May 2017

NYS DEPARTMENT OF ENVIRONMENTAL CONSERVATION
ADIRONDACK PARK AGENCY

MINIMUM REQUIREMENTS APPROACH GUIDE

Construction of Trail Bridges in Wild Forest Areas In the Adirondack Park

Project Title:

"If there is a unifying theme to the master plan, it is that the protection and preservation of the natural resources of the state lands within the Park must be paramount. Human use and enjoyment of those lands should be permitted and encouraged, so long as the resources in their physical and biological context as well as their social or psychological aspects are not degraded."

-- The Adirondack Park State Land Master Plan (page 14)

On March 11, 2016, the Adirondack Park Agency approved changes to the Adirondack Park State Land Master Plan (APSLMP) Wild Forest Guidelines that allow the construction of trail bridges using non-natural materials following a Minimum Requirements Approach (MRA) in Wild Forest. The Final Supplemental Environmental Impact Statement for the APSLMP amendment states that the Agency and the Department would develop the MRA and the MRA will be added as an appendix to the MOU between APA and DEC. This document is the fulfillment of that commitment.

The MRA is a structured process to evaluate multiple criteria as part of planning for trail bridges within areas classified as Wild Forest by the APSLMP. The MRA is similar to the Minimum Requirements Decision Guide (MRDG) used by managers on Federal public lands designated as Wilderness. This MRDG is a process for land managers to identify, analyze, and select management actions that are the minimum necessary for stewardship of Wilderness. Like the MRDG, the MRA is designed to assist Forest Preserve planners and managers in making appropriate decisions. The guiding

principle—for both decision making models—is that only the minimum tools, regulation, or force necessary to achieve established objectives are justified.

This MRA enables an objective evaluation of criteria when possible. The selection of a bridge design, however, is also based on considerations that have a varying degree of measurability. A selection will be made only after careful consideration of each alternative by APA and DEC staff of both the quantifiable and non-quantifiable criteria. A critical component of this MRA is the narrative description for each alternative, particularly to document how criteria were scored and to present information that is not captured in the decision matrix or checklist.

This form is to be completed by DEC staff in consultation with APA staff.
The completed form will be noticed in the Environmental Notice Bulletin.

Description of the Situation

The description explains the situation which requires action. Actual text and page numbers from a UMP or UMP Amendment should be cited. The description will include all necessary activities necessary to construct a bridge, including access to the bridge site and staging areas. It will also describe potential long and short term impacts and associated remediation which will be carried out to address these impacts.

If an existing UMP or UMP amendment does not address the need for a bridge or if a bridge is a replacement bridge, the description will (1) identify span and location and (2) will include an evaluation of bridge or no bridge alternatives.

Description of the Situation

Description of Alternatives

Identify and describe the reasonable range of alternatives. Three to five alternatives are recommended as a range of feasible and appropriate alternatives. The range of alternatives must include a "Natural Materials"[1] option.

Each alternative must comply with the APSLMP's Wild Forest Basic Guideline1: The primary wild forest management guideline will be to protect the natural wild forest setting and to provide those types of outdoor recreation that will afford public enjoyment without impairing the wild forest atmosphere (APSLMP, page 35). Each alternative must be thoroughly described and include design drawings or images of similar existing bridges.

Safety and risk assessment are not analyzed in the MRA criteria because all bridge alternatives will be designed and built to adequate safety standards.

For any bridge deck that has more than a 4 foot drop, railings will be included in the design. The railings design would be essentially the same (toe kick, intermediate and top rails) for all options. The actual railing material would be selected to be compatible with the specific bridge.

1. Using the decision matrix, evaluate the following **quantifiable** criteria:
    - Tree cutting
    - Terrain alteration
    - Impacts to Natural Communities
    - Construction Duration
    - Bridge Raw Profile
    - Bridge Contrast
    - Bridge Lifespan
    - Cost
2. Using the checklist, evaluate the following **non quantifiable** criteria that show positive, negative, or no substantive difference:
    - Impacts to Species
    - Mobilization Impacts

[1] See Adirondack Park State Land Master Plan definition of Natural Materials

- Maintenance Needs
- Aesthetics

3. Using the narrative descriptions, elaborate on the determinations in the decision matrix and checklist (where necessary), and provide other relevant information for each alternative. This section identifies the preferred alternative and provides justification for its selection.

