United States Department of the Interior

NATIONAL PARK SERVICE
Devils Postpile National Monument
P.O. 3999
Mammoth Lakes, California 93546
(760-934-2289)

RECEIVED
JUL 20 2001
TOWN OF MAMMOTH
COMMUNITY DEVELOPMENT DEPARTMENT

May 24, 2001

Federal Aviation Administration
831 Mitten Road
Room 210
Burlingame CA 94010

Attention: Elisha Novak

Subject: Comments on Mammoth Yosemite Airport Expansion Project and Flight Paths

Dear Elisha,

Thank you for our phone conversation of May 24, 2001 and for reviewing these comments concerning possible impacts to Devils Postpile National Monument. The National Park Service appreciates your verbal acknowledgement of the concerns expressed today about possible impacts of flight paths over the Sierra Nevada impacting natural soundscapes, the quality of the visitor experience and safety, and the possible effects of vibrations on the Devils Postpile formation.

The National Park Service responded to the EIS on the Mammoth Yosemite Airport Expansion Project last November, requesting co-operating agency status with the FAA. Thank you for acknowledging the appropriateness of this request in our phone conversation today. Thus far, we have received no written reply from the FAA to the NPS comments, and request a letter confirming our cooperative working relationship.

Devils Postpile National Monument is one of the major visitor destinations for summer visitors of the Mammoth area. While at the monument, visitors enjoy the natural sounds of the San Joaquin River, the wind in the trees, the calls of birds, the occasional coyote howl, and a mixture of natural quiet and sound. Thank you Mr. Novak for letting me know that the FAA is working with these issues of natural soundscape in other NPS areas, and updating Devils Postpile National Monument on any regulations that are applicable.

The majority of the Monument is in the Ansel Adams Wilderness. The National Park Service highly values and is entrusted to protect the natural soundscape and the quality of the visitors' experience. It is very important to preserve this quality visitor experience and natural soundscape. The National Park Service is concerned about possible impacts of noise vibrations on the geologic formation of the Devils Postpile that would possibly compromise this geologic wonder and/or affect visitor safety. Additionally, low flying aircraft over the Monument may negatively impact some park wildlife by interfering with communication between members of a species during critical phases or crucial times of breeding, nesting, and/or rearing of the young. Since the proposed enlargement of the airport has the likelihood of increasing flights over the Monument, and the Ansel Adams Wilderness including Devils Postpile National Monument and Yosemite National Park, this is an impact that needs to be identified and analyzed in the compliance package for this project. I would appreciate the opportunity to assist your team in this task. In the planning and determination of flight paths over the Sierra Nevada that would impact the Devils Postpile National Monument, the National Park Service wants cooperating agency status.

Several statutes and legal precedents confirm this role including:

National Park Service Organic Act. NPS is charged with ensuring the preservation and long-term protection of all park resources, including ecological relationships and natural ecosystems of all species. National park protection statutes reach beyond park boundaries to restrict external threats to park values and resources. There is substantial legal precedent for the National Park Service to act in defense of park resources threatened by activities conducted outside of park boundaries. Case law affirms that the National Park Service Organic Act, as amended, 16 U.S.C. § 1 et seq., and various park enabling statutes, authorize the NPS to affirmatively prevent impairment of park resources from external threats. The threat of potential impacts from unnatural sounds on park values and resources must be evaluated within the context of the NPS mandate to affirmatively prevent park resource degradation.

In 1916, Congress created the National Park Service to manage the park's irreplaceable natural resources in accordance with a single, fundamental purpose -- to provide for the enjoyment of the national parks, monuments and reservations unimpaired for future generations. 16 U.S.C. § 1. The Organic Act's mandate was later reaffirmed and expanded by Congress under the Redwood Amendments of 1978:

> The authorization of activities shall be construed and the protection, management, and administration of these [park] areas shall be conducted in light of the high public value and integrity of the National Park System and shall not be exercised in derogation of the values and purposes for which these areas have been established, except as may have been or shall be directly and specifically provided by Congress.

16 U.S.C. § 1a-1. Applicable judicial precedent incontestably hold that the Organic Act's charge to protect the national parks, together with the park enabling statutes, provide the legal basis for protection from externally-generated threats to basic park resources and values. In Sierra Club v. Department of the Interior, 398 F. Supp. 284 (N. D. Cal. 1975), the court held that a failure to take action to protect Redwood National Park resources from damage caused by activities conducted on lands adjacent to the park violated the duties imposed on the Park Service under the Organic Act and Redwood National Park's enabling statute. Later, another court affirmed that the NPS "has an absolute duty, which is not to be compromised, to fulfill the mandate of the 1916 Act to take whatever actions and seek whatever relief as will safeguard the units of the National Park System." Sierra Club v. Andrus, 487 F. Supp. 443 (D.D.C. 1980).

Accordingly, an appropriate assessment of impacts on the resources of Devils Postpile National Monument must be evaluated under a standard of significance reflective of the NPS mandate to prevent park resource degradation, including the long-term and possibly subtle ecological effects of unnatural sounds on the resources within Devils Postpile National Monument.

FAA is subject to an affirmative duty to protect the resources of Devils Postpile National Monument. FAA is subject to additional legal requirements of the National Environmental Policy Act, 42 U.S.C. § 4371 et seq. ("NEPA"), the implementing regulations of the Council on Environmental Quality, 40 C.F.R. § 1500.1 et seq., FAA Order 5050.4A, and the Airport and Airways Improvement Act, § 509(a)(5) which mandate a broad analysis of potential impacts on the resources of National Park Service areas.

NEPA. NEPA calls for an analysis of all environmental consequences of a proposed action, including a full evaluation of both direct and indirect effects on the environment. Impacts on natural systems, specifically ecosystems, are expressly defined as "effects" under NEPA. 40 C.F.R. § 1508.8. Whether defined as "marginal impacts" or "indirect impacts," all impacts of a proposed project must be evaluated under applicable standards of significance. And, where these standards are exceeded, NEPA calls for complete discussion of mitigation measures aimed at the elimination or reduction of these impacts. It is inappropriate under NEPA to limit an impacts analysis to whether special status species will be jeopardized.

Section 4(f). FAA and the Department of Transportation are further required to protect park resources under federal transportation laws. The Department of Transportation Act and the Airport and Airways Improvement Act prohibit approval of any federally supported transportation project which requires the "use" of any publicly owned land from a public park or which may have a significant impact on natural resources, unless there is no feasible and prudent alternative and all reasonable steps have been taken to minimize such adverse effect. Specifically, Section 4(f) of the Department of Transportation Act states:

The Secretary of Transportation shall cooperate and consult with the Secretaries of Interior, Housing and Urban Development, and Agriculture, and with the States, in developing transportation plans and programs that include measures to maintain or enhance the natural beauty of lands crossed by transportation activities or facilities.

(c) The Secretary may approve a transportation program or project (other than any project for a park road or parkway under section 204 of title 23) requiring the use of publicly owned land of a public park, recreational area, or wildlife and waterfowl refuge of national, State, or local significance, or land of an historic site of national, State or local significance (as determined by the Federal, State or local officials having jurisdiction over the park, area, refuge or site) only if-

(1) there is no prudent and feasible alternative to using that land, and

(2) the program or project includes all possible planning to minimize harm to the park, recreational area, wildlife and waterfowl refuge, or historic site from the use.

49 U.S.C. § 303(c). Similarly, under section 509(b)(5) of the Airport Act, "the FAA shall authorize no project under the Airport Improvement Program involving airport location, a major runway extension, or runway location found to have a significant adverse effect unless the agency shall render a finding in writing, following a full and complete review, that no feasible and prudent alternative to the project exists and that all possible steps have been taken to minimize such adverse effect." FAA Order 5050.4A, ¶ 83.

Other the impacts on a particular park or refuge is considered a "use" under section 4(f), the Federal Ninth Circuit of Appeals has explained that distance is not a key factor. Alder v. Lewis, 675 F. 2d 1085 (9th Cir. 1982). The term "use" is to be construed broadly to include off-site areas significantly adversely affected by the project. Id., citing, D.C. Federation v. Volpe, 459 F.2d 1231, 1239 (D.C. Cir. 1975), cert. denied, 405 U.S. 1030 (1972). Thus, where a park's "utility or importance as a site would be impaired," Section 4(f) is triggered. Alder, supra, at 1091-92

Thank you again for your supportive phone conversation today and for your inclusion of the National Park Service in future planning.

Sincerely,

Deanna M. Dulen

DEANNA M. DULEN
SUPERINTENDENT

Appendix D – Coordination

Agency	Date	Contact Person
Community Development	May 25, 2000	Michael Vance
Mammoth Lakes Airport	June 28, 2000	Bill Manning
Spill Prevention Control and Countermeasure Plan	August 8, 2000	Bill Manning
United States Dept. of Agriculture, Forest Service	October 4, 2000	Ronald F. Keil
California Historical Resources Information System	May 23, 2000	Victoria Avalos
Turner Propane	May 26, 2000	Jim Miller
Edison	May 22, 2000	Robert A. Castaneda
County of Mono Department of Public Work	June 6, 2000	Evan Nikirk
Long Valley Fire Protection District	May 24, 2000	Fred Stump
Mammoth Lakes Airport	March 8, 2000	Bill Manning
California Regional Water Quality Control Board	December 11, 2000	Hisam A. Baqai
Office of Historic Preservation	December 11, 2000	Daniel Abeyta

THE TOWN OF MAMMOTH LAKES CALIFORNIA

COMMUNITY DEVELOPMENT
P. O. Box 1609 Mammoth Lakes, CA 93546
(760) 934-8989 Fax (760) 934-8608

May 25, 2000

Mr. John Pfeifer
Federal Aviation Administration
Manager, San Francisco Airport District Office
831 Mitten Road, Room 210
Burlingame, CA 94010-1303

Re: Land Use Assurance Letter

Dear Mr. Pfeifer:

The Town of Mammoth Lakes makes the following statement of compatible land use assurance as required by Section 511(a)(5) of the Airport and Airway Improvement Act of 1982.

"The Town of Mammoth Lakes provides assurance that appropriate action, including the adoption of zoning laws, has been or will be taken, to the extent reasonable, to restrict the use of land adjacent to or in the immediate vicinity of the Mammoth Lakes Airport activities and purposes compatible with normal airport operations, including landing and takeoff of aircraft. This action includes the consideration of both existing and planned land uses. In addition, we will encourage and support other jurisdictions in the area in their efforts to do the same."

If you have any questions regarding this matter, please contact Bill Taylor at this office at 760 934-8989, x225.

Sincerely,

Michael Vance
Community Development Director

MV/tb

MAMMOTH LAKES AIRPORT
Rt. 1 Box 209, Mammoth Lakes, CA 93546
(760) 934-3813, fax (760) 934-3119

Date: June 28, 2000

To: Steven Julian, Town Manager

From: Bill Manning, Director of Transportation

Subject: New Transit Service to Mammoth Lakes Airport

We are very pleased with the progress made on developing scheduled air carrier service to Mammoth Lakes Airport. This service would clearly be a valuable asset to the local area, regional economy, and to our local residents. However, with the addition of scheduled air carrier service, there is a need for improved ground transportation options between the Airport and the primary destination points in Town.

This letter is to notify you that it is our intent to expand the existing bus services between the Town and the resort area to include service to the Airport. In doing so, the reliance on private vehicles, rental cars, and taxicabs by passengers and employees using the Airport would be reduced. This reduced reliance on automobiles by visitors and local residents would reduce traffic congestion on highways and local streets and assist the Airport in managing the terminal curbs and parking once scheduled air service begins.

The transit service would be designed to operate in coordination with the arrival and departure times of scheduled aircraft. We plan to work with the air carriers serving the airport, travel agents, and local business owners to offer ticket sales in conjunction with the purchase of air travel, local accommodations, ski passes, etc. We believe that this coordinated marketing program would assure that the expanded transit service is successful.

It is our goal to begin the service at the same time scheduled air service begins. Please advise my office if there are any actions that we should take with the Town related to the expansion of transit services to the Airport. I can be reached at 934-3813. I look forward to working with you on implementing this valuable service.

ATTACHMENT

SPILL PREVENTION CONTROL AND COUNTERMEASURE PLAN

PREDICTION OF POTENTIAL SPILLS

Name of Facility Mammoth Lakes Airport

Nearest Navigable Waters:

(1) River Name 1: Hot Creek three miles north of Airport
(2) River Name 2: Convict Creek one mile south of Airport

Possible Spill Sources

The possible sources of spills of oil or other hazardous substances are limited at the Mammoth Lakes Airport. The Fixed Base Operator maintains above ground aviation fuel on the field. There is a possibility of a fuel spill are aviation gasoline and automobile gasoline.

There is also mechanical work done to aircraft on the field which could result in the spillage of a small amount of engine motor oil.

No other use of fuel, or other hazardous materials occurs on the airport.

Alert Procedures for Spills

Any personnel at the Mammoth Lakes Airport observing a spill of oil or gasoline will immediately notify the Airport Manager or his designee, who shall put into effect the following coordinated plan working with the State of California, the government of the United States, and local emergency agencies.

1. The United States Coast and the U.S. Environmental Protection Agency will be notified through the National Response Center (in accordance with federal law) if the hazardous material is likely to find its way into a navigable waterway or coastline.

   The telephone number of the NRC (Coast Guard) in Washington DC is (800-424-8802). The EPA 24-hour emergency telephone number for oil spills/hazardous waste spills is (916) 262-1621.

2. The California State Emergency Service/Disaster Agency (O.E.S.), telephone number is ((916) 464-32[illegible]). This agency will be contacted and given the following information:

   a. Time of observation of spill
   b. Location of spill
   c. Identity of material spilled
   d. Probable source of spill
   e. Estimate time of spill
   f. Volume and duration of spill
   g. Present and anticipated movement of spill

ATTACHMENT

SPILL PREVENTION CONTROL AND COUNTERMEASURE PLAN

h. Weather conditions
i. Personnel at the scene
j. Action initiated by personnel at scene

3. The appropriate Emergency Response Section/Division of the State Environmental Protection Agency, Lahontan Regional Water Control Board, at telephone number (761) 241-7365, will be contacted with the above information.

4. The local Long Valley Fire Department will be contacted for emergency assistance and provided the information listed in #2 above. Telephone of local response agency ____(760) 935-4545.

5. The Airport Manager or his designee will immediately initiate responsive action by transmitting the above information to the agencies named above.

Any measure to mitigate the adverse effects of spills will be directed and coordinated by these national, state, and local emergency agencies.

When spills occur which could endanger human life and this becomes a primary concern, the discharge of the life saving protection will be carried out by Long Valley Fire Department and Mono County Paramedics.

In addition to the above, personnel at the Mammoth Lakes Airport who work in proximity to potential spills of hazardous materials and oils at the facility will be periodically trained in the techniques of prevention of spills and will be advised (or provided copies) of this spill prevention control/countermeasure plan.

Name of Responsible Official Representing
Sponsor/Aviation Department

Aug 03

Date

ATTACHMENT

SPILL PREVENTION CONTROL AND COUNTERMEASURE PLAN

Mammoth Lakes Airport
Mammoth Lakes, California

In order to comply with the Federal Water Pollution Control Act, which is intended to prevent discharges of oil and other flammable liquids into the navigable waterways of the United States, and to contain such discharges if they occur, the Mammoth Lakes Airports has developed the following plan to prevent such spills by establishing procedures, methods, and equipment requirements to achieve that goal.

GENERAL INFORMATION

1. Name and Location of Facility

   Mammoth Lakes Airport
   Highway 395 North Airport Road
   Mammoth Lakes, California 93546

2. Name of Operator

   Town of Mammoth Lakes

3. Name of Person in Charge of Facility

   Bill Manning
   Telephone (760) 934-3813 (daytime)

   760 924-3326 (home)

4. Name and Telephone Number of Person for Oil Spill Prevention at facility:

   Responsible Person: Bill Kerns
   Telephone numbers: work, home (760) 934-3813 (daytime)
   (760) 935-4950 (home)

United States Department of Agriculture
Forest Service
Inyo National Forest
Mammoth Ranger Station
P.O. Box 148
Mammoth Lakes, CA 93546
(760) 924-5500
(760) 924-5531 TDD

File Code: 1920

Date: October 4, 2000

John L. Pfeifer, P.E. Manager
San Francisco Airports District Office
Federal Aviation Administration
831 Mitten Road
Burlingame, CA. 94010-1303

Dear Mr. Pfeifer:

We have reviewed the Administrative Draft Environmental Assessment for the Mammoth Lakes Airport Expansion project and are providing the following preliminary comments prior to public release of the document. As discussed in the document, the U.S. Forest Service was consulted and provided issues for consideration affecting portions of National Forest System lands.

A new Special Use permit will be issued to the Town of Mammoth Lakes prior to any ground disturbing activities on National Forest land. A separate Decision Memo will be made for actions affecting the Federal lands, per National Environmental Policy Act (NEPA) provisions. All resource findings or other information disclosed in the Environmental Assessment will be tiered to our decision document and incorporated by reference in our final decision.

We found that all preliminary issues have been addressed within the current analysis prepared by Ricondo and Associates, Inc. We have no objection to the release of this document to the general public for comment at this time. We will provide additional information or comments on any new issues affecting National Forest resources identified by the public during this general review process.

Our concerns for removal of vegetation for additional runway cuts for safety areas (RSA) along the south side of the runway appears to have been adequately addressed. A native plant species list will be provided by the U.S. Forest Service for erosion control and replanting of the disturbed areas. Specific recommendations will be provided in the decision document for replanting and successful establishment of the new vegetation. Replacement of the existing 3-strand barbed wire fence with a taller chain link fence on National Forest land appears to be acceptable, based on the visual simulations of the fence provided to our agency for review. A natural tan color, or darker green shade, as proposed should adequately blend in with the foreground zones viewed by the public from U.S. Highway 395.

If a portion of the current runway is removed during the project, or if placement of the fence creates a net loss in available grazing area to the Forest Service permittee, off-site mitigation should be considered to compensate for any loss in forage use. Creation of an additional watering source, if requested, is an example of this mitigation. It is not clear to us yet if there would be a reduction in the amount of available forage created by the expansion of the airport facilities.

There are no anticipated impacts to cultural resource values, native plant or animal species or other sensitive resources. The resource surveys conducted and referenced appear to adequately analyze the potential environmental consequences of this proposed action and will be incorporated into the NEPA process.

If you have any additional needs at this time, please feel to contact Rick Murray, Lands Assistant at the Lee Vining Office at (760) 647-3013. We look forward to corresponding with you in the near future following the 30 day public comment period.

Sincerely,

for RONALD F. KEIL
Acting District Ranger

Cc: Elisha Novak, FFA

CALIFORNIA
HISTORICAL
RESOURCES
INFORMATION
SYSTEM

Eastern Information Center
Department of Anthropology
University of California
Riverside, CA 92521-0418

Phone (909) 787-5745
Fax (909) 787-5409

RECEIVED
JUN - 2 2000
RICONDO & ASSOCIATES

May 23, 2000
RS #2232

Xin Wang
Ricondo & Associates
20 North Clark Street, Suite 1250
Chicago, Illinois 60602

Re: Cultural Resources Records Search for Mammoth Lakes Airport Environmental Assessment

Dear Ms. Wang:

We received your request on May 9, 2000 for a cultural resources records search for the Mammoth Lakes Airport EA, located in Sections 1, 2, and 7, T.4S, R.28E, MDBM, in the town of Mammoth Lakes in Mono County. We have reviewed our site records, maps, and manuscripts against the location map you provided.

Our records indicate that three studies have been conducted on the majority of the project areas as part of larger projects. Two archaeological sites are recorded within the project boundaries.

In addition to the California Historical Resources Information System, the following were reviewed:

> The National Register of Historic Places Index (10/20/98): None.
>
> Office of Historic Preservation, Archaeological Determinations of Eligibility (listed through 3/1/99): None.
>
> Office of Historic Preservation, Directory of Properties in the Historic Property Data File (dated 2/26/99): None.
>
> A review of (1953) USGS Mt. Morrison 15' topographic map indicated no historic structures/features present. The General Land Office plat maps for Mono County are on file at UC Berkeley.

Ms. Wang
May 23, 2000
Page 2

Based on existing information, there is a probability of cultural resources being present on those portions of the project area that have not been surveyed for cultural resources; therefore, further archaeological study is recommended. The property should be surveyed systematically by a qualified archaeologist to identify all cultural remains and provide further recommendations for their study and treatment prior to any grading or construction. Enclosed is a list of archaeological consultants. When an archaeologist has been selected to perform the above-recommended work, please provide him/her with a copy of this letter, the records search may then be completed by this office to the level required by the archaeologist. If this finalization of the search is completed within three months of the initial search, we will not charge the consultant the minimum-per-project fee.

This statement does not constitute a negative declaration of impact. This statement reports only known archaeological materials on or in the vicinity of the property in question. The presence of additional archaeological resources on the property cannot be ruled out until a systematic survey is conducted.

State and federal law requires that if any cultural resources are found during construction, work is to stop and the lead agency and a qualified archaeologist be consulted to determine the importance of the find and its appropriate management.

Sincerely,

Victoria Avalos

Victoria Avalos
Information Officer

Enclosure

TURNER PROPANE

Propane Sales

P.O. Box 87 • Mammoth Lakes, California 93546 • Telephone (760) 934-6311

May 24, 2000

Attention: Mr. Bill Manning
Mammoth Yosemite Airport
Route 1, Box 209
Mammoth Lakes, CA 93546

Re: Propane Supply - Terminal Building

Mr. Bill Manning,

This letter is to inform you of our ability to service and supply all improvements including the terminal building at the Mammoth-Yosemite Airport. We have the expertise and resources to provide a master distribution facility which would serve all gas load requirements from a single stationary facility. We also have a supply network which guarantees that ample supply of product will always be available. We at Turner have the largest bulk storage facility in the area at 150,000 gallons.

We look forward to the completion of this project, and welcome the opportunity to meet with you regarding site location for tanks and load requirements, please do not hesitate to call as we understand your accelerated schedule.

Respectfully,

Jim Miller

SOUTHERN CALIFORNIA
EDISON
An EDISON INTERNATIONAL™ Company

Mammoth Lakes Airport
Mammoth Lakes , Ca.

May 22, 2000

Subject: Mammoth Lakes Airport, County of Mono, State of California
To whom it may concern:

I have been requested to advise you that the Southern California Edison Company stands ready to install electrical distribution facilities within the subject area known as Airport Dr. Mammoth Lakes Airport, County of Mono, State of California. Installation to be in accordance with the then applicable tariff schedules which are the effective rates and rules of the Southern California Edison Company on file with and approved by the California Public Utilities Commission and subject to the receipt of such permits or other authorizations from public agencies as may be required for such installation. Also, rules hereinafter referred to in this letter include such changes, modifications, and amendments which the Public Utilities Commission may from time to time direct in the exercise of its jurisdiction.

All requested and/or necessary installation of Southern California Edison Company electrical distribution facilities will be contingent upon our receiving the necessary easements.

Should a shortage of energy and/or generating capacity ever occur, the utility will apportion its available supply of electricity among its customers as set forth in Rule No.14, Shortage of Supply and Interruption of Delivery.

When requested by the developer, underground and/or overhead facilities within the subdivision, tract or parcel require advances under provisions set forth in Rule No. 15. Requirements for advances from the developer for underground and/or overhead lines to reach the subdivision, tract or parcel are also set forth in Rule No. 15. An underground or overhead service lateral from the installed underground and/or overhead distribution system within the development to individual parcels will be in accordance with Rule No.16.

P. O. Box 7329
5001 Chateau Rd.
Mammoth Lakes, CA 93546
760-934-8256

Should an individual applicant require service to his parcel prior to the installation of an underground and/or overhead distribution system to and within the development, as may be installed at the expense of a developer, or within a development for which the developer has undertaken no obligation for the installation of an underground and/or overhead distribution system, an advance will be required from the individual as set forth in Rule No. 15.

Should you have any questions, please do not hesitate to call me at (760) 934-8236

Sincerely,

Robert A. Castaneda
Service Planner
Bishop / Mammoth S/C

RICHARD BOARDMAN
Director of Public Works
JOHN K. BECK
Assistant Director of Public Works
EVAN NIKIRK
Assistant Director of Public Works
SUSAN ARELLANO
Administrative Assistant

County of Mono
Department of Public Works

Post Office Box 457 • 74 North School Street • Bridgeport, California 93517

TELEPHONE:
(760) 932-5252
(760) 932-5252

FACSIMILE
(760) 932-7607

June 6, 2000

Mr. Bill Kerns
Mammoth Lakes-Yosemite Airport
Route 1 Box 209
Mammoth Lakes, California 93546

Via Facsimile and 1st Class Mail
(760) 934-3119; No. Pages: 1

Re: Projected Impact of Expanded Airport Waste Stream

Dear Mr. Kerns:

Pursuant to your request, the Mono County Department of Public Works has evaluated the potential impact that expansion of services at the Mammoth Lakes-Yosemite Airport may have on the Benton Crossing Landfill. The Public Works Department is responsible for solid waste management in Mono County and for daily operation of the Benton Crossing Landfill, which is the destination for all municipal solid waste generated in the Mammoth Lakes area.

Industry literature indicates that a typical waste generation rate for commercial airplanes is one pound per passenger per trip. Given the projected estimate of four to five planes per day and approximately 250 passengers per airplane, we can assume that an additional 1,250 pounds per day may ultimately be generated by the increased air traffic. Further, depending upon the type of services provided in an expanded terminal, the waste generation rate would at least double, bringing the total waste generation at the facility to an estimated 2,500 pounds per day.

Therefore, the quantity of waste that may potentially be generated at an expanded Mammoth Lakes-Yosemite Airport would not have a significant impact on County landfills. The existing permitted landfill capacity will be able to accommodate such an increase in the waste stream.

Please contact me at 932-5252 should you have any additional comments or questions. Thank you for the opportunity to comment on this issue.

Sincerely,

Mono County Department of Public Works

Evan Nikirk, P.E.
Assistant Director

Long Valley Fire Protection District
Rt. 1, P.O. Box 1145 • Crowley Lake, CA 93546
(760) 935-4545

May 24, 2000

Mr. Bill Manning
Airport Manager
Mammoth Lakes Airport
Route 1 Box 209
Mammoth Lakes, Ca. 93546

Re: Alternative emergency access to the Mammoth Lakes Airport

Dear Mr. Manning,

This letter is to support your proposal to use the current and only gate location between the runway and Highway 395 as alternative emergency access to the airport. This access will take the place of a secondary access road into the airport until that road is completed. As we discussed the dimensions for the gate as well as fire department lock access will be agreed to by us, and the service road controlled by the gate will be kept open year round. Having an access point in this location will be of benefit even when the secondary road is complete due to its proximity to the runway. If there are questions, please contact me.

Sincerely,

Fred Stump
Chief

MAMMOTH LAKES AIRPORT
Rt. 1 Box 209, Mammoth Lakes, CA 93546
(760) 934-3813, fax (760) 934-3119

March 8, 2000

Mr. John Pfeifer, Manager
Federal Aviation Administration
Airports District Office
831 Mitten Road
Burlingame, CA 94010

Dear Mr. Pfeifer

This letter is to provide you and your staff an update on the coordination efforts between the Town of Mammoth Lakes, California, and the City of Bishop, California, regarding future airport development plans for the region.

On January 31 a meeting was held in Bishop with representatives of both communities in attendance. Representing the Town of Mammoth Lakes were Mayor John Eastman, Councilman Kathy Cage, Airport Manager Bill Manning, and Community Development Director Mike Vance Representing the City of Bishop was Councilman Bob Kimble. Inyo County was represented by County Supervisor Julie Baer, County Supervisor Linda Arcularius County Administrator Rene Mendez, and Public Works Director Jeff Jewett. At this time, the Mammoth Lakes Expansion Project, as currently conceptualized, was presented to Bishop and Inyo County representatives. The plan, designed to bring commercial air service to the Eastern Sierra region, was well received by representatives of the Bishop area.

The Bishop and County representatives presented their thoughts on the possible future of the Bishop Airport. Strategic planning for the future use of Bishop Airport is just beginning and can be described as broadly conceptual in nature. The production of an Airport Master Plan is being contemplated after discussions solidify the future vision for the Airport.

Currently, the City of Bishop desires some type of local commuter service to a major airline hub, of which the local population can take advantage. While the Mammoth Lakes Airport Expansion Project could provide this service, the City of Bishop would, understandably like this service to be as convenient as possible.

The improvement of Bishop Airport would benefit the entire region. If the Bishop Airport were improved to Federal Air Regulation (FAR) Part 139 standards, the airport could be available for use as an alternate airport should Mammoth Lakes Airport be impacted by adverse weather conditions.

In conclusion, the airport development programs of Mammoth Lakes and Bishop agree to be complimentary in nature rather than competitive. Each jurisdiction is planning in areas that meet both the needs of their respective communities and the region as a whole.

Thank you for your time and attention in this matter. Should you have any questions or comments, please contact me at (760) 934-3813.

Respectfully,

William B. Manning
Airport Manager

California Regional Water Quality Control Board

Lahontan Region

Winston H. Hickox
Secretary for Environmental Protection

Victorville Office
Internet Address: http://www.swrcb.ca.gov/rwqcb6
15428 Civic Drive, Suite 100, Victorville, California 92392
Phone (760) 241-6583 • FAX (760) 241-7308

Gray Davis
Governor

December 11, 2000

FILE No.: 6B26S003680

William Manning
Airport Manager
Mammoth Yosemite Airport
Rt. 1, Box 209
Mammoth Lakes, CA 93546

PROPOSED MAMMOTH YOSEMITE AIRPORT EXPANSION, MONO COUNTY

This letter is in response to Regional Water Quality Control Board staff (Regional Board staff) telephone conversation on Wednesday, December 6, 2000, with Mr. Reinard Brandley, consulting airport engineer. Mr. Brandley requested a "Water Quality Assurance Letter" which is required by Federal Aviation Administration (FAA) under Section 509(7)(A) of the Airport Airway Improvement Act. Information provided by the Town of Mammoth Lakes, Reinard Brandley, the Environmental Impact Report dated 1997, and the draft Environmental Assessment dated 2000, are sufficient for Regional Board staff to comply with Mr. Brandley's request.

Pursuant to Section 509(7)(A) of the Airport Airway Improvement Act, and based on the information provided to us by the Town and proponents, we certify there is reasonable assurance that the proposed Mammoth Yosemite Airport Expansion project will be located, designed, constructed, and operated so as to comply with water quality control standards as required by the Lahontan Regional Water Quality Control Board.

As we advised you, you must apply to this office for any proposed discharges of waste or wetlands disturbance.

If you have any questions, please contact Douglas E. Feay at (760) 241-7353, or Cindi Mitton at (760) 241-7413.

Sincerely,

Hisam A. Baqai, P.E.
Supervising Engineer

cc: Mailing List

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MAILING LIST

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Tom Cornell
Ricondo Associates
221 Main Street, Suite 1460
San Francisco, CA 94105

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STATE OF CALIFORNIA – THE RESOURCES AGENCY GRAY DAVIS, Governor

OFFICE OF HISTORIC PRESERVATION
DEPARTMENT OF PARKS AND RECREATION
P.O. BOX 942896
SACRAMENTO, CA 94296-0001
(916) 653-6624 Fax: (916) 653-9824
calshpo@ohp.parks.ca.gov

December 11, 2000

REPLY TO: FAA000210A

Joseph R. Rodriquez, Supervisor, Planning and Programming Section
Federal Aviation Administration
San Francisco Airports District Office
831 Mitten Road
Burlingame, CA 94010-1303

Subject: **Mammoth Yosemite Airport Improvement Project, Mammoth Lakes, Mono County, California**

Dear Mr. Rodriquez:

Thank you for consulting me concerning the undertaking cited above pursuant to 36 CFR 800, regulations Implementing Section 106 of the National Historic Preservation Act. I understand that the project includes an extension of runway 9-27 1,200 feet to the west, widening the runway to 150 feet, extension of a taxiway of equal length and width of 50 feet, construction of a passenger terminal and other support facilities capable of supporting air carrier and charter operations. Your letter of November 16, 2000 transmitted a copy of a cultural resources report prepared by Jones & Stokes entitled "Mammoth Lakes Airport Improvement Project, Mono County, California" (July 2000) and requested my concurrence with the Federal Aviation Administration's (FAA) determination that no historic properties will be affected by implementation of the proposed project.

