National Park Service
U.S. Department of the Interior

Great Smoky Mountains National Park
Tennessee/North Carolina

Environmental Assessment
Construct New Riding Stables Facilities

November 2003

Abstract

The National Park Service has prepared this Environmental Assessment to evaluate the impacts of replacing riding stables facilities in Great Smoky Mountains National Park. To accomplish this, the National Park Service proposes to approve the construction of an office, hay shed, and two horse barns at Sugarlands Horseback Riding Stables, located east of Newfound Gap Road and approximately 1.5 miles south of the park boundary with Gatlinburg, Tennessee. These new facilities would be constructed by the concessioner at the concessioner's expense under the terms of a new Concession Contract awarded in November 2002. The purpose of these buildings is to provide quality facilities for this concessioner operated horseback riding stables. The proposed barns would provide safe and functional housing for the 48 horses used in this operation as well as essential storage required for this type of operation. The hay shed would provide dry storage for the hay needed to feed 48 stabled horses used in this operation. The office building would serve as the public contact, registration, and sales area for the stable, as well as housing a break room for employees.

The stable area is designated in the Park's General Management Plan (GMP) as a natural environment - type II subzone. The GMP calls for use of this area as a horseback riding stable, continuing a use that has existed since 1962. The proposed facilities do not represent any expansion of the stable operation at this location. The proposed facilities would be constructed by the concessioner under the terms of the concession contract awarded in 2002. The facilities used prior to the award of a contract to a new concessioner were the property of the prior concessioner and were removed by the prior concessioner.

Following the removal of the previous facilities, the new concessioner installed temporary covered stalls, temporary hay storage, and a temporary office/storage building. These temporary facilities are intended for use until the proposed facilities are constructed.

The proposed facilities would address a number of deficiencies that existed with relationship to the old structures. These include inadequate stall size, inefficient stall and aisle flooring, inadequate ventilation, lack of hay storage, and outdated and deteriorating structures.

Three alternatives are analyzed in this document with one alternative having two options. Under two of the action alternatives, two 24-stall horse barns, a hay shed, and an office would be constructed. However, the size of the barns and siting of the structures is different in each of these two alternatives. In the No Action Alternative, no new structures would be built, requiring the continued use of temporary structures. The No Action Alternative serves as a basis for comparing impacts.

No Action Alternative – Under this alternative no new facilities would be constructed and the riding stable would continue to operate with existing temporary facilities. However, the lack of adequate facilities would hamper the ability of the concessioner to successfully operate this stable over the term of the contract. The temporary covered stalls, although adequate for use during one or two seasons, are not designed for long-term use. These covered stalls have temporary fabric roofs and do not provide a covered aisle area for use in grooming, tacking, untacking, shoeing, and otherwise caring for horses. There is no storage in the temporary stalls for tack, feed, and other

supplies. The temporary hay shed is an aluminum carport that does not meet functional or appearance standards for long term use. The temporary office is a converted storage container housing a small office and storage area. This temporary office is inadequate in terms of aesthetics and function and does not include a waiting area for customers or an employee break room.

Alternative One – Option A *(Environmentally Preferred, Preferred Alternative)* - Under this alternative two 24-stall 5,545 ft^2 horse barns would be constructed. Each barn also includes a tack room, feed storage room, and 14-foot wide aisle. A 400 ft^2 hay shed would be constructed near the barns. An 259 ft^2 office and break room building with a 280 ft^2 porch for customer seating would also be constructed. In comparison with Alternative Two, this alternative minimizes impact as a result of a smaller barn footprint and a siting of the structures that reduces vegetation and ground disturbance. The office and break room building is located in a previously disturbed area adjacent to the proposed corral area. The barns are further from the stream (Two Mile Branch) and the parking lot, and are closer together. The hay shed is in a previously disturbed area near the barns. This alternative does not require any relocation of the Two Mile Branch and Two Mile Lead Trails. This alternative would remove four parking spaces from the southeast end of the parking area to accommodate the office and break room building. Six new parking spaces would be added to the northwest end of the parking, two of which would be handicapped parking. This alternative would have minor to negligible adverse impacts on Park resources but a cumulative positive impact.

Alternative One – Option B – The alternative differs from Alternative One – Option A only in the siting of the office and break room building. This option would site the office in and immediately adjacent to the area of the current paved parking lot. In comparison with Alternative One – Option A, this option would remove eight parking spaces from the southeast end of the parking area to accommodate the office and break room building. Six new parking spaces would be added to the northwest end of the parking, two of which would be handicapped parking

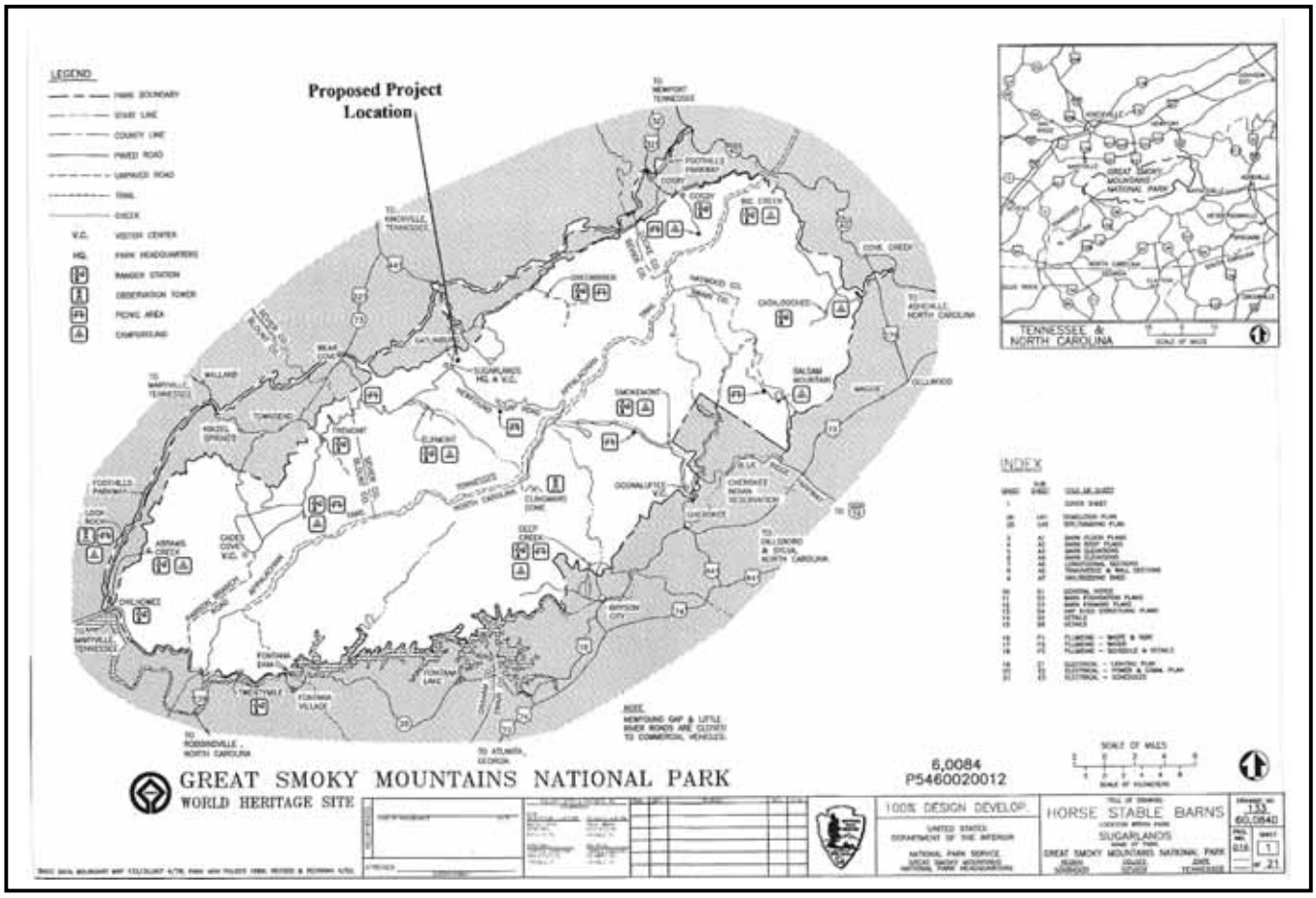
Alternative Two - Under this Alternative Two 24-stall 7,084 ft^2 horse barns would be constructed. Each barn also includes a tack room, feed storage room, and 16' wide aisle. One barn would contain a space for an employee break room and additional storage room. The second barn would include an open covered bay on one end for equipment storage. The larger barns in this alternative would provide more working and storage space and somewhat greater operational flexibility. A 400 ft^2 hay shed would be constructed near the barns. A 259 ft^2 office and break room building with a 280 ft^2 porch for customer seating would also be constructed. In comparison with Alternative One, this alternative would result in somewhat greater ground and vegetation disturbance due to the larger barn footprint and different siting of the structures. The siting of the office just east of the restrooms in a vegetated area would require the removal of more trees than in Alternative One. The siting of the hay shed adjacent to the south side of the parking area would also require the removal of more trees than in Alternative One. In comparison with Alternative One – Option A which would remove four parking spaces from the southeast end of the parking area to accommodate the office and break room building, this alternative would remove eight parking spaces. Six new parking spaces would be added to the northwest end of the parking, two of which would be handicapped parking. This alternative would also require a minor relocation of the Two Mile Branch Trail and Two Mile Lead Trail in the immediate vicinity of the stable facility. This trail relocation would require the removal of trees not impacted in Alternative One.

Table of Contents

1. Introduction 1
1.1 Project Location 1
1.2 Description of Proposed Action 1
1.3 Need for Proposed Action 2
1.4 Related Environmental Documents 3
1.5 Decisions to be Made 3
1.6 Public Involvement 3
2. Alternatives 4
2.1 Project Overview and Background 4
2.3 Alternatives Reviewed but Not Recommended 6
2.4 Alternatives Reviewed but Removed from Further Consideration 6
2.5 Alternatives Under Consideration 6
2.6 Environmentally Preferred Alternative 12
2.7 Summary of Alternatives 14
3. Affected Environment 15
3.1 Vegetation 15
3.2 Soils 16
3.3 Wildlife 17
3.4 Water Resources 17
3.5 Threatened and Endangered Species 18
3.6 Floodplains 19
3.7 Air Quality 19
3.8 Historic Resources 21
3.9 Archeological 22
3.10 Aesthetic Resources and Visitor Experience 23
3.11 Noise 24
3.12 Light Pollution 24
3.13 Environmental Justice 24
3.14 Related Actions 25
4. Environmental Consequences 26
4.1 Terms 26
4.2 Vegetation 26
4.3 Soils 28
4.4 Wildlife 30
4.5 Water Resources 31
4.6 Threatened and Endangered Species 32
4.7 Historic Resources 33
4.8 Archeology 34
4.9 Aesthetic Resources and Visitor Experience 34
4.10 Noise 36
4.11 Light Pollution 36
4.12 Related Actions 37
4.13 Summary Impact Table 38
5. List of Preparers 39
6. Coordination 40
7. Selected References 40

1. Introduction

1.1 Project Location



1.2 Description of Proposed Action

Great Smoky Mountains National Park proposes to replace inadequate temporary facilities at Sugarlands Horseback Riding Stables, a concessioner-operated horseback riding stable. The proposed facilities would include two barns with 24 stalls each and storage space, a hay shed, and an office building with included employee break room. These new facilities would be constructed by the concessioner at his expense under the terms of a new Concession Contract awarded in November 2002. The purpose is to provide a facility that would allow the concessioner to provide a safe and enjoyable horseback riding experience on park trails for park visitors; provide attractive, safe, and functional facilities for horses and horse-related equipment and supplies.

