

# **EXECUTIVE SUMMARY**

## **BACKGROUND**

The Memorial and Sarah Mildred Long Bridges provide two of the three crossings over the Piscataqua River between Portsmouth, New Hampshire and Kittery, Maine. The effective operation of the two bridges, both of which are eligible for listing on the National Register of Historic Places (NR), provides a multi-modal transportation system that impacts trade and commerce, tourism, community life and the historic and aesthetic character of Kittery and Portsmouth. Both bridges are owned and maintained by a 50-50 joint responsibility agreement between Maine and New Hampshire Departments of Transportation (DOTs). The bridges have been determined to be structurally deficient by both Maine and New Hampshire DOTs and their continued operation requires increasing maintenance costs of over one million dollars per year for each bridge. It has been determined that, without improvements, the Memorial Bridge would likely be closed within one to three years. Similarly, without improvements, the Sarah Mildred Long Bridge would likely need to close within seven to ten years. This near-term timeframe necessitated immediate actions by both Maine and New Hampshire DOTs described below.

The major function of the three bridges serve different transportation roles with the I-95 High Level Bridge serving the region's Interstate river crossing needs, the Sarah Mildred Long Bridge serving the regional Maine and New Hampshire river crossing needs and the Memorial Bridge serving the local Kittery and Portsmouth river crossing needs. This study focused primarily on the needs for addressing the functional and structural deficiencies of the Memorial Bridge and the Sarah Mildred Long Bridge.

In 2008, the two states went out to bid for a major rehabilitation of the Memorial Bridge. The final bid costs for this work were 30 percent higher than anticipated. As a result, knowing that the Sarah Mildred Long Bridge would soon also need major rehabilitation, the two states joined in a Memorandum of Agreement (MOA) in December 2008 to conduct a bi-state planning study to conduct detailed bridge inspections. The purpose of the study was to assess the region's long-term transportation needs of the host communities and region and determine the best long-term solution for connecting the two states. MaineDOT took the lead on the planning study and NH DOT took the lead on the bridge inspections.

The Planning Study Request for Proposals was issued in January 2009 and the study was awarded to HNTB Corporation in February 2009. Work commenced in March. The contract for the inspection report was awarded to HDR Corporation in March 2009. Maine and New Hampshire DOTs partnered fully in terms of study management, study direction, and decision-making. The Study Team, comprised of the two DOTs, HNTB and their sub consultants, managed and implemented the study. The Maine and New Hampshire Divisions of the Federal Highway Administration provided procedural guidance and document review for the study.

## **PUBLIC OUTREACH**

The Study's public outreach process communicated the purpose of the Study and provided details on the analysis and ultimate screening of each proposed alternative. It gave the general public and stakeholders the maximum opportunity to provide opinions and input. A study web site, newsletters, ongoing media access and multiple meetings in large and small groups allowed direct and easy input to study decisions and processes. Detailed minutes were reported from every meeting, noting committee and public comments and encouraging transparency in terms of understanding the Study's progress. The media was invited to attend all meetings.

Two committees, the Steering Committee and the Stakeholder Committee, provided feedback at regular intervals, significantly improving study process and direction. The Steering Committee, primarily responsible for directing the study, included representatives from Maine and New Hampshire DOTs, Maine and New Hampshire Historic Preservation Offices, the Town of Kittery, the City of Portsmouth, Pan Am Railways, and, as resources, the Rockingham County Planning Commission, the Southern Maine Regional Planning Commission and Maine and New Hampshire Divisions of the Federal Highway Administration. The Stakeholder Committee, responsible for helping the Steering Committee to interpret public feedback, included the Steering Committee and those representing business, navigation, community groups, multi-modal organizations, emergency services, individuals, conservation/sustainability groups and utilities, and included Section 106 Consulting Parties<sup>1</sup>. Public informational meetings were also held to allow members of the public the opportunity to ask questions, comment on study findings, and provide insight on alternatives relative to community needs.

## **PURPOSE AND NEED STATEMENT**

The Study Purpose and Need Statement was developed from a collaboration of MaineDOT, NH DOT, FHWA, Steering and Stakeholder Committee members, Consulting Parties, other interested parties, and the general public.

The Study Purpose was framed around a positive outcome, and it avoided stating solutions. It was focused on the condition of the transportation system. The purpose statement was broad enough to ensure multi-modal solutions were not dismissed prematurely.

The Study Need established evidence that a transportation problem exists, or would exist if issues are not addressed; was factual and results based; and supported the assertions made in the purpose statement.

Study Goals included other broader elements such as maintaining access to downtowns, maintaining or improving economic growth and stability, and conserving the aesthetic and environmental quality of the river and its setting. Goals sought to balance environmental and transportation values.

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<sup>1</sup> Section 106 Consulting Parties are included under the National Historic Preservation Act. This act requires Federal agencies to take into account the effects of their actions on historic properties, whether publicly or privately owned.