Review of the supporting documentation indicates that reasonable measures were taken to identify historic properties within the undertaking's area of potential effects (APE). These efforts to identify historic properties conform to applicable standards and the documentation provided is consistent with the requirements of § 800.11(d) for a finding of "no historic properties affected." Therefore, pursuant to § 800.4(d)(1), because I do not object to this adequately documented finding, your responsibilities under Section 106 are now fulfilled.

Your consideration of historic properties in the project planning process is appreciated. If you have any questions please contact staff Charles Whatford of my staff at (916) 653-2716 or cwhat@ohp.parks.ca.gov

Sincerely,

[signature] for

Daniel Abeyta, Deputy
State Historic Preservation Officer

RECEIVED
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FORM 99 (7-90)
FAX TRANSMITTAL # of pages ► 1

To Cornell	From E. Novak
Ricondo & Asc.	Phone #
547-1940	Fax #

317-7368 5099-101 GENERAL SERVICES ADMINISTRATION

AR 001309

Appendix E – Airfield Requirements Analysis

E.1 Airfield Requirements and Runway Length Analysis

The airport development alternatives are based on the design aircraft that is expected to operate at the Airport and the origin and destination (O&D) markets to be served. The alternative airfield designs for Mammoth Yosemite Airport were evaluated using airport design criteria set forth in FAA Advisory Circular (AC) 150/5300-13, *Airport Design*. The runway length required to support the O&D markets was assessed by analyzing the aircraft performance capabilities for several of the typical aircraft anticipated to operate at Mammoth Yosemite Airport.

E.2 Existing Airfield Conditions

The existing airfield geometry is depicted in **Exhibit E-1**. Mammoth Yosemite Airport is classified by FAA standards as an Airport Reference Code (ARC) C-III airport. The C designator of the ARC specifies the Aircraft Approach Category (AAC) that the Airport can accommodate. AAC C is designated for aircraft with approach speeds ranging from 121 knots to 140 knots. The ARC III designation specifies that the Airport can accommodate of Aircraft Design Group (ADG) III, aircraft with a wingspan up to 118 feet. The ARC indicates general capability of an airport to accommodate a specific size and performance of an aircraft. Airfield component separation standards are based on the ADG to be served. **Table E-1** summarizes the critical design dimensions for the existing airfield facilities.

The existing runway is designated as Runway 9-27 and has dimensions of 7000 feet by 100 feet. Additionally there is a 3,400-foot paved overrun extending west from the runway. Runway 9-27 is served by a full-length parallel taxiway located to the north.

Local and itinerant general aviation facilities are located north of the runway/taxiway complex. The airfield is served by a Common Traffic Advisory Frequency (CTAF) used for aircraft separation. A Global Positioning System (GPS) approach to Runway 27 is available with provisions for arriving aircraft to circle to land Runway 9.

E.3 Airfield Requirements

Based on the Airport elevation, type of passenger service anticipated, and current airline scheduling plans, the design aircraft selected for Mammoth Yosemite Airport is the Boeing 757-200. This is consistent with the March 1997 *Subsequent Environmental Impact Report and Updated Environmental Assessment, Mammoth Lakes Airport Expansion*. The FAA designates the Boeing 757-200 as an ARC C-IV aircraft. ADG IV specifies that the Airport can accommodate aircraft with a wingspan up to 170 feet. The wingspan of the B-757-200 is approximately 125 feet. Therefore, the existing airfield at Mammoth Yosemite Airport does not currently meet all of the FAA airfield design parameters for the operation of a B-757 aircraft as the ADG III designation specifies the ability to accommodate aircraft with wingspans up to, but no more than, 118 feet.

An initial review was conducted to determine the feasibility of designing the airfield to C-IV standards. It was determined that extensive modifications would be required to the airfield, landside and/or off-airport roadways for this to be accomplished.

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Table E-1

Existing Airfield Conditions

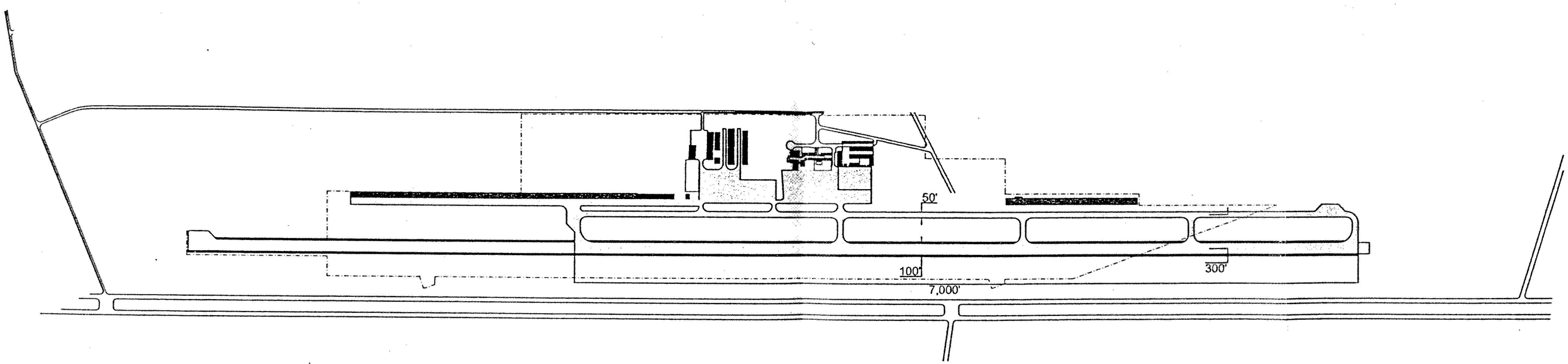
Airfield Component	Existing Conditions
Runway Length	7,000 feet
Runway Width	100 feet
Runway Shoulder Width	15 feet
Runway Blast Pad Width	100 feet
Runway Blast Pad Length	100 feet
Runway Safety Area (length beyond runway end)	500/1,000 feet
Runway Safety Area Width	500 feet
Obstacle Free Zone Width	400 feet
Runway Object Free Area Width	800 feet
Runway Object Free Area Length (beyond runway end)	500/1,000 feet
Runway Pavement Strength – Kips	120 D, 180 DT
Clearway width	500 feet
Clearway length (beyond runway end)	500/1,000 feet
Stopway width	100 feet
Stopway length (beyond runway end)	100/3,000 feet
Taxiway Width	50 feet
Taxiway Edge Safety Margin	15 feet
Taxiway Shoulder Width	0
Taxiway Safety Area Width	125 feet
Taxiway Object Free Area Width	181 feet
Taxiway Wingtip Clearance	32 feet
Runway Centerline to Taxiway Centerline	300 feet
Taxiway Centerline to Fixed or Movable Object	90.5 feet
Taxiway Edge Markings	None

Sources: Airport Layout Plan, 1988, Airport records, field observations, Advisory Circular 150/5300-13; *Airport Design, and* 14 CFR Part 139 1998 edition

Prepared by: Ricondo & Associates, Inc. and Reinard W. Brandley, Consulting Airport Engineer, November 1999

Based on a review of FAA AC 150/5300-13, *Airport Design* and discussions with Airport staff, FAA staff, and other Airport stakeholders, an alternative was developed that would design the airfield components to B-757 specific standards.

This reduces many of the airfield separation requirements based on the 170-foot maximum wingspan of an ADG IV aircraft by specifically designing the airfield to accommodate aircraft with a wingspan up to the B-757, 125 feet. The aircraft specific design parameters are established in *Airport Design*, Appendix 8, "Runway Design Rationale," and Appendix 9, "Taxiway and Taxilane Design Rationale." The airline stakeholders proposing service to Mammoth Lakes required a runway of dimensions at least 8,000 feet in length and 150 feet in width. The need for a specific runway width is a requirement of FAA design standards found in FAA AC 150/5300-13. Both the B-737 and B-757 are approach category C aircraft. A B-737 is an Airplane Design Group (ADG) III and a B-757 is an ADG IV thereby requiring a runway width of 150 feet. **Table E-2** compares and contrasts the



Source: Reinard W. Brandley, Engineer.
Prepared by: Ricondo & Associates, Inc.

Exhibit E-1

0 1,500 ft.
north

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Legend
Existing Airfield
Existing Property Boundary

Existing Airport Development

existing airfield facilities with design requirements for the B-757. Runway strenghthening, widening, and lengthening would be required for the majority of air carrier narrow body jet aircraft fleet such as the B-737, A320, or MD-80.

Table E-2

Summary of Airfield Requirements

Airfield Component	Existing Conditions	B-757 Specific Requirements
Runway Width	100 feet	150 feet
Runway Shoulder Width	15 feet	25 feet
Runway Blast Pad Width	100 feet	200 feet
Runway Blast Pad Length	100 feet	200 feet
Runway Safety Area (length beyond runway end)	500/1,000 feet	1,000 feet
Runway Safety Area Width	500 feet	500 feet
Obstacle Free Zone Width	400 feet*	400 feet*
Runway Object Free Area Width	800 feet	800 feet
Runway Object Free Area Length (beyond runway end)	500/1,000 feet	1,000 feet
Runway Pavement Strength – Kips	120 D, 180 DT	240 DT
Clearway width	500 feet	500 feet
Clearway length (beyond runway end)	500/1,000 feet	up to 1,000 feet
Stopway width	100 feet	150 feet
Stopway length (beyond runway end)	100/3,000 feet	up to 1,000 feet
Taxiway Width	50 feet	75 feet
Taxiway Edge Safety Margin	15 feet	15 feet
Taxiway Shoulder Width	0	25 feet
Taxiway Safety Area Width	125 feet	125 feet
Taxiway Object Free Area Width	181 feet	195 feet
Taxiway Wingtip Clearance	32 feet	35 feet
Runway Centerline to Taxiway Centerline	300 feet	312.5 feet
Taxiway Centerline to Fixed or Movable Object	90.5 feet	97.5 feet
Taxiway Edge Markings	None	Required

* Fence along highway is located 350 feet south of proposed runway centerline

Sources: Airport Layout Plan, 1988, Airport records, field observations, Advisory Circular 150/5300-13; *Airport Design, and* 14 CFR Part 139 1998 edition

Prepared by: Ricondo & Associates, Inc. and Reinard W. Brandley, Consulting Airport Engineer, November 1999

All of the runway widening would be conducted on the south side of the runway, thereby shifting the runway centerline 25 feet south. The parallel taxiway and several connecting taxiways would also be widened from 50 feet to 75 feet and strengthen to allow use by aircraft of weights up to a B-757 aircraft. The parallel taxiway would be widened 20 feet on the south side and 5 feet on the north side, shifting the taxiway centerline 7.5 feet to the south. This provides a runway to taxiway separation of 317.5 feet and a taxiway centerline to a fixed or movable object (east hangers) of 97.5 feet. The 317.5-foot runway to taxiway separation protects for both the Runway Safety Area and Taxiway Safety Area and provides an additional 5 feet for the airfield drainage system. The air carrier apron area would be designed to accommodate up to three narrow body aircraft for pushback operations or two narrow body aircraft for power out operations.

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General aviation hanger facilities have been developed along the east and west ends of the parallel taxiway. The west hangers are setback approximately 140 feet from the widened and relocated parallel taxiway, providing sufficient separation for an aircraft with a wingspan up to 125 feet (the wingspan of a B-757) to taxi unobstructed, as long as other aircraft and objects remain within 42 feet of the front the hangers.

The east hangers would be setback 97.5 feet from the widened and relocated parallel taxiway. This would permit aircraft with a wingspan up to 125 feet to use the taxiway as long as there are no aircraft or other objects located beyond the face of the east hangers. Operational measures would be required to ensure that the taxiway and object free areas are clear during air carrier aircraft operations using this taxiway.

At the completion of the Airport improvements, the Airport would be classified as a C-IV airport with a restriction on the parallel taxiway to only those aircraft with a wingspan of 125 feet or less.

Runway Length Analysis

A runway length analysis was conducted to determine the potential for providing air service to various markets from Mammoth Yosemite Airport. Because of the distinct aviation demand patterns, as well as weather conditions, the analysis was conducted for both the winter ski season and the summer recreation season. The need for additional runway length was determined through the use Boeing 757, Boeing 737, and Embraer 145 aircraft performance and flight planning manuals. Once the Allowable Take Off Gross Weight (ATOGW) was calculated using the aircraft performance data the range of the aircraft was calculated using the aircraft flight planning manuals. Due to the rising terrain in the vicinity of the airport, airport elevation and possible airline specific procedures it was determined that, AC 150/5325-4A - Runway Length Requirements For Airport Design, would not be appropriate for the calculation of required runway length.

Runway Length Analysis Assumptions

A winter takeoff temperature of 49°, based on an estimated 95th percentile hottest temperature in the winter season, was assumed for aircraft performance calculations. Since Mammoth Lakes is not listed in the Boeing Aircraft Corporation's *Airport Temperatures* book, the mean temperature was derived from NOAA data from 1995 to 1998 and adjusted to the 95% reliability temperature using the same standard deviation supplied by Boeing for Bishop, CA. Similarly a summer takeoff temperature of 77° was computed using the same methodology.

Higher temperatures are used in runway length analyses, because transport category aircraft are adversely affected by such conditions. Generally, in hot weather, aircraft departures require a longer takeoff roll than operations in cooler weather. High temperature conditions also affect an aircraft's ability to climb after departure. Airport field elevation also negatively effects aircraft performance because of lower air density effecting an airfoil's lift capability. Mammoth Lake's field elevation of 7,128 feet, combined with warm temperatures, will require much longer take-off rolls and degraded climb performance after departure.

Air routings to and from Mammoth Lakes Airport were computed using either great circle routing or actual airline routing plus 2% for Air Traffic Control handling. Historical headwinds having an 85% probability of not being exceeded were used in fuel burn computations for these routes. The Boeing

Aircraft Corporation also supplied this headwind data. These computed route distances are shown in **Table E-3**.

Table E-3

Route Distances To/From Mammoth Lakes

City	Airport Code	Route distance from Mammoth Lakes (nautical miles)
Sacramento	SAC	160
San Francisco	SFO	170
Las Vegas	LAS	200
Los Angeles	LAX	230
Salt Lake City	SLC	380
Phoenix	PHX	430
Portland	PDX	520
Denver	DEN	670
Dallas/Fort Worth	DFW	1,120
Houston	IAH	1,280
St. Louis	STL	1,370
Chicago	ORD	1,470
Washington D.C.	IAD	1,970
New York	JFK	2,120

Source: Ricondo & Associates, Inc.
Prepared by: Ricondo & Associates, Inc., December 1999

Average passenger and baggage weight was assumed to be 210 pounds in the summer and 230 pounds in the winter. The higher winter weight represents the additional weight of ski equipment. Full passenger and baggage loads were assumed with no additional cargo.

Runway length calculations assumed that the runway would operate under uncontaminated conditions with less than 0.125 inches of slush, 0.25 inches of wet snow, or 1 inch of dry snow.

Obstacles in the takeoff flight path were taken from the National Ocean Service Obstruction Chart 6841 (2nd Ed., published October 1991) and U.S. Geological Survey 7.5-minute Quadrangle maps. An obstacle off the southeast end of Runway 27, at an elevation of 7,079 feet mean sea level (MSL), was identified from the obstruction chart as a potential aircraft performance-limiting obstacle. For the purposes of aircraft performance calculations, this obstacle will assumed to have been removed and replaced with underground wiring.

Three airframe/powerplant combinations were considered in this analysis: the B-757-200, B-737-800, and EMB-145LR regional jet. These aircraft were considered to be representative of the type of aircraft that would operate at the Airport. The aircraft weight characteristics for these aircraft are shown in **Table E-4**.

Only runway extensions to the west were considered in this analysis since the Airport does not own the land east of the Airport. A conservative planning approach was used in determining the departure capabilities described in this section, and the results should be judged on a comparative basis. Some airline-specific operating procedures, such as the use of clearways and stopways, runway length calculations, airspace obstructions, and obstruction avoidance procedures, may affect the payload carrying capabilities of an aircraft in a specific market.

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Table E-4
Aircraft Runway Length Parameters

Aircraft Weight Characteristics *(a)*	Aircraft Type B-757-200	B-737-800	EMB-145
Maximum certificated takeoff weight (pounds)	240.0	174.2	48.5
Operating empty weight	132.6	95.8	26.7
Landing Fuel	8.3	7.8	3.0
Number of seats	188	156	50
Full payload - winter (230 pounds per passenger)	43.2	35.9	11.5
Full payload - summer (210 pounds per passenger)	39.5	32.8	10.5

(a) All weights are in thousands of pounds.

Source: Ricondo & Associates, Inc. and Flight Engineering, Inc., November 1999
Prepared by: Ricondo & Associates, Inc., December 1999

5.5 Runway Length Analysis Preliminary Findings

The service ranges of typical aircraft types using the runway extension alternatives are shown in **Table E-5**. Each aircraft type and runway extension alternative calculated the approximate distance in nautical miles that the aircraft could travel, assuming a full load of passengers and baggage.

Actual allowable takeoff gross weights (ATOGW) for each aircraft and runway length alternative are also shown in Table E-5. Actual ATOGWs will vary depending on airline and pilot procedures and airframe/powerplant configurations. Calculated ATOGWs provided by specific airlines and manufacturers may differ from the estimates presented here. The ATOGWs for various types of airframes/powerplant from an airport can be limited by many factors, the two most common factors being the length of the runway and the ability of the aircraft to climb at an acceptable rate after lifting off from the runway.

The useable runway length may be shorter than the actual runway length due to obstacles in the aircraft's departure flight path. Acceptable climb rates are established for all airframe/powerplant combinations during their certification process in order to provide the required margins of safety for departures. The maximum weight at which an aircraft can achieve an acceptable rate of climb is referred to as the climb-limited weight.

In the case of full passenger and cargo loads, the aircraft weight can approach the ATOGW. If, after adding the passenger, cargo, and fuel loads, the overall takeoff weight of the aircraft would be greater than ATOGW, then the weight of the aircraft would have to be reduced. Common strategies of reducing take-off weights are removing passengers and/or cargo (i.e., weight penalties) or by reducing the fuel load (i.e., reduced aircraft range).

Taking into account the potential for weight penalties to serve specific markets from Mammoth Lakes, **Tables E-6, E-7** and **E-8,** presents the achievable load factors (percentage of seats filled) for hot weather conditions to various markets for the B-757-200, B-737-800 and Embraer 145 LR, respectively.

Table E-5

Estimated Departure Capabilities Under High Temperature Conditions

	Aircraft Type					
	B-757-200 (188 seats)		B-737-800 (156 seats)		EMB-145 (50 seats)	
Runway Length	Range	ATOGW	Range	ATOGW	Range	ATOGW
Winter ski season						
7,000 feet (existing)	1,520	209.0	@	134.9	490	43.2
8,000 feet	1,820	214.2	210	143.1	640	44.5
8,200 feet	1,860	214.9	290	144.7	720	44.9
9,000 feet	2,070	218.4	660	149.3	n.a.	n.a.
Summer season						
7,000 feet (existing)	1,010	196.7	@	130.6	100	40.8
8,000 feet	1,350	202.1	80	137.9	390	42.0
8,200 feet	1,400	202.9	150	138.9	480	42.4
9,000 feet	1,640	206.7	430	143.2	n.a.	n.a.

@/ Weight Restricted

ATOGW = Allowable takeoff gross weight in thousands of pounds.

Range refers to nonstop travel distance, in nautical miles, with adequate fuel reserves, assuming a full load of passengers and baggage and no additional cargo (210 pounds per passenger including baggage in the summer, 230 pounds per passenger including baggage and ski equipment in the winter).

Winter ski season runs from the Wednesday prior to Thanksgiving through the first week of April. The summer season is all dates outside of the winter ski season.

Source: Ricondo & Associates, Inc. and Flight Engineering, Inc., November 1999

Prepared by: Ricondo & Associates, Inc., December 1999

The 94% summer load factor for the Boeing 757 was calculated using Payload for Long Range Cruise Charts found in the Boeing 757 Airplane Characteristics for Airport Planning from the Boeing Aircraft Corporation. As shown in Table B-5 the ATOGW of the Boeing 757 under these conditions is 202,900 lbs. The total fuel load derived from the Payload Range chart is approximately 33,000 lbs. Subtracting this fuel load from the ATOGW leaves 169,500 lbs. for the operational empty weight of the aircraft and payload. The operation empty weight of the Boeing 757 is 132,900 as shown in Table E-4. Subtracting this weight from 169,900 allows a total payload of 37,000 lbs. Dividing the payload by the weight of an average summer passenger (210 lbs.) also found in Table E-4 shows that at this ATOGW the aircraft could hold 176 passengers. The seating configuration of the Boeing 757 found in Table E-4 188 seats. Dividing the 176 by the seating capacity of 188 produces a load factor of 94%.

Performance calculations for contaminated runway were also performed. The contaminated conditions of greater than 0.125 inches of slush, 0.25 inches of wet snow, or 1 inch of dry snow would reduce the payload and range capability of air carrier aircraft operating at Mammoth Lakes Airport. The extent of these payload/range reductions was such that it was assumed that air carriers would not operate until the runway was cleared of snow or otherwise runway conditions had improved.

Table E-6

B-757-200 Estimated Departure Capability Load Factors to Specific Markets Under High Temperature Conditions

Winter

Destination	SFO	LAS	LAX	SLC	PHX	PDX	DEN	DFW	IAH	STL	ORD	IAD	JFK
Distance (nm)	171	204	226	378	426	517	689	1,124	1,279	1,366	1,470	1,972	2,124
Runway Length													
7,000 feet	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	77%	74%
8,000 feet	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	86%	85%
8,200 feet	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	88%	85%
9,000 feet	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	94%	92%

Summer

Destination	SFO	LAS	LAX	SLC	PHX	PDX	DEN	DFW	IAH	STL	ORD	IAD	JFK
Distance (nm)	171	204	226	378	426	517	689	1,124	1,279	1,366	1,470	1,972	2,124
Runway Length													
7,000 feet	100%	100%	100%	100%	100%	100%	100%	93%	87%	85%	78%	62%	59%
8,000 feet	100%	100%	100%	100%	100%	100%	100%	100%	99%	96%	93%	74%	71%
8,200 feet	100%	100%	100%	100%	100%	100%	100%	100%	99%	96%	94%	76%	72%
9,000 feet	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	82%	80%

Source: Ricondo & Associates, Inc., November 1999.

Prepared By: Ricondo & Associates, Inc., December 1999

Table E-7

B-737-800 Estimated Departure Capability Load Factors to Specific Markets Under High Temperature Conditions

Winter

Destination	SFO	LAS	LAX	SLC	PHX	PDX	DEN	DFW	IAH	STL	ORD	IAD	JFK
Distance (nm)	171	204	226	378	426	517	689	1,124	1,279	1,366	1,470	1,972	2,124
Runway Length													
7,000 feet	84%	84%	84%	77%	77%	74%	69%	52%	49%	47%	42%	28%	26%
8,000 feet	100%	100%	100%	98%	98%	95%	88%	74%	69%	66%	63%	48%	45%
8,200 feet	100%	100%	100%	100%	100%	99%	94%	80%	74%	72%	66%	52%	49%
9,000 feet	100%	100%	100%	100%	100%	100%	100%	89%	83%	81%	77%	63%	59%

Summer

Destination	SFO	LAS	LAX	SLC	PHX	PDX	DEN	DFW	IAH	STL	ORD	IAD	JFK
Distance (nm)	171	204	226	378	426	517	689	1,124	1,279	1,366	1,470	1,972	2,124
Runway Length													
7,000 feet	82%	82%	82%	74%	74%	71%	60%	49%	43%	40%	37%	22%	19%
8,000 feet	100%	100%	100%	94%	91%	91%	85%	68%	62%	59%	56%	40%	37%
8,200 feet	100%	100%	100%	97%	97%	92%	86%	71%	65%	62%	57%	42%	39%
9,000 feet	100%	100%	100%	100%	100%	100%	98%	83%	75%	72%	69%	53%	51%

Source: Ricondo & Associates, Inc., November 1999.

Prepared By: Ricondo & Associates, Inc., December 1999

Table E-8

EMB 145 LR Estimated Departure Capability Load Factors to Specific Markets Under High Temperature Conditions

Winter												
Destination	RNO	SFO	LAS	LAX	SLC	PHX	PDX	DEN	DFW	IAH	STL	ORD
Distance (nm)	123	171	204	226	378	426	517	689	1,124	1,279	1,366	1,470
Runway Length												
7,000 feet	100%	100%	100%	100%	100%	99%	97%	88%	66%	58%	54%	49%
8,000 feet	100%	100%	100%	100%	100%	100%	100%	100%	78%	70%	65%	60%
8,200 feet	100%	100%	100%	100%	100%	100%	100%	100%	81%	73%	69%	63%
Summer												
Destination	RNO	SFO	LAS	LAX	SLC	PHX	PDX	DEN	DFW	IAH	STL	ORD
Distance (nm)	123	171	204	226	378	426	517	689	1,124	1,279	1,366	1,470
Runway Length												
7,000 feet	100%	100%	99%	98%	89%	86%	84%	74%	50%	41%	36%	30%
8,000 feet	100%	100%	100%	100%	100%	97%	95%	85%	61%	52%	48%	42%
8,200 feet	100%	100%	100%	100%	100%	100%	99%	89%	65%	56%	51%	46%

Source: Ricondo & Associates, Inc., November 1999.

Prepared By: Ricondo & Associates, Inc., December 1999

FAA Order 8400.9 *National Safety and Operational Criteria for Runway Use Programs* establishes the operational and safety criteria for runway use programs. The Airport will be served by the current GPS approach with air carrier circling minimums. Additionally air carrier specific approach procedures are currently under development. Both these procedures would allow arrival aircraft to land on the runway most aligned into the wind. Air carrier departure procedures are also under development that will also allow departures from both Runway 9 and Runway 27. Tailwind departures are not anticipated allowing the runway to be operated in accordance with FAA Order 8400.9.

Exhibits E-2, **E-3** and **E-4** show the potential markets that could be served nonstop from the Airport with minimal or no weight penalties, using the 8,200 foot runway with Boeing 757, Boeing 737 and Embraer 145 aircraft, respectively. The range capabilities, both during the winter and summer seasons, are shown. Because it is not known whether airlines would, in fact, serve some of these destinations from Mammoth Lakes, this data regarding potential markets are provided for information purposes only.

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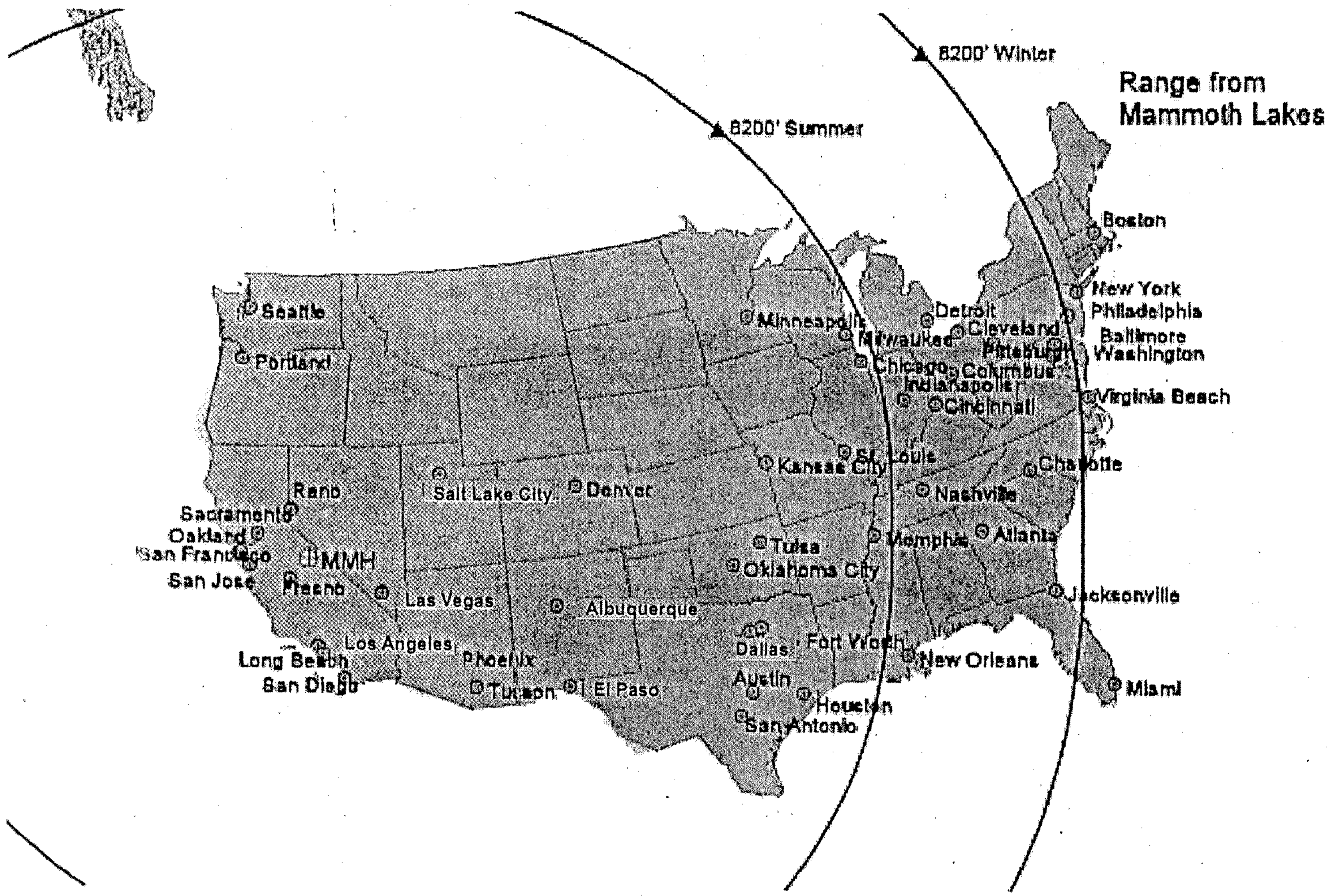


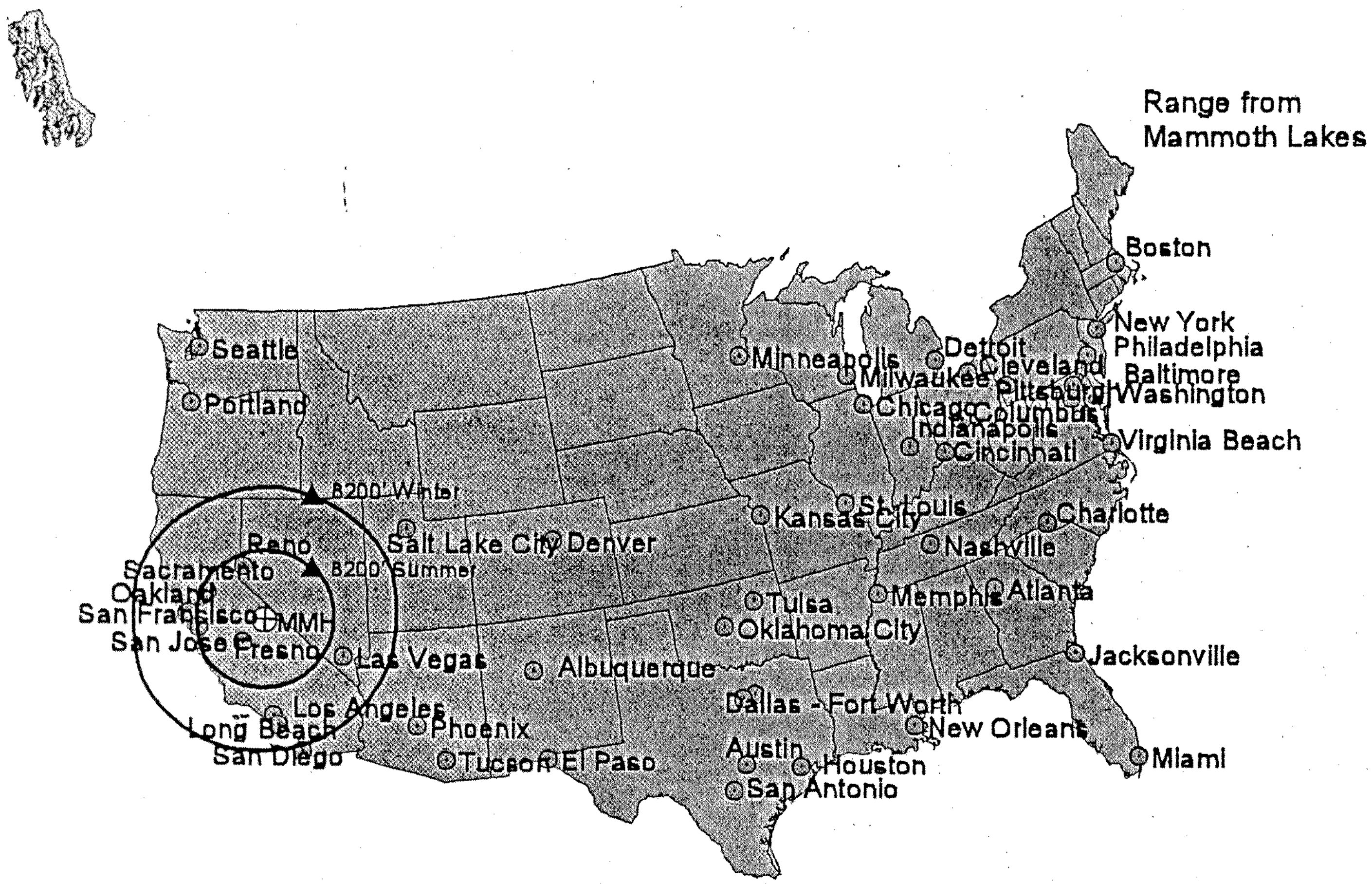
Source: Flight Engineering, Inc.
Prepared by: Ricondo & Associates, Inc.