1.3 Need for Proposed Action

Congress established the purpose of Great Smoky Mountains National Park in the act of May 22, 1926, which provided for the establishment of the Park. This act referenced the National Park Service Organic Act of August 25, 1916, which stated that the fundamental purpose of national parks is "to conserve the scenery and the natural and historic objects and the wildlife therein and to provide for the enjoyment of the same in such manner and by such means as will leave them unimpaired for the enjoyment of future generations." Great Smoky Mountains National Park is world renowned for the diversity of its plant and animal resources, the beauty of its ancient mountains, the quality of its remnants of American pioneer culture, and the depth and integrity of the wilderness sanctuary within its boundaries. The Park's fundamental significance lies in its extraordinary quality as a sanctuary. Massive mountain ridges, deep-cleft valleys, and unspoiled streams create entirely different ecosystems which are refuges for hundreds of plants and animal species.

Horseback riding is a traditional and appropriate recreational activity in National Parks. Many Park visitors consider horseback riding to be an indispensable part of their visit to a National Park. For the average Park visitor, it is both a novel recreational experience and a link to historical modes of transportation. Horseback riding provides an opportunity to experience a small part of the Park's backcountry for visitors who might otherwise miss this part of the Park. Although horseback riding is available outside the Park, the opportunity to experience the unspoiled National Park environment is not. From a resource conservation standpoint, horseback riding is an example of an activity that does not consume nonrenewable resources. Although horseback riding can cause serious impacts on Park trails, the trails used for most concessioner rides are maintained to a higher standard than other Park horse trails to handle these impacts, with most use concentrated on trails used for one and two-hour rides. The four horseback riding stables in Great Smoky Mountains National Park provide for easy access for the majority of Park visitors and a variety of riding experiences. Most of the riding stables in the Park offer rides from one hour to several hours in duration.

The proposed project would replace certain facilities required for the concession horseback riding stables in the Two Mile Branch Area, formerly known as McCarter's Riding Stables. With the award of a Concession Contract to a new concessioner effective November 1, 2002, the name of this stable has changed to Sugarlands Horseback Riding Stables. All of the facilities used prior to the award of the new contract, except the restrooms and parking lot, were the property of the previous concessioner, McCarter's Riding Stables, Inc. The previous concessioner removed these facilities prior to the new concessioner beginning operations in June 2003. The new Concession Contract requires the concessioner, Donald Manis, to construct new facilities to replace the facilities removed by the previous concessioner. The new facilities would be a replacement in-kind of the facilities needed to operate the stable, with no change in the number of horses that would be used in this operation. The new barns would be somewhat larger than the old barns since the stalls in the new barn are larger to meet accepted minimum size standards for horse stalls. The proposed project combines the office and employee break room into one structure rather than two. A hay shed would be constructed to store hay required to feed 48 horses housed on site.

Following the removal of the previous facilities from the site in June 2003, the new concessioner installed temporary facilities on the site for use until the new permanent facilities can be constructed. These temporary facilities include four temporary barns consisting of free standing, modular stall units with roofs covered with a tarpaulin type material. A converted metal storage container was installed for use as a temporary office and storage. A aluminum carport is being used for hay storage. Although these facilities are adequate for temporary use, they are not satisfactory for long term use. The temporary barns do not include any covered aisle space in which to carry out horse maintenance and care activities. The roofing system is designed for temporary use only. The office does not provide adequate work space and does not have a waiting area for customers. No employee break room is currently available and storage space for tack and horse related supplies and equipment is inadequate.

1.4 Related Environmental Documents

The Park's General Management Plan (GMP) was completed in 1982. The GMP and the Final Environmental Impact Statement for the GMP include the following statement regarding horseback riding stables:

> ***Horseback Riding. Horse rental concessions will continue at the present locations. Concession trail use will be concentrated in areas where trails are best able to withstand the exceptionally high levels of impact. The National Park Service will construct basic trails of uniformly high quality, and subsequent maintenance of trails used predominately by concessioners will be the responsibility of the concessioners, under National Park Service guidance and control.***

The GMP designates the proposed project location as a Natural Environment Type II Subzone within the natural zone, which is described as follows:

> ***Natural Environment Type II Subzone. Certain small tracts just inside the park boundary and other tracts adjacent to development zones do not meet the criteria for inclusion in the natural environment type I category because of established use, the small size of these tracts, or the need for entry of mechanized equipment. Tracts in this subzone include some cemeteries, cemetery and utility access roads, stables, and paved or very heavily used trails.***

1.5 Decisions to be Made

In providing for adequate facilities for this concessioner operated horseback riding stable the primary decision to be made is between two alternatives for the design and siting of new facilities, or to take no action and continue to use existing temporary facilities. Facility program needs and location issues (access to park resources and other facilities, suitability for construction/renovation, cost, natural and cultural resource issues, etc.) factor into this decision.

1.6 Public Involvement

The National Park Service published a public notice on October 3, 2003 requesting public input into the proposed project. Two identical written comments from different individuals were

received during the scoping period. Both letters objected to the investment of public funds in riding stables for the use of a private contractor. As stated in Section 1.2 of this environmental assessment, the cost of constructing these improvements is being paid by the concessioner, rather than the government. The letters also stated that the environmental assessment should address impacts on trails and associated maintenance costs and water quality impacts on associated watersheds. The proposed project would result in no additional impacts on trails nor additional maintenance costs to the government. The Concession Contract requires the concessioner to maintain to standards established by the Superintendent the trails used for 95% of the concessioner's rides. Section 1.3 of this environmental assessment explains that the horse trails used by the concessioner are maintained to a higher standard than other park horse trails to minimize the impacts of concentrated use. Water quality impacts are addressed in Section 4.5 of this environmental assessment.

2. Alternatives

2.1 Project Overview and Background

The replacement of facilities for horseback riding at Sugarlands Horseback Riding Stables is in accord with the General Management Plan statement that a horse rental concession would continue at this location. The proposed facilities are a replacement in-kind of the previous facilities at this site, albeit with some necessary improvements in design and function. This proposal does not represent any change in the type or maximum amount of horseback riding services provided at this location.

The previous facilities at this site were temporary facilities constructed by the prior concessioner under the terms of a Concession Permit. As temporary facilities, these structures were the personal property of the prior concessioner rather than the property of the United States. Although the prior concessioner was permitted to sell or rent his structures to a new operator for temporary use, the prior concessioner was not obligated to do so. Had the prior concessioner agreed to sell or rent his structures to the new concessioner, the National Park Service would have authorized the continued use of the barns only until new structures could be constructed.

The previous barns, which were constructed in 1962 and 1963, did not meet current construction standards and did not include stalls meeting generally accepted standards for horse housing. The barns were only in fair condition overall and, due to their age and construction type required a considerable annual expenditure on maintenance. Because of design and construction deficiencies and the age of the structures, these barns did not provide a safe, healthy, or functional environment for housing of horses. These barns also did not include adequate space for essential hay storage.

During the planning process for development of a new Concession Contract for this stable, the National Park Service determined that new barns would be required to enable the concessioner to provide the services specified in the contract. This decision was based on a determination that the existing barns had outlived their useful life span and did not meet acceptable standards for horse housing and storage of horse related equipment and supplies. The decision was also made

to provide hay storage and an employee break room. The contract also included a provision for possible replacement of the office building and construction of a porch or deck for customer use. All of these improvements would be constructed by the concessioner at his expense as a requirement of the Concession Contract.

National Park Service Management Policies Chapter 10 includes the following statement regarding the design of concession facilities:

> ***10.2.6 Concession Facilities***
>
> ***10.2.6.1 Design***
> ***Concession facilities will be of a size and at a location that the Service determines to be necessary and appropriate for their intended purposes. All concession facilities must comply with applicable federal, state, and local construction codes, and meet accessibility requirements as set forth in applicable accessibility guidelines. Proposed concession facilities must conform to NPS standards for sustainable design, universal design, and architectural design. Concession development or improvement proposals must undergo review for compliance with NEPA and section 106 of NHPA (16 USC 470f), and be carried out in a manner consistent with applicable provisions of the Secretary of the Interior's Standards and Guidelines for Archeology and Historic Preservation, and other applicable legal requirements. In addition to general park design requirements, the NPS will apply value analysis during the design process to analyze the functions of facilities, processes, systems, equipment, services, and supplies. Value analysis must be used to help achieve essential functions at the lowest life-cycle cost, consistent with required performance, reliability, environmental quality, and safety criteria and standards.***

The alternatives considered during planning for the new facilities included various options for the structure design as well as options for siting of the structures. The NPS contracted with the architectural firm of Bullock Smith and Partners, Inc. to design a prototype barn for park riding stables and then to adapt this prototype design specifically for Sugarlands Horseback Riding Stables. Initial design criteria specified the design of a barn or barns to house 48 horses and including a tack room, feed storage room, hay storage, and employee break room. The architect initially provided three prototype designs that were reviewed by the NPS and concessioners. All three of the designs placed hay storage in a separate building to more efficiently and economically meet fire safety codes. The prototype alternatives included two designs that consolidated the required facilities into a single barn and one design that separated the facilities into two barns. From the three prototype designs, the NPS selected the two-barn option (Alternative C) as the option that would best meet design objectives. Alternatives 1 and 2 in this EA are variations on the Alternative C prototoype.

A number of design features were considered during the process of completing the prototype design most of which do not have any impact on this environmental assessment. The final prototype design includes standard features and various options that can be selected for specific sites and specific concessioners.

In accordance with the provisions of the GMP, the process of selecting a site for the new facilities did not extend beyond the overall location of the existing stable facilities at Two Mile Branch. This is also the area that is assigned for the use of the concessioner under the

Concession Contract. Within this overall location, the objective in developing a site plan was to stay within the footprint of the previous structures to the greatest extent practical. Towards achieving this objective, several alternative site plans were considered before arriving at the two alternatives being considered in this Environmental Assessment.

The challenge of developing a site plan includes selection of the plan which best meets the demands of use while protecting resources. Site plans with potential as alternatives for siting of these facilities were subjected to a systematic evaluation process based upon careful consideration of site attributes. Criteria were identified for use in the selection process with the goal of bringing logic, analysis, and accountability to the planning process. The following criteria were identified:

- Relationship to NPS policies and existing management documents
- Operational efficiency
- Suitability of site to construction or suitability of existing structures to proposed use
- Cultural and natural resource issues
- Costs both capital and operational

2.3 Alternatives Reviewed but Not Recommended

None

2.4 Alternatives Reviewed but Removed from Further Consideration

2.4.1 Prototype A Barn (single building 270’ by 36’)

The preliminary schematic design for this prototype would have combined horse facilities and storage into one long building with 24 - 10’ by 12’ stalls on either side of a central aisle. The NPS eliminated this prototype from further development due to concerns regarding the usefulness of this design for all of the park stable sites, issues of efficient function, fire protection requirements, and the overall aesthetics of this design.

2.4.2 Prototype B Barn (single building 140’ by 64’)

The preliminary schematic design for this prototype would have combined horse facilities and storage into one large building with 48 - 10’ by 10’ box stalls lined up in four rows along two 12’ aisles. The NPS eliminated this prototype from further development due to the inadequate stall size, higher profile of the building, additional fire protection requirements, and lesser suitability to the historic context of this area.

2.5 Alternatives Under Consideration

The alternatives presented here are based on the evaluation of all the alternatives. The No Action Alternative is presented as a requirement of the NEPA.

2.5.1 No Action Alternative

Under this alternative no new facilities would be constructed and the riding stable would continue to operate with existing temporary facilities. However, the lack of adequate facilities would hamper the ability of the concessioner to successfully operate this stable over the term of the contract. The temporary covered stalls, although adequate for use during one or two seasons, are not designed for long-term use. These covered stalls have temporary fabric roofs and do not provide a covered aisle area for use in grooming, tacking, untacking, shoeing, and otherwise caring for horses. There is no storage in the temporary stalls for tack, feed, and other supplies. The temporary hay shed is an aluminum carport which does not meet NPS policy regarding integration of facilities into the park environment *(NPS Management Policies 9.1.1.2).* The temporary office is a converted storage container housing a small office and storage area. This temporary office is inadequate in terms of the aesthetics and function and does not include a waiting area for customers or an employee break room.

