for the sidewalk) and the upstream side (for the roadway renovations). Additionally, Renovation Alternative 6 is less preferable because it requires additional right-of-way for a trail to provide pedestrian access to the new sidewalk from the parking lot, and because it requires construction on the railroad, which is not owned by WVDOH.

Measures to maintain the historic integrity of the bridge have also been incorporated to the development of Preferred Renovation Alternative 4. The majority of the rehabilitation measures (listed in Section E.3) will be located on the underside of the bridge where they are not highly visible. The basic configuration of the Warren Truss and plate girder spans will not be altered. The refuge bays will be spaced relatively far (200') apart and are minor in scale compared to the overall size of the 826'-7" vehicular roadway. A graphic representation of the refuge bays as they will be seen from the river is provided in Figure 8.

Figure 8. Graphic depiction of the view from upstream of the Thurmond Bridge after implementation of Renovation Alternative 4 (the Preferred Alternative). Four (4) refuge bays will be located approximately every 200 feet along the over 820-foot bridge.

F.3 Mitigation Commitments

In July of 2015, WVDOH presented a draft Memorandum of Agreement (MOA) to the SHPO to formalize commitments to mitigate the adverse effects to the bridge. The Town of Thurmond, the National Park Service, and FHWA are also signatories to the agreement. A final version of the MOA was executed on February 1, 2016 and is included as Attachment 6. The MOA sets forth the following commitments, which will minimize adverse effects to the Thurmond Bridge:

1) Thurmond Bridge will be documented in its present historic setting. The documentation package will include 5”x7” black and white digital prints in accordance with the National Register of Historic Places and National Historic Landmarks Survey Photo Policy Expansion of May 2013.
2) The rehabilitation of the bridge is part of the mitigation to save this historic structure. Refuge bays are being added for the safety of the public. Plans have been submitted to the SHPO and have been approved.
3) 500 color brochures of the Thurmond Bridge will be developed by WVDOH and distributed to the National Park Service and the Town of Thurmond. A CD containing the brochure will also be given to the groups to print brochures when the original total has been exhausted. The SHPO will be given the opportunity to review all materials developed for this stipulation.
4) The Thurmond Bridge will be featured on a future website listing historic bridges under rehabilitated bridges.

F.4 SHPO and ACHP Coordination

As required by Section 106 of the National Historic Preservation Act of 1966, coordination has taken place for the proposed project with the SHPO. WVDOH shared historic resource reports with the SHPO, and received consultation letters in August and December of 2014 for determining effects to the Thurmond Bridge (Attachment 1). SHPO determined the project would adversely affect the Thurmond Bridge. An MOA has been executed with the SHPO to address mitigation for the adverse effects. Additionally, FHWA contacted the Advisory Council on Historic Preservation (ACHP), which, in a letter dated August 6, 2015, declined the invitation to participate further in the consultation for this project (Attachment 7).

G. Conclusion

The FHWA West Virginia Division Administrator concurs with the finding that the Programmatic Section 4(f) Evaluation and Approval for FHWA Projects that Necessitate the Use of Historic Bridges may be applied to the Thurmond Bridge Rehabilitation Project.

H. References

Burgess & Niple, Inc. 2013. Bridge Renovation Study, Final Phase I Report (for the Thurmond Bridge over the New River). Prepared for the West Virginia Department of Transportation Division of Highways. January 16, 2013, Revised August 4, 2013.

Burgess & Niple, Inc. 2012. "In-depth Periodic Inspection, Thurmond Bridge over New River," February 2012. Conducted for the West Virginia Department of Transportation, Division of Highways, Charleston. February 2012.

Federal Highway Administration (FHWA). 1983. "Programmatic Section 4(f) Evaluation and Approval for FHWA Projects that Necessitate the Use of Historic Bridges." Accessible through the FHWA website at: https://www.environment.fhwa.dot.gov/4f/4fbridge.asp. Issued on July 5, 1983.

GAI Consultants. 2000. Preliminary Design Report: Thurmond Bridge Replacement Project. Prepared for the West Virginia Department of Transportation Division of Highways. November 2000.

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National Park Service. 2015. Stats Report Viewer for New River Gorge NR, Report Date: Jan 2014. Accessed March 25, 2015 at: https://irma.nps.gov/Stats/SSRSReports/Park%20Specific%20Reports/Park%20YTD%20Version%201?Park=NERI.

West Virginia Division of Highways (WVDOH). 2001. Bridge Replacement Study: Thurmond Bridge. Prepared by the Planning and Research Division. Amended, January 2001.

Attachment 1. State Historic Preservation Office Letters dated August 18, 2014 and December 31, 2014

Attachment 2. Bridge Renovation Study, 2013

Attachment 3. National Park Service Letters dated June 6, 2014 and August 19, 2014

Attachment 4. Bridge Replacement Study, 2001

Attachment 5. U.S. Fish and Wildlife Service Letter dated July 17, 2014

Attachment 6. Memorandum of Agreement By and Among the WV State Historic Preservation Officer and WVDOH, dated November 2015

Attachment 7. Advisory Council on Historic Preservation Letter dated August 6, 2015