Exhibit E-2

north

B757-200 Range Capability With Full Payload, Length 8,200 ft.

P:\Mmh\Ea\Draft\Draft.Exhibits\Exhibit.B-2.cdr



Source: Flight Engineering, Inc.
Prepared By: Ricondo & Associates, Inc.

Exhibit E-3

north

B737-800 Range Capability With Full Payload, Length 8,200 ft.

P:\Mmh\WP1.Draft\Exhibits\737_82_Final.cdr (9)

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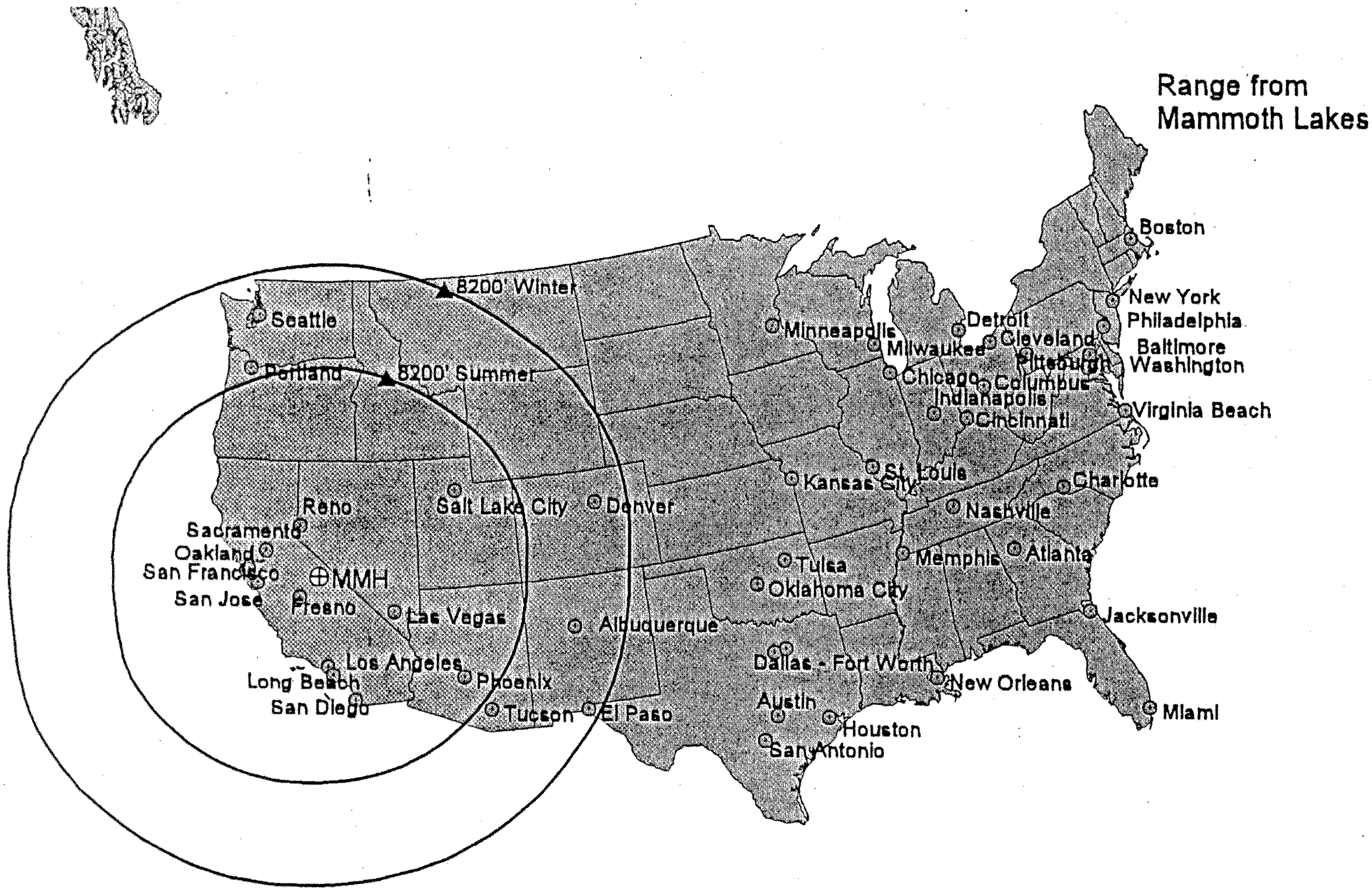

Source: Flight Engineering, Inc.
Prepared By: Ricondo & Associates, Inc.

Exhibit E-4

north

EMB-145LR Range Capability With Full Payload, Runway 9, Length 8,200 ft.

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Appendix F - Aircraft Noise Analysis

F.1 General Characteristics of Aircraft Noise

Aircraft noise originates from both the engines and the airframe of an aircraft, but the engines are by far the more significant source of noise. Loudness, measured in decibels (dB), is the most commonly used characteristic to describe noise. The A-weighted decibel (dBA) is used in aircraft noise studies because it employs a frequency-dependent rating scale that more closely associates sounds and sound frequencies with the sensitivity of the human ear. Some common sounds on the dBA scale, relative to ordinary conversation, are listed in **Table F-1**. As shown in the table, the relative perceived loudness of a sound doubles for each increase of 10 dBA, although a 10-dBA change corresponds to a factor of 10 in relative sound energy. Generally, sounds with differences of 2 dBA or less are not perceived to be noticeably different by most listeners. A noise event produced by a jet aircraft flyover is usually characterized by a buildup to a peak noise level as the aircraft approaches and then a decrease in the noise level, through a series of lesser peaks or pulses, after the aircraft passes and the noise recedes.

Exhibit F-1 illustrates the range of sound produced by, and the average sound level of, several aircraft types that operate at Mammoth Yosemite Airport compared with other sounds such as sirens, motorcycles, and garbage disposals.

Table F-1

Common Sounds On The A-Weighted Decibel Scale

Sound	Sound level (dBA)	Relative loudness (approximate)	Relative sound energy
Rock music, with amplifier	120	64	1,000,000
Thunder, snowmobile (operator)	110	32	100,000
Boiler shop, power mower	100	16	10,000
Orchestral crescendo at 25 feet, noisy kitchen	90	8	1,000
Busy street	80	4	100
Interior of department store	70	2	10
Ordinary conversation, 3 feet away	60	1	1
Quiet automobiles at low speed	50	½	.1
Average office	40	¼	.01
City residence	30	1/8	.001
Quiet country residence	20	1/16	.0001
Rustle of leaves	10	1/32	.00001
Threshold of hearing	0	1/64	.000001

Source: U.S. Department of Housing and Urban Development, Aircraft Noise Impact—Planning Guidelines for Local Agencies, 1972.
Prepared by: Ricondo & Associates, Inc.

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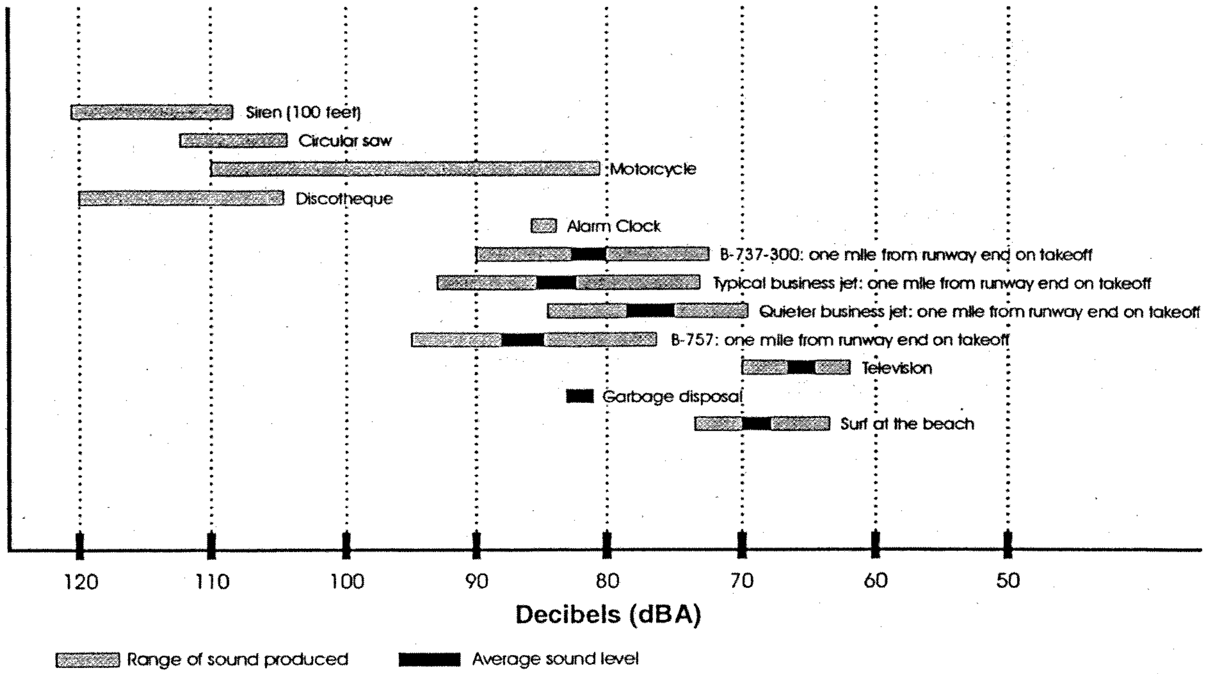
Exhibit F-1
Typical Sound Levels



Source: Brown-Buntin Associates, Inc.
Prepared by: Ricondo & Associates, Inc.

F.2 Noise Analysis Methodology

The methodology used for this aircraft noise analysis involved (1) the use of noise descriptors developed for airport noise analyses, (2) the application of a computer model that provides estimates of aircraft noise levels, and (3) the development of basic data and assumptions as input to the computer model.

F.3 Noise Descriptors

As a result of extensive research into the characteristics of aircraft noise and human response to that noise, a standard system of descriptors has been developed. These descriptors, as used for the EA for Mammoth-Yosemite Airport, are as follows:

F.3.1 A-Weighted Sound Pressure Level

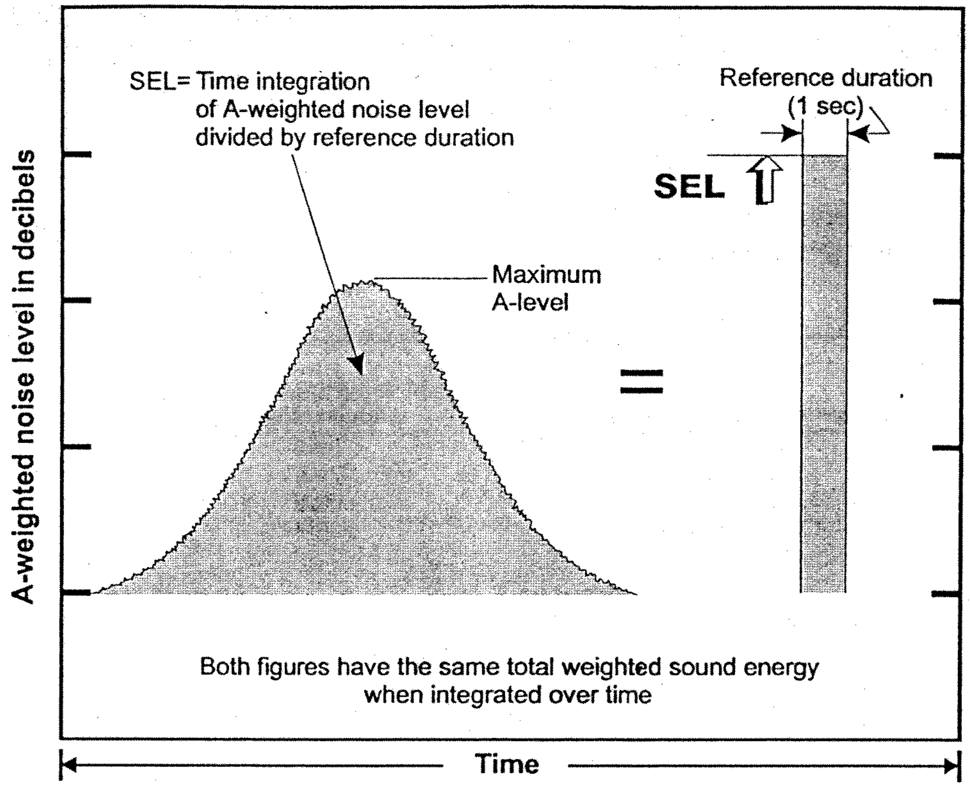
The A-weighted sound pressure level (dBA) is a frequency-weighted sound level in decibels (dB) that correlates with the way sound is heard by the human ear.

F.3.2 Sound Exposure Level

Sound exposure level (SEL) is a time-integrated measure, expressed in decibels, of the sound energy of a single noise event to a reference duration of one second. The sound level is integrated over the period that the level exceeds a threshold (normally 65 dBA for aircraft noise events). Therefore, SEL accounts for both the maximum sound level and the duration of the sound. SELs for aircraft noise events depend on the location of the aircraft relative to the noise receptor, the type of operation (landing, takeoff, or overflight), and the type of aircraft. The SEL concept is depicted on **Exhibit F-2.**

Exhibit F-2

Sound Exposure Level Concept



Source: Brown-Buntin Associates, Inc.
Prepared by: Ricondo & Associates, Inc.

F.3.3 Cumulative Sound Level

As required by the California Airport Noise Regulation (CCR Title 21, Subchapter 6), aircraft noise exposure has been quantified using the Community Noise Equivalent Level (CNEL). CNEL is a method used to describe the existing and predicted cumulative noise exposure from aircraft operations in an airport environ. CNEL values are expressed in dBA and represent the noise level over a 24-hour period. The CNEL values are used to estimate the effects of specific noise levels on land uses.

In the calculation of CNEL, for each hour during the nighttime period (10:00 p.m. to 7:00 a.m.), the sound levels are increased by a 10-decibel weighting penalty (equivalent to a 10-fold increase in aircraft operations) before the 24-hour value is computed. For each hour during the evening (7:00 p.m. to 10:00 p.m.), the sound levels are increased by a 5-decibel weighting penalty. The weighting penalty accounts for the more intrusive nature of noise during the evening and nighttime hours. CNEL is accepted in the State of California as the best method to describe aircraft noise exposure

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and is the noise descriptor preferred by Caltrans (State Division of Aeronautics) for use in aircraft noise exposure analyses and land use compatibility planning in the State of California.

CNEL, as used in the EIR process, is expressed as an average noise level on the basis of annual aircraft operations for a calendar year, not on the average noise levels associated with different aircraft operations. To calculate the CNEL at a specific location, the SELs at that location associated with each individual aircraft operation (landing or takeoff) are determined. Using the SEL for each noise event and applying the 10-decibel penalty for nighttime operations and 5-decibel penalty for evening operations as appropriate, a partial CNEL value is then calculated for each aircraft operation. The partial CNEL values for each aircraft operation are added logarithmically to determine the total CNEL.

The logarithmic addition process, whereby the partial CNELs are combined, can be approximated by the following guidelines presented in **Table F-2**.

Table F-2

When two CNELs differ by:	Add the following amount to the higher value:
0 or 1 dBA	3 dBA
2 or 3 dBA	2 dBA
4 to 9 dBA	1 dBA
10 dBA or more	0 dBA

For example:

70 dBA + 70 dBA (difference: 0 dBA) = 73 dBA
60 dBA + 70 dBA (difference: 10 dBA) = 70 dBA

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Source: Ricondo & Associates, Inc.
Prepared by: Ricondo & Associates, Inc.

Adding the noise from a relatively quiet event (60 dBA) to a relatively noisy event (70 dBA) results in a value of 70 dBA because the quieter event has only 1/10 of the sound energy of the noisier event. As a result, the quieter noise event is "drowned out" by the noisier one, and there is no increase in the overall noise level as perceived by the human ear.

CNEL is used to describe existing and predicted noise exposure in communities in an airport environs based in the average daily operations over the year and the average annual operational conditions at the Airport. Therefore, at a specific location near an airport, the noise exposure on a particular day is likely to be higher or lower than the annual average exposure depending on the specific operations at the airport on that day.

F.4 Integrated Noise Model

The Integrated Noise Model (INM) is a computer model developed by the FAA and required for use in developing noise exposure maps. The INM contains aircraft operational and noise data in an aircraft database, which reflect typical aircraft operating conditions.

Version 6.0 of the INM—the latest accepted, state-of-the-art tool for determining the total effect of aircraft noise at and around airports at the time the noise exposure maps were prepared—was used for the noise analysis. The INM Version 6.0 aircraft database contains a representation of commercial, general aviation, and military aircraft powered by turbojet, turbofan, or propeller-driven engines.

For each aircraft in the database, the following information is provided: (1) a set of departure profiles for each applicable trip length, (2) a set of approach parameters, and (3) SEL versus distance curves for several thrust settings. This information is needed to develop the noise exposure maps based on the CNEL metric.

F.4.1 CNEL and Noise Exposure Ranges

Noise exposure values of CNEL 75, 70, 65, and 60 were used as the criterion levels for the noise analysis. Five specific ranges of noise exposure were estimated: (1) CNEL 75 and higher, (2) CNEL 70 to 75, (3) CNEL 65 to 70, and (4) CNEL 60 to 65. CNEL 75 and higher is considered to be "severe" noise exposure in airport environs and CNEL 65 to 75 is considered to be "significant." CNEL 55 noise exposure values were also developed for information purposes.

F.4.2 Limitations of the CNEL Descriptor

The validity and accuracy of CNEL calculations depend on the basic information used in the calculations. For future airport activities, the reliability of CNEL calculations is affected by a number of uncertainties:

- Aviation activity levels—the forecast number of aircraft operations, the types of aircraft serving the airport, the times of operation (daytime, evening, and nighttime), and aircraft flight tracks—are estimates. Achievement of the estimated levels of activity cannot be assured.
- Aircraft acoustical and performance characteristics are also estimates. When new aircraft designs are involved, aircraft noise data and flight characteristics must be estimated.
- The noise descriptors used as the basis for calculating CNEL represent typical human response (and reaction) to aircraft noise. Because people vary in their responses to noise and because the physical measure of noise accounts for only a portion of an individual's reaction to that noise, CNEL can be used only to obtain an average response to aircraft noise that might be expected from a community.
- Single flight tracks used in computer modeling represent a wider band of actual flight tracks.

These uncertainties aside, CNEL mapping was developed as a tool to assist in land use planning around airports. The mapping is best used for comparative purposes rather than for providing absolute values. That is, CNEL calculations provide valid comparisons between different projected conditions, as long as consistent assumptions and basic data are used for all calculations.

Thus, from a standpoint of noise exposure, sets of CNEL calculations can show anticipated changes in aircraft noise exposure over time, as well as which of a series of simulated situations is better and generally how much better, from the standpoint of noise exposure. However, a line drawn on a map does not imply that a particular noise condition exists on one side of that line and not on the other. CNEL calculations are merely a means for comparing noise effects, not for precisely defining them relative to specific parcels of land.

Nevertheless, CNEL contours can be used to (1) highlight an existing or potential aircraft noise problem that requires attention, (2) assist in the preparation of noise compatibility programs, and

(3) provide guidance in the development of land use controls such as zoning ordinances, subdivision regulations, and building codes. CNEL is considered to be the best methodology available for depicting aircraft noise exposure.

F.4.3 Graphic Representation

Contours are lines on a map that connect points of equal CNEL values. For example, a contour may be drawn to connect all points with a CNEL value of 65, another may be drawn to connect all points with a CNEL value of 60, and so forth. Generally, noise contours are plotted at 5-CNEL intervals.

Noise exposure contours were also reviewed for CNEL 70 and 75 and were found to remain within the airfield boundary. Therefore, for this analysis, the INM was used to produce noise exposure contours for CNEL 55, 60, and 65.

F.5 Basic Data and Assumptions for Developing Noise Exposure Maps

The primary data required to develop noise exposure maps using the INM Version 6.0 are:

- The existing and forecast number of aircraft operations by time of day, aircraft type, and stage length (nonstop departure trip length from the Airport)
- Operational information including use of the runways, location and use of flight tracks (the paths that pilots fly to arrive at and depart from the airport), departure profiles, existing noise abatement procedures, etc.

F.5.1 Aircraft Operations

To determine existing and forecast aircraft noise exposure, aircraft operations associated with the average day of the year are used in INM. The number of aircraft operations for the average day of a calendar year is typically used in the development of noise exposure maps. The number of aircraft operations by type of operation, aircraft type, and time of day, for the average day in 1999 is provided in **Table F-3**. The operations for the average day in 1999 were based on interviews with Airport staff and the fixed based operator. The forecasts of operations for the average day in 2003, 2007, and 2017 for the growth of operations with the existing runway, shown in **Table F-4**, were derived from the annual forecasts provided in Table I-1. The forecasts of operations for the average day in 2003, 2007, and 2017 for the growth of operations with the runway alternatives permitting air carrier operations, shown in **Table F-5**, were derived from the annual forecasts provided in Table I-1.

As shown in Table F-2, approximately 16 average daily aircraft operations (approximately eight departures and eight arrivals) occurred at the Airport in 1999. In accordance with the forecasts of operations, approximately 18 average daily operations with the existing runway configuration and 24 average daily operations with the runway expansion alternatives will occur at the Airport in 2003. Approximately 21 average daily operations are anticipated to occur at the Airport with the existing runway configuration and 39 average daily operations with the runway expansion alternatives.

F.5.1.1 Aircraft Fleet Mix

The generalized aircraft categories listed in Tables F-3, F-4, and F-5 provide general descriptions of the aircraft. The INM aircraft types listed in the tables are those from the INM database that were actually used for the analysis. The INM aircraft types provide representative noise characteristics of a large variety of aircraft types that have operated and are anticipated to operate at the Airport.

Table F-3

1999 INM Fleet Mix Assumptions

	Average Day Operations					
Aircraft (a)	Day	Evening	Night	Total	Annual operations	Percent
Beech 1900	-	-	-	-	-	0.0%
Gulfstream/Challenger	0.164	0.001	-	0.164	60	1.0%
Lear 35	0.736	0.004	-	0.740	270	4.5%
Citation	0.736	0.004	-	0.740	270	4.5%
Twin turboprop	0.701	0.026	0.013	0.740	270	4.5%
Twin prop	2.932	0.108	0.056	3.096	1,130	18.8%
Large single engine prop	5.332	0.099	0.049	5.479	2,000	33.3%
Small single engine prop	5.332	0.099	0.049	5.479	2,000	33.3%
Total	16.009	0.292	0.137	16.438	6,000	100.0%

(a) Representative aircraft types from the Integrated Noise Model database may be used to estimate noise levels from a variety of similar aircraft types with similar noise and operational characteristics. This does not imply that it is anticipated that only these specific types of aircraft have or will be operated at the Airport.

Source: Ricondo & Associates based on interviews with Airport and fixed based operator staff, March 2000

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Table F-4

INM Fleet Mix - Base Case Without Air Carrier Operations

2003	Average Day Operations				
Aircraft (a)	Day	Evening	Night	Total	Annual Operations
B-757-200	-	-	-	-	-
B-737-800/A-319	-	-	-	-	-
BAE-146	-	-	-	-	-
Regional jet	-	-	-	-	-
30 seat commuter	-	-	-	-	-
19 seat commuter	-	-	-	-	-
Gulfstream/Challenger	0.180	0.001	-	0.181	70
Lear 35	0.810	0.004	-	0.814	300
Citation	0.810	0.004	-	0.814	300
Twin turboprop	0.771	0.028	0.015	0.814	300
Twin prop	3.225	0.119	0.061	3.405	1,240
Large single engine prop	5.865	0.108	0.054	6.027	2,200
Small single engine prop	5.865	0.108	0.054	6.027	2,200
Total	17.524	0.374	0.184	18.082	6,610

2007	Average Day Operations				
Aircraft (a)	Day	Evening	Night	Total	Annual operations
B-757-200	-	-	-	-	-
B-737-800/A-319	-	-	-	-	-
BAE-146	-	-	-	-	-
Regional jet	-	-	-	-	-
30 seat commuter	-	-	-	-	-
19 seat commuter	-	-	-	-	-
Gulfstream/Challenger	0.207	0.001	-	0.208	80
Lear 35	0.932	0.005	-	0.937	340
Citation	0.932	0.005	-	0.937	340
Twin turboprop	0.887	0.033	0.017	0.937	340
Twin prop	3.714	0.137	0.071	3.921	1,430
Large single engine prop	6.753	0.125	0.062	6.941	2,530
Small single engine prop	6.753	0.125	0.062	6.941	2,530
Total	20.179	0.430	0.212	20.822	7,590

2022	Average Day Operations				
Aircraft (a)	Day	Evening	Night	Total	Annual operations
B-757-200	-	-	-	-	-
B-737-800/A-319	-	-	-	-	-
BAE-146	-	-	-	-	-
Regional jet	-	-	-	-	-
30 seat commuter	-	-	-	-	-
19 seat commuter	-	-	-	-	-
Gulfstream/Challenger	0.328	0.002	-	0.330	120
Lear 35	1.478	0.007	-	1.486	540
Citation	1.478	0.007	-	1.486	540
Twin turboprop	1.407	0.052	0.027	1.486	540
Twin prop	5.888	0.218	0.112	6.218	2,270
Large single engine prop	10.707	0.198	0.099	11.005	4,020
Small single engine prop	10.707	0.198	0.099	11.005	4,020
Total	31.995	0.682	0.337	33.014	12,050

(a) Representative aircraft types from the Integrated Noise Model database may be used to estimate noise levels from a variety of similar aircraft types with similar noise and operational characteristics. This does not imply that it is anticipated that only these specific types of aircraft have or will be operated at the Airport.

Source: Ricondo & Associates, Inc., March 2000
Prepared By: Ricondo & Associates, Inc.

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Table C-5

INM FLEET MIX - Base Case With Air Carrier Operations

2002

Aircraft (a)	Average Day Operations: Day	Evening	Night	Total	Annual Operations
B-757-200	1.644	-	-	1.644	600
B-737-800/A-319	-	-	-	-	-
BAE-146	-	-	-	-	-
Regional jet	-	-	-	-	-
30 seat commuter	2.137	-	-	2.137	780
19 seat commuter	1.918	-	-	1.918	700
Gulfstream/Challenger	0.180	0.001	-	0.181	70
Lear 35	0.810	0.004	-	0.814	300
Citation	0.810	0.004	-	0.814	300
Twin turboprop	0.771	0.028	0.015	0.814	300
Twin prop	3.225	0.119	0.061	3.405	1,240
Large single engine prop	5.865	0.108	0.054	6.027	2,200
Small single engine prop	5.865	0.108	0.054	6.027	2,200
Total	23.223	0.374	0.184	23.781	8,690

2007

Aircraft (a)	Average Day Operations: Day	Evening	Night	Total	Annual Operations
B-757-200	2.356	-	-	2.356	860
B-737-800/A-319	2.137	-	-	2.137	780
BAE-146	0.795	-	-	0.795	290
Regional jet	1.342	-	-	1.342	490
30 seat commuter	5.589	-	-	5.589	2,040
19 seat commuter	5.589	-	-	5.589	2,040
Gulfstream/Challenger	0.207	0.001	-	0.208	80
Lear 35	0.932	0.005	-	0.937	340
Citation	0.932	0.005	-	0.937	340
Twin turboprop	0.887	0.033	0.017	0.937	340
Twin prop	3.714	0.137	0.071	3.921	1,430
Large single engine prop	6.753	0.125	0.062	6.941	2,530
Small single engine prop	6.753	0.125	0.062	6.941	2,530
Total	37.987	0.430	0.212	38.630	14,090

2022

Aircraft (a)	Average Day Operations: Day	Evening	Night	Total	Annual Operations
B-757-200	4.932	-	-	4.932	1,800
B-737-800/A-319	4.384	-	-	4.384	1,600
BAE-146	2.055	-	-	2.055	750
Regional jet	2.329	-	-	2.329	850
30 seat commuter	9.041	-	-	9.041	3,300
19 seat commuter	9.041	-	-	9.041	3,300
Gulfstream/Challenger	0.328	0.002	-	0.330	120
Lear 35	1.478	0.007	-	1.486	540
Citation	1.478	0.007	-	1.486	540
Twin turboprop	1.407	0.052	0.027	1.486	540
Twin prop	5.888	0.218	0.112	6.218	2,270
Large single engine prop	10.707	0.198	0.099	11.005	4,020
Small single engine prop	10.707	0.198	0.099	11.005	4,020
Total	63.775	0.682	0.337	64.795	23,650

(a) Representative aircraft types from the Integrated Noise Model database may be used to estimate noise levels from a variety of similar aircraft types with similar noise and operational characteristics. This does not imply that it is anticipated that only these specific types of aircraft have or will be operated at the Airport.

Source: Ricondo & Associates, Inc., March 2000
Prepared By: Ricondo & Associates, Inc.

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Under some circumstances, it is appropriate to combine aircraft with similar engine types, numbers of engines, weights, performance characteristics, and (most importantly) noise exposure characteristics for the purposes of noise modeling. Examples of such circumstances include the following:

- A particular aircraft type that may not be included in the INM database may be modeled using a similar aircraft type that is included in the database.
- Only a small number of operations of a particular aircraft may occur at an Airport while a large number of operations of a similar aircraft occur at the Airport. The few operations of the first type could be combined with the operations of the more predominant aircraft type without producing a measurable effect on the noise analysis.
- The FAA has provided some aircraft types that are representative of a wide variety of specific aircraft types and can, therefore, be used to represent the wide variety of aircraft types. The best examples of this are corporate and general aviation aircraft that can be modeled using a series of aircraft types that are representative of the overall fleet. For example, the INM aircraft type "GASEPV" is representative of a wide variety of general aviation single engine propeller aircraft.

The FAA has provided a list of pre-approved aircraft substitutions that can be used for noise modeling purposes using the INM. All aircraft substitutions used in this analysis were consistent with the pre-approved list.

Aircraft noise characteristics can be classified according to federal noise level standards specified in FAR Part 36, "Noise Standards, Aircraft Type, and Airworthiness Certification," as meeting Stage 1 (noisiest), Stage 2 (quieter), or Stage 3 (quietest) standards. As of July 1, 1985, Stage 1 aircraft could no longer be operated in the United States. In accordance with the Airport Noise and Capacity Act of 1990, the FAA established a schedule for phasing out the use of FAR Part 36 Stage 2 aircraft weighing more than 75,000 pounds in favor of FAR Part 36 Stage 3 aircraft within the 48 contiguous states. FAR Part 91, "General Operating and Flight Rules," specifies that after December 31, 1999, no person may operate an FAR Part 36 Stage 2 aircraft over 75,000 pounds in the contiguous United States.

Airlines and other operators of jet aircraft weighing more than 75,000 pounds were provided the option of (1) replacing Stage 2 aircraft with Stage 3 aircraft or (2) modifying Stage 2 aircraft through re-engineering, hushkitting, or modifying the operational procedures of the aircraft to meet Stage 3 noise standards. Most of the major airlines have used a combination of the two methods and have relied to a certain extent on modifying Stage 2 aircraft to meet Stage 3 noise standards. Given the high altitude of the Airport and performance requirements of air carrier aircraft planned to operate at the Airport, it is anticipated that newer, higher performance Stage 3 aircraft, such as the B-757, would be utilized.