2.5.2 Construct new facilities at Sugarlands Horseback Riding Stables

This approximately 3.6 acre site is located just east of Newfound Gap Road and approximately one and one-half miles south of Gatlinburg, Tennessee. This site has been used as a concession operated horseback riding stable since 1962. The only NPS owned facilities at the site are the public restrooms, trails, and a paved parking area. The prior concessioner was authorized to construct temporary facilities on the site for this operation. These temporary facilities included two horse barns, an office, an employee break room, a storage building, and corrals. The Two Mile Branch Trail and Two Mile Lead Trails have trailheads at the site and are among the trails assigned for non-exclusive use of the concessioner.

The temporary facilities owned by the prior concessioner were removed prior to the new concessioner beginning operations. The new concessioner has installed temporary facilities on the site which consist of four 12-stall temporary barns, a combined office-storage building, and a corral. These temporary facilities are intended for use only until permanent facilities can be constructed, as required by the new Concession Contract awarded in November 2002.

The prior concessioner, McCarter's Riding Stables, Inc., reported that nearly 17,000 visitors took horseback rides during the 2002 operating season. Approximately 91% of the visitors took advantage of the one-hour guided trail ride, with the other 9% taking rides from 1.5 to 4 hours in length. In 2002, the concessioner reported gross receipts of $304,432. The current concession contract authorizes the use up to 48 horses on a given day in this operation which is equivalent to the authorized use under the prior concessions permit. This concession normally operates from mid-March to Thanksgiving each year.

Basic utilities are already present at the site. Electrical service is provided by Sevier Country Electric System. Water is provided by the City of Gatlinburg. A septic system services the restrooms. Horse manure must be removed from the site and disposed of outside the Park at least once each week.

The proposed new facilities would be constructed by the concessioner at his expense under the terms of his Concession Contract.

Alternative One-Option A *(Preferred Alternative and Option)*
Under this alternative two 24-stall 5,545 ft^2 horse barns would be constructed. Each barn also includes a tack room, feed storage room, and 14' wide aisle. A 400 ft^2 hay shed would be constructed near the barns. An 259 ft^2 office and break room building with a 280 ft^2 porch for customer seating would also be constructed.

In comparison with Alternative Two, this alternative minimizes impact as a result of smaller barn footprint and a siting of the structures that reduces vegetation and ground disturbance. The smaller barn footprint has been achieved by eliminating a break room space and storage room from one barn and an open storage bay from the other. In addition, the aisle width has been reduced from 16' to 14'. These changes would not have any practical adverse impact on the function of the barns. Since a break room would be included in the office building the break room space in the barn, while it allows more flexibility for future concessioners, is unnecessary. While the 14' aisle allows only 12' of clearance for vehicles at the barn entrances, this was judged adequate clearance.

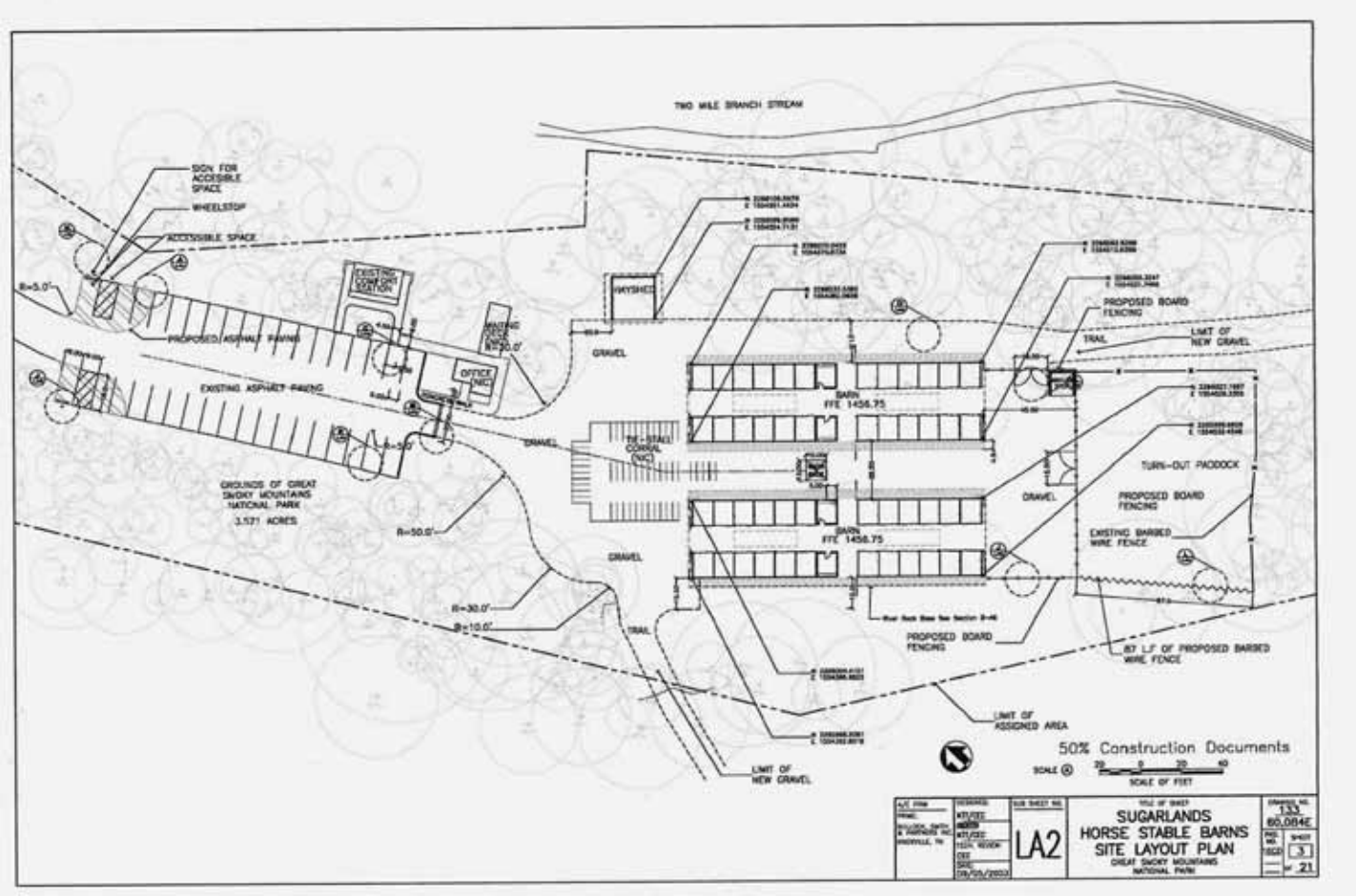
In comparison with Alternative Two, this alternative places the barns closer together and moves the barns approximately 40' to the southeast. With this change, the barns are further from Two Mile Branch and the parking lot. The additional buffer between the facilities and the stream (Two Mile Branch) would reduce the risk of water pollution or siltation from the operation. This alternative does not require any relocation of the Two Mile Branch and Two Mile Lead Trails, reducing impacts to vegetation, soils, and water quality. Under this alternative, Two Mile Branch Trail would not be moved closer to the stream.

Both Alternative One and Two include a number of design features that would reduce water quality impacts in comparison with the No Action Alternative. In particular, these design features should minimize the risk of siltation or nutrification from this operation. Surface water from the slopes surrounding the site would be collected by a drainage ditch and diverted into a drainage system rather than flowing through the stable area. A french drain system would collect runoff from the barn roofs and divert this water into a drainage system. The outflow from this drainage system would be designed to trap silt in the outflow area which would be well away from the stream. Prior to construction, several inches of crushed rock and gravel would be applied to the building site and corral area to allow for percolation and filtration of water and animal wastes from the site. Drainage from the barn aisles and horse wash rack would be piped to a large dry well to allow filtration and percolation of the drainage from these areas. The floor drains would be equipped with a solids separator to collect any horse manure than enters the drain. Horse stalls in the barn would be floored with an open-cell paver system that consists of a honeycomb plastic mesh filled with fine gravel that is installed over a thick layer of gravel and sand to allow for percolation and filtration of horse urine.

The office is located in a disturbed area near the proposed corral. The hay shed is in a previously disturbed area near the barns and corral. Under Option A, four parking spaces would be removed from the southeast end of the parking lot to accommodate the office and break room. Six new parking spaces would be added to the opposite end of the parking lot, two of which would be

handicapped parking. The new parking spaces would be constructed in an area not currently impacted, requiring removal of approximately five trees, excavation, application of gravel, and paving.

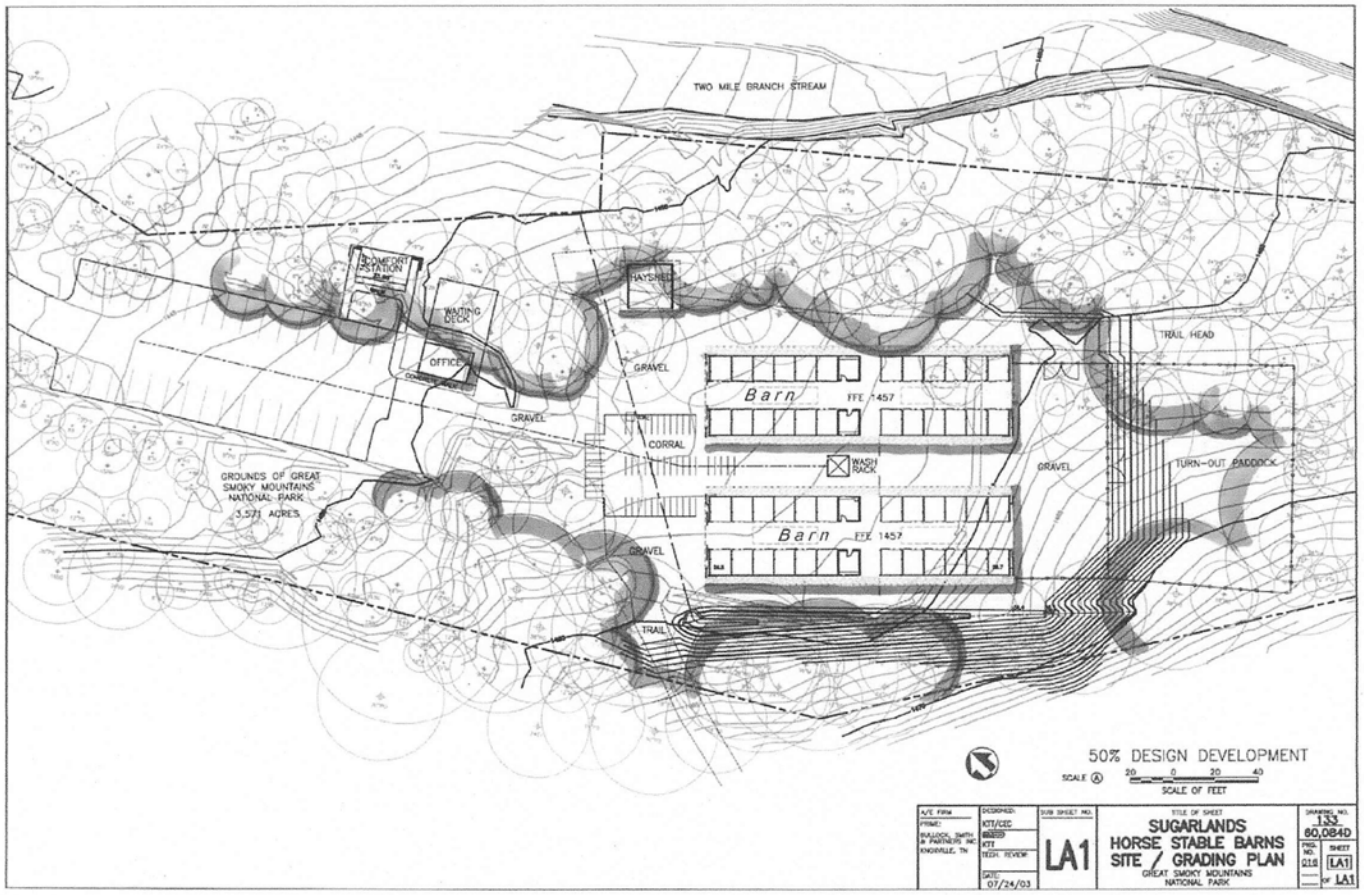
This alternative would have negligible adverse impacts on Park resources and an overall positive impact.