The following is the Final Study Purpose and Need Statement for the Maine-New Hampshire Connections Study as agreed to by all participants:

STATEMENT OF PURPOSE:

*The purpose of the Maine-New Hampshire Connections Study is to identify and evaluate feasible long-term (2035) transportation strategies that facilitate the safe, secure and effective multi-modal movement of people and goods across and upon the Piscataqua River between Kittery, Maine and Portsmouth, New Hampshire and which support the region's economic, cultural, historic, archeological and natural resources objectives and its community quality of life.*

STATEMENT OF NEED: (Statement of Transportation Deficiencies)

*The Need for the Study is based on present and future transportation deficiencies, specifically:*

- 1. Structural deficiencies exist that threaten accessibility and mobility to the region and require load postings on the Memorial Bridge and the Sarah Mildred Long Bridge,*
- 2. Decreased reliability of the lift spans and increasing maintenance needs of the Memorial and Sarah Mildred Long Bridges are causing unnecessary delays to marine and land transportation, including response times of emergency vehicles,*
- 3. Inadequate or outdated design features of these two bridges potentially adversely affect marine and land transportation safety,*
- 4. Multi-modal (pedestrian, bicycle, rail, maritime traffic, vehicular) opportunity is limited by inadequate or outdated facilities.*

GOALS:

*In order to achieve the stated Purpose and Need, the Study would strive to achieve the following goals:*

- a. Improve local and regional economic growth and stability, tourism and recreational opportunities.*
- b. Maintain or improve access to Portsmouth and Kittery downtowns and Portsmouth Naval Shipyard.*
- c. Improve local connections to regional transportation modes, for example the Portsmouth International Airport at Pease.*
- d. Minimize long-term costs for the regional transportation system.*
- e. Improve bicycle and pedestrian access across the Piscataqua River.*
- f. Reduce operational and maintenance costs (currently \$1.1+ M per year per bridge).*
- g. Avoid or minimize detrimental impacts to the historic significance and integrity of the Kittery-Portsmouth area.*
- h. Conserve the aesthetic setting of the Piscataqua River.*
- i. Conserve the environmental quality of the Piscataqua River.*
- j. Avoid or minimize detrimental impacts to residential neighborhoods in Kittery, Portsmouth and neighboring areas.*
- k. Reduce or maintain emissions of pollutants, including greenhouse gases.*

- l. Comply with applicable federal and state regulations, for example Section 106 of the National Historic Preservation Act<sup>2</sup>.*
- m. Maintain or improve emergency evacuation efficiency across the Piscataqua River.*
- n. Do not preclude future transportation opportunities, for example, providing for passenger rail service or bus service across the Piscataqua River.*

## **DEVELOPMENT OF INITIAL ALTERNATIVES**

The Study Team developed an initial list of alternatives that was presented to the committees and the public for input. In total, 63 alternatives were identified through this process, including a No-Build Alternative. An alternative was defined as a combination of an option for the Memorial Bridge and an option for the Sarah Mildred Long Bridge. Because the decision involving one bridge impacts the effects on the other bridge, each option had to be evaluated in combination with a proposed option for the other bridge. Proposed alternatives included rehabilitation for both bridges as well as a range of low, mid and high-level replacement options, both on and off the current alignment. Alternatives also included such suggestions as a tunnel, ferry service, or new bridge on new alignment that would replace both bridges.

## **FATAL FLAW ANALYSIS**

Each of the 63 alternatives then went through a Fatal Flaw Analysis, in which the Study Team evaluated if the alternative:

- Did not satisfy Study Purpose and Need;
- Had significant environmental impacts;
- Was not permissible;
- Was not financially feasible;
- Was not physically feasible; and/or
- Was clearly inferior in comparison to other alternatives.

Of the 63 alternatives evaluated in the Final Fatal Flaw Report, the Study Team recommended six options be carried forward for a detailed evaluation as listed below. The remaining options and alternatives did not meet all of the Fatal Flaw criteria listed above and therefore were not advanced for further study.

The Memorial Bridge (MB) options carried forward from the Fatal Flaw Analysis included:

- **Option MB1:** Rehabilitate the existing bridge on existing alignment, including replacing the lift span, with existing clearances and reuse of the existing abutments and piers.
- **Option MB2:** Replace the superstructure of the existing bridge, including the lift span, with similar navigational clearances and reuse of the existing abutments and piers.
- **Option MB6:** Similar to Option MB2 above, except that the replacement bridge would only accommodate bicycle and pedestrian traffic.

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<sup>2</sup> Compliance with applicable federal and state regulations are not goals, but requirements of the NEPA, Section 106 and Section 4(f) processes. However, the language has not been modified to preserve the final Purpose and Need statement as approved.