F.5.1.2 Time of Day

Interviews with Airport staff and the fixed based operator at the Airport were used to determine the number of operations occurring during the daytime hours (7:00 a.m. to 7:00 p.m.), evening hours (7:00 p.m. to 10:00 p.m.), and nighttime hours (10:00 p.m. to 7:00 a.m.), which are listed by aircraft type in Tables F-3, F-4, and F-5. As stated in the aeronautical charts and information for the Airport, operations after dark are not recommended at the Airport, and therefore, the number of evening and nighttime operations are relatively small. It was assumed that the split between daytime, evening, and nighttime operations for each aircraft type would be the same in forecast years as that presented for 1999. It is also assumed that air carrier operations would occur during daytime hours.

F.5.1.3 Departure Trip Length (Stage Length)

Departure trip length, also called stage length (unrelated to "Stage" classifications of aircraft for FAR Part 36 noise certification), refers to the non-stop distance an aircraft travels after departure. This information is needed to determine average gross takeoff weights for the different aircraft types. The noise generated by departures of a specific aircraft type will vary depending on the takeoff weights of the particular operations. For example, a fully loaded aircraft departing on a long flight will weigh more on departure than the same fully loaded aircraft departing on a shorter flight, because the longer flight requires more fuel on board. It usually takes the heavier aircraft longer to reach its take off velocity, thereby using more runway length, and it then climbs at a slower rate than a lighter aircraft, particularly on hot days. Therefore, more land area will be exposed to higher levels of aircraft noise by departures of heavier aircraft than departures of the same aircraft with lighter loads.

In the INM, up to seven different stage length categories have been established representing different departure trip length distances, as presented in **Table F-6**.

Table F-6
INM Departure Stage Length Categories

Stage Length Category	Range of Departure Trip Length (nautical miles)
1	0 – 500
2	500 – 1,000
3	1,000 – 1,500
4	1,500 – 2,500
5	2,500 – 3,500
6	3,500 – 4,500
7	4,500 +

Source: Federal Aviation Administration, *INM User's Guide*
Prepared by: Ricondo & Associates, Inc.

Interviews with Airport staff, the fixed based operator, and American Airlines were used to determine the departure stage lengths as presented in **Table F-7**. The INM uses the stage length category for each operation to determine which profile to use for a specific aircraft departure. In most cases, using the published departure distances to determine the stage length, and therefore, the departure profile to be used, provides good correlation between noise levels estimated by the INM and measured noise levels.

F.5.2 Airport Operational Information

The existing and assumed future uses of the runways and flight tracks to and from the Airport are important in determining where aircraft are flying and, therefore, the noise levels generated in the Airport environs.

F.5.2.1 Runway Use

Runway use at an airport is typically a function of the prevailing wind and weather conditions, the lengths and widths of the runways, the instrumentation of the runways, the obstructions or terrain in the vicinity of the airport, and the effects of other airports or air facilities in the area. To a certain extent, runway use is also determined based on the destination of a departing aircraft or origination of an arriving aircraft and the location of the aircraft parking position on the ground. Of these factors,

Table F-7
INM Fleet Mix - Aircraft Stage Lengths

Aircraft	Stage Length 1	Stage Length 2	Stage Length 3	Total
B-757-200	0%	0%	100%	100%
B-737-800/A-319	0%	100%	0%	100%
BAE-146	100%	0%	0%	100%
Regional jet	100%	0%	0%	100%
30 seat commuter	100%	0%	0%	100%
19 seat commuter	100%	0%	0%	100%
Gulfstream/Challenger	100%	0%	0%	100%
Lear 35	100%	0%	0%	100%
Citation	100%	0%	0%	100%
Twin turboprop	100%	0%	0%	100%
Twin prop	100%	0%	0%	100%
Large single engine prop	100%	0%	0%	100%
Small single engine prop	100%	0%	0%	100%

Note: Stage lengths are based on standard classifications. Stage 1 = 0 to 500 nautical miles; Stage 2 = 500 – 1,000 nautical miles; Stage 3 = 1,000 – 1,500 nautical miles. The use of the term "Stage" in this context has no reference to FAR Part 36 noise standards.

Source: Ricondo & Associates, Inc., March 2000
Prepared By: Ricondo & Associates, Inc.

wind and weather conditions and terrain in the vicinity of the Airport primarily affect runway use at Mammoth-Yosemite Airport. Typically, arrivals on Runway 27 are preferred due to prevailing winds and terrain. However, because of terrain northwest of the Airport that can affect the takeoff weight allowable for an aircraft, larger aircraft tend to prefer departing on Runway 9.

F.5.2.2 Aircraft Flight Tracks

Flight track information is another important input to the INM. However, inputting the individual tracks for each aircraft operation is not possible, and the FAA suggests that flight tracks be consolidated into a generalized set that is representative of all of the flight tracks into and out of the Airport. Deviations from the generalized flight tracks occur because of weather conditions, pilot technique, air traffic control proeedures, and aircraft weight. However, the generalized flight tracks do provide representative tracks for arrivals and departures at the Airport. The generalized arrival and departure tracks assumed for the noise analysis for the existing airfield are shown in **Exhibit F-3**. The generalized flight tracks for the runway alternatives do not change significantly except that the start and end locations of the tracks change with the length/location of the runway. **Exhibit F-4** shows the generalized arrival and departure flight tracks for Alternative 2 as an example. The same flight tracks were used for the each year analyzed.

Because of terrain to the west of the Airport, air carrier jet aircraft departing Runway 27 were assumed to follow a departure procedure, track T04, in which aircraft make a slight left turn off of the runway and roughly follow U.S. Highway 395 to gain altitude before turning right. Air carrier aircraft are not expected to turn right immediately from Runway 27.

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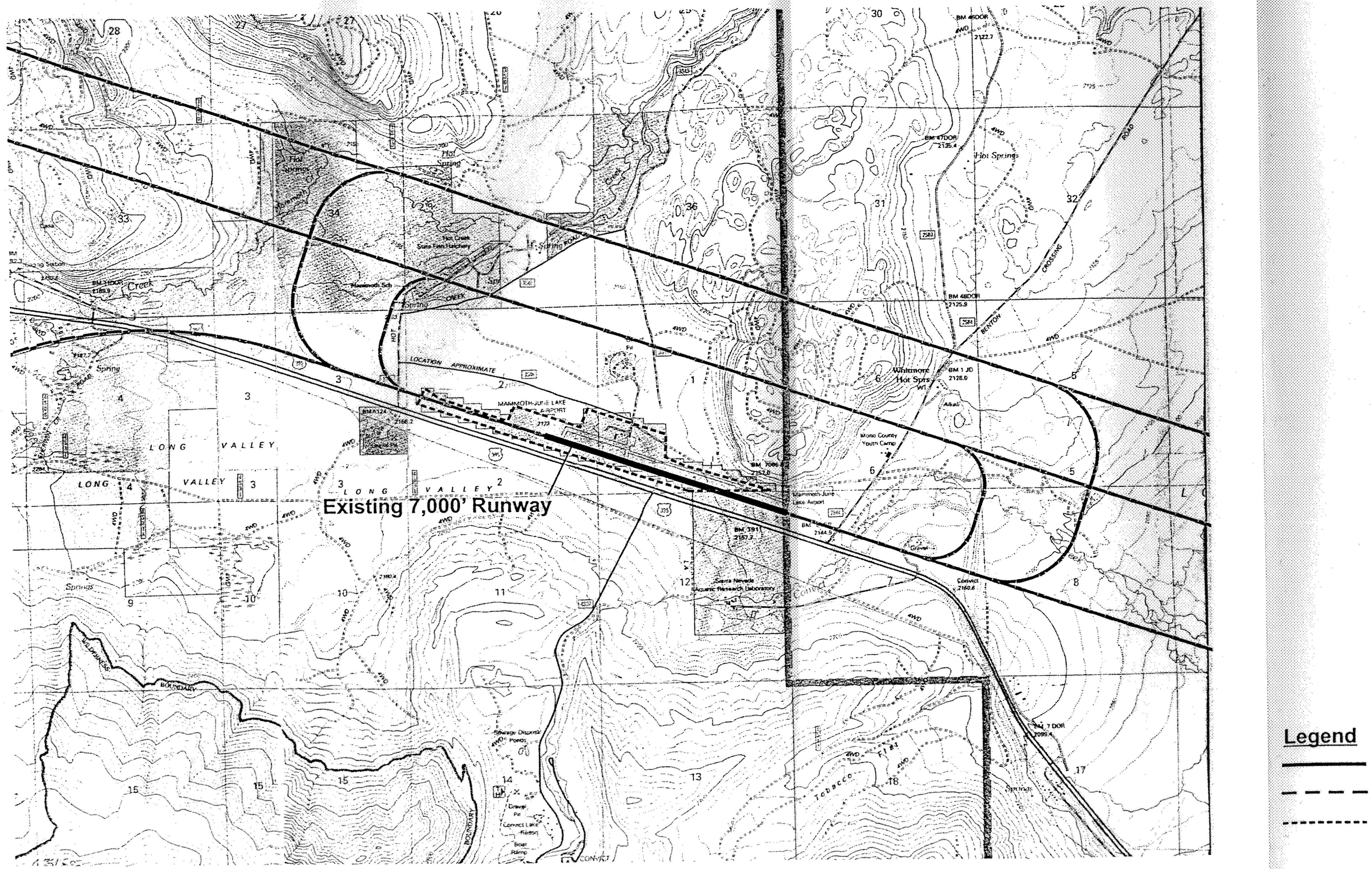

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Source: Brown-Buntin Associates, Inc.
Prepared by: Ricondo & Associates, Inc.

north

Scale 1" = 3000

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Exhibit F-3

Existing 1999 Flight Tracks

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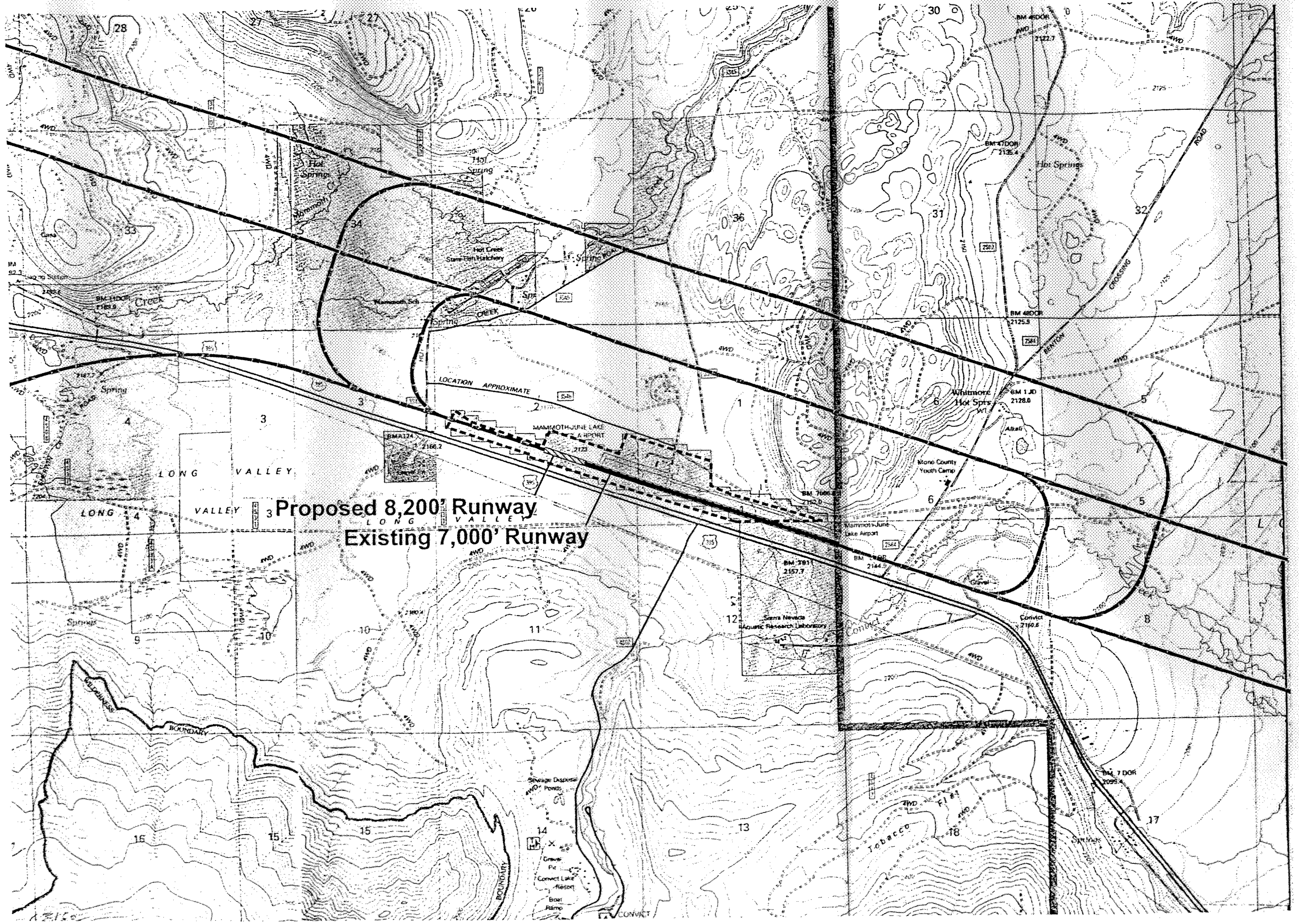

Source: Brown-Buntin Associates, Inc.
Prepared by: Ricondo & Associates, Inc.

Exhibit F-4

north

Scale 1" = 3000

Proposed Project - 8,200' Runway Flight Tracks

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The generalized flight tracks are used in differing percentages by different aircraft types. The estimated percentage use of the flight tracks and runway use is provided for each aircraft category in **Table F-8**.

Table F-8
INM Flight Track Distribution Assumptions

Departures	RW27 T01	RW27 T02	RW27 T03	RW09 T04	RW09 T05	RW09 T06	
ACJets	26.3%	0.0%	0.0%	73.7%	0.0%	0.0%	100.0% (a)
Business jets	32.9%	0.0%	0.0%	67.1%	0.0%	0.0%	100.0% (b)
Commuter/turboprop	32.9%	0.0%	0.0%	67.1%	0.0%	0.0%	100.0% (b)
Twin engine props	27.4%	41.0%	0.0%	23.7%	7.9%	0.0%	100.0% (c)
Single engine props	27.4%	13.7%	27.4%	19.0%	3.2%	9.5%	100.0% (c)
Arrivals	RW27 L01	RW27 L02	RW27 L03	RW09 L04	RW09 L05	RW09 L06	
ACJets	68.4%	0.0%	0.0%	31.6%	0.0%	0.0%	100.0% (d)
Business jets	68.4%	0.0%	0.0%	31.6%	0.0%	0.0%	100.0% (d)
Commuter/turboprop	68.4%	0.0%	0.0%	31.6%	0.0%	0.0%	100.0% (d)
Twin engine props	47.9%	13.7%	6.8%	11.1%	17.4%	3.2%	100.0% (d)
Single engine props	41.0%	20.5%	6.8%	11.1%	17.4%	3.2%	100.0% (d)

(a) Assumes preference to depart Runway 9 with up to 5 knot tailwind based on daytime (7:00 a.m. through 7:00 p.m.) wind data
(b) Assumes preference to depart Runway 9 up to 3 knot tailwind (calm conditions) based on daytime wind data
(c) Assumes preference to depart Runway 27 up to 3 knot tailwind (calm conditions) based on daytime wind data
(d) Assumes preference to land Runway 27 up to 3 knot tailwind (calm conditions) based on daytime wind data

Source: Ricondo & Associates, Inc., March 2000
Prepared By: Ricondo & Associates, Inc.

F.5.2.3 Other Assumptions

In addition to the runway use and flight track information, the following conditions were assumed in developing noise exposure maps for the Airport:

- Departure profiles for air carrier jet aircraft, general aviation jet aircraft, general aviation and commuter turboprop aircraft, and general aviation single-engine propeller aircraft are those typical of aircraft in each of these classifications.
- All approaches flown by jet and turboprop aircraft follow a flight track descending along a three-degree glide-slope, with touchdown at a point 1,000 feet beyond the threshold of the runway.
- All approaches flown by multi-engine piston and single-engine aircraft follow a flight track descending at a five-degree glide-slope, with a touchdown point 575 feet beyond the threshold of the runway.

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- Noise, thrust, and altitude information for each specific aircraft is as specified in the INM Version 6.0 aircraft database.

F.6 Land Use Compatibility Guidelines

Estimates of total noise exposure resulting from aircraft operations, as expressed in CNEL values, can be interpreted in terms of the probable effect on land uses. Suggested compatibility guidelines for evaluating land uses in aircraft noise exposure areas developed by the FAA are provided in **Table F-9**. Compatible or incompatible land use is determined by comparing the predicted or measured day-night average noise level (DNL) at a site with the values given in the table. The DNL metric is used by the FAA for noise analysis and differs from the CNEL metric in that 5 dBA is not added to evening operations. However, the land use compatibility guidelines for these DNL levels are consistent with CNEL. The guidelines reflect the statistical variability of the responses of large groups of people to noise. Therefore, any particular level might not accurately assess an individual's perception of or reaction to an actual noise environment.

Each generalized land use listed in Table F-8 includes a wide range of human activities having various sensitivities to noise intrusions. CNEL values and the associated listings of compatible and incompatible land uses in the table should be interpreted only as indications of the effect aircraft noise has on people living and working in areas surrounding an airport. Although specific CNEL values are obtained from a noise analysis, they do not dictate certain consequences. They are merely intended to guide a community in land use development.

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Table F-9

Suggested Land Use Compatibility Guidelines In Aircraft Noise Exposure Areas

The designations in this table do not constitute a federal determination that any use of land is acceptable or unacceptable under federal, state, or local law. The responsibility for determining the acceptable and permissible land uses and the relationship between specific properties and specific noise contours rests with the local authorities.

Land use	CNEL 65 to 70	CNEL 70 to 75	CNEL 75+
Residential			
Residential other than mobile homes and transient lodgings	NLR required *(a)*	NLR required *(a)*	Incompatible
Mobile homes	Incompatible	Incompatible	Incompatible
Transient lodgings	NLR required *(a)*	NLR required *(a)*	NLR required *(b)*
Public use			
Schools, hospitals, and nursing homes	NLR required *(a)*	NLR required *(a)*	Incompatible
Churches, auditoriums, and concert halls	NLR required *(a)*	NLR required *(a)*	Incompatible
Governmental services	Compatible	NLR required	NLR required *(b)*
Transportation	Compatible	Compatible *(c)*	Compatible *(c)*
Parking	Compatible	Compatible *(c)*	Compatible *(c,d)*
Commercial use			
Offices, business, and professional	NLR required	NLR required	NLR required *(b)*
Wholesale and retail—building materials, hardware, and farm equipment	Compatible	Compatible *(c)*	Compatible *(c,d)*
Retail trade—general	NLR required	NLR required	NLR required *(b)*
Utilities	Compatible	Compatible *(c)*	Compatible *(c,d)*
Communication	NLR required	NLR required	NLR required *(b)*
Manufacturing and production			
Manufacturing—general	Compatible	Compatible *(c)*	Compatible *(c, d)*
Photographic and optical	Compatible	NLR required	NLR required *(b)*
Agriculture (except livestock) and forestry	Compatible	Compatible	Compatible
Livestock farming and breeding	Compatible	Compatible	Incompatible
Mining and fishing resources production and extraction	Compatible	Compatible	Compatible
Recreational			
Outdoor sports arenas and spectator sports	Compatible	Compatible	Incompatible
Outdoor music shells, amphitheaters	Incompatible	Incompatible	Incompatible
Nature exhibits and zoos	Compatible	Incompatible	Incompatible
Amusements, parks, resorts, and camps	Compatible	Compatible	Incompatible
Golf courses, riding stables, and water recreation	Compatible	Compatible	Incompatible *(b, c)*

CNEL = Community Noise Equivalent Level average sound level, in A-weighted decibels.

Compatible = Generally, no special noise attenuating materials are required to achieve an interior noise level of DNL 45 in habitable spaces, or the activity (whether indoors or outdoors) would not be subject to a significant adverse effect by the outdoor noise level.

Incompatible = Generally, the land use, whether in a structure or an outdoor activity, is considered to be incompatible with the outdoor noise level even if special attenuating materials were to be used in the construction of the building.

NLR = Noise Level Reduction. NLR is used to denote the total amount of noise transmission loss in decibels required to reduce an exterior noise level in habitable interior spaces to DNL 45. In most places, typical building construction automatically provides an NLR of 20 decibels. Therefore, if a structure is located in an area exposed to aircraft noise of DNL 65, the interior noise level would be about DNL 45. If the structure is located in an area exposed to aircraft noise of DNL 70, the interior noise level would be about DNL 50, so an additional NLR of 5 decibels would be required if not afforded by the normal construction. This NLR can be achieved through the use of noise attenuating materials in the construction of the structure.

(a) The land use is generally incompatible with aircraft noise and should only be permitted in areas of infill in existing neighborhoods or where the community determines that the use must be allowed.
(b) NLR required between DNL 75 and 80; incompatible for DNL 80 and above.
(c) NLR required in offices or other areas with noise-sensitive activities.
(d) Incompatible for DNL 85 and above.

Source: Ricondo & Associates, 2000, as derived from the U.S. Department of Transportation, Federal Aviation Administration, Federal Aviation Regulations Part 150, *Airport Noise Compatibility Planning*, Code of Federal Regulations, Title 14, Chapter I, Subchapter I, Part 150, Table 1, January 18, 1985, as amended

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Appendix G – Air Quality Construction Emissions Calculations

This appendix contains input data and assumptions for the construction emissions analysis conducted during the preparation of the environmental assessment for Mammoth Yosemite Airport.

Construction related emissions associated with the proposed action, the no build action, and other alternatives considered in the environmental assessment were estimated using standard emissions calculation/modeling techniques. Pollutant emissions from Non-Road construction equipment and On-Road construction equipment were evaluated separately.

Non-Road vehicles are defined as equipment that do not travel on highways (e.g., Dozers, Loaders, Cranes, etc.). Emissions factors for non-road vehicles equipped with gasoline-powered engines were derived from the EPA document *AP-42: Compilation of Air Pollutant Emissions Factors: Mobile Sources* (April, 1998). Emissions factors for diesel-powered engines were derived from Tier 1 standards regulated under *40 CFR, Part 89.112* (USEPA, September 1997). **Table G-1** summarizes all of the individual input data and assumptions used to determine pollutant emissions factors for nonroad equipment (Alternatives 2 and 5). **Table G-3** presents similar information for Alternatives 3 and 4.

On-road vehicles include equipment that can and would travel on highways (e.g., cars, light duty trucks, tractor trailers, etc.). On-road emissions factors were calculated using the California Air Resources Board's EMFAC7G pollutant emissions factor model. This model determines the emissions factors of 10 different types of vehicles (light duty automobiles, light heavy diesel trucks, etc.), vehicle technology type (non-catalyst and catalyst gasoline-powered vehicles and diesel powered vehicles), the season of year, average ambient temperature, and average speed. **Tables G-2** and **G-4** list all of the individual factors used in the determination of pollutant emissions factors for on-road equipment. **Table G-5** presents the raw data output of the EMFAC7G model.

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Table G-1
Non-Road Construction Emissions -- Alternatives 2 and 5

Phase	Equipment	Fuel Type	Total Hours	Load Factor	Horse Power	Conversion Factor (lb to ton)	HC (lb/hp-hr)	CO (lb/hp-hr)	NOx (lb/hp-hr)	PM10 (lb/hp-hr)	VOC (tons/yr)	CO (tons/yr)	NOx (tons/yr)	PM10 (tons/yr)
Clearing & Grubbing	Dozer	D	144	55%	305	0.0005	0.00087	0.00314	0.01537	0.00143	0.01	0.04	0.19	0.02
	Scraper	D	192	72%	450	0.0005	0.00087	0.00314	0.01537	0.00143	0.03	0.10	0.48	0.04
	Blade	D	96	72%	450	0.0005	0.00087	0.00314	0.01537	0.00143	0.01	0.05	0.24	0.02
Excavation	Blade	D	600	72%	450	0.0005	0.00087	0.00314	0.01537	0.00143	0.08	0.31	1.49	0.14
	Scraper	D	1600	72%	450	0.0005	0.00087	0.00314	0.01537	0.00143	0.23	0.81	3.98	0.37
	Compactor	D	800	53%	100	0.0005	0.00111	0.00361	0.01644	0.00149	0.02	0.08	0.35	0.03
	Dozer	D	800	55%	305	0.0005	0.00087	0.00314	0.01537	0.00143	0.06	0.21	1.03	0.10
Subgrade-Scarify&Recompact	Blade	D	192	72%	450	0.0005	0.00087	0.00314	0.01537	0.00143	0.03	0.10	0.48	0.04
	Compactor	D	384	53%	100	0.0005	0.00111	0.00361	0.01644	0.00149	0.01	0.04	0.17	0.02
Aggregate Subbase	Blade	D	1200	72%	450	0.0005	0.00087	0.00314	0.01537	0.00143	0.17	0.61	2.99	0.28
	Dozer	D	240	55%	305	0.0005	0.00087	0.00314	0.01537	0.00143	0.02	0.06	0.31	0.03
	Compactor	D	160	53%	100	0.0005	0.00111	0.00361	0.01644	0.00149	0.00	0.02	0.07	0.01
Aggregate Base	Blade	D	1800	72%	450	0.0005	0.00087	0.00314	0.01537	0.00143	0.25	0.92	4.48	0.42
	Dozer	D	360	55%	305	0.0005	0.00087	0.00314	0.01537	0.00143	0.03	0.09	0.46	0.04
	Compactor	D	240	53%	100	0.0005	0.00111	0.00361	0.01644	0.00149	0.01	0.02	0.10	0.01
Heater Remix	Heater Rig	G	96	68%	25	0.0005	0.02148	0.43659	0.01056	0.00072	0.02	0.36	0.01	0.00
	Sweeper	D	96	68%	97	0.0005	0.00186	0.00495	0.01676	0.00154	0.01	0.02	0.05	0.00
	Tractor	D	48	55%	90	0.0005	0.00186	0.00495	0.01676	0.00154	0.00	0.01	0.02	0.00
	Roller	D	96	56%	145	0.0005	0.00111	0.00361	0.01644	0.00149	0.00	0.01	0.06	0.01
Bituminous Surface Course	Paver	D	200	62%	130	0.0005	0.00111	0.00361	0.01644	0.00149	0.01	0.03	0.13	0.01
	Roller	D	800	56%	145	0.0005	0.00111	0.00361	0.01644	0.00149	0.04	0.12	0.53	0.05
	F.E. Loader-Tractor	D	200	55%	160	0.0005	0.00111	0.00361	0.01644	0.00149	0.01	0.03	0.14	0.01
Portland Cement Concrete Pavement	Batch Plant	D	48	78%	127	0.0005	0.00111	0.00361	0.01644	0.00149	0.00	0.01	0.04	0.00
	Paver	D	48	62%	130	0.0005	0.00111	0.00361	0.01644	0.00149	0.00	0.01	0.03	0.00
	Finish Machine	D	96	53%	100	0.0005	0.00111	0.00361	0.01644	0.00149	0.00	0.01	0.04	0.00
	Saw	D	96	73%	56	0.0005	0.00186	0.00495	0.01676	0.00154	0.00	0.01	0.03	0.00
	Sweeper	D	48	68%	97	0.0005	0.00186	0.00495	0.01676	0.00154	0.00	0.01	0.03	0.00
	F.E. Loader-Tractor	D	48	55%	160	0.0005	0.00111	0.00361	0.01644	0.00149	0.00	0.01	0.03	0.00

Notes:
1. Load Factor based on information contained in the EPA document *Median Life, Annual Activity, and Load Factor Value for Nonroad Engine Emissions Modeling* (Report NR-005a)
2. Emissions factors are determined by fuel type and horsepower in conjunction with Tier 1 standards
3. NO_x emissions factors determined using AP-42 and Tier 1 standards
4. VOC emissions factors determined using AP-42 or Tier 1 standards for Hydrocarbons
5. Hydrocarbon emissions converted to VOC emissions according to the methodology presented in the EPA document *Conversion Factors for Hydrocarbon Emission Components* (Report NR-002)
6. The conversion factor listed is used to translate lb/yr to tons/yr.
7. Tier 1 standards from Federal Register, October 23, 1998, page 57001, Table 1

Source: Brandley Engineering and Ricondo & Associates, Inc.
Prepared by: Ricondo & Associates, Inc.

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Table G-1 (Cont.)
Non-Road Construction Emissions Alternative 2

Non-Road Construction Pollutant Emissions

Phase	Equipment	Fuel Type	Total Hours	Load Factor	Horse Power	Conversion Factor (lb to ton)	Emissions in lb/hp-hr HC	CO	NOx	PM10	Emissions in tons/yr HC	CO	NOx	PM10
Saw & Seal Pavement	Saw	D	1280	73%	56	0.0005	0.00186	0.00495	0.01676	0.00154	0.05	0.13	0.44	0.04
	Sweeper	D	640	68%	97	0.0005	0.00186	0.00495	0.01676	0.00154	0.04	0.10	0.35	0.03
Groove Runway	Grinder	D	160	73%	99	0.0005	0.00186	0.00495	0.01676	0.00154	0.01	0.03	0.10	0.01
	Sweeper	D	160	68%	97	0.0005	0.00186	0.00495	0.01676	0.00154	0.01	0.03	0.09	0.01
Marking: Remove Marking	Sandblaster	D	96	38%	92	0.0005	0.00186	0.00495	0.01676	0.00154	0.00	0.01	0.03	0.00
	Sweeper	D	48	68%	97	0.0005	0.00186	0.00495	0.01676	0.00154	0.00	0.01	0.03	0.00
Marking: New Marking	Striper	D	96	72%	450	0.0005	0.00087	0.00314	0.01537	0.00143	0.01	0.05	0.24	0.02
Drainage	Trencher	D	480	75%	60	0.0005	0.00186	0.00495	0.01676	0.00154	0.02	0.05	0.18	0.02
	Backhoe	D	480	55%	90	0.0005	0.00186	0.00495	0.01676	0.00154	0.02	0.06	0.20	0.02
	F.E. Loader-Tractor	D	240	55%	160	0.0005	0.00111	0.00361	0.01644	0.00149	0.01	0.04	0.17	0.02
	Compactor	D	480	53%	100	0.0005	0.00111	0.00361	0.01644	0.00149	0.01	0.05	0.21	0.02
Lighting	Trencher	D	480	75%	60	0.0005	0.00186	0.00495	0.01676	0.00154	0.02	0.05	0.18	0.02
	Backhoe	D	480	55%	90	0.0005	0.00186	0.00495	0.01676	0.00154	0.02	0.06	0.20	0.02
	F.E. Loader-Tractor	D	240	55%	160	0.0005	0.00111	0.00361	0.01644	0.00149	0.01	0.04	0.17	0.02
	Compactor	D	480	53%	100	0.0005	0.00111	0.00361	0.01644	0.00149	0.01	0.05	0.21	0.02
Structures-Manholes-Retaining Walls	Backhoe	D	160	55%	90	0.0005	0.00186	0.00495	0.01676	0.00154	0.01	0.02	0.07	0.01
	Compactor	D	320	53%	100	0.0005	0.00111	0.00361	0.01644	0.00149	0.01	0.03	0.14	0.01
	F.E. Loader-Tractor	D	160	55%	160	0.0005	0.00111	0.00361	0.01644	0.00149	0.01	0.03	0.12	0.01
Terminal Construction	Dozer	D	24	64%	200	0.0005	0.00104	0.00314	0.01603	0.00143	0.00	0.00	0.02	0.00
	Backhoe	D	37	55%	112	0.0005	0.00111	0.00361	0.01644	0.00149	0.00	0.00	0.02	0.00
	Grader	D	24	61%	140	0.0005	0.00111	0.00361	0.01644	0.00149	0.00	0.00	0.02	0.00
	Tandem Roller	D	24	56%	145	0.0005	0.00111	0.00361	0.01644	0.00149	0.00	0.00	0.02	0.00
	Dozer	D	24	64%	200	0.0005	0.00104	0.00314	0.01603	0.00143	0.00	0.00	0.02	0.00
	Crane (5 ton)	D	108	43%	194	0.0005	0.00104	0.00314	0.01603	0.00143	0.00	0.01	0.07	0.01
	Cement Finisher	D	729	53%	99	0.0005	0.00186	0.00495	0.01676	0.00154	0.04	0.09	0.32	0.03
	Gas Vibrator	G	729	43%	5	0.0005	0.02148	0.43659	0.01056	0.00072	0.02	0.34	0.01	0.00
	Crane (90 ton)	D	248	43%	194	0.0005	0.00104	0.00314	0.01603	0.00143	0.01	0.03	0.17	0.01
	Gas Welder	G	830	45%	19	0.0005	0.02148	0.43659	0.01056	0.00072	0.08	1.55	0.04	0.00
	Torch, Gas & Air	G	100	45%	19	0.0005	0.02148	0.43659	0.01056	0.00072	0.01	0.19	0.00	0.00
	Mixer	D	208	56%	11	0.0005	0.00336	0.01136	0.01979	0.00207	0.00	0.01	0.01	0.00
										Total	1.51	7.14	21.83	2.02

Notes:
1. Load Factor based on information contained in the EPA document *Median Life, Annual Activity, and Load Factor Value for Nonroad Engine Emissions Modeling* (Report NR-005a)
2. Emissions factors are determined by fuel type and horsepower in conjunction with Tier 1 standards
3. NO_x emissions factors determined using AP-42 and Tier 1 standards
4. VOC emissions factors determined using AP-42 or Tier 1 standards for Hydrocarbons
5. Hydrocarbon emissions converted to VOC emissions according to the methodology presented in the EPA document *Conversion Factors for Hydrocarbon Emission Components* (Report NR-002)
6. The conversion factor listed is used to translate lb/yr to tons/yr.
7. Tier 1 standards from Federal Register, October 23, 1998, page 57001, Table 1

Source: Brandley Engineering and Ricondo & Associates, Inc.
Prepared by: Ricondo & Associates, Inc.