Alternative One – Option A

Alternative One-Option B

This option differs from Option A in the siting of the office building. Under this option, the office building would be constructed largely in a portion of the area currently occupied by a paved parking lot. This option would require the removal of eight parking spaces from the southeast end of the paved parking lot to accommodate the office building and to eliminate parking directly adjacent to the office and driveway. More fill would be required adjacent to the parking area to accommodate the construction. Six new parking spaces would be added to the opposite end of the parking lot, two of which would be handicapped parking. The new parking spaces would be constructed in an area not currently impacted, requiring removal of approximately five trees, excavation, application of gravel, and paving.



Alternative One – Option B

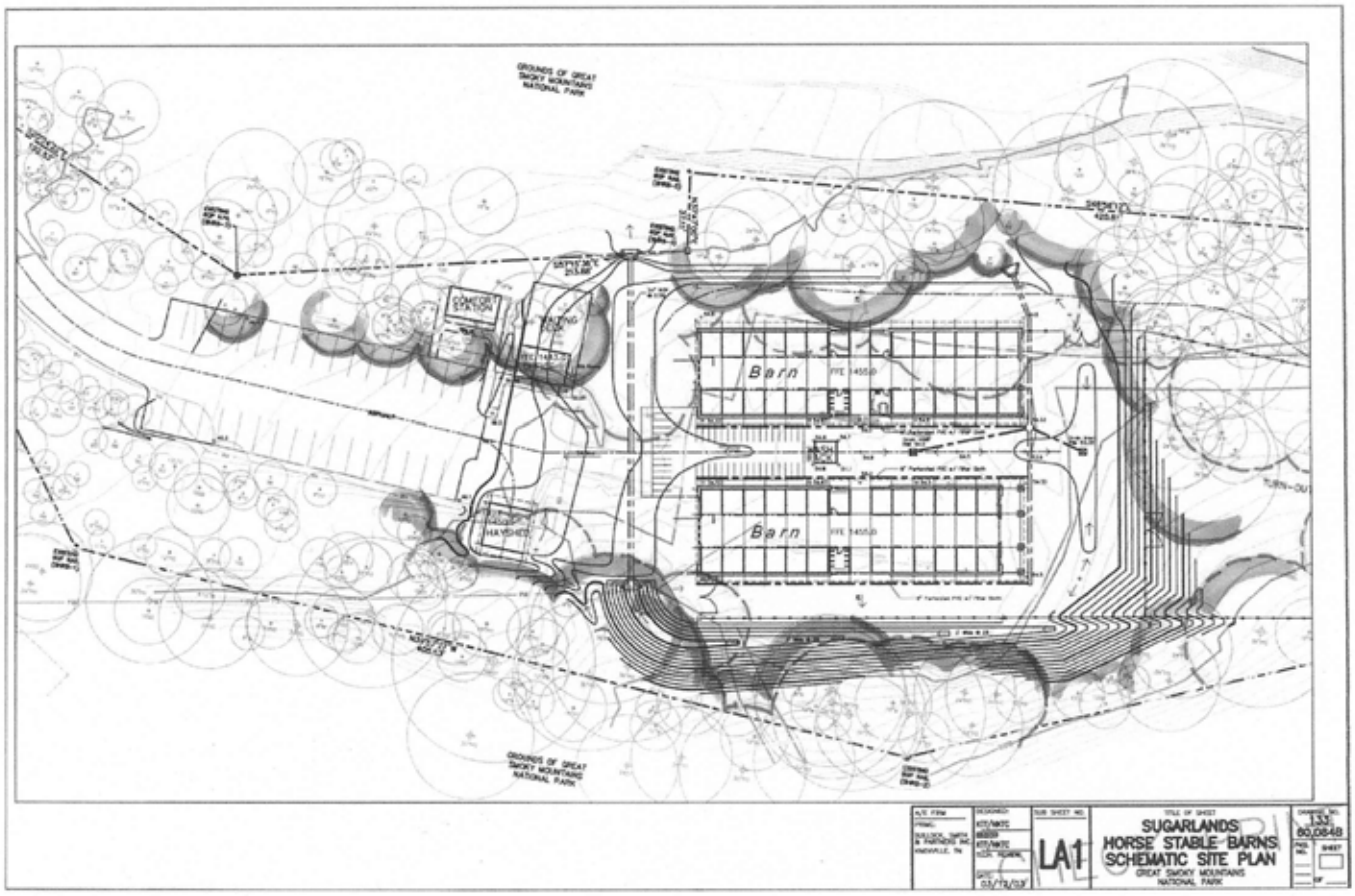
Alternative Two

Under this alternative two 24-stall 7,084 ft^2 horse barns would be constructed. Each barn also includes a tack room, feed storage room, and 16' wide aisle. One barn would contain a space for an employee break room and additional storage room. The second barn would include an open covered bay on one end for equipment storage. Although the current concessioner would be constructing an employee break room as part of the proposed office building, the employee break room space in the barn would allow flexibility should a future concessioner prefer to have the employee break room in the barn. The additional storage room would provide additional storage capacity. The open bay would provide a covered space to park a tractor or other equipment. The 16' wide aisle allows for a full 14' of clearance at the barn entrances for vehicle access.

A 400 ft^2 hay shed would be constructed in and adjacent to the southwest corner of what is currently the parking lot. A 259 ft^2 office and break room building with a 280 ft^2 porch for customer seating would be constructed in and adjacent to the northeast corner of what is currently the parking lot. The orientation of the office building is different than in Alternative One – Option B.

In comparison with Alternative One, this alternative would result in somewhat greater ground and vegetation disturbance due to the larger barn footprint and different siting of the structures. The barns are somewhat larger, further apart, and approximately 40' further to the northwest in comparison with Alternative One. This places the barns approximately 12' closer to Two Mile Branch. In order to accommodate the difference in size and siting of the barns, this alternative would require a minor relocation of the Two Mile Branch Trail and Two Mile Lead Trail in the immediate vicinity of the stable facility. A section of the Two Mile Branch Trail approximately 200 ' long would be moved 20' to the northeast, requiring the removal of approximately 35 trees that would not be removed in Alternative One. This would place Two Mile Branch Trail approximately 20' closer to Two Mile Branch. Approximately 80' of the Two Mile Lead Trail would be moved 40' to the northwest requiring the removal of approximately 20 trees that would not be removed in Alternative One.

The office is located just east of the restrooms in a vegetated area and in the area which is currently part of the parking area. The hay shed is located adjacent to the southwest corner of the parking area, partially within a vegetated area. Under this alternative, eight parking spaces would be removed from the southeast end of the parking lot. Six new parking spaces would be added at the opposite end of the parking lot, two of which would be handicapped parking.



Alternative Two

2.6 Environmentally Preferred Alternative

The environmentally preferred alternative is defined as the alternative that will promote the national environmental policy expressed in NEPA. Of the alternatives under consideration, including the No Action alternative, the Environmentally Preferred alternative is Alternative One-Option A for the reasons given below. Other alternatives including the No Action Alternative do not provide the same level of benefit

Alternative One-Option A minimizes any impact on the resources of the Park while constructing facilities that are essential to providing necessary and appropriate concession services for the public. The lack of these facilities would hinder the ability of the concessioner to provide services which contribute to the understanding, enjoyment, and appreciation of the Park. Under Alternative One – Option A, the construction footprint is kept as small as possible and potential impacts are mitigated to assure that the resources of the site would be preserved to the maximum extent possible. The No Action alternative, while having no immediate impact on resources at the proposed construction site, does not provide the needed facilities. The No Action alternative requires the continued use of temporary facilities that do not incorporate the sustainable design,

efficient function, and aesthetic features of the preferred alternative. The lack of a well-designed permanent facility with adequate facilities for horse housing, storage, and public use would have greater impacts than the preferred alternative. Alternative Two, with larger barns and less efficient placement of structures, would have a larger construction footprint and a slightly greater impact on resources.

2.7 Summary of Alternatives

The following chart summarizes and compares the major similarities and differences between the Alternatives:

		No Action Alternative	Alternative One - A *Preferred and Environmentally Preferred Alternative*	Alternative One - B	Alternative Two
Barns	**Area (per barn)**	**N/A**	**5,545 ft^2**	**5,545 ft^2**	**7,084 ft^2**
	Aisle Width	**N/A**	**14**	**14**	**16**
	Tack Rooms	**N/A**	**2**	**2**	**2**
	Feed Rooms	**N/A**	**2**	**2**	**2**
	Employee Break Room	**N/A**	**0**	**0**	**1**
	Extra Storage Room	**N/A**	**0**	**0**	**1**
	Open Covered Storage Bay	**N/A**	**0**	**0**	**1**
	Distance Between Barns	**N/A**	**20'**	**20'**	**30'**
	Distance to Stream	**N/A**	**100'**	**100'**	**88'**
Hay Shed	**Area**	**N/A**	**400 ft^2**	**400 ft^2**	**400 ft^2**
	Location	**N/A**	**Near barns**	**Near barns**	**Adjacent to parking lot**
Office	**Enclosed Area**	**N/A**	**259 ft^2**	**259 ft^2**	**259 ft^2**
	Porch Area	**N/A**	**280 ft^2**	**280 ft^2**	**280 ft^2**
	Location	**N/A**	**Near Corral**	**Parking lot/adjacent to parking lot**	**Adjacent to parking lot**
Trail Relocation	**Two Mile Branch Trail**	**N/A**	**N/A**	**N/A**	**20' to northeast**
	Two Mile Lead Trail	**N/A**	**N/A**	**N/A**	**40' to northwest**
Parking Lot	**Parking Spaces Removed**	**0**	**4**	**8**	**8**
	New Parking Spaces (Reg/Handicapped)	**0**	**4/2**	**4/2**	**4/2**

3. Affected Environment

Great Smoky Mountains National Park, located in the States of North Carolina and Tennessee, encompasses 800 square miles of forested lands. In 1934, the States of North Carolina and Tennessee donated the Great Smoky Mountains to the Federal Government, creating Great Smoky Mountains National Park. President Franklin Delano Roosevelt dedicated the Park on September 2, 1940.

Great Smoky Mountains National Park is distinguished by the extraordinary diversity and abundance of its plants and animals, the beauty of its mountain terrain and waterways, the quality of its remnants of pioneer culture, and the sanctuary it affords for those resources and for its modern human users. The purpose and mission of the Park is to preserve these diverse resources and, at the same time, provide for public benefit and enjoyment of them in ways that will leave the resources and dynamic natural processes of which they are components essentially unaltered.

Elevations in the Park range from 800 feet to 6,643 feet. Topography affects local weather with temperatures 10 to 20 degrees cooler on the mountaintops. Annual precipitation averages 65 inches in the lowlands to 88 inches in the high country. Spring often brings unpredictable weather, particularly at higher elevations. Summer is hot and humid, but more pleasant at higher elevations. Fall has warm days and cool nights and is the driest period. Frosts occur starting in late September. Winter is generally moderate, but extreme conditions occur. The peak tourist months are June to August and October. The lowest visitation occurs during the winter months of December to February.