The Sarah Mildred Long Bridge (SL) Options carried forward from the Fatal Flaw Analysis included:

- **Option SL1:** Rehabilitate the existing bridge on existing alignment, consists of complete demolition and replacement of the approach spans, piers and foundations and the rehabilitation of the fixed span trusses, towers, the lift span truss, and the associated foundations and rehabilitation of the rail component.
- **Option SL2:** Replace the existing bridge on existing alignment with a new two-lane or four-lane bridge, including the lift span and substructure, with improved horizontal navigational clearances; and, replace the rail component.
- **Options SL2A:** Replace the existing bridge with a new two-lane or four-lane bridge, including the lift span and rail line, on a new alignment immediately upstream with improved horizontal navigational clearances to improve vessel passage.

These options combined into the newly labeled twelve alternatives, plus No-Build Alternative listed below:

- The No-Build Alternative = Memorial Bridge Closed, Sarah Mildred Long Bridge remains open with reduced posting
- Alternative 1 = Memorial Bridge Rehabilitated, Sarah Mildred Long Bridge Rehabilitated
- Alternative 2a = Memorial Bridge Rehabilitated, Sarah Mildred Long Bridge Replaced on existing alignment (two-lane)
- Alternative 2b = Memorial Bridge Rehabilitated, Sarah Mildred Long Bridge Replaced on existing alignment (four-lane)
- Alternative 3a = Memorial Bridge Rehabilitated, Sarah Mildred Long Bridge Replaced on upstream alignment (two-lane)
- Alternative 3b = Memorial Bridge Rehabilitated, Sarah Mildred Long Bridge Replaced on upstream alignment (four-lane)
- Alternative 4 = Memorial Bridge Replaced on existing alignment, Sarah Mildred Long Bridge Rehabilitated
- Alternative 5a = Memorial Bridge Replaced on existing alignment, Sarah Mildred Long Bridge Replaced on existing alignment (two-lane)
- Alternative 5b = Memorial Bridge Replaced on existing alignment, Sarah Mildred Long Bridge Replaced on existing alignment (four-lane)
- Alternative 6a = Memorial Bridge Replaced on existing alignment, Sarah Mildred Long Bridge Replaced on upstream alignment (two-lane)
- Alternative 6b = Memorial Bridge Replaced on existing alignment, Sarah Mildred Long Bridge Replaced on upstream alignment (four-lane)
- Alternative 7 = Memorial Bridge Bicycle/Pedestrian Replaced on existing alignment, Sarah Mildred Long Bridge Replaced on existing alignment (four-lane)
- Alternative 8 = Memorial Bridge Bicycle/Pedestrian Replaced on existing alignment, Sarah Mildred Long Bridge Replaced on upstream alignment (four-lane)

As a benchmark, the No-Build Alternative was advanced throughout the study. The No-Build Alternative assumed that the existing Memorial Bridge would not be available for use due to age and structural issues, as it has been determined that without improvements, the Memorial Bridge would likely be closed within one to three years. The Sarah Mildred Long Bridge would remain open but would be posted with limiting load restrictions.

Subsequent to the completion of the Final Fatal Flaw Report, three additional alternatives were proposed by MaineDOT and were developed and evaluated in the same manner as the previous 63 alternatives that had been screened in the Final Fatal Flaw Report. These three additional alternatives were comprised of an additional Memorial Bridge Option, identified as MB7 and an additional Sarah Mildred Long Bridge Option, identified as SL2B (6 percent grade hybrid) and SL2C (5percent grade hybrid). The three additional alternatives are described as follows:

- **Alternative 9** = Memorial Bridge Replaced on existing alignment. A new two-lane “hybrid” mid-level Sarah Mildred Long Bridge with 6 percent road grade would be constructed on a new alignment immediately upstream with an 86-foot± vertical clearance moveable span (in the closed position) to reduce the number of lift openings and provide greater lift span opening (approximately 270 feet versus 200 feet) to improve vessel passage. The new bridge would also provide for a new rail crossing. (Memorial Bridge Option MB2 with Sarah Mildred Long Bridge Option SL2B.)
- **Alternative 10** = Memorial Bicycle/Pedestrian Bridge Replaced on existing alignment. A new two-lane “hybrid” mid-level Sarah Mildred Long Bridge with 6 percent road grade would be constructed on a new alignment immediately upstream with an 86-foot± vertical clearance moveable span (in the closed position) to reduce the number of lift openings and provide greater lift span opening (approximately 270 feet versus 200 feet) to improve vessel passage. The new bridge would also provide for a new rail crossing. (Memorial Bridge Option MB6 with Sarah Mildred Long Bridge Option SL2B.)
- **Alternative 11** = Memorial Bridge would be closed and removed, with the bridge between Kittery and Badgers Island remaining open. A free bus transit system would operate seven days per week, 365 days per year from 5:00 AM to 11:00 PM for providing bicycle/pedestrian river crossing connections that were provided by the Memorial Bridge. A new two-lane “hybrid” mid-level Sarah Mildred Long Bridge with 5percent road grade, adequate shoulders for bicyclists and a sidewalk for pedestrians would be constructed on a new alignment immediately upstream with a 74-foot± vertical clearance moveable span (in the closed position) to reduce the number of lift openings and provide greater lift span opening (approximately 270 feet versus 200 feet) to improve vessel passage. The new bridge would also provide for a new rail crossing. (Memorial Bridge Option MB7 with Sarah Mildred Long Bridge Option SL2C.)