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Table G-2
On-Road Constructions Emissions Inventory – Alternatives 2 and 5

			On-Road Construction, Offsite Hauling, and Material Transportation Pollutant Emissions										
			Emissions Factor in lb/mi						Emissions in Tons per Year				
Phase	Equipment	Total Miles per Year	VOC	CO	NOx	Total Exhaust PM10	Entrained Road Dust	Conversion Factor lb to tons	VOC	CO	NOx	Total Exhaust PM10	Entrained Road Dust
Clearing & Grubbing	Pick Up Truck	353	0.00151	0.03115	0.00300	0.00006	0.07937	0.0005	0.00	0.01	0.00	0.00	0.01
	Water Truck	1411	0.00213	0.03166	0.00415	0.00005	0.07937	0.0005	0.00	0.02	0.00	0.00	0.06
	Employees	3600	0.00080	0.01688	0.00131	0.00005	0.07937	0.0005	0.00	0.03	0.00	0.00	0.14
Excavation	Pick Up Truck	2940	0.00151	0.03115	0.00300	0.00006	0.07937	0.0005	0.00	0.05	0.00	0.00	0.12
	Water Truck	3920	0.00213	0.03166	0.00415	0.00005	0.07937	0.0005	0.00	0.06	0.01	0.00	0.16
	Employees	25500	0.00080	0.01688	0.00131	0.00005	0.07937	0.0005	0.01	0.22	0.02	0.00	1.01
Subgrade-Scarify & Recompact	Pick Up Truck	706	0.00151	0.03115	0.00300	0.00006	0.07937	0.0005	0.00	0.01	0.00	0.00	0.03
	Water Truck	2822	0.00213	0.03166	0.00415	0.00005	0.07937	0.0005	0.00	0.04	0.01	0.00	0.11
	Employees	5400	0.00080	0.01688	0.00131	0.00005	0.07937	0.0005	0.00	0.05	0.00	0.00	0.21
Aggregate Subbase	Pick Up Truck	588	0.00151	0.03115	0.00300	0.00006	0.07937	0.0005	0.00	0.01	0.00	0.00	0.02
	Truck-HDDV	23520	0.00397	0.02784	0.02210	0.00142	0.07937	0.0005	0.05	0.33	0.26	0.02	0.93
	Truck-Roundtrip	329000	0.00192	0.01343	0.02325	0.00142	0.07937	0.0005	0.32	2.21	3.82	0.23	13.06
	Water Truck	3136	0.00213	0.03166	0.00415	0.00005	0.07937	0.0005	0.00	0.05	0.01	0.00	0.12
	Employees	6000	0.00080	0.01688	0.00131	0.00005	0.07937	0.0005	0.00	0.05	0.00	0.00	0.24
Aggregate Base	Pick Up Truck	882	0.00151	0.03115	0.00300	0.00006	0.07937	0.0005	0.00	0.01	0.00	0.00	0.04
	Truck-HDDV	35280	0.00397	0.02784	0.02210	0.00142	0.07937	0.0005	0.07	0.49	0.39	0.02	1.40
	Truck-Roundtrip	350000	0.00192	0.01343	0.02325	0.00142	0.07937	0.0005	0.34	2.35	4.07	0.25	13.89
	Water Truck	4704	0.00213	0.03166	0.00415	0.00005	0.07937	0.0005	0.00	0.07	0.01	0.00	0.19
	Employees	9000	0.00080	0.01688	0.00131	0.00005	0.07937	0.0005	0.00	0.08	0.01	0.00	0.36
Heater Remix	Pick Up Truck	353	0.00151	0.03115	0.00300	0.00006	0.07937	0.0005	0.00	0.01	0.00	0.00	0.01
	Employees	2160	0.00080	0.01688	0.00131	0.00005	0.07937	0.0005	0.00	0.02	0.00	0.00	0.09
Rejuvenating Agent	Pick Up Truck	147	0.00151	0.03115	0.00300	0.00006	0.07937	0.0005	0.00	0.00	0.00	0.00	0.01
	Truck-Roundtrip	2700	0.00192	0.01343	0.02325	0.00142	0.07937	0.0005	0.00	0.02	0.03	0.00	0.03
	Employees	600	0.00080	0.01688	0.00131	0.00005	0.07937	0.0005	0.00	0.01	0.00	0.00	0.02
Bituminous Surface Course	Pick Up Truck	2205	0.00151	0.03115	0.00300	0.00006	0.07937	0.0005	0.00	0.03	0.00	0.00	0.09
	Truck-HDDV	78400	0.00397	0.02784	0.02210	0.00142	0.07937	0.0005	0.16	1.09	0.87	0.06	3.11
	Truck-Roundtrip	224000	0.00192	0.01343	0.02325	0.00142	0.07937	0.0005	0.22	1.50	2.60	0.16	8.89
	Asphalt Trucks	72000	0.00154	0.01127	0.01687	0.00095	0.07937	0.0005	0.06	0.41	0.61	0.03	2.86
	Employees	13500	0.00080	0.01688	0.00131	0.00005	0.07937	0.0005	0.01	0.11	0.01	0.00	0.54
Prime Coat	Truck-Roundtrip	6000	0.00192	0.01343	0.02325	0.00142	0.07937	0.0005	0.01	0.04	0.07	0.00	0.12
Tack Coat	Truck-Roundtrip	3600	0.00192	0.01343	0.02325	0.00142	0.07937	0.0005	0.00	0.02	0.04	0.00	0.07

Notes:
On-Road emissions factors from the California Air Resources Board EMFAC7G model
Total exhaust PM10 is a composite of EMFAC7G PM10 emissions factors for PM10 from exhaust, PM10 from tire wear, and PM10 from break wear
Entrained road dust emissions factors are from the *Air Quality Management Plan for the Town of Mammoth Lakes, November 30, 1990, page 3-5*

Source: Brandley Engineering and Ricondo & Associates, Inc.
Prepared by: Ricondo & Associates, Inc.

Table G-2 (Cont.)

On-Road Constructions Emissions Inventory

Phase	Equipment	Total Miles per Year	On-Road Construction, Offsite Hauling, and Material Transportation Pollutant Emissions — Emissions Factor in lb/mi: VOC	CO	NOx	Total Exhaust PM10	Entrained Road Dust	Conversion Factor lb to tons	Emissions in Tons per Year: VOC	CO	NOx	Total Exhaust PM10	Entrained Road Dust
Portland Cement Concrete Pavement	Pick Up Truck	353	0.00151	0.03115	0.00300	0.00006	0.07937	0.0005	0.00	0.01	0.00	0.00	0.01
	Cement Truck	300	0.00154	0.01127	0.01687	0.00095	0.07937	0.0005	0.00	0.00	0.00	0.00	0.01
	Concrete Trucks	1400	0.00154	0.01127	0.01687	0.00095	0.07937	0.0005	0.00	0.01	0.01	0.00	0.06
	Water Truck	470	0.00213	0.03166	0.00415	0.00005	0.07937	0.0005	0.00	0.01	0.00	0.00	0.02
	Employees	3600	0.00080	0.01688	0.00131	0.00005	0.07937	0.0005	0.00	0.03	0.00	0.00	0.14
Saw & Seal Pavement	Pick Up Truck	2352	0.00151	0.03115	0.00300	0.00006	0.07937	0.0005	0.00	0.04	0.00	0.00	0.09
	Truck	2352	0.00151	0.03115	0.00300	0.00006	0.07937	0.0005	0.00	0.04	0.00	0.00	0.09
	Water Truck	6272	0.00213	0.03166	0.00415	0.00005	0.07937	0.0005	0.01	0.10	0.01	0.00	0.25
	Employees	14400	0.00080	0.01688	0.00131	0.00005	0.07937	0.0005	0.01	0.12	0.01	0.00	0.57
Groove Runway	Pick Up Truck	588	0.00151	0.03115	0.00300	0.00006	0.07937	0.0005	0.00	0.01	0.00	0.00	0.02
	Truck	588	0.00151	0.03115	0.00300	0.00006	0.07937	0.0005	0.00	0.01	0.00	0.00	0.02
	Water Truck	1568	0.00213	0.03166	0.00415	0.00005	0.07937	0.0005	0.00	0.02	0.00	0.00	0.06
	Employees	3000	0.00080	0.01688	0.00131	0.00005	0.07937	0.0005	0.00	0.03	0.00	0.00	0.12
Marking: Remove Marking	Pick Up Truck	353	0.00151	0.03115	0.00300	0.00006	0.07937	0.0005	0.00	0.01	0.00	0.00	0.01
	Water Truck	941	0.00213	0.03166	0.00415	0.00005	0.07937	0.0005	0.00	0.01	0.00	0.00	0.04
	Employees	900	0.00080	0.01688	0.00131	0.00005	0.07937	0.0005	0.00	0.01	0.00	0.00	0.04
Marking: New Marking	Pick Up Truck	353	0.00151	0.03115	0.00300	0.00006	0.07937	0.0005	0.00	0.01	0.00	0.00	0.01
	Truck-Roundtrip	1200	0.00192	0.01343	0.02325	0.00142	0.07937	0.0005	0.00	0.01	0.01	0.00	0.03
	Employees	540	0.00080	0.01688	0.00131	0.00005	0.07937	0.0005	0.00	0.00	0.00	0.00	0.02
Drainage	Pick Up Truck	1764	0.00151	0.03115	0.00300	0.00006	0.07937	0.0005	0.00	0.03	0.00	0.00	0.07
	Truck-Roundtrip	6300	0.00192	0.01343	0.02325	0.00142	0.07937	0.0005	0.01	0.04	0.07	0.00	0.25
	Truck-HDDV	9408	0.00397	0.02784	0.02210	0.00142	0.07937	0.0005	0.02	0.13	0.10	0.01	0.37
	Employees	18000	0.00080	0.01688	0.00131	0.00005	0.07937	0.0005	0.01	0.15	0.01	0.00	0.71
Lighting	Pick Up Truck	1764	0.00151	0.03115	0.00300	0.00006	0.07937	0.0005	0.00	0.03	0.00	0.00	0.07
	Truck-Roundtrip	10000	0.00192	0.01343	0.02325	0.00142	0.07937	0.0005	0.01	0.07	0.12	0.01	0.20
	Truck-HDDV	9408	0.00397	0.02784	0.02210	0.00142	0.07937	0.0005	0.02	0.13	0.10	0.01	0.37
	Truck-Roundtrip	6300	0.00192	0.01343	0.02325	0.00142	0.07937	0.0005	0.01	0.04	0.07	0.00	0.25
	Employees	18000	0.00080	0.01688	0.00131	0.00005	0.07937	0.0005	0.01	0.15	0.01	0.00	0.71
Structures-Manholes-Retaining Walls	Pick Up Truck	1176	0.00151	0.03115	0.00300	0.00006	0.07937	0.0005	0.00	0.02	0.00	0.00	0.05
	Truck-Roundtrip	6000	0.00192	0.01343	0.02325	0.00142	0.07937	0.0005	0.01	0.04	0.07	0.00	0.12
	Truck-HDDV	6272	0.00397	0.02784	0.02210	0.00142	0.07937	0.0005	0.01	0.09	0.07	0.00	0.25
	Truck-Roundtrip	4200	0.00192	0.01343	0.02325	0.00142	0.07937	0.0005	0.00	0.03	0.05	0.00	0.17
	Employees	9000	0.00080	0.01688	0.00131	0.00005	0.07937	0.0005	0.00	0.08	0.01	0.00	0.36
Terminal Construction	Employees	60000	0.00080	0.01688	0.00131	0.00005	0.07937	0.0005	0.02	0.51	0.04	0.00	2.38
							Total		1.41	11.39	13.66	0.83	55.88

Notes:
1. On-Road emissions factors from the California Air Resources Board EMFAC7G model
2. Total exhaust PM10 is a composite of EMFAC7G PM10 emissions factors for PM10 from exhaust, PM10 from tire wear, and PM10 from break wear
3. Entrained road dust emissions factors are from the *Air Quality Management Plan for the Town of Mammoth Lakes, November 30, 1990, page 3-5*

Source: Brandley Engineering and Ricondo & Associates, Inc.
Prepared by: Ricondo & Associates, Inc.

Table G-3
Non-Road Construction Emissions - Alternatives 3 and 4

Phase	Equipment	Fuel Type	Total Hours	Load Factor	Horse Power	Conversion Factor (lb to ton)	HC (lb/hp-hr)	CO (lb/hp-hr)	NOx (lb/hp-hr)	PM10 (lb/hp-hr)	VOC (tons/yr)	CO (tons/yr)	NOx (tons/yr)	PM10 (tons/yr)
Clearing & Grubbing	Dozer	D	180	55%	305	0.0005	0.00087	0.00314	0.01537	0.00143	0.01	0.05	0.23	0.02
	Scraper	D	240	72%	450	0.0005	0.00087	0.00314	0.01537	0.00143	0.03	0.12	0.60	0.06
	Blade	D	120	72%	450	0.0005	0.00087	0.00314	0.01537	0.00143	0.02	0.06	0.30	0.03
Excavation	Blade	D	750	72%	450	0.0005	0.00087	0.00314	0.01537	0.00143	0.11	0.38	1.87	0.17
	Scraper	D	2000	72%	450	0.0005	0.00087	0.00314	0.01537	0.00143	0.28	1.02	4.98	0.46
	Compactor	D	1000	53%	100	0.0005	0.00111	0.00361	0.01644	0.00149	0.03	0.10	0.44	0.04
	Dozer	D	1000	55%	305	0.0005	0.00087	0.00314	0.01537	0.00143	0.07	0.26	1.29	0.12
Subgrade-Scarify&Recompact	Blade	D	240	72%	450	0.0005	0.00087	0.00314	0.01537	0.00143	0.03	0.12	0.60	0.06
	Compactor	D	480	53%	100	0.0005	0.00111	0.00361	0.01644	0.00149	0.01	0.05	0.21	0.02
Aggregate Subbase	Blade	D	1500	72%	450	0.0005	0.00087	0.00314	0.01537	0.00143	0.21	0.76	3.73	0.35
	Dozer	D	300	55%	305	0.0005	0.00087	0.00314	0.01537	0.00143	0.02	0.08	0.39	0.04
	Compactor	D	200	53%	100	0.0005	0.00111	0.00361	0.01644	0.00149	0.01	0.02	0.09	0.01
Aggregate Base	Blade	D	2250	72%	450	0.0005	0.00087	0.00314	0.01537	0.00143	0.32	1.15	5.60	0.52
	Dozer	D	450	55%	305	0.0005	0.00087	0.00314	0.01537	0.00143	0.03	0.12	0.58	0.05
	Compactor	D	300	53%	100	0.0005	0.00111	0.00361	0.01644	0.00149	0.01	0.03	0.13	0.01
Heater Remix	Heater Rig	G	120	68%	25	0.0005	0.02148	0.43659	0.01056	0.00072	0.02	0.45	0.01	0.00
	Sweeper	D	120	68%	97	0.0005	0.00186	0.00495	0.01676	0.00154	0.01	0.02	0.07	0.01
	Tractor	D	60	55%	90	0.0005	0.00186	0.00495	0.01676	0.00154	0.00	0.01	0.02	0.00
	Roller	D	120	56%	145	0.0005	0.00111	0.00361	0.01644	0.00149	0.01	0.02	0.08	0.01
Bituminous Surface Course	Paver	D	250	62%	130	0.0005	0.00111	0.00361	0.01644	0.00149	0.01	0.04	0.17	0.01
	Roller	D	1000	56%	145	0.0005	0.00111	0.00361	0.01644	0.00149	0.05	0.15	0.67	0.06
	F.E. Loader-Tractor	D	250	55%	160	0.0005	0.00111	0.00361	0.01644	0.00149	0.01	0.04	0.18	0.02
Portland Cement Concrete Pavement	Batch Plant	D	60	78%	127	0.0005	0.00111	0.00361	0.01644	0.00149	0.00	0.01	0.05	0.00
	Paver	D	60	62%	130	0.0005	0.00111	0.00361	0.01644	0.00149	0.00	0.01	0.04	0.00
	Finish Machine	D	120	53%	100	0.0005	0.00111	0.00361	0.01644	0.00149	0.00	0.01	0.05	0.00
	Saw	D	120	73%	56	0.0005	0.00186	0.00495	0.01676	0.00154	0.00	0.01	0.04	0.00
	Sweeper	D	60	68%	97	0.0005	0.00186	0.00495	0.01676	0.00154	0.00	0.01	0.03	0.00
	F.E. Loader-Tractor	D	60	55%	160	0.0005	0.00111	0.00361	0.01644	0.00149	0.00	0.01	0.04	0.00

Notes:
1. Load Factor based on information contained in the EPA document *Median Life, Annual Activity, and Load Factor Value for Nonroad Engine Emissions Modeling* (Report NR-005a)
2. Emissions factors are determined by fuel type and horsepower in conjunction with Tier 1 standards
3. NO_x emissions factors determined using AP-42 and Tier 1 standards
4. VOC emissions factors determined using AP-42 or Tier 1 standards for Hydrocarbons
5. Hydrocarbon emissions converted to VOC emissions according to the methodology presented in the EPA document *Conversion Factors for Hydrocarbon Emission Components* (Report NR-002)
6. The conversion factor listed is used to translate lb/yr to tons/yr
7. Tier 1 standards from Federal Register, October 23, 1998, page 57001, Table 1

Source: Brandley Engineering and Ricondo & Associates, Inc.
Prepared by: Ricondo & Associates, Inc.

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Table G-3 (Cont.)

Non-Road Construction Emissions Alternative 3

Phase	Equipment	Fuel Type	Total Hours	Load Factor	Horse Power	Conversion Factor (lb to ton)	Emissions in lb/hp-hr: HC	CO	NOx	PM10	Emissions in tons/yr: HC	CO	NOx	PM10
Saw & Seal Pavement	Saw	D	1600	73%	56	0.0005	0.00186	0.00495	0.01676	0.00154	0.06	0.16	0.55	0.05
	Sweeper	D	800	68%	97	0.0005	0.00186	0.00495	0.01676	0.00154	0.05	0.13	0.44	0.04
Groove Runway	Grinder	D	200	73%	99	0.0005	0.00186	0.00495	0.01676	0.00154	0.01	0.04	0.12	0.01
	Sweeper	D	200	68%	97	0.0005	0.00186	0.00495	0.01676	0.00154	0.01	0.03	0.11	0.01
Marking: Remove Marking	Sandblaster	D	120	38%	92	0.0005	0.00186	0.00495	0.01676	0.00154	0.00	0.01	0.04	0.00
	Sweeper	D	60	68%	97	0.0005	0.00186	0.00495	0.01676	0.00154	0.00	0.01	0.03	0.00
Marking: New Marking	Striper	D	120	72%	450	0.0005	0.00087	0.00314	0.01537	0.00143	0.02	0.06	0.30	0.03
Drainage	Trencher	D	600	75%	60	0.0005	0.00186	0.00495	0.01676	0.00154	0.03	0.07	0.23	0.02
	Backhoe	D	600	55%	90	0.0005	0.00186	0.00495	0.01676	0.00154	0.03	0.07	0.25	0.02
	F.E. Loader-Tractor	D	300	55%	160	0.0005	0.00111	0.00361	0.01644	0.00149	0.01	0.05	0.22	0.02
	Compactor	D	600	53%	100	0.0005	0.00111	0.00361	0.01644	0.00149	0.02	0.06	0.26	0.02
Lighting	Trencher	D	600	75%	60	0.0005	0.00186	0.00495	0.01676	0.00154	0.03	0.07	0.23	0.02
	Backhoe	D	600	55%	90	0.0005	0.00186	0.00495	0.01676	0.00154	0.03	0.07	0.25	0.02
	F.E. Loader-Tractor	D	300	55%	160	0.0005	0.00111	0.00361	0.01644	0.00149	0.01	0.05	0.22	0.02
	Compactor	D	600	53%	100	0.0005	0.00111	0.00361	0.01644	0.00149	0.02	0.06	0.26	0.02
Structures-Manholes-Retaining Walls	Backhoe	D	200	55%	90	0.0005	0.00186	0.00495	0.01676	0.00154	0.01	0.02	0.08	0.01
	Compactor	D	400	53%	100	0.0005	0.00111	0.00361	0.01644	0.00149	0.01	0.04	0.17	0.02
	F.E. Loader-Tractor	D	200	55%	160	0.0005	0.00111	0.00361	0.01644	0.00149	0.01	0.03	0.14	0.01
Terminal Construction	Dozer	D	24	64%	200	0.0005	0.00104	0.00314	0.01603	0.00143	0.00	0.00	0.02	0.00
	Backhoe	D	37.125	55%	112	0.0005	0.00111	0.00361	0.01644	0.00149	0.00	0.00	0.02	0.00
	Grader	D	24	61%	140	0.0005	0.00111	0.00361	0.01644	0.00149	0.00	0.00	0.02	0.00
	Tandem Roller	D	24	56%	145	0.0005	0.00111	0.00361	0.01644	0.00149	0.00	0.00	0.02	0.00
	Dozer	D	24	64%	200	0.0005	0.00104	0.00314	0.01603	0.00143	0.00	0.00	0.02	0.00
	Crane (5 ton)	D	108	43%	194	0.0005	0.00104	0.00314	0.01603	0.00143	0.00	0.01	0.07	0.01
	Cement Finisher	D	729	53%	99	0.0005	0.00186	0.00495	0.01676	0.00154	0.04	0.09	0.32	0.03
	Gas Vibrator	G	729	43%	5	0.0005	0.02148	0.43659	0.01056	0.00072	0.02	0.34	0.01	0.00
	Crane (90 ton)	D	248	43%	194	0.0005	0.00104	0.00314	0.01603	0.00143	0.01	0.03	0.17	0.01
	Gas Welder	G	830	45%	19	0.0005	0.02148	0.43659	0.01056	0.00072	0.08	1.55	0.04	0.00
	Torch, Gas & Air	G	100	45%	19	0.0005	0.02148	0.43659	0.01056	0.00072	0.01	0.19	0.00	0.00
	Mixer	D	208	56%	11	0.0005	0.00336	0.01136	0.01979	0.00207	0.00	0.01	0.01	0.00
										Total	1.85	8.36	27.10	2.51

Notes:
1. Load Factor based on information contained in the EPA document *Median Life, Annual Activity, and Load Factor Value for Nonroad Engine Emissions Modeling* (Report NR-005a)
2. Emissions factors are determined by fuel type and horsepower in conjunction with Tier 1 standards
3. NO_x emissions factors determined using AP-42 and Tier 1 standards
4. VOC emissions factors determined using AP-42 or Tier 1 standards for Hydrocarbons
5. Hydrocarbon emissions converted to VOC emissions according to the methodology presented in the EPA document *Conversion Factors for Hydrocarbon Emission Components* (Report NR-002)
6. The conversion factor listed is used to translate lb/yr to tons/yr
7. Tier 1 standards from Federal Register, October 23, 1998, page 57001, Table 1

Source: Brandley Engineering and Ricondo & Associates, Inc.
Prepared by: Ricondo & Associates, Inc.

Table G-4

On-Road Constructions Emissions Inventory -- Alternatives 3 and 4

			On-Road Construction, Offsite Hauling, and Material Transportation Pollutant Emissions										
			Emissions Factor in lbs/mi						Emissions in Tons per Year				
Phase	Equipment	Total Miles per Year	VOC	CO	NOX	Total Exhaust PM10	Entrained Road Dust	Conversion Factor lbs to tons	VOC	CO	NOX	Total Exhaust PM10	Entrained Road Dust
Clearing & Grubbing	Pick Up Truck	353	0.00151	0.03115	0.00300	0.00006	0.07937	0.0005	0.00	0.01	0.00	0.00	0.02
	Water Truck	1411	0.00213	0.03166	0.00415	0.00005	0.07937	0.0005	0.00	0.03	0.00	0.00	0.07
	Employees	3600	0.00080	0.01688	0.00131	0.00005	0.07937	0.0005	0.00	0.04	0.00	0.00	0.18
Excavation	Pick Up Truck	2940	0.00151	0.03115	0.00300	0.00006	0.07937	0.0005	0.00	0.06	0.01	0.00	0.15
	Water Truck	3920	0.00213	0.03166	0.00415	0.00005	0.07937	0.0005	0.01	0.08	0.01	0.00	0.19
	Employees	25500	0.00080	0.01688	0.00131	0.00005	0.07937	0.0005	0.01	0.27	0.02	0.00	1.26
Subgrade-Scarify & Recompact	Pick Up Truck	706	0.00151	0.03115	0.00300	0.00006	0.07937	0.0005	0.00	0.01	0.00	0.00	0.04
	Water Truck	2822	0.00213	0.03166	0.00415	0.00005	0.07937	0.0005	0.00	0.06	0.01	0.00	0.14
	Employees	5400	0.00080	0.01688	0.00131	0.00005	0.07937	0.0005	0.00	0.06	0.00	0.00	0.27
Aggregate Subbase	Pick Up Truck	588	0.00151	0.03115	0.00300	0.00006	0.07937	0.0005	0.00	0.01	0.00	0.00	0.03
	Truck-HDDV	23520	0.00397	0.02784	0.02210	0.00142	0.07937	0.0005	0.06	0.41	0.32	0.02	1.17
	Truck-Roundtrip	329000	0.00192	0.01343	0.02325	0.00142	0.07937	0.0005	0.40	2.76	4.78	0.29	16.32
	Water Truck	3136	0.00213	0.03166	0.00415	0.00005	0.07937	0.0005	0.00	0.06	0.01	0.00	0.16
	Employees	6000	0.00080	0.01688	0.00131	0.00005	0.07937	0.0005	0.00	0.06	0.00	0.00	0.30
Aggregate Base	Pick Up Truck	882	0.00151	0.03115	0.00300	0.00006	0.07937	0.0005	0.00	0.02	0.00	0.00	0.04
	Truck-HDDV	35280	0.00397	0.02784	0.02210	0.00142	0.07937	0.0005	0.09	0.61	0.49	0.03	1.75
	Truck-Roundtrip	350000	0.00192	0.01343	0.02325	0.00142	0.07937	0.0005	0.42	2.94	5.09	0.31	17.36
	Water Truck	4704	0.00213	0.03166	0.00415	0.00005	0.07937	0.0005	0.01	0.09	0.01	0.00	0.23
	Employees	9000	0.00080	0.01688	0.00131	0.00005	0.07937	0.0005	0.00	0.09	0.01	0.00	0.45
Heater Remix	Pick Up Truck	353	0.00151	0.03115	0.00300	0.00006	0.07937	0.0005	0.00	0.01	0.00	0.00	0.02
	Employees	2160	0.00080	0.01688	0.00131	0.00005	0.07937	0.0005	0.00	0.02	0.00	0.00	0.11
Rejuvenating Agent	Pick Up Truck	147	0.00151	0.03115	0.00300	0.00006	0.07937	0.0005	0.00	0.00	0.00	0.00	0.01
	Truck-Roundtrip	2700	0.00192	0.01343	0.02325	0.00142	0.07937	0.0005	0.00	0.02	0.04	0.00	0.07
	Employees	600	0.00080	0.01688	0.00131	0.00005	0.07937	0.0005	0.00	0.01	0.00	0.00	0.03
Bituminous Surface Course	Pick Up Truck	2205	0.00151	0.03115	0.00300	0.00006	0.07937	0.0005	0.00	0.04	0.00	0.00	0.11
	Truck-HDDV	78400	0.00397	0.02784	0.02210	0.00142	0.07937	0.0005	0.19	1.36	1.08	0.07	3.89
	Truck-Roundtrip	224000	0.00192	0.01343	0.02325	0.00142	0.07937	0.0005	0.27	1.88	3.26	0.20	11.11
	Asphalt Trucks	72000	0.00154	0.01127	0.01687	0.00095	0.07937	0.0005	0.07	0.51	0.76	0.04	1.79
	Employees	13500	0.00080	0.01688	0.00131	0.00005	0.07937	0.0005	0.01	0.14	0.01	0.00	0.67
Prime Coat	Truck-Roundtrip	6000	0.00192	0.01343	0.02325	0.00142	0.07937	0.0005	0.01	0.05	0.09	0.01	0.15
Tack Coat	Truck-Roundtrip	3600	0.00192	0.01343	0.02325	0.00142	0.07937	0.0005	0.00	0.03	0.05	0.00	0.09

*Some truck-roundtrips had travel outside of the air basin and values for entrained road dust were based on only 50% of roundtrip miles being within the air basin limits

Notes:

1. On-Road emissions factors from the California Air Resources Board EMFAC7G model
2. Total exhaust PM10 is a composite of EMFAC7G PM10 emissions factors for PM10 from exhaust, PM10 from tire wear, and PM10 from break wear
3. Entrained road dust emissions factors are from the Air Quality Management Plan for the Town of Mammoth Lakes, November 30, 1990, page 3-5

Source: Brandley Engineering and Ricondo & Associates, Inc.
Prepared by: Ricondo & Associates, Inc.