The Park is a regional, continental and in some cases global center of diversity for a number of organism groups, including vascular plants, salamanders, spiders, terrestrial mollusks, aquatic insects, millipedes, and other invertebrate groups. Recent scientific consensus estimates that 100,000 (multicellular) species may occur in the Park, yet only 10,000 species have been documented. The Park is also beset by numerous threats to resources. Among these are some of the highest depositions of nitrate and sulfate in North America, Eurasian forest insects and diseases that have devastated stands of Fraser fir, American Beech, American Mountain Ash, Butternut, and soon Eastern Hemlock, over 25 exotic invasive plants requiring consistent control to maintain natural systems, exotic fish that out-compete native trout, high visitor use at sensitive backcountry habitats, and a rapidly urbanizing boundary. Comprehensive inventory information and monitoring of species is necessary to effectively deal with the many threats to the Park's diverse resources.

3.1 Vegetation

Vegetation is one of the Park's primary natural resources. Due to its topographic relief and position on the continent, Great Smoky Mountains National Park supports an enormous diversity of vegetation. Almost 95 percent of the Park is forested. These forests have been described as mong the most diverse and complex in North America (NPS 1982). The Park has more vascular

plant species than any other unit in the national park system, and the number of its nonvascular plant species rank among the highest of any area in North America north of Mexico (NPFLORA 1988 as cited in Rock and Langdon 1991). More than 1,600 species of vascular plants have been identified in the Park (including 100 native tree species), 10 percent of which are considered rare. Of the 1,600 species of vascular plants, over 350 are nonnative. More than 4,000 non-flowering plant species are present, including 430 species of mosses and liverworts, 2,250 species of fungi, and 600 species of lichens. Many taxa new to the Park, as well as species new to science, are discovered each year.

The Park's flora is highly representative of the Eastern Forest Biotic Province, existing in both disturbed and undisturbed ecosystems and over a wide range of elevation and aspect. The Great Smoky Mountains also contain one of the largest blocks of virgin temperate deciduous forest in North America. About 100,000 acres of virgin forest are believed to be in the Park (NPS 1991). Other forested areas in the Park are in varying successional stages, having been cut over at various times in the past. Dominant tree species in the Park's forests include red maple (*Acer rubrum*), sugar maple (*Acer saccharum*), yellow buckeye (*Aesculus octandra*), yellow birch (*Betula lutea*), hickories (*Carya* sp.) beech (*Fagus grandifolia*), red spruce (*Picea rubens*), silverbell (*Halesia carolina*), tuliptree (*Liriodendron tulipifera*), pines (*Pinus* sp.), oaks (*Quercus* sp.) white basswood (*Tila heterophylla*), and eastern hemlock (*Tsuga canadensis*).

The Park has five dominant forest types that recently have been subdivided into 79 associations according to the National Classification System of the Nature Conservancy/NatureServe. The project area can be classified as a semi-natural lowland forest. It is reforested abandoned farmland that is still in a relatively early stage of succession. The overstory is dominated by tulip poplar and sweetgum (Lyquidambar styraciflua). The understory is dominated by eastern hemlock. Using the classification developed by The Nature Conservancy (TNC), the site can best be classified as a Montane Sweetgum Alluvial Flat. This forest type typically develops on sites that were formerly cleared for farming or settlement.

3.2 Soils

The soils in the Great Smoky Mountains vary according to their elevation and location. They are generally thin and rocky and are predominately inceptisols that exhibit minimal horizontal development. In general, the valley bottoms of the Park have well-drained deep soils, while the higher mountain soils are thin and rocky. The parent materials of the primary soils are noncalcareous shales, quartzites, and sandstones of the Ocoee series. In general, soils follow major geology types in their characteristics. The geology type of the project area is Roaring Fork sandstone. The soils in the Park are currently being categorized and mapped.

The soil in the project area has been classified as the Spivey-Santeetlah Complex and is derived from colluvium. This soil type is common in cove-like areas of the Park. This is well-drained very deep soil (greater than 150 cm) with 8 to 15 percent slopes. Spivey soils contain many cobbles and boulders. Santeetlah soils are less coarse.

The Smokies are a complex natural area for soils. Some soil types, especially those associated with wetlands or rare geological formations are indicators of unusual or rare species

assemblages. Spivey-Santeetlah Complex is not associated with wetlands or rare geological formations.

3.3 Wildlife

Vertebrates

Great Smoky Mountains National Park contains a diverse number of wildlife species due to the Park's size, topography, vegetation, and human land uses. More than 60 native mammal species are known to occur in the Park, half of which are rodents. Thirty-nine reptilian species have been identified including six turtle species, nine lizard species, and 24 snake species.

The proposed project area was visited on October 3, 2003. The terrestrial habitat for wildlife consists of a mixture of second growth forest of primarily tulip popular, sweet gum and hemlock with a few scattered maple, beech and dogwood. Direct observation or indirect evidence (i.e., scat, tracks, etc.) of the following animals were noted: American crow (*Corvus brachyrhynchos*) and gray squirrel (*Sciurus carolinensis*). Through conversations with concession employees as well as previous site visits on unrelated matters, other species that have been observed in the area include wild hog (*Sus scrofa*), black bear (*Ursus americanus*), coyote (*Canis latrans*), and eastern wild turkey (*Meleagris gallopavo*). Other animals, such as small mammals and other species birds are also likely found in this area.

3.4 Water Resources

The central ridgeline of the Great Smoky Mountains is a local drainage divide. Streams in the eastern end of the Park drain into the Pigeon River. Streams in the south and west parts of the Park are tributaries of the Little Tennessee River. Tributaries of the Little River and Little Pigeon River drain the north side of the Park.

All of the streams in the Park are relatively small, with none draining an area of more than 200 square miles. There are 333 streams (735 miles) large enough to be classified as fishable. The Park's heavy precipitation and numerous streams support a very diverse amphibian population. Forty-one amphibian species occur here, including 31 salamander species. Approximately 60 species of freshwater fish inhabit the streams of the region, although several of these species are nonnatives.

Water quality in Park streams is considered by the states of North Carolina and Tennessee to be of Outstanding National Resource Water (ONRW) caliber. Streams are typically cold, fast-flowing, slightly acidic, and low in dissolved solids. During normal and low flows the water is clear, although streams may become turbid following storms. Stream flow usually is lowest during late summer and early fall.

The project area is bordered on the northeast by Two Mile Branch. This stream is in the West Prong Little Pigeon River watershed, which is designated as an Outstanding National Resource Waters (ONRW), meaning that existing water quality cannot be altered according to the Clean Water Act.

Diverse aquatic communities, containing mayflies, stoneflies, caddisflies, flies, crayfish, salamanders, etc.are typically found in second order streams like Two Mile Branch across the Park. Many species in these groups are sensitive to disturbances such as siltation, runoff, and nitrogenous input. A remnant population of rainbow trout (*Oncorhynchus mykiss*) and blacknose dace (*Rhinichthys atratulus*) exists in the first kilometer (0.6 miles) of the stream. Rainbow trout are more sensitive to siltation and nutrient rich runoff than are blacknose dace.

3.5 Threatened and Endangered Species

The Endangered Species Act of 1973 requires examination of impacts of federal actions on federally listed threatened, endangered, rare, declining, and sensitive species. Ten federally listed species occurring within Great Smoky Mountains National Park are as follows:

Northern Flying squirrel	*Glaucomys sabrinus coloratus*	Endangered
Red-cockaded woodpecker	*Picoides borealis*	Endangered
Smoky madtom	*Noturus baileyi*	Endangered
Duskytail darter	*Etheostoma percnurum*	Endangered
Spotfin chub	*Hybopsis monacha*	Threatened
Yellowfin madtom	*Noturus flavipinnis*	Threatened
Indiana bat	*Myotis sodalis*	Endangered
Spruce-fir moss spider	*Microhexura montivaga*	Endangered
Rock gnome lichen	*Gymnoderma lineare*	Endangered
Spreading avens	*Geum radiatum*	Endangered
Virginia spiraea.	*Spiraea virginiana*	Threatened

One tulip popular tree was identified as potential summer habitat for the endangered Indiana bat (*Myotis sodalis*). Although the main trunk of the tree is alive and contains tight bark, a limb on the tree (approximately 17-cm in diameter) is dead with exfoliating bark, an important characteristic of summer roost trees for Indiana bats.

Based on habitat and elevation, none of the ten other federally listed species occurring within Great Smoky Mountains National Park are known to occur in the project area.

3.6 Floodplains

Generically, the term "floodplain" refers to the area near streams that may be submerged by flood waters. For streams that have undergone detailed analysis by the Federal Emergency Management Agency (FEMA) as a part of the National Flood Insurance Program, the term "floodplain" is more specifically defined as the area that can be expected to be submerged during a 100-year flood (often referred to as the "regulatory flood"). The 100-year flood serves as the "base" flood for purposes of floodplain management measures. The "flood profile elevation" is an associated term that refers to the water level elevation at any point along a stream during a 100-year flood event.

Two Mile Branch, which is adjacent to the project area, flows into the West Prong Little Pigeon River, the primary drainage for the area, before reaching the Park boundary at Gatlinburg.

The building site is located approximately 60-90 feet from Two Mile Branch and about 5 feet above the top of the streambank and appears to be out of the 100 year flood plain.

None of the alternatives under consideration would have an impact on floodplains.

3.7 Air Quality

Congress passed the Clean Air Act (Act) in 1970, establishing national policy toward preserving, protecting, and enhancing air quality. The 1977 Clean Air Act Amendments designated all national parks that exceeded 6,000 acres in size as mandatory Class I areas worthy of the greatest degree of air quality protection under the Act. The 1990 Amendments to the Act left intact the requirements for Class I area protection, while providing additional tools to accomplish the protection. Under the Act, the federal land manager has been given the affirmative responsibility to assure that air quality and the air quality-related values in Class I areas, such as GRSM, do not deteriorate, and to take an aggressive role in protecting, preserving and enhancing the Park's resources.

Monitoring and research conducted over the past 22 years in Great Smoky Mountains National Park (GRSM) has shown that airborne pollutants emitted outside the Park and transported into the Park, are impacting Park resources (streams, soils, vegetation and visibility), visitor enjoyment and public health. The burning of fossil fuels (e.g. coal, oil, and gas) produces emissions of sulfur dioxide and nitrogen oxides that convert into harmful secondary pollutants (e.g. sulfates, nitrates and ozone). Winds coming into the southern Appalachian Mountains carry pollutants from as far away as the Tennessee, Ohio, and Mississippi River valleys, the industrial cities of the Southeast and Midwest, the Gulf States and the Northeast. The height and physical structure of the mountains, combined with predominant weather patterns, tend to trap and concentrate air currents entering the southern Appalachians.

Visibility at GRSM has been seriously degraded over the last 50 years by human-made pollution. Since 1948, based on regional airport records, annual average visibility in the southern Appalachians has decreased 60% overall, 80% in summer, and 40% in winter. Summer used to

have some of the best visibility, and now it has the worst. Tiny sulfate particles, from the transformation of sulfur dioxide emissions from burning coal by power plants, causes light to be scattered and is responsible for 83 percent of the chronic visibility impairment during the summer months. Increasingly, visitors are no longer seeing the sweeping mountain vistas because of this haze. Scenic views at GRSM are impaired by pollutants more than 90 percent of the time with haziness in the summer months so bad that on average, one can only see 14 miles, when you should be able to see 77 miles. During severe haze episodes, visibility has been reduced to less than one mile. Annual average visibility at GRSM is 25 miles when it should be about 113 miles. Declining visibility is well correlated with increasing emissions of sulfur dioxide. Fine particulate matter, summer sulfate concentrations, light extinction, and haziness have not decreased since 1988. In April of 1999, EPA promulgated the Regional Haze Rule that requires visibility in the Class I areas, including GRSM, to improve our haziest days to natural conditions by 2064 and to preserve the clearest days presently being experienced. The Tennessee Valley Authority announced in Fall 2001, that they will put SO2 controls on 3 of the closest power plants to the Park, which will reduce SO2 emissions from those plants by over 90 percent.