Alternative 1:

Description of the "Natural Materials" Alternative

Alternative 2:

Description of the Alternative

Alternative 3:

Description of the Alternative

Alternative 4:

Description of the Alternative

Alternative 5:

Description of the Alternative

Alternative Comparison Criteria
Quantifiable Criteria

As part of the alternative comparison, reviewers will work their way down the alternative's column and evaluate each alternative against the criteria listed in the corresponding row. Each option will be scored on a 10-point scale from 0 (very poor) to 10 (very good). Scores are based on impacts as they relate to the alternatives considered. Ties may occur. Examples of scoring are in Appendix A.

Tree cutting

This criterion compares alternatives with respect to how many trees are being removed for construction of the trail bridge. The minimum number of zero (0) trees is given a score of ten (10), and a score of zero (0) will be given to the alternative with the maximum number of trees expected to be removed. The alternatives that have expected tree removal that fall between these numbers will be scored proportionately.

Terrain alteration

This criterion compares alternatives with respect to the area of the terrain, in square feet, expected to be permanently altered for construction of the trail bridge. The minimum area of zero (0) square feet is given a score of ten (10), and a score of zero (0) will be given to the alternative with the maximum area of altered square feet. The alternatives that have terrain alteration square footage that fall between these values will be scored proportionately.

Impacts to Significant Natural Communities

This criterion compares alternatives with respect to the square footage of Significant Natural Community(s) (as State ranked A or B by the New York Natural Heritage Program) is impacted by the construction of the trail bridge. The minimum area of zero (0) square feet is given a score of ten (10), and a score of zero (0) will be given to the alternative with the maximum area of square feet expected to impact these communities. The alternatives that have Significant Natural Community impacts that fall between these values will be scored proportionately.

Construction Duration

This criterion compares alternatives with respect to the duration, in days, it is expected to take to build the trail bridge. The minimum value of zero (0) days is given a score of ten (10), and a score of zero (0) will be given to the alternative with the maximum number of construction days. The alternatives that have a number of construction days that fall between these values will be scored proportionately.

Bridge Raw Profile

This criterion compares alternatives with respect to the area of the vertical profile (side-view) of the trail bridge structure. This is the raw profile, or maximum length (span) times the maximum height, in square feet. The minimum area of zero (0) square feet is given a score of ten (10), and a score of zero (0) will be given to the alternative with the maximum number of raw profile square footage. The alternatives that have a raw profile square footage that fall between these values will be scored proportionately. The methodology for measuring bridges is in Appendix B.

Bridge Contrast

Since the raw profile calculation does not account for how much of the bridge structure obstructs the view of the landscape beyond it (contrast of bridge versus landscape beyond it), this criterion compares the alternatives with respect to how much of the bridge profile, by percentage, obstructs the view of the landscape beyond the bridge. The minimum score of zero (0) is given to the alternative with 100% obstructed view, and the maximum score of ten (10) is assigned to the minimum obstructed view of 0% (an 'invisible' bridge). The alternatives that have a percentage of obstructed view that fall between these values will be scored proportionately.

Bridge Lifespan

This criterion compares alternatives with respect to how long, in years, the trail bridge is expect to last until it needs to be replaced. The minimum lifespan of zero (0) years is given a score of zero (0), and a score of ten (10) will be given to the alternative with the maximum lifespan. The alternatives that have a lifespan that fall between these values will be scored proportionately.

Cost

This criterion compares alternatives with respect to how much the trail bridge is expected to cost. The minimum cost of zero (0) dollars is given a score of ten (10), and a score of zero (0) will be given to the alternative with the maximum cost. The alternatives that have a cost that fall between these values will be scored proportionately.

Alternative Comparison Criteria
Non- Quantifiable Criteria

As part of the alternative comparison, reviewers will review the criteria and determine if there is a negative effect, positive effect or no substantive difference.