Table G-4 (Cont.)
On-Road Constructions Emissions Inventory Alternative 3

			On-Road Construction, Offsite Hauling, and Material Transportation Pollutant Emissions										
			Emissions Factor in lbs/mi						Emissions in Tons per Year				
Phase	Equipment	Total Miles per Year	VOC	CO	NOX	Total Exhaust PM10	Entrained Road Dust	Conversion Factor lbs to tons	VOC	CO	NOX	Total Exhaust PM10	Entrained Road Dust
Portland Cement Concrete Pavement	Pick Up Truck	353	0.00151	0.03115	0.00300	0.00006	0.07937	0.0005	0.00	0.01	0.00	0.00	0.02
	Cement Truck	300	0.00154	0.01127	0.01687	0.00095	0.07937	0.0005	0.00	0.00	0.00	0.00	0.01
	Concrete Trucks	1400	0.00154	0.01127	0.01687	0.00095	0.07937	0.0005	0.00	0.01	0.01	0.00	0.07
	Water Truck	470	0.00213	0.03166	0.00415	0.00005	0.07937	0.0005	0.00	0.01	0.00	0.00	0.02
	Employees	3600	0.00080	0.01688	0.00131	0.00005	0.07937	0.0005	0.00	0.04	0.00	0.00	0.18
Saw & Seal Pavement	Pick Up Truck	2352	0.00151	0.03115	0.00300	0.00006	0.07937	0.0005	0.00	0.05	0.00	0.00	0.12
	Truck	2352	0.00151	0.03115	0.00300	0.00006	0.07937	0.0005	0.00	0.05	0.00	0.00	0.12
	Water Truck	6272	0.00213	0.03166	0.00415	0.00005	0.07937	0.0005	0.01	0.12	0.02	0.00	0.31
	Employees	14400	0.00080	0.01688	0.00131	0.00005	0.07937	0.0005	0.01	0.15	0.01	0.00	0.71
Groove Runway	Pick Up Truck	588	0.00151	0.03115	0.00300	0.00006	0.07937	0.0005	0.00	0.01	0.00	0.00	0.03
	Truck	588	0.00151	0.03115	0.00300	0.00006	0.07937	0.0005	0.00	0.01	0.00	0.00	0.03
	Water Truck	1568	0.00213	0.03166	0.00415	0.00005	0.07937	0.0005	0.00	0.03	0.00	0.00	0.08
	Employees	3000	0.00080	0.01688	0.00131	0.00005	0.07937	0.0005	0.00	0.03	0.00	0.00	0.15
Marking: Remove Marking	Pick Up Truck	353	0.00151	0.03115	0.00300	0.00006	0.07937	0.0005	0.00	0.01	0.00	0.00	0.02
	Water Truck	941	0.00213	0.03166	0.00415	0.00005	0.07937	0.0005	0.00	0.02	0.00	0.00	0.05
	Employees	900	0.00080	0.01688	0.00131	0.00005	0.07937	0.0005	0.00	0.01	0.00	0.00	0.04
Marking: New Marking	Pick Up Truck	353	0.00151	0.03115	0.00300	0.00006	0.07937	0.0005	0.00	0.01	0.00	0.00	0.02
	Truck-Roundtrip	1200	0.00192	0.01343	0.02325	0.00142	0.07937	0.0005	0.00	0.01	0.02	0.00	0.03
	Employees	540	0.00080	0.01688	0.00131	0.00005	0.07937	0.0005	0.00	0.01	0.00	0.00	0.03
Drainage	Pick Up Truck	1764	0.00151	0.03115	0.00300	0.00006	0.07937	0.0005	0.00	0.03	0.00	0.00	0.09
	Truck-Roundtrip	6300	0.00192	0.01343	0.02325	0.00142	0.07937	0.0005	0.01	0.05	0.09	0.01	0.31
	Truck-HDDV	9408	0.00397	0.02784	0.02210	0.00142	0.07937	0.0005	0.02	0.16	0.13	0.01	0.47
	Employees	18000	0.00080	0.01688	0.00131	0.00005	0.07937	0.0005	0.01	0.19	0.01	0.00	0.89
Lighting	Pick Up Truck	1764	0.00151	0.03115	0.00300	0.00006	0.07937	0.0005	0.00	0.03	0.00	0.00	0.09
	Truck-Roundtrip	10000	0.00192	0.01343	0.02325	0.00142	0.07937	0.0005	0.01	0.08	0.15	0.01	0.25
	Truck-HDDV	9408	0.00397	0.02784	0.02210	0.00142	0.07937	0.0005	0.02	0.16	0.13	0.01	0.47
	Truck-Roundtrip	6300	0.00192	0.01343	0.02325	0.00142	0.07937	0.0005	0.01	0.05	0.09	0.01	0.31
	Employees	18000	0.00080	0.01688	0.00131	0.00005	0.07937	0.0005	0.01	0.19	0.01	0.00	0.89
Structures-Manholes-Retaining Walls	Pick Up Truck	1176	0.00151	0.03115	0.00300	0.00006	0.07937	0.0005	0.00	0.02	0.00	0.00	0.06
	Truck-Roundtrip	6000	0.00192	0.01343	0.02325	0.00142	0.07937	0.0005	0.01	0.05	0.09	0.01	0.15
	Truck-HDDV	6272	0.00397	0.02784	0.02210	0.00142	0.07937	0.0005	0.02	0.11	0.09	0.01	0.31
	Truck-Roundtrip	4200	0.00192	0.01343	0.02325	0.00142	0.07937	0.0005	0.01	0.04	0.06	0.00	0.21
	Employees	9000	0.00080	0.01688	0.00131	0.00005	0.07937	0.0005	0.00	0.09	0.01	0.00	0.45
Terminal Construction	Employees	60000	0.00080	0.01688	0.00131	0.00005	0.07937	0.0005	0.02	0.51	0.04	0.00	2.38
							Total		1.76	14.11	17.06	1.04	67.51

Notes:
1. On-Road emissions factors from the California Air Resources Board EMFAC7G model
2. Total exhaust PM10 is a composite of EMFAC7G PM10 emissions factors for PM10 from exhaust, PM10 from tire wear, and PM10 from break wear
3. Entrained road dust emissions factors are from the *Air Quality Management Plan for the Town of Mammoth Lakes, November 30, 1990, page 3-5*

Source: Brandley Engineering and Ricondo & Associates, Inc.
Prepared by: Ricondo & Associates, Inc.

Table G-5
EMFAC7G On-Road Emissions Factors

On-Road Emissions Factors From The California Air Resources Board EMFAC7G Software Model

ABN	CY	MYA	MYB	PROCESS	CLASS	TECH	I/M	SEASON	DP	TEMP	SPD	VOC	CO	NOX	CO2	PMEX10	PMTW10	PMBW10	FUEL	EVAP	TIMES
GBV	2001	1967	2001	R	1	2	N	S	56	76	20	0.362	7.6545	0.5921	339.5391	0.0042	0.008	0.0127	27.0637	0.2102	0
GBV	2001	1967	2001	R	2	2	N	S	56	76	10	0.6863	14.1283	1.3598	697.6967	0.0043	0.008	0.0127	20.7598	0.7445	0
GBV	2001	1967	2001	R	3	2	N	S	56	76	10	0.9641	14.3589	1.8808	1038.9091	0.004	0.008	0.0127	11.6975	0.6406	0
GBV	2001	1967	2001	R	7	3	N	S	56	76	50	0.7001	5.1141	7.6535	0	0.4068	0.012	0.0127	6.3099	0	0
GBV	2001	1967	2001	R	8	3	N	S	56	76	50	0.8717	6.0915	10.5471	0	0.594	0.036	0.0127	6.1819	0	0

Notes:
1. CY is the year the emissions factors are applicable.
2. Class is a number scale of 1 through 0 (10) where each number represents a type of vehicle:
   - 1 Light duty automobiles
   - 2 Light duty trucks
   - 3 Medium duty trucks
   - 4 Light heavy gas trucks
   - 5 Light heavy diesel trucks
   - 6 Medium heavy gas trucks
   - 7 Medium heavy diesel trucks
   - 8 Heavy heavy diesel trucks
   - 9 Buses
   - 10 Motorcycles
3. Tech is the vehicle technology type as defined with a value of 1 to 3 where:
   - 0 Non-catalyst gasoline powered vehicles
   - 1 Catalyst powered vehicle
   - 2 Diesel powered vehicle
4. Season is defined as S or W for Summer and Winter.
5. Temperature is the average temperature over the course of the study period.
6. PMEX10 is PM10 emissions from exhaust.
7. PMTW10 is PM10 emissions from tire wear.
8. PMBW10 is PM10 emissions from break wear.
9. All emissions factors are provided in grams per mile.

EMFAC7G is a product of the California Air Resources Board (www.arb.ca.gov/).

Source: Ricondo & Associates, Inc.
Prepared by: Ricondo & Associates, Inc.

Appendix H - Historical and Forecast of Aviation Demand Background Information

H.1 Mammoth Lakes Market Area

The Mammoth Lakes region is abundant with mountains, lakes, streams, and forests. Based on statistics provided by the California Department of Transportation (Caltrans), approximately 1.5 million summer visitors are attracted to the Mammoth Lakes region yearly. As a result, the tourism industry is a major contributor to the region's economic health.

Historical and projected population for the California counties of Inyo and Mono (the Two-County Area that surrounds Mammoth Lake), the State of California (California), and the United States is presented in **Table H-1**. As shown, population in the Two-County Area increased at an annual compounded growth rate of 0.4 percent between 1980 and 2000, which was less than the 1.8 percent increase for California and the 1.0 percent increase for the nation during this same period. Between the 1999 through 2025 period, however, population in the Two-County Area is projected to increase at an annual compounded growth rate that is comparable to that for California and the nation.

Table H-1

Historical and Projected Population

					Annual Compounded Growth			
	Historical			Projected	Historical			Projected
Area	1980	1990	1999	2025	1980-1990	1990-1999	1980-1999	1999-2025
Mono County	8,650	10,080	10,690	16,260	1.5%	0.7%	1.1%	1.6%
Inyo County	17,910	18,270	18,020	21,420	0.2%	-0.2%	0.0%	0.7%
Two-County Area	26,560	28,350	28,710	37,680	0.7%	0.1%	0.4%	1.1%
California	23,792,840	29,925,530	33,125,060	45,243,640	2.3%	1.1%	1.8%	1.2%
United States	227,225,620	249,438,710	272,890,020	345,950,400	0.9%	1.0%	1.0%	0.9%

Source: NPA Data Services, Inc., June 2000.
Prepared By: Ricondo & Associates, Inc., October 2000

Table H-2, H-3 and **H-4** present historical and projected per capita personal income (PCPI), nonagricultural employment, and service industry employment respectively, for the Two-County Area, California, and the nation between 1989 and 2025. As shown, historical and projected trends for these economic indicators are similar to those for population. Growth in PCPI and nonagricultural employment (total and services-oriented) for the Two-County Area was below that for California and the nation between 1989 and 1999. However, their projected growth rates for the Two-County Area are more in line with (actually exceeds) those for California and the nation between 1999 and 2025.

Table H-2

Per Capital Personal Income

Year	Two-County Area	California	United States
Historical			
1989	$19,678	$22,870	$20,526
1990	$19,162	$22,993	$20,618
1991	$18,405	$22,197	$20,268
1992	$18,617	$22,191	$20,547
1993	$18,640	$21,849	$20,671
1994	$17,921	$21,332	$20,499
1995	$18,102	$21,842	$21,001
1996	$18,909	$22,760	$21,874
1997	$19,581	$23,537	$22,619
1998	$20,309	$24,819	$23,394
1999	$21,137	$25,458	$24,035
Projected			
2025	$33,191	$37,117	$35,426
Annual Compounded Growth			
1989-1999	0.7%	1.1%	1.7%
1999-2025	1.8%	1.5%	1.5%

Source: NPA Data Services, Inc. June2000.
Prepared By: Ricondo & Associates, Inc. October 2000.

Table H-3

Total Nonagricultural Employment

Year	Two-County Area	California (000)	United States (000)
Historical			
1989	16,660	16,303	134,118
1990	16,850	16,692	136,034
1991	16,110	16,634	135,682
1992	16,360	16,302	136,362
1993	16,810	16,267	138,993
1994	16,850	16,477	142,693
1995	17,240	16,821	146,378
1996	17,410	17,297	149,709
1997	17,670	17,743	153,453
1998	17,790	18,205	156,125
1999	18,150	18,700	158,912
Projected			
2025	30,760	28,422	224,844
Annual Compounded Growth			
1989-1999	0.9%	1.4%	1.7%
1999-2025	2.0%	1.6%	1.3%

Source: NPA Data Services, Inc. June2000.
Prepared By: Ricondo & Associates, Inc. October 2000.

Table H-4
Services Industry Employment

Year	Two-County Area	California (000)	United States (000)
Historical			
1989	5,450	4,885	37,235
1990	5,500	5,132	38,662
1991	5,250	5,298	38,572
1992	5,460	5,280	40,476
1993	5,640	5,384	41,903
1994	5,600	5,476	43,117
1995	5,660	5,691	44,905
1996	5,820	5,939	46,588
1997	5,830	6,079	48,227
1998	5,860	6,282	49,636
1999	5,970	6,519	50,943
Projected			
2025	10,660	11,189	80,198
Annual Compounded Growth			
1989-1999	0.9%	2.9%	3.2%
1999-2025	2.3%	2.1%	1.8%

Source: NPA Data Services, Inc. June2000.
Prepared By: Ricondo & Associates, Inc. October 2000.

Currently, there are approximately 14,730 rental beds/pillows in Mammoth Lakes, of which 28 percent are hotel rooms and 72 percent are rentable condominiums. Mammoth Lake's bed base is projected to increase dramatically in the next few years with the development of three new Intrawest projects: Juniper Springs, Sierra Star, and Gondola Village. These three developments are anticipated to add approximately 2,100 units to the existing bed base. In addition, Mammoth Mountain is in the midst of a five-year, $132 million improvement program.

Between 1985 and 1995, the Airport was provided with commercial service by Trans World Express, via Beech 1900 aircraft, with up to five daily roundtrips from Los Angeles and San Francisco combined. This service was discontinued due to the financial difficulties and restructuring of Trans World Airlines. In addition, United Express also served the Airport during the winter seasons in 1993 and 1994, with daily flights to Fresno. Discontinued service by United Express was largely due to several business and market factors, including frequent overbookings out of the Fresno market that resulted in poor passenger loyalty and low repeat business. Since 1995, the Airport has not been provided with a scheduled commercial air service.

Currently, the nearest commercial service airport to the Mammoth Lakes area is Reno, located approximately 170 miles north of Mammoth Lakes. The next closest commercial service airports are Fresno (190 miles), Sacramento (220 miles) the three Bay-area airports (San Francisco/Oakland/San Jose - roughly 250 miles), Las Vegas (310 miles) and Los Angeles (320 miles). The driving times from these areas to Mammoth Lakes range from three to eight hours. The majority of visitors to Mammoth Lakes arrive via car from the Los Angeles area, either originating travel in the Los Angeles area or flying to a Los Angeles area airport and renting a car to drive to Mammoth Lakes. With the exception of the drive from Los Angeles and Reno via U.S. 395, the drive from each of these airports is via winding mountainous roads through the Sierra Nevada Mountain range, some of which are not open during the winter season. Another airport in the region is Bishop Airport, approximately 45 miles south of Mammoth Lakes, but Bishop Airport is a general aviation facility and does not provided commercial service.

The region has two distinct seasonal attractions, consisting of skiing in the winter and numerous outdoor recreational activities in the summer. **Table H-5** presents historical skier day statistics for the Mammoth Mountain Ski Resort since 1960. As shown, through the early 1980's skier days increased dramatically to over 1.5 million skier days in 1986. During the early 1980's, Mammoth Mountain was the number one ski resort in the country, based on skier visits. The massive influx of skiers was reportedly taken for granted, as very little was done to maintain the success of the region. While new ski facilities were built to meet demand, very little was done to improve guest service at the resort as well as the region. Other resorts such as Vail and Aspen began to emphasize guest service, which attracted skiers from Mammoth. Since the mid-1980's, skier days have decreased from their peak levels, to approximately one million skier day visits in the 1998/99 winter season. Since the mid-1980's, with the exception of the 1986/87 and 1990/91 seasons, the number of skier days has remained relatively constant averaging around one million skier days. During the 1986/87 and 1990/91 seasons, a drought and the nationwide economic recession resulted in unusually low skier day visits, for each of these seasons respectively. Since then, improvements in snow making capabilities, lodging, and ski facilities have increased the number of winter visitors.

During the summer, major attractions include Yosemite National Park, Death Valley National Park, Kings Canyon National Park, Mono Lake, June Lake, and Devils Postpile National Monument, among many others. Popular summer activities in the Mammoth Lakes area include mountain biking, golfing, hiking in the Ansel Adams and John Muir Wilderness Areas, fishing, horseback riding, and rock climbing. Concerts and weekend festivals are occur during the summer season. **Table H-6** presents historical national park visitors for Yosemite, Death Valley, Kings Canyon, and the total U.S. since 1980. As shown, nearly 5.3 million tourists visited nearby Yosemite, Kings Canyon and Death Valley National Parks in 1999. Overall, national park visitors to the region's four national parks increased at an annual compounded growth rate of 1.6 percent as compared to 1.9 percent for the nation. The U.S. Park Service plans anticipate decreasing automobile use in Yosemite National Park with increased use of buses from accommodations and staging areas outside of the park. Mammoth Lakes, Mariposa, and Merced are three communities from which the Yosemite Area Regional Transportation System (YARTS) has started bus service. A letter from YARTS discussing this service is provided in Appendix D.

Over the last several years, interests within the Mammoth Lakes area have explored the opportunity of providing air carrier service to the Mammoth Lakes region. Discussions have been conducted with American Airlines to provide air carrier and commuter service to Mammoth Lakes during both winter and summer seasons. Agreements between the airline and local business interests have been negotiated with air carrier service scheduled to initiate in the 2002/2003 winter season from both Chicago and Dallas/Fort Worth. A copy of the Air Service Agreement is provided in Appendix M. It is the intent of American Airlines and local business interests to increase the air service over the term of the agreement, as outlined in the attached Table 1 from the Air Service Agreement. From 2003 to 2006, the American Airlines service is based on the recently negotiated agreement with American, and results in an estimated 256 annual flights and approximately 22,500 enplanements in the 2002/2003 winter season growing to an estimated 576 annual flights and nearly 66,000 enplanements for the 2005/2006 winter season. As discussed below, additional service, including summer service and additional markets, to Mammoth Yosemite Airport is anticipated to develop over time.

Table H-5

Historical Mammoth Mountain Skier Day Statistics

Season Year	Paid Skier Visits	Total Skier Visits [1]	Annual Increase/ Decrease
1960-61	151,554	178,834	--
1961-62	143,717	169,586	-5.2%
1962-63	147,221	173,721	2.4%
1963-64	212,075	250,249	44.1%
1964-65	221,064	260,856	4.2%
1965-66	262,938	310,267	18.9%
1966-67	301,690	355,994	14.7%
1967-68	312,394	368,625	3.5%
1968-69	324,425	382,822	3.9%
1969-70	401,524	473,798	23.8%
1970-71	362,169	427,359	-9.8%
1971-72	443,289	523,081	22.4%
1972-73	560,915	661,880	26.5%
1973-74	693,402	818,214	23.6%
1974-75	819,316	966,793	18.2%
1975-76	595,688	702,912	-27.3%
1976-77	300,672	354,793	-49.5%
1977-78	1,050,990	1,240,168	249.5%
1978-79	932,430	1,100,267	-11.3%
1979-80	1,131,855	1,335,589	21.4%
1980-81	894,526	1,055,541	-21.0%
1981-82	1,235,796	1,458,239	38.2%
1982-83	1,144,691	1,350,735	-7.4%
1983-84	1,164,362	1,373,947	1.7%
1984-85	1,118,864	1,320,260	-3.9%
1985-86	1,299,053	1,532,883	16.1%
1986-87	711,757	839,873	-45.2%
1987-88	1,112,980	1,313,316	56.4%
1988-89	1,053,908	1,243,611	-5.3%
1989-90	981,935	1,158,683	-6.8%
1990-91	463,987	547,505	-52.7%
1991-92	889,387	1,049,477	91.7%
1992-93	905,236	1,068,178	1.8%
1993-94	700,617	826,728	-22.6%
1994-95	964,561	1,138,182	37.7%
1995-96	799,838	943,809	-17.1%
1996-97	786,934	928,582	-1.6%
1997-98	879,853	1,038,227	11.8%
1998-99	829,569	959,738	-7.6%
1999-00 (est.)	790,000	930,000	-3.1%
Annual Compounded Growth Rate			
1960 - 1970	9.1%	9.1%	
1970 - 1980	9.5%	9.5%	
1980 - 1990	-6.4%	-6.4%	
1990 - 1999	6.1%	6.1%	
1960 - 1999	4.3%	4.3%	

[1]Skier visits from 1960-61 through 1997-98 are calculated by taking actual paid skier visits and adding an additional 18 % (8% for complimentary tickets and 10 % for season passes), which are standard industry figures.
Skier visit data for the 1998-99 season are based on actual records.

Source: Mammoth Mountain Ski Resort, June 2000.
Prepared by: Ricondo & Associates, Inc., October 2000.

Table H-6

Historical National Park Visitor Statistics

Season Year	Yosemite National Park Visitors	Death Valley National Park Visitors	Kings Canyon National Park Visitors	Total National Park Visitors	Annual Increase/ Decrease	Total U.S. National Park Visitors	Annual Increase/ Decrease
1980	2,490,282	618,140	819,065	3,927,487	--	62,068,871	--
1981	2,516,893	630,402	776,850	3,924,145	-0.1%	65,109,868	4.9%
1982	2,415,587	679,992	831,044	3,926,623	0.1%	66,260,713	1.8%
1983	2,457,464	635,582	765,755	3,858,801	-1.7%	66,820,348	0.8%
1984	2,738,467	621,197	937,262	4,296,926	11.4%	67,442,783	0.9%
1985	2,831,952	576,679	874,456	4,283,087	-0.3%	68,093,505	1.0%
1986	2,363,756	586,668	1,028,785	3,979,209	-7.1%	73,047,438	7.3%
1987	2,573,194	665,345	1,081,172	4,319,711	8.6%	78,087,260	6.9%
1988	2,182,113	692,267	1,007,695	3,882,075	-10.1%	80,371,507	2.9%
1989	2,644,442	664,449	1,037,349	4,346,240	12.0%	82,518,266	2.7%
1990	2,823,572	690,965	1,062,867	4,577,404	5.3%	79,653,630	-3.5%
1991	3,423,101	743,608	1,071,022	5,237,731	14.4%	82,798,847	3.9%
1992	3,819,518	869,183	637,446	5,326,147	1.7%	82,926,372	0.2%
1993	3,839,645	998,474	636,515	5,474,634	2.8%	85,171,601	2.7%
1994	3,962,117	971,487	725,930	5,659,534	3.4%	87,205,340	2.4%
1995	3,958,406	1,109,421	832,794	5,900,621	4.3%	89,012,480	2.1%
1996	4,046,207	1,189,215	502,749	5,738,171	-2.8%	86,569,839	-2.7%
1997	3,669,970	1,188,212	484,718	5,342,900	-6.9%	89,662,333	3.6%
1998	3,657,132	1,177,746	540,212	5,375,090	0.6%	88,922,796	-0.8%
1999	3,493,607	1,227,583	559,534	5,280,724	-1.8%	88,350,924	-0.6%
Projected							
2000	3,369,463	1,245,892	559,534	5,174,889	-2.0%	87,467,415	-1.0%
2001	3,237,595	1,268,377	559,534	5,065,506	-2.1%	86,592,741	-1.0%
Annual Compounded Growth Rate							
1980 - 1990	1.3%	1.1%	2.6%		1.5%		2.5%
1990 - 1999	2.4%	6.6%	-6.9%		1.6%		1.2%
1980 - 1999	1.8%	3.7%	-2.0%		1.6%		1.9%
1999 - 2001	-3.7%	1.6%	0.0%		-2.1%		-1.0%

Source: National Park Service, 2000.
Prepared by: Ricondo & Associates, Inc., October 2000.

Table 1

Mammoth/Yosemite Airport City Pair Growth Scenario - American Airlines Winter Season Only

City Pair		Aircraft	Seats	2002	2003	2004	2005	2006
	Airline--AA							
	DFW-MMH			W	W	W	W	W
	Annual Departures	757-200	176	128	144	288	288	288
	Load Factor			50%	55%	60%	65%	65%
	Enplanements			11,264	13,939	30,413	32,947	32,947
	ORD--MMH			W	W	W	W	W
	Annual Departures	757-200	176	128	144	144	288	288
	Load Factor			50%	55%	60%	65%	65%
	Enplanements			11,264	13,939	15,206	32,947	32,947
	Total Departures			256	288	432	576	576
	Total Operations			512	576	864	1,152	1,152
	Total Seats			45,056	50,688	76,032	101,376	101,376
	Total Enplanements			22,528	27,878	45,619	65,894	65,894

W--Winter Service 112 Days

16 weeks of 8 flights per week=128

16 weeks of 9 flights per week=144

Operations are for 112 days from mid-December to early April.

Air Service from DFW and ORD with American Airlines for years beyond 2006 will grow at a level above the national average.

Mammoth Mountain and American Airlines are currently investigating 737-800 air service from two additional markets that are not included in this forecast.

Airline operations in the national airspace system largely operate using a "hub and spoke" system. Major air carriers establish central hub airports where passengers can arrive from outlying or spoke airports, transfer or connect with another flight, and continue to their destination airport. In the case of the proposed service from American Airlines to and from Mammoth Yosemite Airport, initial service would be provided from two of American Airlines' hubs: Chicago and Dallas/Fort Worth. Service from these two airports could carry passengers that connect from locations throughout the Eastern, Southern, and Midwest U.S. in additional to international passengers such as from Europe, South America, Canada, and Mexico. Many of the visitors traveling from these locations to or from the Mammoth Lakes area currently use Los Angeles or Reno airports and drive between the Mammoth Lakes area and these airports.

Based on the comparisons with the case study airports (See Section H.2), future service is anticipated from other hub airports such as Los Angeles, San Francisco and/or Denver by American Airlines and/or other air carrier/commuter operators. However, as may be the case with air service from Denver or some of the other hub airports, only a small percentage of the passengers may originate from those locations with the majority of passengers being connecting passengers from other originating points.

H.2 Case Study Airports

In order to provide a basis for potential air carrier service at Mammoth Yosemite Airport, historical activity, local demographics, and tourism-related visitor statistics were reviewed at five comparable airports, as prescribed in the FAA's Benefit-Cost Analysis Guidance:

- Yampa Valley Regional Airport (Steamboat Springs, CO)
- Vail/Eagle County Airport (Vail, CO)
- Aspen-Pitkin County Airport (Aspen, CO)
- Jackson Hole Airport (Jackson, WY)
- Glacier Park International Airport (Kalispell, MO)

In order compare each airport's market characteristics, the following factors were examined and summarized in **Table H-7**:

- Number of annual ski visitors (represented as skier days)
- Number of ski-lifts, trails and skiable acreage
- Number of area beds/pillows
- Number of annual national park visitors
- Driving distances from competing commercial service airports
- Historical enplanement levels

These factors, along with each case airport's commercial activity levels, serve to give an overall idea of the level of service that might be expected at Mammoth Lakes.

Table H-8 presents each case study airport's historical growth in aviation activity from 1990 through 1998. In addition, historical ski visitor statistics for Steamboat Springs, Vail, and Aspen, as well as historical visitors for the national parks surrounding Jackson Hole and Glacier Park International, are presented in Table H-8. As shown, the estimated number of 1998 winter enplanements per ski visitor ranges from a low of approximately 0.026 enplanements per skier at Vail/Eagle County Airport to a high of 0.104 enplanements per ski visitor at Yampa Valley Regional Airport. Enplanements to national park visitors range from approximately 0.02 enplanements per national park visitor at Jackson Hole Airport, to nearly 0.06 enplanements per national park visitor at Glacier Park International Airport.

As also shown in Table H-8, with the exception of Vail/Eagle County and Aspen-Pitkin County airports, average aircraft load factors have generally increased at each case study airport from the 35-45 percent range to the 60-70 percent range. At Vail/Eagle County and Aspen-Pitkin County airports, the average aircraft load factors have decreased in recent years after peaking at 73 and 64 percent, respectively. These decreases in load factors at Vail/Eagle County and Aspen-Pitkin County airports are due to the following:

- Load factors at Vail/Eagle County Airport have decreased in recent years due an increase in the number of aircraft seats relative to the airport's enplanement growth. These additional scheduled aircraft seats are due to the initiation and/or expansion of new nonstop hub service by United to LaGuardia, Chicago, and Dulles; American to Chicago, Los Angeles, and Newark; and Continental to Houston and Newark.

- Load factors at Aspen-Pitkin County Airport have decreased in recent years due an increase in the number of aircraft seats relative to the airport's enplanement growth. These additional scheduled aircraft seats are due to the initiation and expansion of new nonstop hub service by Aspen Mountain Air to Denver; Mesaba Aviation to Minneapolis; and Mesa Airlines to Phoenix.

Table H-9 presents a summary of each case study airport's air service, including the airlines serving each airport, nonstop markets, number of daily flights, and aircraft types.

A detailed discussion of the specific factors contributing to the commercial air service levels at each of the case study airports is provided in the following sections.

Table H-7
Comparison of Case Study Airport Market Characteristics

	Mammoth Lakes	Steamboat Springs	Vail	Aspen	Jackson Hole	Kalispell/ Whitefish
General Statistics						
Skier Days	956,573 [3]	1,027,729 [1]	5,736,902 [2]	1,510,144 [8]	541,000 [5]	556,000 [9]
Number of Lifts	30	25 [1]	115 [2]	45 [8]	18	10
Number of Trails	150	155 [1]	780 [2]	383 [8]	173	67
Skiable Acreage	3,500 +	2,964 [1]	13,481 [2]	5,242 [8]	5,900	3,000
Beds/Pillows	14,730	N/A	44,000 [4]	N/A	7,822 [5]	N/A
Number of National Park Visitors	5,375,090 [6]	--	--	--	5,877,890 [7]	2,234,456 [10]
Driving Distance to Nearest Commerical Service Airport (miles)						
Reno	170					
Las Vegas	310					
Fresno	190					
San Francisco / Oakland / San Jose	250					
Los Angeles	320					
Denver International Airport		210	120	170		
Yampa Valley Regional Airport		--	85	130		
Vail/Eagle County Airport		85	--	75		
Aspen		130	100	--		
Idaho Falls					100	
Jackson Hole					--	
Yellowstone Regional					70	
Riverton Regional					130	
Salt Lake City					270	
Casper					280	
Missoula						125
Great Falls						230
Helena						200
1998 Activity Statistics						
Annual Enplanements	--	110,621	169,740	248,510	184,903	133,515
Annual Scheduled Aircraft Seats	--	165,817	301,324	541,496	334,364	231,389
Load Factor	--	66.7%	56.3%	45.9%	55.3%	57.7%

1. Colorado Ski Country USA. Includes the ski resorts located in the Front Range Destination including, Arapahoe Basin, Beaver Creek, Breckenridge, Copper Mountain, Keystone, Vail, and Ski Cooper.
2. Colorado Ski Country USA. Includes Howelsen Hill and Steamboat resorts.
3. California Department of Transportation (CalTrans).
4. Vail Chamber of Commerce.
5. National Park Service. Includes Yellowstone National Park and Grand Teton National Park.
6. National Park Service. Includes Yellowstone National Park, Kings Canyon National Park, and Death Valley National Park.
7. Jackson Chamber of Commerce.
8. Colorado Ski Country USA. Includes the Aspen Highlands, Aspen Mountain, Buttermilk, Snowmass, and Sunlight ski resorts.
9. Big Mountain Ski Resort.
10. National Park Service. Includes Yellowstone National Park, Kings Canyon National Park, and Death Valley National Park.

Source: Ricondo & Associates, Inc., October 1999.
Prepared by: Ricondo & Associates, Inc., October 2000.