Ground-level ozone (O_3) pollution, produced by the reaction of nitrogen oxides and volatile organic compounds in the presence of sunlight, is one of the most serious and pervasive air pollutants injuring vegetation at GRSM. Ozone exposures at GRSM are among the highest in the eastern U.S. and have exceeded the National Ambient Air Quality Standard (NAAQS) for the protection of public health. Since May 1998, the Park has exceeded the 8-hour ozone standard to protect public health on 185 different days. Ozone is transported long distances from large urban areas to rural forested areas like GRSM. On average, daily O_3 levels over the ridge-tops of the Park are up to two times higher than Knoxville or Atlanta levels. Since 1984, field surveys have identified 90 plant species that exhibit O_3-like foliar injury symptoms in the Park. Thirty species of plants that were exposed to O_3 under controlled conditions in fumigation chambers, showed foliar damage at O_3 levels that occur in the Park. To further quantify this injury, permanent vegetation monitoring plots and field surveys were conducted. In general, the higher the elevation, the more severe the O_3 concentrations and leaf injury. In especially sensitive species including black cherry and tall milkweed, the incidence of O_3 injury can be as high as 90 percent and is having overt affects to the vegetation of the Park. Ozone is also causing certain sensitive plant species to grow slower (e.g., yellow-poplar and black cherry).

The Park receives some of the highest deposition rates of sulfur and nitrogen of all monitored locations in North America. These pollutants are deposited in the form of, not only rainfall, but from large amounts of dry particles and cloud water. Annual wet nitrate deposition has increased 16 percent from 1981-2000 at GRSM. The annual average acidity (pH) of rainfall at the Park is 4.5, 10 times more acidic than natural rainfall pH (5.0-5.6). Cloud water acidity averages 3.5 pH and has been measured as low as 2.0 pH. Cloud-water concentrations of sulfate, nitrate, hydrogen, ammonium, and calcium have increased since 1994. Both long-term chronic and episodic acidification are adversely affecting sensitive streams and soils. Most high-elevation Park streams are highly sensitive to acidification with little ability to neutralize acids resulting from sulfur and nitrogen pollution. Certain high elevation Park streams have the highest nitrate levels of any systems in the U.S. draining undisturbed watersheds. Certain high elevation soils in the Park are experiencing advance stages of nitrogen saturation, causing leaching of forest nutrients like calcium

and mobilizing toxic aluminum that can hurt vegetation (by inhibiting uptake of nutrients) as well as biota in streams.

None of the alternatives under consideration would have an impact on air quality.

3.8 Historic Resources

The Park contains more than one hundred historic buildings, most ranging from the 1830's Euro-American settlement to the early twentieth century. The grounds around many of the historic buildings in Great Smoky Mountains National Park are considered to be historic landscapes. Historic structures include bridges, rock walls, tunnels, roads, and fire towers.

The Park's historic resources also include the curatorial collection of historic objects. These objects range from papers relative to the establishment of the Park to objects once belonging to former residents of what became the Park. Some of the items considered to be part of the natural history collection can also be considered to be historic resources. These include not only papers such as vegetation maps but also specimens.

The project intent is to replace certain facilities required for the concession horseback riding facility in the Two-Mile Branch Area. With the award of a concession contract to a new concessionaire, the name of this stable has been changed to Sugarlands Riding Stables. All of the facilities except the restrooms were the property of the previous concessionaire and were removed prior to June 4, 2003. These facilities were constructed in 1962 and 1963 and are less than 50 years of age and are not eligible for the National Register of Historic Places.

The Sugarlands Horseback Riding Stables area was once part of a small farming community near Gatlinburg, known as Forks-of-the-River. The Forks-of–the-River community consisted of about thirty families that inhabited the immediate area around the present Sugarlands Visitor Center. The present horse stable location was once part of a large tract of land that was homesteaded by William and his first born son James Madison Trentham in the early 1800’s.

Farm land was at a premium in the Smokies and structures and outbuildings were usually confined to areas less suitable for farming. The recollections of Gladys Trentham Russell, a descendant of William, claims the area of the present horse stable was farm land. The structures and archaeological deposits associated with historic occupation of the area now lie underneath US highway 441. Only, the Trentham cemetery still exists and is located southwest of the present parking area. There are no dates on any of the headstones, but Gladys Trentham wrote that William was the first to be buried here in December of 1848.

The Park Development Historic District within Great Smoky Mountains National Park is nationally significant under National Register criterion A for its association with the expansion of the National Park System in the Eastern United States in the 1930s. It is also significant under criterion C for design and the National Park Service's landscape design philosophy. Newfound Gap Road (U.S. Highway 441) is a contributing element to the Park Development Historic District (draft) National Register Nomination. The Smoky Mountain Riding Stables access is

from Newfound Gap Road. The Smoky Mountain Riding Stables lie outside of the proposed boundary of the historic district.

3.9 Archeological

In the Smokies, archeological resources consist of prehistoric and aboriginal sites that represent several southeastern cultural periods, as well as historic sites related to mountain culture and the Park development period. While over 272 sites have been found within the Park boundary, the total remains unknown.

Historic Resources

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Farm land was at a premium in the Smokies and structures and outbuildings were usually confined to areas less suitable for farming. The recollections of Gladys Trentham Russell, a descendant of William, claims the area of the present horse stable was farm land. The structures and archaeological deposits associated with historic occupation of the area now lie underneath US highway 441. Only, the Trentham cemetery still exists and is located southwest of the present parking area. William was the first to be buried here in December of 1848. Based on consultation with the State Historic Preservation Office, it was determined that there are no historic resources that would be impacted by the alternatives being considered.

No historic structures and/or associated outbuildings are known to exist in the area of the present horse stable facilities. During the summer and fall of 2003, a Phase I reconnaissance of the project area was conducted. No historic artifacts associated with historic occupation of the area were recovered.

Prehistoric Resources

Prehistoric occupation of the Great Smoky Mountains probably occurred shortly after the arrival of humans to the New World more than 12,000 years ago. However, evidence for the Paleoindian Period (12,000-8,000 B.C.) is rare within the park. Noted for the manufacture of large ovate projectile points, the Paleoindians are thought to have focused subsistence on the extinct large mammals present in the terminal Ice Age. It is generally believed these people followed the large mammals as they migrated in small highly mobile groups.

As the climate warmed to temperatures comparable to today, the fauna associated with the Ice Age began to disappear. Known to archaeologist's as the Archaic Period (8,000-1000 B.C.), the people's subsistence focused on the gathering of wild plants and the hunting of modern game, such as whitetail deer. Evidence for this shift in the subsistence economy is noted by the

appearance of tools related to the processing of wild plants and the occurrence of smaller more expedient types of weaponry. These groups of peoples were still highly mobile and some archaeologist's suggest that the Archaic people traveled seasonally to favored spots, where plants would ripen at differing times of the year or game would congregate.

The Woodland Period (1000 B.C.-1000 A.D.) was marked by the first appearance of intentional cultivation of wild plants. People began to settle in favored areas. The appearance of the bow and arrow, the occurrence of pottery, and mound-building all have their roots in the Woodland period. Ceremony and social stratification became apparent. Mounds were utilized for the internment of a select few during this cultural period.

The Mississippian Period (1000- 1650 A.D.) is marked by the appearance of full blown cultivation, the development of long-distance trade networks, the appearance of craft specialists and social elites. People during this period built large mound complexes enclosed by palisade walls. Large open plazas around the mounds provided space for the traditional stick ball game. With the arrival of the Spanish in the New World in 1650, the Mississippian way of life was gradually eroded.

No prehistoric resources are known to exist in the area of the present horse stable facilities. During the summer and fall of 2003, a Phase I reconnaissance of the project area was conducted. No prehistoric artifacts associated with prehistoric occupation of the area were recovered.

3.10 Aesthetic Resources and Visitor Experience

Providing for visitor enjoyment is a fundamental purpose of the Park. Great Smoky Mountains National Park is the most visited national park in the United States totaling over 10 million visitors annually. The scenic beauty (aesthetic resources) of the Great Smoky Mountains is a major attraction for Park visitors. The Parks as Classrooms program reaches over 10,000 students each year. This program integrates the natural and cultural resources of the Park into North Carolina and Tennessee curriculum objectives.

The project area is a forested area located adjacent to Newfound Gap Road. This road bisects the park from north to south and is the most heavily traveled road in the park. Species of wildlife that are frequently observed by visitors to this horseback riding stable and trail users in this area include black bear, whitetail deer, and wild turkey. In 2002, approximately 3,472,714 visitors used the Gatlinburg entrance to Newfound Gap Road out of a total of 9,316,419 visitors for the park as a whole. The Two Mile Branch Trail and Two Mile Lead Trail have trailheads in the project area. Compared to similar trails in the Park such as the Gatlinburg and Oconaluftee River trails these trails receive little use other than the authorized use by the concessioner. The guided horseback trips provided by this concessioner afford an opportunity to experience the park resources for many visitors who would otherwise never see what the park has to offer away from paved roads.

Sugarlands Visitor Center is located approximately one-half mile south of the project area on Newfound Gap Road. Gatlinburg, Tennessee is approximately one and one-half miles north of

the project area. The riding stable is conveniently located to Gatlinburg as well as the heavily traveled routes from Gatlinburg to Cherokee and Gatlinburg to Cades Cove.

3.11 Noise

Great Smoky Mountains National Park is primarily a serene and quiet environment; however, high traffic volumes on Park roads and air traffic add to background noise. Park visitors, stables customers, and hikers in the immediate vicinity of the project area are subject to noise pollution generated by traffic on Newfound Gap Road. However, the project area is not immediately adjacent to this road, lessening the impact of this traffic noise. This noise has the potential to affect the tranquility visitors to the Park seek but lessens as they move away from the road corridor on a guided horseback trip or hike. The Gatlinburg entrance to Newfound Gap Road is the most heavily traveled road in the Park. Approximately 17,000 – 20,000 visitors are expected to use this concession facility annually.

3.12 Light Pollution

Outdoor lighting is known to disturb the behavior of nocturnal insects and to reduce astronomical viewing opportunities. Great Smoky Mountains National Park offers an island of darkness in an increasingly illuminated nocturnal environment. With the exception of developed areas within the Park there is no outdoor lighting.

The project area is located approximately 1.5 miles from Gatlinburg, a well illuminated urban area. The project area is within a natural environment type II subzone of the Park. The proposed barns would have exterior lighting controlled by a timer. However, public use of the project area is limited to daylight hours. The entrance to the stables is gated at night.

3.13 Environmental Justice

Executive Order 12898, Federal Actions to Address Environmental Justice in Minority and Low-Income Populations, directs all federal agencies to determine whether a proposed action would have an adverse or disproportionate impact on minority and/or low-income populations. It also directs agencies to ensure that representatives of an affected community have every opportunity to provide input regarding the impact of the proposed project.

In compliance with Executive Order 12898, this document was completed to ensure that these social groups would not receive disproportionately adverse heath and/or environmental impacts from the proposed project.

There are no minority or low-income populations within or adjacent to the project area. Land within the City of Gatlinburg adjacent to this area of the Park is zoned as low-density residential and general commercial. Land uses in this area include single family residential, city park, and resort hotel. Sevier County has been identified as one of the fastest growing counties in the State of Tennessee and has seen a 39.4% increase in population (1990 to 2000) as opposed to 16.7% for the State and 13.1 for the Nation. Private non-farm employment has increased in the County 52.6% (1990 to 1998) as opposed to 23% for the State and 15.7% for the Nation. However, the

percentage of persons below the poverty level for the County is 13.9% (1997 model-based estimate) as opposed to 13.6% for the State and 13.3% for the Nation (U.S. Census Bureau, The American Community Survey, 1999).

3.14 Related Actions

No other projects are planned or under consideration for this area of the Park.

4. Environmental Consequences

The following addresses the environmental consequences of the alternatives and is organized by resource topic.