Impacts to Species

Does the action impact a population or individuals of any threatened or endangered species, as listed by New York State or the Federal Government?

Mobilization Impacts

How does the transportation of materials to the bridge site impact the natural resources? Many of these impacts may be temporary and will be remediated, including tree cutting for a staging area and construction and removal of an access road.

Maintenance Needs

How often in a bridge's lifespan is maintenance, including routine maintenance and inspections, required?

Aesthetics

On the Forest Preserve, structures should blend in and be compatible with their surroundings. Designs should minimize the visual conflict with the landscape. The principles of aesthetics that stimulate the senses in most viewers are proportion, order, simplicity, balance, color, and texture[2]. How much of the bridge profile is in contrast to its setting? Are natural materials integrated as much as possible?

[2] http://www.dot.state.mn.us/bridge/pdf/aestheticguidelinesforbridgedesign.pdf

Decision matrix for evaluating **quantifiable** criteria:

Quantifiable Criteria		Alt 1	Alt 2	Alt 3	Alt 4	Alt 5
Tree Cutting	Number					
	Score*					
Terrain Alteration (Area)	Sq. Ft.					
	Score*					
Impacts to Natural Communities (Area)	Sq. Ft.					
	Score*					
Construction Duration (Days)	Days					
	Score*					
Bridge Raw Profile (Area)	Sq. Ft.					
	Score*					
Bridge Contrast (Percent)	Percent					
	Score*					
Bridge Lifespan (Years)	Years					
	Score*					
Cost ($)	Dollars					
	Score*					
Total Scores**						

*Score calculated by staff, ** Higher score reflects less impact for these criteria

Checklist for evaluating non quantifiable criteria (positive, negative, or no substantive difference):

Non-quantifiable Criteria	**Alt 1**	**Alt 2**	**Alt 3**	**Alt 4**	**Alt 5**
Impacts to Species					
Mobilization Impacts					
Maintenance needs					
Aesthetics					
Total**					

** Higher score reflects less impact for these criteria

Alternatives Not Analyzed

Alternatives that are not feasible or are otherwise not acceptable to implement should be identified and the reason for not considering the alternative explained. For example, alternatives that would incur unacceptable negative impacts such as excessive tree cutting.

Alternatives Not Analyzed
What alternatives were considered but not analyzed, and why?

Determination of Preferred Alternative

Explain Rationale for Selection

Selected Alternative

Explain why the selected alternative is the minimum necessary for the construction of a trail bridge in Wild Forest. The explanation should discuss why other alternatives do not meet the minimum requirements. An alternative may not be chosen based primarily on cost of implementation.

Review

DEC	Name	Position	
		Forest Preserve Coordinator	
	Signature		Date

APA	Name	Position	
		Deputy Director, Planning	
	Signature		Date

Appendix A
Alternative Comparison Criteria
Quantifiable Criteria Example Calculations*

* Indicates multiplication

Tree cutting

Example Calculation:

	Alternative 1	Alternative 2	Alternative 3	Alternative 4
Tree Cutting (Number of Trees)	107	150	200	100
Score	**4.7**	**2.5**	**0**	**5.0**

Scoring Formula:

Score = 10 – ((# trees * 10)/Maximum # trees)

Example:

Tree Cutting Maximum # of 200 trees = Score of **0**

Tree Cutting Value of 0 trees = Score of 10

Therefore:

Tree Cutting Value of 107:

Score = 10 – ((107 * 10)/200) = **4.7**

Tree Cutting Value of 150:

Score = 10 – ((150 * 10)/200) = **2.5**

Tree Cutting Value of 100:

Score = 10 – ((100 * 10)/200) = **5.0**

Terrain alteration

Example Calculation:

	Alternative 1	Alternative 2	Alternative 3	Alternative 4
Terrain Alteration (Square Feet)	16,177	17,000	15,000	15,799
Score	**0.5**	**0**	**1.2**	**0.7**

Scoring Formula:

Score = 10 – ((Area * 10)/Maximum Area)

Example:

Terrain Alteration Maximum Area of 17,000 square feet = Score of **0**

Terrain Alteration Value of 0 square feet = Score of 10

Therefore:

Terrain Alteration Value of 16,177:

Score = 10 – ((16,177 * 10)/17,000) = **0.5**

Terrain Alteration Value of 15,000:

Score = 10 – ((15,000 * 10)/17,000) = **1.2**

Terrain Alteration Value of 15,799:
Score = 10 – ((15,799 * 10)/17,000) = **0.7**

Impacts to Significant Natural Communities

Example Calculation:

	Alternative 1	Alternative 2	Alternative 3	Alternative 4
Impact to S.N.C. (Square Feet)	50	75	200	10
Score	**7.5**	**6.3**	**0**	**9.5**

Scoring Formula:
Score = 10 – ((Area * 10)/Maximum Area)
Example:
Impact to S.N.C. Maximum Area of 200 square feet = Score of **0**
Impact to S.N.C Value of 0 square feet = Score of 10

Therefore:
Impact to S.N.C Value of 50:
Score = 10 – ((50 * 10)/200) = **7.5**
Impact to S.N.C Value of 75:
Score = 10 – ((75 * 10)/200) = **6.3**
Impact to S.N.C Value of 10:
Score = 10 – ((10 * 10)/200) = **9.5**

Construction Duration

Example Calculation:

	Alternative 1	Alternative 2	Alternative 3	Alternative 4
Construction Duration (Days)	277	297	250	317
Score	**1.3**	**0.6**	**2.1**	**0**

Scoring Formula:
Score = 10 – ((Duration * 10)/Maximum Duration)
Example:
Construction Duration Maximum Value of 317 days = Score of **0**
Construction Duration Value of 0 days = Score of 10

Therefore:
Construction Duration Value of 277:
Score = 10 – ((277 * 10)/317) = **1.3**
Construction Duration Value of 297:
Score = 10 – ((297 * 10)/317) = **0.6**
Construction Duration Value of 250:
Score = 10 – ((250 * 10)/317) = **2.1**

Bridge Raw Profile

Example Calculation:

	Alternative 1	Alternative 2	Alternative 3	Alternative 4
Bridge Raw Profile (sq. ft.)	1,274	1,744	879	2,122
Score	**4.0**	**1.8**	**5.9**	**0**

Scoring Formula:

Score = 10 – ((Area * 10)/Maximum Area)

Example:

Bridge Raw Profile Maximum Value of 2,122 sq. ft. = Score of **0**

Bridge Raw Profile Value of 0 sq. ft. = Score of 10

Therefore:

Bridge Raw Profile Value of 1,274:

Score = 10 – ((1,274 * 10)/2,122) = **4.0**

Bridge Raw Profile Value of 1,744:

Score = 10 – ((1,744 * 10)/2,122) = **1.8**

Bridge Raw Profile Value of 879:

Score = 10 – ((879 * 10)/2,122) = **5.9**

Bridge Contrast

Example Calculation:

	Alternative 1	Alternative 2	Alternative 3	Alternative 4
Raw Profile (sq. ft.)	1274	1744	879	2122
Obstructed Profile (sq. ft.)	706	1013	835	659
Obstructed (%)	55.4%	58.1%	95.0%	31.1%
Score	**4.5**	**4.2**	**0.5**	**6.9**

Scoring Formula:

Score = 10 – ((Percent contrast * 10)/100)

Example:

Bridge Contrast Maximum Value of 100% = Score of **0**

Bridge Contrast Value of 0% = Score of 10

Therefore:

Bridge Contrast Value of 55.4:

Score = 10 – ((55.4 * 10)/100) = **4.5**

Bridge Contrast Value of 58.1:

Score = 10 – ((58.1 * 10)/100) = **4.2**

Bridge Contrast Value of 95.0:

Score = 10 – ((95.0 * 10)/100) = **0.5**

Bridge Contrast Value of 31.1:

Score = 10 – ((31.1 * 10)/100) = **6.9**

Bridge Lifespan

Example Calculation:

	Alternative 1	Alternative 2	Alternative 3	Alternative 4
Bridge Lifespan (Years)	100	40	75	50
Score	**10**	**4.0**	**7.5**	**5.0**

Scoring Formula:

Score = (Lifespan * 10)/Maximum Lifespan

Example:

Bridge Lifespan Maximum Value of 100 years = Score of 1**0**

Bridge Lifespan Value of 0 days = Score of 0

Therefore:

Bridge Lifespan Value of 40:

Score = (40 * 10)/100 = **4.0**

Bridge Lifespan Value of 75:

Score = (75 * 10)/100 = **7.5**

Bridge Lifespan Value of 50:

Score = (50 * 10)/100 = **5.0**

Cost

Example Calculation:

	Alternative 1	Alternative 2	Alternative 3	Alternative 4
Cost ($)	1,026,000	950,000	1,183,000	1,792,000
Score	**4.3**	**4.7**	**3.4**	**0**

Scoring Formula:

Score = (Cost * 10)/Maximum Value

Example:

Bridge Cost Maximum Value of $1,792,000 = Score of **0**

Bridge Cost Value of $0 = Score of 10

Therefore:

Bridge Cost Value of $1,026,000:

Score = 10 – ((1,026,000 * 10)/ 1,792,000) = **4.3**

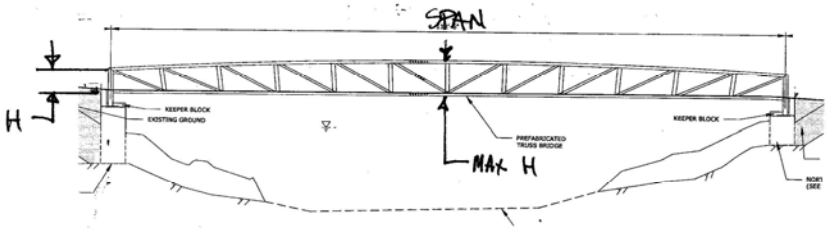
Bridge Cost Value of $950,000:

Score = 10 – ((950,000 * 10)/ 1,792,000) = **4.7**

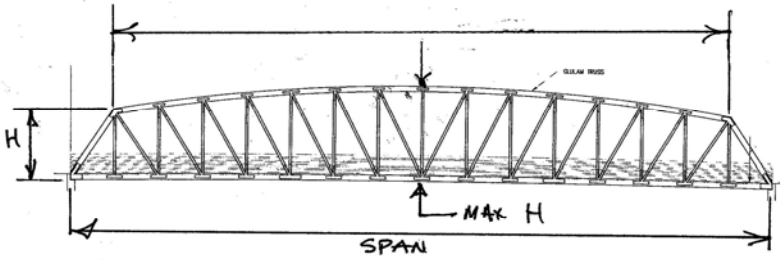
Bridge Cost Value of $1,183,000:

Score = 10 – ((1,183,000 * 10)/ 1,792,000) = **3.4**

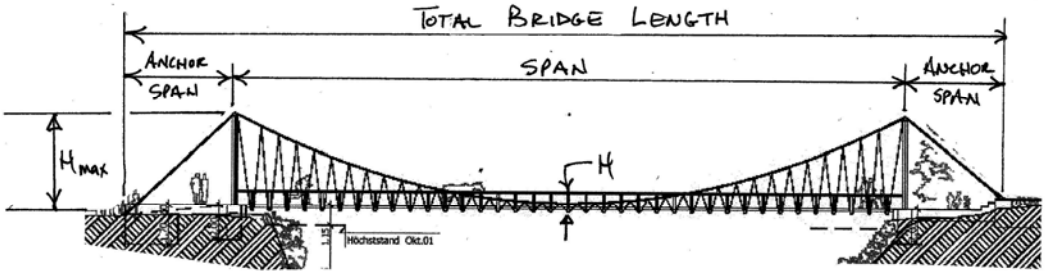
Appendix B:
Bridge Profile Measurement Guidelines



STEEL TRUSS BRIDGE



WOOD TRUSS BRIDGE



SUSPENSION BRIDGE