Table H-8
Historical Activity at Case Study Airports

YAMPA VALLEY REGIONAL AIRPORT

Year	Annual Enplanements	Annual Growth	Aircraft Seats	Load Factor	Estimated Winter Enplanements (100%)	Skier Days 1	EPs per Ski Visitor
1990	46,075	--	94,335	48.8%	46,075	N/A	N/A
1991	60,309	30.89%	125,416	48.1%	60,309	N/A	N/A
1992	58,643	-2.76%	91,981	63.8%	58,643	N/A	N/A
1993	66,317	13.09%	90,233	73.5%	66,317	N/A	N/A
1994	69,299	4.50%	106,945	64.8%	69,299	1,037,320	0.0668
1995	93,173	34.45%	154,790	60.2%	93,173	1,027,701	0.0907
1996	97,975	5.15%	150,310	65.2%	97,975	1,035,110	0.0947
1997	110,170	12.45%	168,662	65.3%	110,170	1,121,487	0.0982
1998	110,621	0.41%	165,817	66.7%	110,621	1,068,091	0.1036
(1990-1998) Annual Compounded Growth Rate		11.6%	7.3%			0.7%	

VAIL/EAGLE COUNTY AIRPORT

Year	Annual Enplanements	Annual Growth	Aircraft Seats	Load Factor	Estimated Winter Enplanements (90%)	Skier Days 1	EPs per Ski Visitor
1990	5,956	--	16,302	36.5%	5,360	N/A	N/A
1991	28,341	375.84%	58,608	48.4%	25,507	N/A	N/A
1992	35,317	24.61%	56,513	62.5%	31,785	N/A	N/A
1993	55,490	57.12%	102,541	54.1%	49,941	N/A	N/A
1994	57,821	4.20%	86,495	66.8%	52,039	4,667,635	0.0111
1995	77,882	34.70%	115,514	67.4%	70,094	5,476,402	0.0128
1996	110,063	41.32%	149,519	73.6%	99,057	5,896,743	0.0168
1997	159,874	45.26%	263,144	60.8%	143,887	6,136,048	0.0234
1998	169,740	6.17%	301,324	56.3%	152,766	5,935,018	0.0257
(1990-1998) Annual Compounded Growth Rate		52.0%	44.0%			6.2%	

ASPEN-PITKIN COUNTY AIRPORT

Year	Annual Enplanements	Annual Growth	Aircraft Seats	Load Factor	Estimated Winter Enplanements (60%)	Skier Days 1	EPs per Ski Visitor
1990	214,725	--	448,770	47.8%	128,835	N/A	N/A
1991	206,041	-4.04%	435,057	47.4%	123,625	N/A	N/A
1992	238,097	15.56%	472,268	50.4%	142,858	N/A	N/A
1993	251,914	5.80%	460,037	54.8%	151,148	N/A	N/A
1994	239,050	-5.11%	438,874	54.5%	143,430	1,542,094	0.0930
1995	200,685	-16.05%	312,216	64.3%	120,411	1,518,723	0.0793
1996	210,672	4.98%	345,494	61.0%	126,403	1,433,187	0.0882
1997	224,815	6.71%	431,884	52.1%	134,889	1,536,309	0.0878
1998	248,510	10.54%	541,496	45.9%	149,106	1,661,775	0.0897
(1990-1998) Annual Compounded Growth Rate		1.8%	2.4%			1.9%	

Table H-8

Historical Activity at Case Study Airports

JACKSON HOLE AIRPORT

Year	Annual Enplanements	Annual Growth	Aircraft Seats	Load Factor	Estimated Summer Enplanements (35%)	National Park Visitors[2]	EPs per NP Visitor
1990	148,144	--	299,613	49.4%	51,850	4,411,825	0.0118
1991	170,458	15.06%	335,281	50.8%	59,660	4,546,289	0.0131
1992	192,283	12.80%	390,526	49.2%	67,299	4,889,041	0.0138
1993	192,982	0.36%	391,856	49.2%	67,544	5,480,882	0.0123
1994	181,080	-6.17%	328,837	55.1%	63,378	5,586,844	0.0113
1995	169,062	-6.64%	289,470	58.4%	59,172	5,856,300	0.0101
1996	180,120	6.54%	327,931	54.9%	63,042	5,745,610	0.0110
1997	191,057	6.07%	334,045	57.2%	66,870	5,548,275	0.0121
1998	199,693	4.52%	334,364	59.7%	69,893	5,877,890	0.0119
(1990 – 1998) Annual Compound Growth Rate		3.8 %	1.4 %			3.7 %	

GLACIER PARK INTERNATIONAL AIRPORT

Year	Annual Enplanements	Annual Growth	Aircraft Seats	Load Factor	Estimated Summer Enplanements (50%)	National Park Visitors[3]	EPs per NP Visitor
1990	70,883	--	198,591	35.7%	35,442	2,173,164	0.0326
1991	76,652	8.14%	206,852	37.1%	38,326	2,300,619	0.0333
1992	85,953	12.13%	205,748	41.8%	42,977	2,411,191	0.0356
1993	89,553	4.19%	220,138	40.7%	44,777	2,383,980	0.0376
1994	101,715	13.58%	226,570	44.9%	50,858	2,403,603	0.0423
1995	114,971	13.03%	252,711	45.5%	57,486	2,091,783	0.0550
1996	121,341	5.54%	223,545	54.3%	60,671	2,025,179	0.0599
1997	130,620	7.65%	253,713	51.5%	65,310	2,055,902	0.0635
1998	133,515	2.22%	231,389	57.7%	66,758	2,234,456	0.0598
(1990 – 1998) Annual Compound Growth Rate		8.2 %	1.9%			0.3%	

[1] Colorado Ski County USA.
[2] National Park Service. Includes Yellowstone National Park and the Grand Teton National Park.
[3] National Park Service. Includes Glacier National Park and Glacier Bay National Park.

Source: Individual Airport Records.
Prepared by: Ricondo & Associates, Inc., October 2000.

Table H-9

Existing Air Service at Case Study Airports

Airport	Airlines	Nonstop Markets	Number of Daily Flights	Aircraft Types
Yampa Valley Regional Airport (Winter Schedule)	American, Continental, Trans World, United Express	Denver, Dallas/Ft. Worth, Newark, Houston, St. Louis	11	B-737-300, B-737-500, B-757, BAE 146, Dornier 328, MD-80
Vail/Eagle County Airport (Winter Schedule)	American, Continental, Delta, Mesa, Northwest, United, United Express	Atlanta, Denver, Dallas/Ft. Worth, Detroit, Newark, Houston, Los Angeles, LaGuardia, Miami, Minneapolis, Chicago O'Hare, Phoenix, San Francisco	16	B-757, BAE 146, Dash-8
Aspen-Pitkin County Airport (Winter Schedule)	America West, Mesa, Mesaba, Northwest, United, United Express	Denver, Los Angeles, Minneapolis, Phoenix	17	BAE 146, Dash-8, Dornier 328
Jackson Hole Airport (Summer Schedule)	American, Skywest, Delta, United, United Express	Dallas/Ft. Worth, Denver, Salt Lake City	17	A-319, B-757, BAE 146, Emb 120
Glacier Park International Airport (Summer Schedule)	Alaska, Continental, Delta, Big Sky, Northwest, Horizon	Spokane, Great Falls, Helena, Missoula, Minneapolis, Seattle, Salt Lake City	14	Dash-8, DC-9-30/40/50, F28, Metro, B-727-200, B-737-300

Source: Official Airline Guide, December 1999.
Prepared by: Ricondo & Associates, Inc., October 2000

H.2.1 Yampa Valley Regional Airport (Steamboat Springs, Colorado)

The Yampa Valley Regional Airport is situated in the Rocky Mountains in Northwestern Colorado. Yampa Valley predominately serves winter ski visitors to the area. In terms of skiing characteristics, Steamboat Springs is the most comparative in size to Mammoth Lakes. The Yampa Valley Regional Airport essentially serves two area ski resorts: the Steamboat and Howelsen ski resorts. Combined, these two ski resorts accommodated 1,028,000 ski visitors in 1998, as compared to the 957,000 ski visitors to Mammoth Mountain in 1999. Similarly, these ski resorts provide similar size ski facilities, in terms of number of lifts (25 lifts versus 30 lifts at Mammoth Lakes), number of ski trails (155 trails versus 150 trails at Mammoth Lakes), and skiable acreage (2,964 acres versus 3,500 plus acres at Mammoth Lakes).

In addition to the Yampa Valley Regional In addition to the Yampa Valley Regional Airport, three other commercial service airports are located nearby including Denver International (210 miles), Vail/Eagle County Airport (85 miles), and Aspen (130 miles). Given the proximity and the level of service provided at Denver, these airports likely serve some ski visitors traveling to the Steamboat Springs area. Due to the indirect two lane access from these airports to Steamboat Springs, however, approximately 75 to 85 percent of the ski visitors traveling by air are estimated to arrive via the Yampa Valley Regional Airport. Due to the indirect two lane access from these airports to Steamboat

Springs, however, approximately 75 to 85 percent of the ski visitors traveling by air are estimated to arrive via the Yampa Valley Regional Airport.

Until as recently as this summer, Yampa Valley Regional Airport did not have any scheduled commercial service during the summer months. During the 1999 winter season, Yampa Valley Regional was provided with 11 daily flights by four commercial air carriers (American, Continental, Trans World and United) and one regional/commuter airline (United Express). United Express also provides service to Yampa Valley in the summer. As shown in Table H-8, Yampa Valley's enplanements have increased from 46,100 in 1990 to 110,600 in 1998, representing an annual compounded growth rate of 11.6 percent. Overall, average aircraft load factors have increased as well, averaging approximately 66.7 percent in 1998.

Table H-10 presents the top 30 origin and destination (O&D) markets for Yampa Valley Regional Airport. As shown, Chicago O'Hare is Yampa Valley's top O&D market, with over 7 percent of the Airport's traffic originating from the Chicago O'Hare Airport. The states of New York and Texas also constitute major O&D markets for Yampa Valley.

Table H-10

Yampa Valley Regional Airport - Top O&D Markets

Rank	Airport	State	Passengers	Percent
1	O'Hare Intl	IL	7,210	7.3%
2	George Bush Int	TX	5,340	5.4%
3	Newark Intl	NY	5,320	5.4%
4	Dallas/Ft Worth	TX	4,800	4.9%
5	Atlanta	GA	3,680	3.7%
6	Denver Intl	CO	3,520	3.6%
7	La Guardia	NY	3,300	3.3%
8	St Paul Intl	MN	2,810	2.8%
9	Los Angeles Intl	CA	2,700	2.7%
10	Philadelphia Intl	PA	2,470	2.5%
11	Lambert-St Louis	MO	2,400	2.4%
12	Tampa Intl	FL	2,110	2.1%
13	Boston Logan	MA	2,070	2.1%
14	Orlando Intl	FL	2,040	2.1%
15	Miami Intl	FL	2,000	2.0%
16	Detroit	MI	1,870	1.9%
17	Dulles Intl	DC	1,840	1.9%
18	Moisant Intl	LA	1,770	1.8%
19	San Francisco Intl	CA	1,580	1.6%
20	Baltimore/Wash Intl	MD	1,560	1.6%
21	Sky Harbor Intl	AZ	1,440	1.5%
22	Austin	TX	1,270	1.3%
23	Memphis Intl	TN	1,270	1.3%
24	Hopkins Intl	OH	1,220	1.2%
25	Lindberg Field	CA	1,170	1.2%
26	Indianapolis	IN	1,160	1.2%
27	Fort Laud Intl	FL	1,150	1.2%
28	Nashville	TN	1,120	1.1%
29	Charlotte	NC	1,040	1.1%
30	Birmingham	AL	980	1.0%
Total – Top 30 Markets			72,210	73.2 %
Total – All Markets			98,700	100.0 %

Source: USDOT Origin & Destination Survey of Airline Passenger Traffic, December 1999.
Prepared by: Ricondo & Associates, Inc., October 2000.

Ski visitors to Steamboat Springs resorts have remained relatively constant since 1994, averaging approximately 1.06 million visitors from 1994 to 1998 (see Table H-8). Based on conversations with staff, historical scheduled seats at the Airport and winter enplanements are estimated to be approximately 90 percent of the Airport's total annual enplanements. When compared to ski visitor statistics for Steamboat Springs, the number of estimated winter enplanements per ski visitor has increased since 1994 from 0.067 enplanements per ski visitor to approximately 0.104 enplanements per ski visitor in 1998.

H.2.2 Vail/Eagle County Airport (Vail, Colorado)

Vail/Eagle County Airport is situated in the Rocky Mountains in Northwestern Colorado. Similar to the Yampa Valley Regional Airport, Vail/Eagle County Airport also predominately serves winter ski visitors to the area. Skiing activity in Vail is nearly six times greater than that of Mammoth Lakes or Steamboat Springs. There are seven ski resorts located in the Vail area: Arapahoe Basin, Beaver Creek, Breckenridge, Copper Mountain, Keystone, Vail and Ski Cooper. Combined, these ski resorts accommodated 5,737,000 ski visitors in 1998, as compared to the 957,000 ski visitors to Mammoth Mountain in 1999. These seven ski resorts provide 115 ski lifts, 780 ski trails, and 13,481 skiable acres.

In addition to the Vail/Eagle County Airport, three other commercial service airports are located nearby: Yampa Valley Regional Airport (85 miles), Aspen (100 miles) and Denver International (120 miles). Given their proximity, particularly Denver International Airport, these airports serve some ski visitors traveling to the Vail area. Direct interstate access via I-70 is provided from Denver to Vail, thereby likely resulting in some diversion of air traffic destined for the Vail area.

Commercial service was initiated at Vail/Eagle County Airport in late 1990. Since that time, the level of commercial service and airport enplanements has grown considerably. As shown in Table H-8, enplanements have increased from 6,000 in 1990 to 170,000 in 1998, representing an annual compounded growth rate of 52.0 percent. Similarly, the number of scheduled aircraft seats at the Vail/Eagle County Airport has increased at an annual compounded rate of 44.0 percent from 1990 to 1998. Overall, average aircraft load factors have increased as well, averaging approximately 56.3 percent in 1998. As mentioned previously, the airport's average aircraft load factors have decreased in recent years due an increase in the number of aircraft seats relative to the airport's enplanement growth. These additional scheduled aircraft seats are due to the initiation and/or expansion of new nonstop hub service by United to LaGuardia, Chicago, and Dulles; American to Chicago, Los Angeles, and Newark; and Continental to Houston and Newark. While the Airport is still in a growth mode, the market is considered to be maturing and is likely to level off in terms of overall air service and enplanement growth in the near-term.

During the 1999 winter season, Vail/Eagle County Airport was provided with 16 daily flights on weekdays and 30 flights on weekends, by five commercial air carriers (American, Continental, Delta, Northwest and United) and two regional/commuter airline (United Express and Mesa). United Express also provides service to the Airport in the summer.

Table H-11 presents the top 30 origin and destination (O&D) markets for Vail/Eagle County Airport. Similar to Yampa Valley, the states of New York and Texas constitute major O&D markets for the Airport. In particular, when combined, the New York markets account for 17.3 percent of the Airport's demand. Chicago O'Hare and Los Angeles are also major markets for Vail, accounting for 6.0 percent and 5.3 percent of Vail/Eagle County Airport's O&D traffic, respectively.

Table H-11

Vail/Eagle County Airport - Top O&D Markets

Rank	Airport	State	Passengers	Percent
1	Newark Intl	NY	16,100	10.2%
2	La Guardia	NY	11,160	7.1%
3	O'Hare Intl	IL	9,430	6.0%
4	Dallas/Ft Worth	TX	8,350	5.3%
5	Los Angeles Intl	CA	8,340	5.3%
6	Miami Intl	FL	6,950	4.4%
7	George Bush Int	TX	5,700	3.6%
8	Atlanta	GA	5,270	3.4%
9	St Paul Intl	MN	4,720	3.0%
10	Detroit	MI	4,200	2.7%
11	Boston Logan	MA	4,000	2.5%
12	Philadelphia Intl	PA	3,860	2.5%
13	Tampa Intl	FL	2,810	1.8%
14	San Francisco Intl	CA	2,440	1.6%
15	Dulles Intl	DC	2,390	1.5%
16	Fort Lauderdale Intl	FL	2,300	1.5%
17	Baltimore/Wash Intl	MD	2,080	1.3%
18	Nashville	TN	2,020	1.3%
19	Raleigh/Durham	NC	1,900	1.2%
20	Orlando Intl	FL	1,890	1.2%
21	West Palm Beach	FL	1,770	1.1%
22	Bradley Intl	CT	1,680	1.1%
23	Birmingham	AL	1,650	1.0%
24	Memphis Intl	TN	1,630	1.0%
25	Hopkins Intl	OH	1,590	1.0%
26	Charlotte	NC	1,560	1.0%
27	Indianapolis	IN	1,550	1.0%
28	Ronald Regan National	DC	1,520	1.0%
29	Moisant Intl	LA	1,500	1.0%
30	Pittsburgh Intl	PA	1,420	0.9%
Total – Top 30 Markets			121,780	77.4 %
Total – All Markets			157,310	100.0 %

Source: USDOT Origin & Destination Survey of Airline Passenger Traffic, December 1999.
Prepared by: Ricondo & Associates, Inc., October 2000.

Ski visitors to the Vail ski resorts have increased since 1994 from 4.7 million skiers in 1994 to nearly 6.0 million skiers in 1998 (see Table H-8). Based on conversations with staff, historical scheduled seats at the Airport and winter enplanements are estimated to be approximately 90 percent of the Airport's total annual enplanements. The number of estimated winter enplanements per ski visitor has increased in the last five years from approximately 0.011 in 1994 to approximately 0.026 in 1998. The lower ratio of enplanements to ski visitor ratio for Vail/Eagle County Airport can be directly attributed to the competition for commercial service with other nearby commercial service airports, primarily Denver International Airport.

H.2.3 Aspen-Pitkin County Airport (Aspen, Colorado)

Aspen-Pitkin County Airport is situated in the Rocky Mountains in Northwestern Colorado. Similar to the Yampa Valley Regional and Vail/Eagle County airports, the Airport predominately serves winter ski visitors. There are five ski resorts located in the Aspen area: Aspen Highlands, Aspen Mountain, Buttermilk, Snowmass, and Sunlight ski resorts. Combined, these ski resorts accommodated 1,510,144 ski visitors in 1998, as compared to the 957,000 ski visitors to Mammoth Mountain in 1999. Combined, these five ski resorts provide 45 ski lifts, 383 ski trails, and 5,242 skiable acres.

In addition to the Aspen-Pitkin County Airport, three other commercial service airports are located nearby: Vail/Eagle County (75 miles), Yampa Valley Regional Airport (130 miles), and Denver International (170 miles). Given their proximity, particularly Denver International Airport, these airports serve some ski visitors traveling to the Aspen area.

During the 1999 winter season, Aspen-Pitkin County Airport was provided with 17 daily flights by three commercial air carriers (America West, Northwest, and United) and three regional/commuter airlines (Mesa, Mesaba, and United Express). As shown in Table H-8, the Airport's enplanements have increased from 214,725 in 1990 to 248,510 in 1998, representing an annual compounded growth rate of 1.8 percent. Overall, average aircraft load factors have decreased in recent years, averaging approximately 45.9 percent in 1998. This decrease in average aircraft load factors is due an increase in the number of aircraft seats relative to the airport's enplanement growth. These additional scheduled aircraft seats are due to the initiation and expansion of new nonstop hub service by Aspen Mountain Air to Denver; Mesaba Aviation to Minneapolis; and Mesa Airlines to Phoenix.

Table H-12 presents the top 30 origin and destination (O&D) markets for Aspen-Pitkin County Airport. As shown, Denver constitutes the Airport's top O&D market with nearly 13 percent of the Airport's passengers traveling to and from Denver. Similar to Yampa Valley and Vail/Eagle County airports, the states of California, New York, and Texas also constitute major O&D markets for the Aspen-Pitkin County Airport. When combined, California markets account for 14.0 percent of the Airport's demand, while the New York markets account for 10.4 percent of the Airport's demand.

Chicago O'Hare is also a major market from Aspen, accounting for 6.9 percent of the Airport's O&D traffic. Visitors to Aspen ski resorts have increased since 1994 from 1.5 million skiers in 1994 to nearly 1.7 million skiers in 1998 (see Table H-8). Based on conversations with staff, historical scheduled seats at the Aspen-Pitkin County Airport, winter enplanements are estimated to be approximately 60 percent of the Airport's total annual enplanements. The number of estimated winter enplanements per ski visitor has remained relatively constant in the last five years, averaging approximately 0.088 winter enplanements per skier.

H.2.4 Jackson Hole Airport (Jackson, Wyoming)

Jackson Hole Airport is located in the Rocky Mountain range in Northwestern Wyoming. Similar to Mammoth Lakes, Jackson Hole serves two distinct seasonal attractions, skiing in the winter and numerous outdoors recreational activities in the summer. Skiing is provided at the Snow King, Jackson Hole and Grand Targhee resorts. Combined, these ski resorts attracted approximately 541,000 skiers to the region in 1998. During the summer, major attractions are the Grand Teton National Park, Yellowstone National Park and numerous national forest parks in the region. Based on statistics provided by the National Park Service, nearly 6.0 million tourists visited nearby Yellowstone and Grand Teton national parks in 1998.

Table H-12

Aspen-Pitkin County Airport - Top O&D Markets

Rank	Airport	State	Passengers	Percent
1	Denver Intl	CO	29,980	12.8%
2	O'Hare Intl	IL	16,130	6.9%
3	Los Angeles Intl	CA	15,410	6.6%
4	La Guardia	NY	15,150	6.5%
5	Dallas/Ft Worth	TX	10,210	4.4%
6	San Francisco Intl	CA	9,170	3.9%
7	Newark Intl	NY	9,160	3.9%
8	Miami Intl	FL	8,770	3.7%
9	Dulles Intl	DC	6,650	2.8%
10	George Bush Intl	TX	5,900	2.5%
11	Phoenix	AZ	5,660	2.4%
12	Logan Intl	MA	5,320	2.3%
13	Detroit	MI	5,050	2.2%
14	Philadelphia Intl	PA	4,590	2.0%
15	Atlanta	GA	4,530	1.9%
16	Minneapolis	MN	4,470	1.9%
17	San Diego	CA	3,820	1.6%
18	John Wayne Intl	CA	3,100	1.3%
19	Seattle	WA	2,890	1.2%
20	Baltimore/Wash Intl	MD	2,610	1.1%
21	Orlando Intl	FL	2,610	1.1%
22	St Louis	MO	2,610	1.1%
23	Tampa Intl	FL	2,410	1.0%
24	Hopkins Intl	OH	2,300	1.0%
25	New Orleans	LA	2,130	0.9%
26	Kansas City Intl	MO	1,840	0.8%
27	Indianapolis	IN	1,740	0.7%
28	San Jose	CA	1,500	0.6%
29	Las Vegas	NV	1,460	0.6%
30	Oakland	CA	1,430	0.6%
Total – Top 30 Markets			188,600	80.5 %
Total – All Markets			234,270	100.0 %

Source: USDOT Origin & Destination Survey of Airline Passenger Traffic, December 1999.
Prepared by: Ricondo & Associates, Inc., October 2000.

Five other commercial service airports are located in the region: Yellowstone Regional Airport (70 miles), Idaho Falls Airport (100 miles), Riverton Regional Airport (130 miles), Salt Lake City (270 miles), and Natrona County International Airport (280 miles). The close proximity of Yellowstone Regional and Idaho Falls in particular, result in competition for commercial air service visitors to the region.

Commercial service at Jackson Hole Airport also revolves around its winter and summer seasons. Commercial service during the winter and summer increases, while it decreases during the spring and fall. In 1999, during the winter and summer an average of 17 daily flights were provided via three air carrier airlines (American, Delta and United) and two regional/commuter airlines (Delta Connection and

United Express). Of the Airport's annual enplanements, however, winter enplanements represent a larger percentage of total enplanements than summer enplanements. Based on discussions with airport staff, it is estimated that between 60 and 70 percent of total enplanements occur in the winter, while the remaining 30 to 40 percent of enplanements occur in the summer. This is based on a number of factors including:

- Change in traveler types (i.e., singles/couples in the winter, who are more likely to fly, versus families in the summer, who are more likely to drive)
- Adverse weather for driving conditions during the winter
- More affluent ski travelers in the winter

As shown in Table H-8, Jackson Hole Airport's enplanements have increased from 148,000 in 1990 to 185,000 in 1998, representing an annual compounded growth rate of 2.8 percent. Overall, average aircraft load factors have increased as well, averaging approximately 55.3 percent in 1998.

Table H-13 presents the top 30 origin and destination (O&D) markets for Jackson Hole Airport. As shown, Chicago is the Airport's top O&D market, with nearly 6 percent of the Airport's traffic originating from the Chicago O'Hare Airport. Denver represents the Airport's second highest O&D market, with 5.5 percent of the Airport's traffic originating from Denver. The states of New York (8.5 percent), California (9.6 percent), and Texas (5.3 percent) also constitute major O&D markets for the Jackson Hole Airport.

National park visitors to Yellowstone and Grand Tenton National parks have increased from 4.4 million visitors in 1990 to nearly 5.9 million visitors in 1998 (see Table H-8). Based on conversations with staff, historical scheduled seats at the Airport, summer enplanements are estimated to be approximately 35 percent of total annual enplanements. When compared to national park visitor statistics provided by the National Park Service, the number of estimated summer enplanements per national park visitor has remained relatively constant since 1990, averaging approximately 0.0119 summer enplanements per visitor.

H.2.5 Glacier Park International Airport (Kalispel, Montana)

Glacier Park International Airport is located in the Rocky Mountain range in Northwestern Montana. Similar to Mammoth Lakes and Jackson Hole, Glacier Park serves two distinct seasonal attractions, skiing in the Winter and numerous outdoor recreational activities in the summer. Skiing is provided at the Big Mountain ski resort. This ski resort served approximately 556,000 skiers in 1999. During the summer, major attractions include the Glacier National Park, Flathead Lake, Flathead National Forest, and numerous other national parks in the region. Based on statistics provided by the National Park Service, nearly 2.2 million tourists visited nearby Glacier National Park in 1998.

Compared to the other case study airports, Glacier Park International Airport is considered to have less competition for air travelers to the region due to its distance from other airports in the region. The other commercial service airports located in proximity to the region are Missoula (125 miles), Helena (200 miles) and Great Falls International (230 miles).

Table H-13

Jackson Hole Airport - Top O&D Markets

Rank	Airport	State	Passengers	Percent
1	O'Hare Intl	IL	10,620	5.9%
2	Denver Intl	CO	9,940	5.5%
3	Los Angeles Intl	CA	6,930	3.8%
4	La Guardia	NY	6,770	3.8%
5	Atlanta	GA	6,740	3.7%
6	Boston Logan	MA	6,500	3.6%
7	Dallas/Ft Worth	TX	6,410	3.6%
8	Newark Intl	NY	5,940	3.3%
9	San Francisco Intl	CA	5,920	3.3%
10	Dulles Intl	DC	5,700	3.2%
11	Salt Lake Intl	UT	5,330	3.0%
12	Philadelphia Intl	PA	4,460	2.5%
13	George Bush Intl	TX	3,070	1.7%
14	St Paul Intl	MN	3,030	1.7%
15	Sky Harbor Intl	AZ	2,810	1.6%
16	Detroit	MI	2,790	1.5%
17	San Diego	CA	2,640	1.5%
18	John F Kennedy	NY	2,530	1.4%
19	Seattle/Tacoma	WA	2,530	1.4%
20	Orlando Intl	FL	2,360	1.3%
21	Baltimore/Wash Intl	MD	2,120	1.2%
22	Nashville	TN	2,060	1.1%
23	Cincinnati/N KY Intl	OH	2,030	1.1%
24	Raleigh/Durham	NC	2,030	1.1%
25	John Wayne Intl	CA	2,030	1.1%
26	Bradley Intl	CT	1,940	1.1%
27	San Jose	CA	1,750	1.0%
28	Charlotte	NC	1,710	0.9%
29	Miami Intl	FL	1,690	0.9%
30	Tampa Intl	FL	1,680	0.9%
Total – Top 30 markets			122,060	67.7%
Total – All MArkets			180,310	100.0%

Source: USDOT Origin & Destination Survey of Airline Passenger Traffic, December 1999.
Prepared by: Ricondo & Associates, Inc., October 2000.

Table H-14

Glacier Park International Airport - Top O&D Markets

Rank	Airport	State	Passengers	Percent
1	Seattle	WA	11,350	8.8%
2	Los Angeles Intl	CA	6,160	4.8%
3	Phoenix	AZ	5,550	4.3%
4	Salt Lake Intl	UT	5,350	4.1%
5	San Francisco Intl	CA	4,350	3.4%
6	Portland	OR	4,230	3.3%
7	Denver Intl	CO	3,890	3.0%
8	Las Vegas	NV	3,490	2.7%
9	Minneapolis	MN	3,300	2.6%
10	Dallas/Ft Worth	TX	3,240	2.5%
11	San Diego	CA	2,840	2.2%
12	O'Hare Intl	IL	2,750	2.1%
13	Sacramento Metro	CA	2,630	2.0%
14	Atlanta	GA	2,510	1.9%
15	San Jose Mun	CA	2,390	1.9%
16	John Wayne Intl	CA	2,080	1.6%
17	Orlando Intl	FL	1,820	1.4%
18	Billings	MT	1,810	1.4%
19	Ontario Intl	CA	1,810	1.4%
20	Dulles Intl	DC	1,720	1.3%
21	John F Kennedy	NY	1,720	1.3%
22	Kansas City Intl	MO	1,590	1.2%
23	Boston	MA	1,580	1.2%
24	Oakland	CA	1,510	1.2%
25	Newark Intl	NY	1,430	1.1%
26	Elko	NV	1,320	1.0%
27	George Bush Intl	TX	1,310	1.0%
28	Philadelphia Intl	PA	1,310	1.0%
29	Anchorage Intl	AK	1,300	1.0%
30	Reno	NV	1,240	1.0%
Total – Top 30 Markets			87,580	67.8%
Total – All Markets			129,150	100.0%

Source: USDOT Origin & Destination Survey of Airline Passenger Traffic, December 1999.
Prepared by: Ricondo & Associates, Inc., October 2000.

Commercial service at Glacier Park International Airport also revolves around its winter and summer seasons. During the winter and summer, commercial service increases, while it decreases during the spring and fall months. During the 1999 summer season, 14 daily flights are provided via four air carrier airlines (Alaska, Continental, Delta, and Northwest) and two regional/commuter airlines (Big Sky and Horizon). Historically, summer activity has accounted for a majority of annual enplanements, however recently, winter skiing at Big Mountain has increased. Based on discussions with airport staff, it is estimated that approximately 50 percent of total enplanements now occur in the winter.

As shown in Table H-8, Glacier Park International Airport's enplanements have increased from 70,883 in 1990 to 133,515 in 1998, representing an annual compounded growth rate of 8.2 percent. Overall, average aircraft load factors have increased as well, averaging approximately 57.7 percent in 1998.

Table H-14 presents the top 30 origin and destination (O&D) markets for Glacier Park International Airport. As shown, the Airport's O&D patterns are more heavily weighted towards West Coast markets than the other case study airports. With the exception of Minneapolis and Dallas/Ft. Worth, eight of the Airport's top ten O&D markets are western markets. Seattle and Los Angeles represent the first and second highest O&D markets, accounting for 8.8 percent and 4.8 percent of the O&D traffic, respectively.

Visitors to Glacier National Park have remained relatively constant, averaging 2.2 million visitors in 1998 (see Table H-8). As mentioned previously, based on conversations with staff, historical scheduled seats at the Airport, summer enplanements are estimated to be approximately 50 percent of total annual enplanements. When compared to national park visitor statistics provided by the National Park Service, the number of estimated summer enplanements per national park visitor has increased since 1990, from 0.033 enplanements per national park visitor to 0.060 enplanements per national park visitor in 1998.

H.3 Basis for Enplanement Projections

For the purposes of case study methodology in this analysis, ski visitor statistics were used as the basis for projecting winter season enplanements at the Airport. As such, actual statistics for skier-days at each of the comparable airports were obtained. Skier-days represent the number of days (i.e., duration) multiplied by the number of skiers visiting each of the ski resorts. The number of skier-days was found to provide a strong correlation to the activity levels at each comparable airport. Skier-day statistics also represent a reliable source of data since this data is collected by the ski resorts through lift ticket sales, and is used by the ski resorts to track historical skier activity at each respective resort. This historical data is also used by the ski resorts to provide estimates of future skier activity for the ski resorts, which can be used as a basis for estimating future winter enplanements at the Airport.

Summer season enplanements at the Airport are assumed to be a function of the number of national park visitors to the region's national parks. As a result, the number of annual national park visitors at the respective national parks served by each of the comparable airports was gathered. This data served to provide an estimate of the level of summer enplanements that might be expected to occur at the Airport. Summer season enplanements were then determined based on an estimate of a percentage of the Airport's annual enplanements anticipated to occur during the summer season.

Enplanements at the Airport by regional residents are anticipated to be a small percentage of the summer and winter traffic at the Airport. Local passengers were included as part of the overall statistics for the case study airports and forecasts for Mammoth Yosemite Airport.

The following sections provide a discussion of the assumptions used to project passenger enplanements at the Airport.

H.4 Estimated Base Year Demand

The Airport's base year demand for 1999 was developed through a review of each case study airport's activity levels and visitor statistics. The goal of estimating the Airport's base year demand is to define a current "potential" demand level that might occur at Mammoth Yosemite Airport based on the level of tourists and visitors attracted to the region, and without other significant influences from other sources (i.e., competing commercial service at other airports capture of area visitors that would otherwise drive, etc.). Under this scenario, some demand is assumed to continue to occur at other airports (i.e., primarily Los Angeles), with those visitors driving to the Mammoth Lakes region.

Table H-15 presents the estimated base year demand enplanements for 1999 based on a ratio of enplanements to skier visits, and percentage of summer enplanements to total airport enplanements. As shown, there is a total of approximately 135,500 potential enplanements, or unmet demand, for the Airport in 1999. It is important to note that this level of enplanements is considered to be the total demand potential for the Airport today, and is not representative of the level of enplanements that would occur in the first year of operation at Mammoth Lakes. As experienced in the Vail/Eagle County market, it would likely take the Mammoth Yosemite Airport up to five years to reach its total demand potential.

Table H-15
Estimated Base Year (1999) Enplanements

Winter Season Enplanements (60% of Total)	
1999 Mammoth Skier Visits	956,573
Ratio of Enplanements to Skier Visits	0.085
Estimated Potential Winter Enplanements (1999)	81,300
Summer Season Enplanements (40% of Total)	
Estimated Potential Summer Enplanements (1999)	*54,200*
ESTIMATED TOTAL POTENTIAL AIPRORT ENPLANEMENTS	**135,500**

Source: Ricondo & Associates, Inc., July 2000.
Prepared by: Ricondo & Associates, Inc., October 2000.