## INSPECTION REPORTS

Also subsequent to the completion of the Final Fatal Flaw Report, a detailed inspection report of the Memorial Bridge provided the basis for NH DOT and MaineDOT determination that rehabilitation of the Memorial Bridge was not reasonable and viable due to its poor structural

condition. FHWA determined the rehabilitation is not prudent to fund as a major rehabilitation would provide a much reduced service life. The rehabilitation option for the Memorial Bridge will be considered in the Section 106, 4(f), and NEPA analyses. Based on this report, MaineDOT and NH DOT are recommending that all alternatives involving the rehabilitation of the Memorial Bridge be dismissed from further analysis, subject to review and approval of all documentation. This recommendation removes the five alternatives (Alternatives 1, 2a, 2b, 3a, and 3b) that include the Memorial Bridge rehabilitation option from detailed evaluation as a part of this report.

The Inspection Report for the Sarah Mildred Long Bridge indicated that while deterioration had occurred, particularly in the approach spans, rehabilitation of the truss portion of the bridge was feasible, though the approach spans should be replaced and other work would be needed as well.

Additionally, the inspection reports determined that, without improvements, the Memorial Bridge would likely be closed within one to three years. Similarly, without improvements, the Sarah Mildred Long Bridge would likely be closed within seven to ten years.

## **EVALUATION CRITERIA**

Based on the Purpose and Need Statement and working with the committees and the public, a detailed list of evaluation criteria was developed by and presented to the committees and the public and was modified based on feedback. The final list of criteria used to evaluate the remaining alternatives was:

### **Structural Improvement**

- ***Satisfy Structural and Functional Needs:*** This criterion evaluated two things: the physical condition of the structure and the functional life of the proposed bridge alternatives. The functional life of a bridge is indicated by the ability of the bridge to accommodate vehicle, pedestrian, bicycle and marine needs safely and reliably over the desired timeframe.
- ***Lift Span Reliability:*** The proposed condition of the lift span was assessed to evaluate its dependability over the desired timeframe.

### **Mobility**

- ***2035 Vehicle Miles Traveled (VMT):*** Vehicle miles traveled is the total number of miles driven by all vehicles within a given time period in the study area.
- ***2035 Vehicle Hours Traveled (VHT):*** Vehicle hours traveled is the total number of hours driven within a given time period in the study area. VHT primarily measures level of congestion within the study area.
- ***Level of Service (LOS):*** LOS is commonly used to analyze highways and is also used to analyze intersections, transit, bicycle and pedestrian facilities. LOS is graded using the letters A through F, with A being the most efficient and F the most congested.

- **Available Bridge Vehicular Capacity:** Available bridge capacity is determined by estimating how many vehicles (volume) are using a bridge at a certain time compared to the maximum number that could use the bridge if it was at full capacity (capacity).
- **Local Road Traffic Impacts:** Three local (not state subsidized) residential roads in close proximity to the Sarah Mildred Long and Memorial Bridges were identified. This criterion measured whether an alternative would increase traffic volumes along those roads, thereby potentially increasing local maintenance costs.
- **Mobility During Construction:** The study assumed that the Memorial Bridge is closed during any future construction. This criterion measured the positive impacts of keeping the Sarah Mildred Long Bridge open during construction of a rehabilitation or replacement bridge.
- **Emergency Access:** Emergency access relates to the alternatives' ability to accommodate fire, ambulance, and other emergency services.
- **Evacuation Access:** Evacuation access relates to existing evacuation route plans and the ability of the alternatives to accommodate these plans under the various alternatives.

#### Accessibility

- **Accessibility to Portsmouth, Kittery Downtowns:** The ability of the transportation system to address needs of all people using multiple transportation modes to get to the community centers of Kittery and Portsmouth was evaluated/measured.
- **Accessibility to Portsmouth Naval Shipyard (PNSY):** The ability of the transportation system to provide safe and efficient access to PNSY was evaluated/measured.
- **Bridge Design Features/Vehicle:** This criterion measured whether the proposed alternatives would improve, maintain or reduce the width of travel lanes.
- **Bridge Design Features/Marine:** This criterion measured whether the alternatives would reduce, maintain or improve navigational clearances at the Sarah Mildred Long Bridge. (The US Coast Guard and study area marine pilots have indicated the Memorial Bridge poses no navigational hazard).
- **Bridge Design Features/Bicycle:** This criterion measured whether the alternative does or does not meet current bicycle guidelines for shoulder widths.
- **Bridge Design Features/Pedestrian:** This criterion measured whether the alternative does or does not meet pedestrian guidelines in terms of sidewalk presence and widths.
- **Bridge Design/Rail Line:** A rail line is required for PNSY and is maintained for all alternatives.