The impact topic of **Environmental Justice** has been eliminated from discussion under these environmental consequences. As discussed in the *Affected Environment* section of this document, 3.13 *Environmental Justice*, there are no minority or low-income populations within the project area or immediate surroundings. None of the alternatives discussed would cause these social groups a disproportionately adverse health and/or environmental impact

The impact topic of **Floodplains** has been eliminated from discussion under environmental consequences. As discussed in the *Affected Environment* section of this document, 3.6 *Floodplains*, none of the alternatives being considered would have an impact on floodplains

The impact topic of **Air Quality** has been eliminated from discussion under environmental consequences. As discussed in the *Affected Environment* section of this document, 3.7 *Air Quality*, none of the alternatives being considered would have an impact on air quality.

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4.1 Terms

The following terms are used to discuss environmental consequences:

negligible impact
An impact with a low level of detection
minor impact
A slight, but detectable impact
moderate impact
An impact that is readily apparent
major impact
A severe adverse impact or exceptionally beneficial impact
short term impacts
Impacts limited to the construction period
long term impacts
Impacts continuing to occur or occurring beyond the construction period

4.2 Vegetation

NO ACTION ALTERNATIVE

Impacts: The area currently used as a 'turn-out paddock' appears to be heavily used due to lack of corral space. Horses suffering minor injuries along with resting horses are isolated in this fenced area near the barns. The paddock area supports trampled, sparse vegetation not suited to

withstand livestock pressure. Soils on this slope are eroding due to horse use and lack of stability in vegetative cover.

Cumulative Impacts: There would be no cumulative impacts under this alternative.

Conclusion: The No Action Alternative would have a minor short-term impact and a negligible long-term impact. Under this alternative, the paddock area would need to be seeded with native grasses and forbs to establish an area appropriate for sustained use by horses. If the corral is built, the paddock would be minimally used and vegetation restoration actions would be minor.

Impairment: There would be no impairment of the Park's vegetative resources under this alternative.

ALTERNATIVE ONE - OPTION A

Impacts: Approximately 61 trees would be removed to accommodate the changes in barn/office placement, of which approximately 38 trees are 12" or less in diameter. The trees that would be removed are mostly tulip poplar (*Liriodendron tulipifera*), sweetgum (Lyquidambar styraciflua) and eastern hemlock (*Tsuga canadensis*). Likewise, some ground vegetation would be removed to allow for the placement of facilities, aisle, and parking area. Approximately .75 acre of vegetated area would be disturbed under this alternative. None of the marked trees are considered rare or in need of special protection due to species or size. No species of special concern were detected in the ground vegetation in the impact zones.

Cumulative Impacts: There would be no measurable cumulative impacts under this alternative.

Conclusion: Considering the small acreage to be impacted and given other areas in the Park with similar plant communities, there would be negligible long-term impact to the Park's vegetative resources. In general, the trees and associated vegetation in this community type are common throughout disturbed, lower elevations in the Park. The loss of a few isolated trees and patches of ground vegetation is outweighed by the associated benefits of facility improvement. Vegetation would be better protected by the addition of these new facilities as the main horse use would be confined and concentrated in gravel areas. Potential non-native species introductions would be lessened if horses spend idle time in the barns and corral versus the turn-out paddock. In addition, the newer facilities allow for better hay storage, manure storage/disposal and wastewater disposal. These improvements would allow better protection of our vegetative resources.

Impairment: There would be no impairment of the Park's vegetative resources under this alternative.

ALTERNATIVE ONE - OPTION B

Impacts: The impacts of this alternative are similar to Option A, except that the office placement would have a slightly greater impact on ground vegetation. Approximately .8 acre of vegetation area would be disturbed under this alternative.

Cumulative Impacts: Same as with Option A.

Conclusion: Same as with Option A.

Impairment: There would be no impairment of the Park's vegetative resources under this alternative.

ALTERNATIVE TWO

Impacts: This alternative allows for a greater disturbance area along with some trail rerouting to accommodate the larger facilities. Approximately 135 trees would be removed under this alternative, including approximately 55 trees for the required trail relocation. Of the trees to be removed, 80 are 12' or less in diameter. The required relocation of a section of Two Mile Branch and Two Mile Lead Trails would account for approximately 55 of the trees to be removed. Approximately 1 acre of vegetated area would be disturbed under this alternative. While none of the vegetation in this larger zone requires special protection, the disturbance zone extends well past the original footprint of the current facility.

Cumulative Impacts: There would be no measurable cumulative impacts under this alternative.

Conclusion: This alternative would have a minor long-term impact to the Park's vegetative resources. The area of disturbance in this alternative exceeds the disturbed area covered by the original footprint. The amount of newly disturbed vegetation to accommodate this alternative is greater than in Alternative One. Further, disturbed space in this alternative encroaches on the riparian zone near the creek. This reduced space decreases the efficiency of buffering vegetation between the facilities and the creek. The area between the facilities and the creek must continue to be maximized to allow ground vegetation and soils space to adequately absorb and filter runoff from the facility – especially during storm events.

Impairment: There would be no impairment of the Park's vegetative resources under this alternative.

4.3 Soils

NO ACTION ALTERNATIVE

Impacts: Under the No Action Alternative no construction activities would occur and no soil resources would be disturbed. However, existing impervious surfaces (temporary buildings, parking lot) would continue to cover approximately .4 acres of previously disturbed soil.

Cumulative Impacts: Under this alternative there would be no cumulative impact on soils.

Conclusion: The No Action Alternative would have no affect on soils within the Park.

Impairment: There would be no impairment of the Park's soil resources under this alternative.

ALTERNATIVE ONE - OPTIONS A & B

Impacts: Soils would be disturbed within the approximately .75 acre area of new disturbance under this alternative. However, no impervious surfaces (buildings, parking lot) would be placed in this area of new disturbance with the exception of .03 acre of new parking spaces. However, approximately .05 - .06 acre of existing pavement would be removed for a net reduction of .03 - .04 acre of pavement. New buildings to be constructed within the previously disturbed area would cover approximately .27 acres, an increase of .12 acres for buildings compared to the No Action Alternative.

Cumulative Impacts: Land development in the counties surrounding the Park have resulted in land use changes from native forest ecosystems to residential and other uses. These changes are expected to continue in the future and would result in the continued disturbance of soils and additional impervious surfaces.

The area at Sugarlands Horseback Riding Stables currently covered by impervious materials is approximately .4 acres. This alternative would result in less than .2 acre of additional impervious surfaces.

Conclusion: Considering the small acreage to be impacted and given other areas in the Park of similar soil type and condition, there would be a negligible long-term adverse impact to the Park's soil resources. This would be mitigated by keeping the construction site as compact as possible.

Impairment: There would be no impairment of the Park's soil resources under this alternative.

ALTERNATIVE TWO

Impacts: The size of the construction zone under Alternative Two is approximately the same as in Alternative One, but this alternative would require the relocation of two sections of trail within previously undisturbed areas. The area covered by impervious surfaces is approximately .55 acres or approximately .05 acre more than in Alternative One. While these areas are not as compact as under Option A, it remains a small area of disturbance.

Cumulative Impacts: Cumulative impacts under this alternative would be approximately the same as under Alternative One – Option A.

Conclusion: Alternative Two would have a negligible long-term impact to the Park's soil resources..

Impairment: There would be no impairment of the Park's soil resources under this alternative.

4.4 Wildlife

NO ACTION ALTERNATIVE

Impacts: The continued use of temporary facilities under this alternative does not provide satisfactory storage for horse feed and human food. A converted storage container serves as an office, feed storage, and employee break area. There is potential for bears and other wildlife to access horse feed and human foods; this could result in food-conditioned animals that would have to be trapped and removed or euthanized. Food-conditioned animals, particularly bears, could also pose a risk for human safety.

Cumulative Impacts: Habituated or food conditioned animals could pass this behavior to their offspring.

Conclusion: The continued use of temporary facilities under this alternative has the potential to have a moderate long-term impact on wildlife and human safety.

Impairment: There would be no impairment of the Park's wildlife resources under this alternative.

ALTERNATIVES ONE - OPTIONS A & B
ALTERNATIVE TWO

Impacts: One tree that is scheduled to be removed under all of the action alternatives could be potential summer habitat for the endangered Indiana bat. All of the action alternatives would result in a permanent animal resistant facility for the storage of horse feed, minimizing the possibility of bears and other wildlife from accessing the feed storage area. These alternatives also provide for a secure, enclosed employee break room for the storage of human foods and garbage.

Cumulative Impacts: There would be no cumulative impacts under this alternative.

Conclusion: Considering the small amount of vegetation to be removed, that the trees would be removed during winter when Indiana bats are hibernating, that only a few reproductively active female Indiana bats have been found in the entire southeast during summer, that Indiana bats have never been found in Sevier county, Tennessee, and other suitable habitat in the Park, it is unlikely Indiana bats would be impacted either directly or indirectly. Considering the small area to be impacted and other available habitat in the Park, the potential short and long-term impacts on other wildlife in the Park are also negligible. The permanent and properly designed facilities for the storage of horse feed and human food and garbage would have a moderate long-term positive impact on wildlife resources by reducing the likelihood of animals obtaining horse feed

and human foods. This would also reduce the human safety concerns associated with habituated or food-conditioned animals.

Impairment: There would be no impairment of the Park's wildlife resources under these alternatives.

4.5 Water Resources

The National Park Service has adopted the goal of no net loss of wetlands. The information presented in Section 4.5 complies with the requirements set forth by Director's Order (D.O.) 77-1; "Wetland Protection," and Executive Order (E.O.) 11990: "Protection of Wetlands".

NO ACTION ALTERNATIVE

Impacts: Nutrient enrichment and siltation would occur as a result of continued use of temporary facilities that are not designed to adequately control run-off from the site and capture or filter nutrients from horse manure.

Cumulative Impacts: Nutrient enrichment and siltation under this alternative would result in minor cumulative impacts to aquatic communities. Aquatic communities in the Park and the area surrounding the Park would continue to be moderately impacted by the siltation and runoff from land development and other sources.

Conclusion: The No Action Alternative would have a moderate long-term impact on aquatic resources in this area.

Impairment: There would be no impairment of the Park's water resources under this alternative.

ALTERNATIVE ONE – OPTION A

Impacts: Potential nutrient enrichment and siltation could occur, but is less likely than under the No Action Alternative or Alternative Two. In comparison with Alternative Two, this alternative places facilities and the Two Mile Branch Trail further from the stream, reducing the risk of impacts on water resources. In comparison with the No Action Alternative, the new facilities and site improvements in Alternatives One and Two are designed to control runoff and enhance percolation and filtration.

Cumulative Impacts: There would be negligible cumulative impacts on water resources under this alternative. Aquatic communities in the Park and the area surrounding the Park would continue to be moderately impacted by the siltation and runoff from land development and other sources.

Conclusion: This alternative results in a moderate long-term positive impact on aquatic resource conditions as a result of the design and siting of facilities to minimize siltation, runoff, and nutrient enrichment.

Impairment: There would be no impairment of the Park's water resources under this alternative.

ALTERNATIVE ONE – OPTION B

Impacts: Potential nutrient enrichment and siltation could occur, but is less likely than under the No Action Alternative or Alternative Two. In comparison with Alternative Two, this alternative places facilities and the Two Mile Branch Trail further from the stream, reducing the risk of impacts on water resources. In comparison with the No Action Alternative, the new facilities and site improvements in Alternatives One and Two are designed to control runoff and enhance percolation and filtration.

Cumulative Impacts: There would be no change from Alternative One – Option A.

Conclusion: Although Option B would result in slightly more site disturbance than Option A, this option would still result in a moderate long-term positive impact on aquatic resource conditions.

Impairment: There would be no impairment of the Park's water resources under this alternative.

ALTERNATIVE TWO

Impacts: Potential increased sediment and nutrient loading to the stream could occur in comparison with Alternative One, since the facilities and Two Mile Branch Trail would be closer to the stream. The shorter distance between the horse facilities and the stream increases the probability of sediment from erosion and nutrients from horse manure reaching the stream.

Cumulative Impacts: There would be no change from Alternative One – Option A.

Conclusion: This alternative has the potential to increase sediment and nutrient loading to the stream which would have a minor long-term impact on aquatic communities and water quality.