#### Planning Level Costs

The planning level costs developed are not based on engineering plans or designs for the alternatives concepts, but rather are based on a compilation of assumptions, unit costs from other projects, percentage factors and best estimates of what the work may cost. No alternatives were dismissed based on the planning level costs developed. Actual costs may vary from these planning level costs once design engineering is completed and cost estimates are developed based on these designs.

- **Capital Costs:** Capital cost included all initial construction costs associated with a given build alternative, including all engineering, construction and right of way, but excluding wetland and other mitigation costs, permitting and miscellaneous capital costs.
- **Operation and Maintenance Costs:** Operation and maintenance costs included all ongoing costs after completion of construction, including those associated with capital reinvestment and preventative maintenance to extend and preserve the life of the alternative, such as painting, redecking, etc., over a 100-year bridge life cycle.
- **Life Cycle Costs:** Life cycle costs included both initial capital cost of construction as well as all 100-year operation and maintenance costs.
- **Travel Time Delay Cost:** The inability of a transportation system to adequately accommodate the public's travel needs results in increased travel time. The Travel Time Delay Cost measure quantified changes in travel time and the associated costs.
- **Benefit/Cost Ratio:** This ratio compared the change in costs from increases or decreases in Vehicle Miles Traveled, Vehicle Hours Traveled (Travel Time Delay) and safety versus the annualized Life Cycle Cost for each alternative. Marine costs or savings were not calculated. Ratios that are less than 1.0 are not usually considered financially feasible because the costs of the alternative have been determined to be greater than the associated transportation user benefits. Ratios that are equal or greater than 1.0 are considered to provide transportation user benefits that are greater than the cost of the alternative.
- **Local Business Impacts:** This criterion measured any impacts to businesses adjacent to the Memorial Bridge should vehicle and/or other modes of traffic be prohibited across the bridge based on results of local business survey.
- **Regional Economic Impacts:** This criterion measured any overall regional economic impact on the area should vehicle traffic be prohibited across the Memorial Bridge. The region under this measure of effectiveness is defined as the Labor Market Areas (LMA) of coastal Maine and New Hampshire that includes Kittery and Portsmouth. It was determined that the closing of the Memorial Bridge would not have a measurable regional economic impact.

### **Preliminary Historic**

- **Impacts to National Register-Listed or Eligible Historic Bridges:** Both the Memorial and the Sarah Mildred Long Bridges are eligible for listing on the National Register of Historic Places (NR). This criterion identified whether none, one, or both of these bridges are replaced or removed.
- **Other Historic Resource Impacts:** This criterion measured potential impacts to other historic resources for each alternative.
- **Archaeological Resource Impacts:** This criterion measured potential impacts to archeologically sensitive areas for each alternative.

### **Natural Environment**

- ***River Quality Impacts:*** This criterion measured temporary river quality impact as it relates to the number of piers to be removed, replaced, or placed in the river for pier construction or removal as identified for each alternative.
- ***Air Quality:*** This assessment conducted a local air quality analysis to demonstrate compliance with the National Ambient Air Quality Standards (NAAQS) by evaluating air quality impacts of 2035 No Build and Build conditions.
- ***Aquatic Resource Impacts:*** This criterion measured permanent aquatic habitat loss as it relates to the number of additional bridge piers to be placed in the river as identified for each alternative versus current number of river bridge piers.
- ***Access to River:*** This criterion looked at whether any alternative impacted public access to the Piscataqua River.
- ***Threatened and Endangered Species (T&E):*** This criterion measured the potential for impacts to threatened and endangered species of plants and animals for each alternative.
- ***Special Aquatic Sites:*** This criterion measured the quantified impact to special aquatic sites for each alternative.
- ***Floodplain/Floodway:*** This criterion measured the quantified impact on floodplains/floodways for each alternative.