Impairment: There would be no impairment of the Park's water resources under this alternative.

4.6 Threatened and Endangered Species

NO ACTION ALTERNATIVE

Impacts: One tulip popular tree was identified as potential summer habitat for the endangered Indiana bat (*Myotis sodalis*) which would not be removed under this alternative. Although the main trunk of the tree is alive and contains tight bark, a limb on the tree (approximately 17-cm in diameter) is dead with exfoliating bark, an important characteristic of summer roost trees for Indiana bats.

Cumulative Impacts: There would be no cumulative impacts under this alternative.

Conclusion: The No Action Alternative would have no affect on threatened and endangered species. Potential summer habitat for the endangered Indiana bat would not be removed under this alternative.

Impairment: There would be no impairment of threatened and endangered species in the Park under this alternative.

ALTERNATIVE ONE - OPTIONS A & B
ALTERNATIVE TWO

Impacts: One tulip popular tree that was identified as potential summer habitat for the endangered Indiana bat (*Myotis sodalis*) would be removed. Although the main trunk of the tree is alive and contains tight bark, a limb on the tree (approximately 17-cm in diameter) is dead with exfoliating bark, an important characteristic of summer roost trees for Indiana bats.

Cumulative Impacts: There would be no cumulative impacts under this alternative.

Conclusion: Considering the small amount of vegetation to be removed, that the trees would be removed during winter when Indiana bats are hibernating, that only a few reproductively active female Indiana bats have been found in the entire southeast during summer, that Indiana bats have never been found in Sevier county, Tennessee, and other suitable habitat in the Park, it is unlikely Indiana bats would be impacted either directly or indirectly. The U.S. Fish and Wildlife Service was consulted during the public scoping phase of EA preparation and had no comments on this project.

Impairment: There would be no impairment of threatened and endangered species in the Park under these alternatives.

4.7 Historic Resources

The National Park Service is required to mitigate actions upon properties that are or may be eligible for listing on the National Register of Historic Places. Consultation with the Tennessee State Historic Preservation Office was initiated in October 2003. Consultation under Section 106 of the National Historic Preservation Act was completed on October 31, 2003, and determined that there are no National Register of Historic Places listed or eligible properties affected by this undertaking.

NO ACTION ALTERNATIVE
ALTERNATIVE ONE - OPTION A & B
ALTERNATIVE TWO

Impacts: There would be no impacts under these alternatives.

Cumulative Impacts: There would be no cumulative impacts under these alternatives.

Conclusion: Site is not eligible for the National Register of Historic Places. None of the alternatives would have an impact on historic resources.

Impairment: There would be no impairment of the Park's historic resources under these alternatives.

4.8 Archeology

NO ACTION ALTERNATIVE
ALTERNATIVE ONE - OPTION A & B
ALTERNATIVE TWO

Impacts: No historic structures and/or associated outbuildings are known to exist in the area of the present horse stable facilities. During the summer and fall of 2003, a Phase I reconnaissance of the project area was conducted. No historic artifacts associated with historic occupation of the area or prehistoric artifacts associated with prehistoric occupation of the area were recovered.

Cumulative Impacts: There would be no cumulative impacts under these alternatives.

Conclusion: Site is not eligible for the National Register of Historic Places. None of the alternatives would have an impact on historic or prehistoric archeological resources.

Impairment: There would be no impairment of the Park's historic or prehistoric resources under these alternatives.

4.9 Aesthetic Resources and Visitor Experience

NO ACTION ALTERNATIVE

Impacts: The continued use of a converted storage container for office/storage and temporary covered stalls for horse housing would detract from the visitor experience and aesthetic resources of this area. Neither the appearance nor function of the temporary facilities would adequately meet NPS or visitor expectations for this type of facility.

Cumulative Impacts: There would be no cumulative impacts under this alternative.

Conclusion: The No Action Alternative would have a moderate long-term impact on aesthetic resources and the visitor experience as a result of the continued use of inadequate, temporary facilities.

Impairment: There would be no impairment of the Parks' aesthetic resources or visitor experience under this alternative.

ALTERNATIVE ONE - OPTIONS A & B

Impacts: The proposed action would result in the construction of attractive and functional facilities to replace the existing temporary facilities that detract from the aesthetic resources and visitor experience. The proposed office would provide an attractive, functional area for visitor contact, reservations, and sales as well as a deck area with benches for visitors waiting. The proposed barns and hay shed would provide attractive and functional housing for horses and storage for supplies and equipment. The design selected under this alternative allows for a more traditional grouping of building masses in the landscape than a single large barn facility. The smaller footprint of the barns has a scale akin to the farm buildings built in the park in centuries past. The materials recommended are consistent with current park architecture. Construction activities would take place during the season when the stables is closed and would not be generally visible from the main Park road.

Cumulative Impacts: There would be no cumulative impacts under this alternative.

Conclusion: This alternative would result in a major long-term positive impact on aesthetic resources and visitor experience in comparison with the No Action Alternative by replacing temporary facilities with attractive and functional facilities. Construction activities would have a negligible impact on aesthetic resources and the visitor experience.

Impairment: There would be no impairment of the Parks' aesthetic resources or visitor experience under this alternative.

ALTERNATIVE TWO

Impacts: The larger footprint of the barns and siting of the barns closer to the parking lot under this alternative would have a minor negative impact on aesthetic resources and visitor experience in comparison to Alternative One. The required relocation of two sections of trail under this alternative would have a minor negative impact in the loss of trees and vegetation in the areas of the site most visible to the public.

Cumulative Impacts: There would be no cumulative impacts under this alternative.

Conclusion: Although the proposed new facilities would have a similar positive impact as described for Alternative One, the larger footprint and different siting of the structures under this alternative would only result in a moderate long-term positive impact in comparison with Alternative One.

Impairment: There would be no impairment of the Parks' aesthetic resources or visitor experience under this alternative.

4.10 Noise

NO ACTION ALTERNATIVE

Impacts: Under the No Action Alternative no construction would take place and there would be no associated increase in noise levels.

Cumulative Impacts: There would be no cumulative impacts under this alternative.

Conclusion: The No Action Alternative would have no affect on noise within the Park.

Impairment: There would be no impairment of Park resources under this alternative.

ALTERNATIVE ONE - OPTIONS A & B
ALTERNATIVE TWO

Impacts: There would be a negligible short-term impact from construction activities and no long-term impact on Park resources. Construction activities would take place from January – early March while the riding stable is closed for the season so stables visitors would not be impacted by associated noise. The construction site is several hundred feet from the Park road and is shielded from the road by a wooded area which would minimize any noise impacts to motorists or pedestrians along the road. The trails in the vicinity of the construction site receive very light use in the season when construction would take place. No other visitor facilities are located near the proposed construction site.

Cumulative Impacts: There would be no cumulative impacts under these alternatives.

Conclusion: This alternative would have a negligible short-term impact on noise within the Park and no long-term affect.

Impairment: There would be no impairment of Park resources under this alternative.

4.11 Light Pollution

NO ACTION ALTERNATIVE

Impacts: Under the No Action Alternative no new lighting would be installed.

Cumulative Impacts: There would be no cumulative impacts under this alternative.

Conclusion: The No Action Alternative would have no impact on light pollution in the Park.

Impairment: There would be no impairment of Park resources under this alternative.

ALTERNATIVE ONE - OPTIONS A & B

ALTERNATIVE TWO

Impacts: The two exterior lights that would be installed on each of the proposed barns would have a negligible impact on light pollution in the Park. The project location is not near any visitor facilities that are used at night, other than U.S. 441. The specifications for this project call for exterior light fixtures that are designed to minimize light pollution. These lights would be controlled by timers that can turn lighting off when it is not needed.

Cumulative Impacts: There would be no cumulative impacts under these alternatives.

Conclusion: These alternatives would have a negligible long-term impact on light pollution in the Park.

Impairment: There would be no impairment of Park resources under these alternatives.

4.12 Related Actions

There are no related actions.

4.13 Summary Impact Table

The following chart summarizes and compares the likely results of implementing each of the alternatives, including the No Action Alternative as they relate to the environment.

	No Action Alternative	Alternative One - A	Alternative One - B	Alternative Two
		Preferred and Environmentally Preferred Alternative		
Vegetation	**Short-term – minor adverse impact Long-term – negligible adverse impact**	**Long-term – negligible adverse impact**	**Long-term – negligible adverse impact**	**Long-term – minor adverse impact**
Soils	**No Change**	**Long-term - negligible**	**Long-term - negligible**	**Long-term - negligible**
Wildlife	**Long-term – moderate adverse impact**	**Short-term – negligible Long-term – Negligible**	**Short-term – negligible Long-term – Negligible**	**Short-term – negligible Long-term – Negligible**
Water Resources	**Long-term – moderate adverse impact**	**Long-term – moderate positive impact**	**Long-term – moderate positive impact**	**Long-term – minor adverse impact**
Threatened and Endangered Species	**No change**	**No change**	**No change**	**No change**
Historic Resources	**No change**	**No change**	**No change**	**No change**
Floodplains	**No change**	**No change**	**No change**	**No change**
Air quality	**No change**	**No change**	**No change**	**No change**
Archeology	**No change**	**No change**	**No change**	**No change**
Aesthetic Resources and Visitor Experience	**Long-term – moderate adverse impact**	**Long-term – major positive impact**	**Long-term – major positive impact**	**Long-term – moderate impact**
Noise	**No Change**	**Short-term – negligible adverse Long-term – no adverse impacts**	**Short-term – negligible adverse Long-term – no adverse impacts**	**Short-term – negligible adverse Long-term – no adverse impacts**
Light Pollution	**No Change**	**Long-term impact – negligible**	**Long-term impact – negligible**	**Long-term impact – negligible**

5. List of Preparers

Team Members

Name	Contributions	Degree	Years Exp.
Becky Nichols	Aquatic Invertebrates	PhD Entomology	7
Steve Moore	Fisheries and Water Quality	MS Fisheries Science	22
Bill Stiver	Wildlife – Vertebrates Threatened and Endangered Species	MS Wildlife Science	14
Janet Rock	Threatened and Endangered Species Soils Vegetation	MS Biology	15
Kristine Johnson	Vegetation	MS Forestry	26
Jim Renfro	Air Quality	MS Forestry	20
Dana Soehn	Vegetation	MS Wildlife Biology	10
Eric Kreusch	Archeological Resources	BA Archeology (MA Archeology Candidate)	9
David Chapman	Historical Resources	MA History	15
Joel Ossoff *and* Chiara Palazzolo	Aesthetic Resources and Visitor Experience Noise Light Pollution Floodplains Environmental Justice	BA Biology-Geology Bachelor of Landscape Architecture	26 14
Joel Ossoff	Editor	BA Biology-Geology	26

6. Coordination

As required by NPS policies and planning documents, it is the Park's objective to work with state, federal, and local governmental organizations to ensure that the Park and its programs are coordinated with others. Consultation and coordination have occurred with several agencies for the preparation of the EA. The following organizations and agencies were contacted during the public scoping stage of EA preparation:

U.S. Fish and Wildlife Service
Tennessee Department of Environment and Conservation

Additional consultation and coordination is on-going with interested parties. The EA was distributed to the following agencies at the time the document was released for public comment:

U.S. Fish and Wildlife Service
(as required under Section 7 of the Endangered Species Act)
Tennessee State Historic Preservation Officer
(as required under Section 106 of the National Historic Preservation Act)
Tennessee Department of Environment and Conservation

7. Selected References

National Park Service, Management Policies

National Park Service, 1982. *General Management Plan for Great Smoky Mountains* National Park, Denver Service Center-National Park Service.

Rock, J. H. and K. R. Langdon, 1991. *Rare Plant Species Report of Great Smoky Mountains National Park: 1989-1990*. Unpublished report, Great Smoky Mountains National Park.

U.S. Fish and Wildlife Service. 1999. Agency Draft Indiana Bat (*Myotis sodalis*) Revised Recovery Plan. Fort Snelling, Minnesota. 53pp.