### **Physical Environment**

- ***Neighborhood Traffic Impacts:*** This criteria measured levels of traffic impact in the five neighborhoods identified within close proximity to both the Memorial and Sarah Mildred Long Bridges. Increased traffic through neighborhoods is considered a negative impact.
- ***Publicly Owned Property Impacts:*** This criterion measured the quantified impact to publicly owned property such as a school or municipal office.
- ***Commercial Property Impacts:*** A commercial property is any privately owned business on land zoned for commercial use. This criterion measured the quantified impacts to commercial property. An impact means a portion of the property is acquired.
- ***Residential Property Impacts:*** A residential property is any privately owned dwelling unit on land zoned for residential use. This criterion measured the quantified impact to residential property. An impact means a portion of the property is acquired.
- ***Business or Residential Displacements:*** A displacement means that the entire property would require complete acquisition. This criterion measured the number of likely acquisitions identified for each alternative.
- ***Noise:*** The Traffic Noise Model (TNM) was used to calculate the existing and future noise levels at all the receptor locations in the study area for each alternative.

### **Environmental clearances**

- ***Permitting/NEPA:*** These criteria evaluated the alternatives' ability to obtain necessary federal (U.S. Coast Guard, US Army Corps of Engineers) and state permits as well as satisfying the procedural requirements of the National Environmental Policy Act (NEPA).

- **Section 4(f) Properties:** These criteria measured impacts to historic and other Section 4(f) properties based on direct impacts to these properties.

### **ALTERNATIVES DISMISSED FROM FURTHER CONSIDERATION**

Based on systematic evaluation, the Study Team, with input from the committees and the public, the preceding criteria were used to dismiss the following alternatives from further consideration.

**Dismissal #1: Six-lane River Crossing Bridge Alternatives.** The Study Team determined that six lanes in addition to the I-95 high level bridge were not needed for accommodating future river crossing traffic needs within the Study timeframe (2035). Therefore, the alternatives that provided six lanes of river crossing capacity at the Memorial Bridge and Sarah Mildred Long Bridge were dismissed: Alternative 5b and Alternative 6b. This reduced the number of build alternatives from ten to eight.

**Dismissal #2: On-line Sarah Mildred Long Bridge Alternatives.** Two of the remaining eight alternatives would replace the Sarah Mildred Long Bridge on existing alignment. The temporary negative impacts of having to close this crossing during construction of a new bridge led to the dismissal of these two alternatives: Alternative 5a and Alternative 7. This reduced the number of build alternatives from eight to six.

**Dismissal #3: One Four-Lane Vehicle Bridge as Compared to One Two-Lane Vehicle Bridge.** Based on comparing Alternative 8, a four-lane, low level Sarah Mildred Long Bridge to Alternative 10, a two-lane hybrid, mid-level Sarah Mildred Long Bridge, the Study Team determined that Alternative 10 was superior. The key benefits are improving both horizontal and closed position vertical marine clearance, and reduction in travel time delays. This reduced the number of build alternatives from six to five.

**Dismissal #4: Measure of Remaining Alternatives to Study Goals.** After further analysis measured against the goals of the study, two alternatives were determined to be inferior to the remaining five. For the reasons set forth below, Alternative 10 (a pedestrian/bicycle replacement for the Memorial Bridge) and Alternative 11 (transit service in place of the Memorial Bridge) will not be analyzed further.

- Alternatives 10 and 11 do not adequately meet the goals established by the Study process. Specifically, these alternatives (a) would not maintain or improve access to Portsmouth and Kittery downtowns and the Portsmouth Naval Shipyard, (b) would not improve bicycle and pedestrian access across the Piscataqua River, (c) would not maintain or improve emergency evacuation efficiency across the Piscataqua River, and (d) could preclude future transportation alternatives.
- NH DOT indicates it has no funding sources for pedestrian/bicycle bridges or transit services.
- There is virtually no community support, as evidenced by Stakeholder and local public meetings, for any option that does not include a highway Memorial Bridge replacement.

**ALTERNATIVES RECOMMENDED TO BE CARRIED FORWARD**

The following three alternatives are recommended to proceed immediately to further environmental permitting, conceptual design, estimated cost refinement, funding feasibility, and project delivery:

- Alternative 4: Memorial Bridge Replacement with Sarah Mildred Long Bridge Rehabilitation.
- Alternative 6a: Memorial Bridge Replacement with Sarah Mildred Long Bridge Replacement upstream.
- Alternative 9: Memorial Bridge Replacement with Sarah Mildred Long Bridge Replacement Hybrid upstream with 6 percent grade.

A summary of the key advantages and disadvantages of each Alternative is noted below:

<b>Alternative 4: Memorial Bridge Replacement with Sarah Mildred Long Bridge Rehabilitation</b>	
Advantages	Disadvantages
<ul style="list-style-type: none"> <li>• Maintains/improves mobility to Portsmouth, Kittery, and PNSY</li> </ul>	<ul style="list-style-type: none"> <li>• Rehabilitated Sarah Mildred Long does not fully address lift span reliability</li> </ul>
<ul style="list-style-type: none"> <li>• Improvements to Memorial Bridge: vehicle, bicycle, pedestrian</li> </ul>	<ul style="list-style-type: none"> <li>• No improvement to Sarah Mildred Long marine vessel clearances in the open or closed position</li> </ul>
<ul style="list-style-type: none"> <li>• Limited resource impacts</li> </ul>	<ul style="list-style-type: none"> <li>• Removal of Memorial Bridge – National Register eligible bridge</li> </ul>
<ul style="list-style-type: none"> <li>• No impacts to local businesses, except during construction</li> </ul>	<ul style="list-style-type: none"> <li>• Traffic impacts from both bridges being closed separately during construction</li> </ul>
<ul style="list-style-type: none"> <li>• Low Life Cycle cost</li> </ul>	<ul style="list-style-type: none"> <li>• No sidewalk on SML</li> </ul>
<ul style="list-style-type: none"> <li>• Maintains current emergency and evacuation access, and bridge redundancy, except during construction</li> </ul>	<ul style="list-style-type: none"> <li>• Does not accommodate bicycles on lift span section of SML (3 foot shoulder)</li> </ul>
<ul style="list-style-type: none"> <li>• Maintains Sarah Mildred Long Bridge – National Register eligible bridge</li> </ul>	<ul style="list-style-type: none"> <li>• Rehabilitation of Sarah Mildred Long Bridge will require additional operation and maintenance investment compared to a new structure</li> </ul>

<b>Alternative 6a: Memorial Bridge Replacement with Sarah Mildred Long Bridge Replacement upstream</b>	
Advantages	Disadvantages
<ul style="list-style-type: none"> <li>Fully addresses structural deficiencies</li> </ul>	<ul style="list-style-type: none"> <li>Removal of Memorial Bridge and Sarah Mildred Long Bridges – National Register Eligible Bridges</li> </ul>
<ul style="list-style-type: none"> <li>Maintains/improves mobility to Portsmouth, Kittery, and PNSY</li> </ul>	<ul style="list-style-type: none"> <li>Greater natural and physical environment impacts</li> </ul>
<ul style="list-style-type: none"> <li>Improvements to Memorial Bridge (vehicle, bicycle/pedestrian) and Sarah Mildred Long (vehicle, bicycle)</li> </ul>	<ul style="list-style-type: none"> <li>Memorial Bridge closed to traffic during construction of new Memorial Bridge</li> </ul>
<ul style="list-style-type: none"> <li>Improves Sarah Mildred Long marine vessel clearances – horizontal only</li> </ul>	<ul style="list-style-type: none"> <li>No sidewalk on Sarah Mildred Long Bridge</li> </ul>
<ul style="list-style-type: none"> <li>Traffic maintained on existing Sarah Mildred Long during construction and on new Memorial Bridge</li> </ul>	<ul style="list-style-type: none"> <li>High Life Cycle Cost</li> </ul>
<ul style="list-style-type: none"> <li>No impacts to local businesses, except during construction</li> </ul>	<ul style="list-style-type: none"> <li>No vertical clearance improvement for marine vessels in closed position</li> </ul>
<ul style="list-style-type: none"> <li>Maintain current emergency and evacuation access and bridge redundancy, except during construction</li> </ul>	

<b>Alternative 9: Memorial Bridge Replacement with Sarah Mildred Long Bridge Replacement Hybrid upstream with 6% grade</b>	
Advantages	Disadvantages
<ul style="list-style-type: none"> <li>Fully addresses structural deficiencies</li> </ul>	<ul style="list-style-type: none"> <li>Removal of Memorial Bridge and Sarah Mildred Long Bridges – National Register Eligible Bridges</li> </ul>
<ul style="list-style-type: none"> <li>Maintains/improves mobility to Portsmouth, Kittery, and PNSY</li> </ul>	<ul style="list-style-type: none"> <li>Greater natural and physical environmental impacts</li> </ul>
<ul style="list-style-type: none"> <li>Improvements to Memorial Bridge (vehicle, bicycle/pedestrian) and Sarah Mildred Long (vehicle, bicycle)</li> </ul>	<ul style="list-style-type: none"> <li>Sarah Mildred Long Bridge can only accommodate one mode at a time (rail or road)</li> </ul>

<ul style="list-style-type: none"> <li>• Improves Sarah Mildred Long Bridge marine vessel clearances – vertical (closed) and horizontal</li> </ul>	<ul style="list-style-type: none"> <li>• Rail in road at Sarah Mildred Long Bridge</li> </ul>
<ul style="list-style-type: none"> <li>• Reduction in # of Sarah Mildred Long Bridge openings vs. low level two-lane Sarah Mildred Long</li> </ul>	<ul style="list-style-type: none"> <li>• Memorial Bridge closed to traffic during construction of new Memorial Bridge</li> </ul>
<ul style="list-style-type: none"> <li>• Increases bridge vehicle capacity compared to low-level options</li> </ul>	<ul style="list-style-type: none"> <li>• No sidewalk on Sarah Mildred Long Bridge</li> </ul>
<ul style="list-style-type: none"> <li>• Traffic maintained on SL during construction and on new Memorial Bridge</li> </ul>	<ul style="list-style-type: none"> <li>• High Life Cycle Cost</li> </ul>
<ul style="list-style-type: none"> <li>• No impacts to local businesses, except during construction</li> </ul>	
<ul style="list-style-type: none"> <li>• Maintain current emergency and evacuation access and bridge redundancy, except during construction</li> </ul>	

Discussions and recommendations regarding proposed bicycle/pedestrian facilities should be considered during the development of final design plans for each bridge.

### CONCLUSION/RECOMMENDATION

It is recommended that the remaining alternatives be separated for independent Section 106, Section 4(f), and NEPA analyses. Each of the remaining bridge options appear to have both logical termini and independent utility and may be classified as Categorical Exclusions if the appropriate studies substantiate this classification.

The Maine-New Hampshire Connections Study is a feasibility planning study with no direct FHWA approval or action.

### NEXT STEPS

This Report culminates the feasibility analysis phase of the Maine-New Hampshire Connections Study. A joint Executive Order was issued on October 5, 2010 by the Governors of Maine and New Hampshire to form a Bi-State Bridge Funding Task Force to address the financial challenges involving the Memorial and Sarah Mildred Long Bridge, as well as future work on the I-95 High Level Piscataqua River Bridge (see Appendix 57). The duties of the Task Force are:

- Identify mechanisms that would allow the two states to jointly identify and maximize funding for the replacement, rehabilitation, repair, maintenance, and operations of the three bridges;

- Identify methods to jointly structure financing for the replacement of Memorial Bridge, the replacement or rehabilitation of Sarah Mildred Long Bridge and the repair of the I-95 High Level Bridge;
- Propose such legislation that may be necessary in each state to facilitate the funding structure and other contractual authority for state agencies or authorities consistent with each state’s laws; and
- Deliver a report to the Governors of the States of Maine and New Hampshire no later than December 15, 2010 with the proposals and recommended legislation required by the Order.
  - On December 15, 2010, the Task Force delivered a report with the following recommendations:
    - Construct the Memorial Bridge replacement beginning in 2011 using a combination of TIGER II Grant funds, FHWA funds, and MaineDOT and NHDOT Bridge funds;
    - Construct the recommended Sarah Mildred Long Bridge option beginning in 2016 using a combination of FHWA funds, NH Bureau of Turnpike funds, Maine Turnpike Authority funds, MaineDOT and NHDOT funds, and Department of Defense funds;
    - Create a sinking fund that would be contributed to equally by each state to be used for the continued Capital Repair and Rehabilitation (R&R) of the Sarah Mildred Long and I-95 High Level Bridges, using state and federal funding when necessary to address short falls;
    - No recommendation is being made by the Task Force on tolling, which if thought to be necessary would be considered by future Legislatures of the two States;
    - Continue to share Operation and Maintenance (O&M) costs for all three bridges equally between the two states. Combine bridge operator duties to significantly reduce operator costs; and
    - Revitalize the Interstate Bridge Authority (IBA) to oversee all three bridges and to serve as Funds’ Administrator of Sinking Fund. This includes a re-establishment of the IBA, extending its charter to include the High Level Bridge, use the IBA to oversee and manage the Sarah Mildred Long and High Level bridges, and to act as an entity to oversee, manage and distribute monies from the sinking fund. IBA members will be selected from each state.

While the Task Force conducted its work, the Connections Study Report was being finalized. Additionally:

- NH DOT is taking the lead on the Memorial Bridge to:

- Work with a consultant to conduct environmental documentation to satisfy National Environmental Policy Act, Section 106 (historic) and Section 4(f) (public lands) analyses and documentation.
- Work with a consultant on a design-build approach to replace the Memorial Bridge.
- Continue these activities with full public involvement, including Steering and Stakeholder Committees and Section 106 Consulting Parties, similar to what has been done on the Maine-New Hampshire Connections Study.
- MaineDOT is taking the lead on the Sarah Mildred Long Bridge to:
  - Work with a consultant to develop 30 percent design plans and detailed cost estimates for the rehabilitation option and mid-level Hybrid two-lane replacement bridge option immediately upstream. The Connections Report costs prepared by HDR are being used for the upstream low-level, two-lane bridge replacement option.
  - Conduct environmental documentation to satisfy National Environmental Policy Act, Section 106 (historic) and Section 4(f) (public lands) analyses and documentation.
  - Continue these activities with full public involvement, including Steering and Stakeholder Committees and Section 106 Consulting Parties, similar to what has been done on the Maine – New Hampshire Connections Study.

All of the activities noted above will occur concurrently so as to expedite delivery of the Memorial Bridge construction and determination of final recommended actions regarding the Sarah Mildred Long Bridge. The work is expected to begin immediately.