Of the Airport's total estimated potential demand for 1999, approximately 81,300 enplanements were estimated to occur during the winter season from late November through early April. This estimate was derived based on an assumed ratio of 0.085 enplanements per skier. As shown previously in

Table H-8, enplanements per skier at Yampa Valley Regional, Vail/Eagle County, and Aspen-Pitkin County airports were 0.104, 0.026, and 0.090 in 1998, respectively. The ratio for Mammoth Lakes would be considered conservative when compared with Yampa Valley and Aspen-Pitkin. The somewhat higher enplanement per skier ratio for Mammoth Lakes when compared with Vail/Eagle is based on the fact that the Mammoth Lakes region is further from other competing commercial service airports.

Similar to the visitor characteristics occurring at each of the other case study airports, it is assumed that a majority of the enplanements at Mammoth Lakes would be derived from the winter skiing activities. This is primarily due to the change in tourism demographics, from more affluent individual visitors in the winter to more discretionary family-oriented visitors in the summer. In addition, many visitors choose to make their trips via automobile in the summer months. As exhibited by each of the case study airports, anywhere from between 50 percent and 100 percent of each airport's annual enplanements occur during the winter season. Excluding Yampa Valley Regional and Vail/Eagle County airports, which serve predominately winter skiers, the percentage of winter enplanements ranges from 50 percent to 65 percent of total annual enplanements. Based on an assumption of 60 percent of the Airport's annual enplanements occurring in the winter season and the previous estimate of 81,300 winter enplanements, a total of approximately 54,200 enplanements were estimated to occur in the summer months from April through November. Because of the potential restrictions currently being proposed by the National Park Service on private vehicles in Yosemite National Park, there is the potential of an even greater percentage of summer visitors in the future given the Mammoth Lakes higher quality and larger bed base and expansion of the recently initiated day trips to Yosemite via the bus system.

H.5 Projection of Passenger Enplanements

Projections of passenger enplanements were prepared on the basis of local skier statistics, national park visitors, and anticipated trends in activity at the Airport. This section discusses the factors and assumptions made in projecting passenger enplanements at the Airport.

Summer season enplanements at the Airport are assumed to be a function of the number of national park visitors to the region's national parks. As a result, the number of annual national park visitors at the respective national parks served by each of the comparable airports was gathered. This data served to provide an estimate of the level of summer enplanements that might be expected to occur at the Airport. Summer-season enplanements were then determined based on an estimate of a percentage of the Airport's annual enplanements anticipated to occur during the summer season.

Enplanements at the Airport by regional residents are anticipated to be a small percentage of the summer and winter traffic at the Airport. Local passengers were included as part of the overall statistics for the case study airports and forecasts for Mammoth Yosemite Airport.

Three enplanement scenarios were examined for the Airport to give an estimate of the range of enplanement activity that might occur at the Airport: Base Case scenario, Low Case scenario, and High Case scenario. The Base Case scenario was selected as the most reasonable forecast level to use for planning, design, engineering, and environmental analyses. Each of these scenarios are discussed in greater detail in the following sections.

H.5.1 Base Case Scenario

The Base Case scenario, which is modeled after the ratio of enplanements to skier days experienced at Aspen-Pitkin County Airport, is presented in **Table H-16**. As presented earlier in Table H-8, Aspen-Pitkin County Airport experiences more of an average enplanement to skier ratio - higher than those experienced at Vail/Eagle County Airport, but lower than those experienced at Yampa Valley Regional Airport. As shown under this scenario, the Airport's enplanements are projected to increase from approximately 37,000 in 2003 (the anticipated first full year of operation), to approximately 333,800 enplanements in 2022, representing an annual compounded growth rate of 11.6 percent.

Table H-16
Projected Base Case Enplanements

Year	Projected Mammoth Lakes Area Skier Days[1]	Winter Enplanements per Skier Visit	Winter Enplanements	%	Summer Enplanements	%	Total Enplanements
2003	1,058,000	0.035	37,000	100.0%	0	0.0%	37,000
2007	1,473,000	0.076	111,900	70.0%	48,000	30.0%	159,900
2012	1,775,000	0.082	145,600	60.0%	97,100	40.0%	242,700
2017	2,053,000	0.084	172,500	60.0%	115,000	40.0%	287,500
2022	2,356,000	0.085	200,300	60.0%	133,500	40.0%	333,800
Annual Compounded Growth Rate							
2003-2022	4.1%		8.8%		--		11.6%
2007-2022	3.2%		4.0%		7.1%		5.0%
2012-2022	2.9%		3.2%		3.2%		3.2%
2017-2022	2.8%		3.0%		3.0%		3.0%

[1]Mammoth Mountain Ski Resort.

Source: Ricondo & Associates, Inc., July 2000.
Prepared By: Ricondo & Associates, Inc., October 2000.

As mentioned previously, it is anticipated that the Airport would not immediately realize its full demand potential. As such, a ratio of only 0.035 winter enplanements per skier was assumed for the Airport's first full year of operation in 2003. Beyond 2002, estimated winter enplanements per ski visitor for the Airport are assumed to increase from a ratio of approximately 0.035 winter enplanements per skier to approximately 0.085 winter enplanements per skier by 2022. This level of winter enplanements per skier approximates those experienced at Aspen-Pitkin County Airport.

Initially, the Airport is anticipated to provide commercial service only during the winter season, with scheduled service in the summer season beginning soon thereafter. As a result, winter enplanements are projected to represent 100 percent of the Airport's enplanements in 2003, and decreasing thereafter to approximately 60 percent of total airport enplanements by 2022. Based on these assumptions, winter enplanements are projected to increase from approximately 37,000 in 2003 to 200,300 by 2022. Summer enplanements are projected to increase from approximately 48,000 in 2007 to 133,500 in 2022.

H.4.2 Low Case Scenario

Table H-17 presents projected activity for the Airport under the Low Case scenario. As shown, under this scenario, the Airport's enplanements are projected to increase from approximately 27,500 in 2003 to approximately 217,500 enplanements in 2022, representing an annual compounded growth rate of 10.9 percent. Under this scenario, the Airport would experience a winter enplanement to skier ratio less than both Yampa Valley Regional and Aspen-Pitkin County airports, but higher than that of Vail/Eagle County Airport (due to the high competition that Vail/Eagle County Airport experiences from Denver International).

As mentioned previously, it is anticipated that the Airport would not immediately realize its full demand potential. As such, a ratio of only 0.026 winter enplanements per skier was assumed for the Airport's first full year of operation in 2003. Beyond 2003, estimated winter enplanements per ski visitor for the Airport are projected to increase from a ratio of approximately 0.026 winter enplanements per skier to approximately 0.060 winter enplanements per skier by 2022.

Similar to the Base Case scenario, it is assumed that initially the Airport would only provide commercial service during the winter season, with scheduled service in the summer season beginning soon thereafter. As a result, winter enplanements are projected to represent 100 percent of the Airport's enplanements in 2003, and decreasing thereafter to approximately 65 percent of total airport enplanements by 2022. Based on these assumptions, winter enplanements are projected to increase from approximately 27,500 in 2003 to 141,400 by 2022. Summer enplanements are projected to increase from approximately 22,600 in 2007 to 76,100 in 2022.

H.4.3 High Case Scenario

Table H-18 presents projected activity for the Airport under the High Case scenario. As shown, under this scenario, the Airport's enplanements are projected to increase from approximately 79,400 in 2003 to approximately 449,800 enplanements in 2022, representing an annual compounded growth rate of 9.1 percent. Under this scenario, the Airport would experience a winter enplanement to skier ratio which is higher than all of the case study airports. In addition, winter enplanements are estimated to account for approximately 55 percent of the Airport's annual enplanements. This level of enplanements might be experienced if the Airport were to secure a high level of nonstop service during both the winter and summer seasons, particularly from the Los Angeles market, thereby capturing a large number of visitors currently driving to the region.

As shown, the estimated winter enplanements per ski visitor for the Airport would increase from a ratio of approximately 0.075 winter enplanements per skier in 2003 to approximately 0.105 winter enplanements per skier by 2022. During the initial year of operation, it is assumed that the Airport would only provide commercial service during the winter season, with scheduled service in the summer season beginning soon thereafter. As a result, winter enplanements are projected to represent 100 percent of the Airport's enplanements in 2003, and decreasing thereafter to approximately 55 percent of total airport enplanements by 2022. Based on these assumptions, winter enplanements are projected to increase from approximately 79,400 in 2003 to 247,400 by 2022. Summer enplanements are projected to increase from approximately 74,600 in 2007 to 202,400 in 2022.

Table H-17

Projected Low Case Enplanements

Year	Projected Mammoth Lakes Area Skier Days[1]	Winter Enplanements per Skier Visit	Winter Enplanements	%	Summer Enplanements	%	Total Enplanements
2003	1,058,000	0.026	27,500	100.0%	0	0.0%	27,500
2007	1,473,000	0.046	67,800	75.0%	22,600	25.0%	90,400
2012	1,775,000	0.056	99,400	65.0%	53,500	35.0%	152,900
2017	2,053,000	0.058	119,100	65.0%	64,100	35.0%	183,200
2022	2,356,000	0.060	141,400	65.0%	76,100	35.0%	217,500
Annual Compounded Growth Rate							
2003-2022	4.1%		8.5%		--		10.9%
2007-2022	3.2%		5.0%		8.4%		6.0%
2012-2022	2.9%		3.6%		3.6%		3.6%
2017-2022	2.8%		3.5%		3.5%		3.5%

[1]Mammoth Mountain Ski Resort.

Source: Ricondo & Associates, Inc., July 2000.
Prepared By: Ricondo & Associates, Inc., October 2000.

Table H-18

Projected High Case Enplanements

Year	Projected Mammoth Lakes Area Skier Days[1]	Winter Enplanements per Skier Visit	Winter Enplanements	%	Summer Enplanements	%	Total Enplanements
2003	1,058,000	0.075	79,400	100.0%	0	0.0%	79,400
2007	1,473,000	0.094	138,500	65.0%	74,600	35.0%	213,100
2012	1,775,000	0.097	172,200	55.0%	140,900	45.0%	313,100
2017	2,053,000	0.101	207,400	55.0%	169,700	45.0%	377,100
2022	2,356,000	0.105	247,400	55.0%	202,400	45.0%	449,800
Annual Compounded Growth Rate							
2003-2022	4.1%		5.8%		--		9.1%
2007-2022	3.2%		3.9%		6.9%		5.1%
2012-2022	2.9%		3.7%		3.7%		3.7%
2017-2022	2.8%		3.6%		3.6%		3.6%

[1]Mammoth Mountain Ski Resort.

Source: Ricondo & Associates, Inc., July 2000.
Prepared By: Ricondo & Associates, Inc., October 2000.

H.6 Potential Nonstop Markets

This section provides an estimate of the Airport's top origin and destination (O&D) passenger markets. Utilizing the estimated top O&D markets for the Airport, an assessment can be made as to the feasibility of providing nonstop air service between Mammoth Lakes and various hub airports.

The Airport's estimated top O&D markets were determined based on survey efforts undertaken at the Mammoth Mountain ski resort, as well as the top O&D markets for the five case study airports. **Table H-19** presents the top 10 geographic markets, on a state-by-state basis, for the Mammoth Mountain ski resort. As shown, California represents the largest source of business by far, for the Mammoth Mountain ski resort, with approximately 87 percent of the lift ticket revenue for the resort. Of the California ski visitors, it is estimated that approximately 70 percent reside in the Los Angeles region. San Diego and the San Francisco Bay Area are the next largest markets in California. The United Kingdom represents the second largest market for the resort accounting for approximately 2.4 percent of the lift ticket revenue for the resort.

Table H-19
Mammoth Mountain Top Markets[1]

Rank	State	Percentage
1	California	87.1%
2	United Kingdom	2.4%
3	Nevada	0.7%
4	Illinois	0.4%
5	Texas	0.4%
6	Arizona	0.3%
7	Florida	0.3%
8	New York	0.3%
9	Washington	0.2%
10	Hawaii	0.2%
	All Other Markets	7.7%
		100.0%

[1] Mammoth Mountain Source of Business Report, May 12, 1999.

Source: Ricondo & Associates, Inc., July 2000.
Prepared by: Ricondo & Associates, Inc., October 2000.

Table H-20 presents the Airport's estimated top O&D markets. As shown, the top O&D market for Mammoth Lakes is assumed to be Los Angeles (7 percent). In addition to serving domestic travelers, Los Angeles would also likely serve as the gateway for international air travelers. While some visitors that are currently driving from Los Angeles to the Mammoth Lakes region will change their mode of transportation from automobile to airplane, the vast majority of the region's visitors originating from Los Angeles are anticipated to continue to make the six hour drive northeast from Los Angeles by automobile. It is estimated that between 5 and 10 percent of the visitors now traveling to Mammoth Lakes from Los Angeles will choose to travel by air. San Francisco would likely serve as a gateway for international travelers as well, however, these travelers would likely drive to Mammoth Lakes or connect through Los Angeles until such time as nonstop air service is provided. Similar to the other case study airports, Chicago O'Hare, New York (LaGuardia, John H. Kennedy, and Newark), and Dallas/Ft. Worth are also anticipated to be top O&D markets for the Airport.

Based on the estimated top O&D markets for the Airport, several hub airports were reviewed for their potential to provide nonstop service to Mammoth Lakes, and are briefly discussed below:

- Dallas/Ft. Worth (DFW) – American Airlines has currently committed to providing service to the Mammoth Yosemite Airport starting the 2002/2003 winter season with nonstop flights to and from DFW on B-757 aircraft. DFW provides excellent connecting service to key markets in Texas, Florida, Washington D.C, other southern U.S. cities, and the United Kingdom.
- Chicago O'Hare (ORD) – American Airlines has currently committed to providing service to the Mammoth Yosemite Airport starting the 2001/2002 winter season with nonstop flights to and from ORD on B-757 aircraft. Chicago O'Hare would provide excellent nonstop service between the Chicago market, as well as good connections between major East Coast, Midwest, and European markets.
- Los Angeles (LAX and other region airports) – Given the strong market demand from the Los Angeles area, Los Angeles is considered to be an excellent potential nonstop market for Mammoth Lakes. LAX would serve as a good connecting point for many domestic travelers from both the east coast (New York, Chicago, Washington D.C., Philadelphia, etc.), as well as the west coast (Seattle, Portland, Phoenix, etc.). In addition, as mentioned previously, LAX has served, and would continue to serve, as a good connecting point for international travelers traveling to the Mammoth Lakes region. Given the stage length of roughly 230 miles between Mammoth Lakes and LAX, as well as the strong O&D demand, the LAX market could be a good market for commuter, regional jet and narrow-body jet service.

- Denver (DEN) – Denver would serve as a strong connecting hub airport primarily for travelers from major East Coast markets, north-central U.S. markets and Midwest markets. In particular, due to United Airline's hubbing activities at both Denver and Chicago O'Hare, Denver would provide excellent connecting service for travelers from the Chicago market area. At a stage length of approximately 750 miles, Denver could also be a good potential market for nonstop service.

- Other Hub-Airports – In addition to the above airports, a number of other hub airports could also potentially provide potential nonstop service to the Airport, including:

  - *Short-Range Hub Airports* – Phoenix and Seattle
  - *Mid-Range Hub Airports* – Minneapolis, Houston (Intercontinental), and St. Louis
  - *Long-Range Hub Airports* – Pittsburgh, Detroit, New York, and Atlanta

Potential service from these hubs would likely be dependent on the airlines electing to provide service, as well as the location of the airline's hub, and potential aircraft they would use to service the Mammoth Lakes market. However, in order to provide an idea of how the Airport's nonstop air service to various hub airports might evolve over time, a review of the evolution of hub service at each case study airport was undertaken. **Table H-21** presents the historical growth of nonstop service to major hub airports from each of the case study airports since 1985. As shown, each airport began nonstop service to either one or two major hub airports. As each airport's nonstop hub service matured, service to other major hub airports was added. In each case, the airport's hub service fully matured within a five to ten year period. While this type of maturity may not necessary occur for Mammoth Lakes, it is reasonable to assume that given time and the proper marketing by the region, the Airport could provide nonstop service to at least three or four major hub airports within a five to ten year period after the initiation of commercial service.

Table H-20

Mammoth Yosemite Airport – Estimated Top O& D Markets

Rank	Airport	Percent
1	Los Angeles Intl	7.0%
2	O'Hare Intl	6.1%
3	Newark Intl	5.0%
4	La Guardia	4.8%
5	Dallas/Ft Worth	4.4%
6	Denver Intl	3.0%
7	San Francisco Intl	3.1%
8	Atlanta	3.0%
9	George Bush Intl	2.7%
10	Boston	2.6%
11	Miami Intl	2.6%
12	Dulles Intl	2.4%
13	Seattle	2.2%
14	Philadelphia Intl	2.2%
15	Detroit	1.8%
16	Phoenix	1.5%
17	Orlando Intl	1.4%
18	Salt Lake Intl	1.4%
19	St Paul Intl	1.4%
20	San Diego	1.4%
21	Tampa Intl	1.2%
22	Baltimore/Wash Intl	1.1%
23	Minneapolis	1.0%
24	John Wayne Intl	1.0%
25	San Jose	0.7%
26	New Orleans	0.7%
27	Nashville	0.7%
28	Hopkins Intl	0.7%
29	St Louis	0.7%
30	Las Vegas	0.7%
Total – Top 30 Markets		67.3%
Total – All Markets		100.0%

Source: Ricondo & Associates, Inc., July 2000.
Prepared By: Ricondo & Associates, Inc., October 2000.

Table H-21

Evolution of Major Hub Service at Case Study Airports

Case Study Airport	1985-1989	1990-1994	1995-1999	2000
Yampa Valley Regional Airport	Chicago, Dallas, Los Angeles	Chicago, Dallas, Los Angeles, Denver, Minneapolis	Chicago, Dallas, Los Angeles, Denver, Minneapolis, Houston, St. Louis	Chicago, Dallas, Los Angeles, Denver, Minneapolis, Houston, St. Louis
Vail/Eagle County Airport	-	Chicago, Dallas Los Angeles, Denver	Chicago, Dallas Los Angeles, Denver, Atlanta, Minneapolis, Houston, Newark	Chicago, Dallas Los Angeles, Denver, Atlanta, Minneapolis, Houston, Newark
Aspen-Pitkin County Airport	Denver, Los Angeles	Denver, Dallas Los Angeles,	Denver, Dallas, Los Angeles, Phoenix, Minneapolis	Denver, Minneapolis, Los Angeles, Phoenix
Jackson Hole Airport	Denver, Salt Lake City	Denver, Salt Lake City, Dallas, Chicago	Denver, Salt Lake City, Dallas, Chicago	Denver, Salt Lake City, Dallas, Chicago
Glacier Park International Airport	Salt Lake City	Salt Lake City	Salt Lake City, Minneapolis, Seattle	Salt Lake City, Minneapolis, Seattle

Source: Offical Airline Guides, Inc. (OAG), June 2000.
Prepared By: Ricondo & Associates, Inc., October 2000.

H.7 Projection of Airline Departures

Operations projections were developed for the commercial air carrier and regional/commuter carriers anticipated to serve the Airport. Enplaned passenger projections presented in the previous section were used in conjunction with historical and expected trends in load factors and average seats per departure in order to develop projected passenger airline operations. Assumptions were also made in regards to which markets would be provided with nonstop service from the Airport in the future. Projected nonstop service to future markets is purely hypothetical, however, and would be based on the Airport's actual passenger demand and individual airline decisions.

As mentioned previously, it is anticipated that it would take the Airport roughly five years to reach its full demand potential. As such, during the first full year of operation (2003), it is assumed that the Airport would have service only during the winter season from two to four hub airports, via B-757 and commuter aircraft.

In general, aircraft load factors during the winter season are estimated to increase from approximately 50 percent in 2003 to approximately 65% percent by 2022. The predominate increase in load factors is anticipated to occur between 2003 and 2007, as the Airport's market matures. Aircraft load factors during the summer season are projected to be slightly less than those during the winter season, increasing from approximately 50 percent in 2002 to approximately 60 percent in 2022. This lower load factor during the summer season is based on changing visitor demographics discussed previously.

Details concerning the airline departure projections for each projection scenario are described below.

H.7.1 Base Case Airline Departures

Under the Base Case scenario, it is assumed that the Airport would initially (the first few years) be provided with nonstop service to Dallas/Ft. Worth, Chicago O'Hare, Los Angeles, and San Francisco and/or San Jose. In later years, regular nonstop service may be provided to short-range hubs (such as Denver and Phoenix), and longer-range hub (such as St. Louis, Houston, and Atlanta). Of these potential nonstop markets, Los Angeles is assumed to be provided with service via both air carrier jet aircraft and regional/commuter aircraft, while San Francisco and/or San Jose are assumed to be provided with service via regional/commuter aircraft. All other potential markets are assumed to be provided with air carrier jet service. As mentioned previously, projected nonstop service to future markets is purely hypothetical, and would be based on the Airport's actual passenger demand and individual airline decisions.

Table H-22 presents projected airline departures for the Base Case scenario. As shown, total annual aircraft departures are projected to increase from 1,040 in 2003 to 5,800 in 2022, representing an annual compounded growth rate of approximately 9.0 percent. By 2022, the winter season is projected to account for 3,410 annual airline departures, while the remaining 2,390 annual airline departures are anticipated to occur in the summer season. Similarly, of the 5,800 annual airline departures projected for 2022, air carrier jet aircraft are estimated to account for 2,500 annual departures (43 percent), while regional/commuter aircraft are projected to account for the remaining 3,300 annual departures (57 percent).

Table H-22

Summary of Projected Aircraft Departures - Base Case

	WINTER SEASON DEPARTURES			SUMMER SEASON DEPARTURES			TOTAL ANNUAL DEPARTURES		
Year	Air Carrier	Regional/ Commuter	Total	Air Carrier	Regional/ Commuter	Total	Air Carrier	Regional/ Commuter	Total
2003	300	740	1,040	0	0	0	300	740	1,040
2007	840	1,420	2,260	370	620	990	1,210	2,040	3,250
2012	1,130	1,500	2,630	770	1,020	1,790	1,900	2,520	4,420
2017	1,290	1,720	3,010	890	1,180	2,070	2,180	2,900	5,080
2021	1,470	1,940	3,410	1,030	1,360	2,390	2,500	3,300	5,800
Annual Compounded Growth Rate									
2003-2022	8.3%	4.9%	6.1%	--	--	--	11.2%	7.8%	9.0%
2007-2022	3.8%	2.1%	2.8%	7.1%	5.4%	6.1%	5.0%	3.3%	3.9%

Source: Ricondo & Associates, Inc., July 2000.
Prepared By: Ricondo & Associates, Inc., October 2000.

H.7.2 Low Case Airline Departures

Under the Low Case scenario, it is assumed that the Airport would initially be provided with nonstop service to only Dallas/Ft. Worth, Los Angeles, and San Francisco and/or San Jose. In later years, nonstop service to a short-range hub such as Denver, Phoenix, or Seattle may also be provided at the Airport. Of these potential nonstop markets, Los Angeles is assumed to be provided with service via both air carrier jet aircraft and regional/commuter aircraft, while San Francisco and/or San Jose are assumed to be provided with service via regional/commuter aircraft. All other potential markets are assumed to be provided with air carrier jet service. As mentioned previously, projected nonstop service to future markets is purely hypothetical, and would be based on the Airport's actual passenger demand and individual airline decisions.

Table H-23 presents projected airline departures for the Low Case scenario. As shown, total annual aircraft departures are projected to increase from 470 in 2003 to 2,770 in 2022, representing an annual compounded growth rate of approximately 9.3 percent. By 2022, the winter season is Table H-23 projected to account for 1,760 annual airline departures, while the remaining 1,010 annual airline departures are anticipated to occur in the summer season. Similarly, of the 2,770 annual airline departures projected for 2022, air carrier jet aircraft are estimated to account for 1,480 annual departures (53 percent), while regional/commuter aircraft are projected to account for the remaining 1,290 annual departures (47 percent).

Table H-23

Summary of Projected Aircraft Departures - Low Case

	WINTER SEASON DEPARTURES			SUMMER SEASON DEPARTURES			TOTAL ANNUAL DEPARTURES		
Year	Air Carrier	Regional/ Commuter	Total	Air Carrier	Regional/ Commuter	Total	Air Carrier	Regional/ Commuter	Total
2003	240	230	470	0	0	0	240	230	470
2007	490	430	920	170	150	320	660	580	1,240
2012	700	610	1,310	400	340	740	1,100	950	2,050
2017	820	710	1,530	450	400	850	1,270	1,110	2,380
2022	940	820	1,760	540	470	1,010	1,480	1,290	2,770
Annual Compounded Growth Rate									
2002-2022	7.1%	6.6%	6.8%	--	--	--	9.5%	9.0%	9.3%
2007-2022	4.4%	4.4%	4.4%	8.0%	7.9%	8.0%	5.5%	5.5%	5.5%

Source: Ricondo & Associates, Inc., July 2000.
Prepared By: Ricondo & Associates, Inc., October 2000.

H.7.3 High Case Airline Operations

Under the High Case scenario, it is assumed that the Airport would initially be provided with regular nonstop service to a number of markets, including Dallas/Ft. Worth, Los Angeles, Chicago O'Hare, and San Francisco and/or San Jose. In later years, nonstop service to one or more short-range hubs (such as Denver, Phoenix, or Seattle) and one or more longer-range hubs (such as Atlanta, St. Louis, or Minneapolis) may also be provided at the Airport. Of these potential nonstop markets, Los Angeles is assumed to be provided with service via both air carrier jet aircraft and regional/commuter aircraft, while San Francisco and/or San Jose are assumed to be provided with service via regional/commuter aircraft. All other potential markets are assumed to be provided with air carrier jet service. As mentioned previously, projected nonstop service to future markets is purely hypothetical, and would be based on the Airport's actual passenger demand and individual airline decisions.

Table H-24 presents projected airline operations for the High Case scenario. As shown, total annual aircraft departures are projected to increase from 2,320 in 2003 to 7,670 in 2022, representing an annual compounded growth rate of approximately 6.2 percent. By 2022, the winter season is projected to account for 4,110 annual airline departures, while the remaining 3,560 annual airline departures are anticipated to occur in the summer season. Similarly, of the 7,670 annual airline departures projected for 2022, air carrier jet aircraft are estimated to account for 3,200 annual departures (42 percent), while regional/commuter aircraft are projected to account for the remaining 4,470 annual departures (58 percent).

Table H-24

Summary of Projected Aircraft Departures - High Case

	WINTER SEASON DEPARTURES			SUMMER SEASON DEPARTURES			TOTAL ANNUAL DEPARTURES		
Year	Air Carrier	Regional/ Commuter	Total	Air Carrier	Regional/ Commuter	Total	Air Carrier	Regional/ Commuter	Total
2003	600	1,720	2,320	0	0	0	600	1,720	2,320
2007	980	1,750	2,730	540	970	1,510	1,520	2,720	4,240
2012	1,260	1,770	3,030	1,070	1,480	2,550	2,330	3,250	5,580
2017	1,470	2,060	3,530	1,260	1,730	2,990	2,730	3,790	6,520
2022	1,720	2,390	4,110	1,480	2,080	3,560	3,200	4,470	7,670
Annual Compounded Growth Rate									
2002-2022	5.4%	1.7%	2.9%	--	--	--	8.7%	4.9%	6.2%
2007-2022	3.8%	2.1%	2.8%	7.0%	5.2%	5.9%	5.1%	3.4%	4.0%

Source: Ricondo & Associates, Inc., July 2000.
Prepared By: Ricondo & Associates, Inc., October 2000.

H.8 Summary of Projected Airline Activity Based on Skier-Day Enplanement Projections and Case Study Airports

Table H-25 summarizes projected airline activity, in terms of passenger enplanements and aircraft departures, for the Airport for the skier-day enplanement projects and case study projects described above. The following points summarize key findings with regard to this projected airline activity:

- Initially, a number of enplanement scenarios were examined for the Airport to give an idea of the range of enplanement activity that might occur at the Airport. These enplanement projections were based on a relationship of skier-days to annual enplanements at several comparable airports.
- In order to provide a basis for the potential for air carrier service at Mammoth Yosemite Airport, historical activity, local demographics and tourism-related visitor statistics were reviewed at five comparable airports, as prescribed in the FAA's Benefit-Cost Analysis Guidance:

  - Yampa Valley Regional Airport (Steamboat Springs, CO)
  - Vail/Eagle County Airport (Vail, CO)
  - Aspen-Pitkin County Airport (Aspen, CO)

AR 001389

- Jackson Hole Airport (Jackson, WY)
- Glacier Park International Airport (Kalispell, MT)

- For the purpose of the initial enplanement projections, ski visitor statistics were used as the basis for projecting winter season enplanements at the Airport. Skier-days represent the number of days multiplied by the number of skiers visiting the ski resort. The number of skier-days was found to provide a strong correlation to the activity levels at each comparable airport.

- It is anticipated that the Airport would not immediately realize its full demand potential. As a result, the Airport's growth during the first five years of operation is expected to be strong until the market's full potential is realized. Once the market matures, the Airport's growth is expected to slow to more typical growth levels as experienced at airports throughout the U.S. This high initial growth is best illustrated by examining the enplanement growth that occurred at Vail/Eagle County Airport. During the first five years of operations from 1990 to 1995, enplanements at Vail/Eagle County Airport increased at an annual compounded growth rate of over 67 percent. From 1995 to 1998, however, enplanement growth at the airport has increased at an annual compounded growth rate of 27 percent. While this growth is still much higher than that of the U.S. overall, it is lower than exhibited during the initial startup of service at the Airport.

Table H-25

Summary of Projected Airline Activity

ENPLANEMENT PROJECTIONS	2003	2007	2012	2017	2022
Base Case	37,000	159,900	242,700	287,500	333,800
Low Case	27,500	90,400	152,900	183,200	217,500
High Case	79,400	213,100	313,100	377,100	449,800
AIRLINE DEPARTURES					
Base Case					
Regional/Commuter Departures	740	2,040	2,520	2,900	3,300
Air Carrier Departures	300	1,210	1,900	2,180	2,500
Total Base Case Departures	1,040	3,250	4,420	5,080	5,800
Low Case					
Regional/Commuter Departures	230	580	950	1,110	1,290
Air Carrier Departures	240	660	1,100	1,270	1,480
Total Low Case Departures	470	1,240	2,050	2,380	2,770
High Case					
Regional/Commuter Departures	1,720	2,720	3,250	3,790	4,470
Air Carrier Departures	600	1,520	2,330	2,730	3,200
Total High Case Departures	2,320	4,240	5,580	6,520	7,670

Source: Ricondo & Associates, Inc., July 2000.
Prepared By: Ricondo & Associates, Inc., October 2000.

- In general, three enplanement scenarios were examined: a Base Case scenario, Low Case scenario, and a High Case scenario.

- Under the Base Case Scenario, the Airport's enplanements were projected to increase from approximately 37,000 in 2003 (the anticipated first full year of operation), to approximately 333,800 enplanements in 2022, representing an annual compounded growth rate of 11.6 percent overall (34.0 percent ACG from 2003-2007 and 5.0 percent ACG from 2007-2022). Estimated winter enplanements per ski visitor for the Airport would increase from a ratio of approximately 0.035 winter enplanements per skier in 2003 to approximately 0.085 winter enplanements per skier by 2022. Winter enplanements were projected to represent 100 percent of the Airport's enplanements in 2003, and decreasing thereafter to approximately 60 percent of total airport enplanements by 2022.

- Under the Low Case Scenario, the Airport's enplanements were projected to increase from approximately 27,500 in 2003 (the anticipated first full year of operation), to approximately 217,500 enplanements in 2022, representing an annual compounded growth rate of 10.9 percent overall (26.9 percent ACG from 2003-2007 and 6.0 percent ACG from 2007-2022). Estimated winter enplanements per ski visitor for the Airport would increase from a ratio of approximately 0.026 winter enplanements per skier in 2002 to approximately 0.060 winter enplanements per skier by 2022. Winter enplanements were projected to represent 100 percent of the Airport's enplanements in 2003, and decreasing thereafter to approximately 65 percent of total airport enplanements by 2022.

- Under the High Case Scenario, the Airport's enplanements were projected to increase from approximately 79,400 in 2003 (the anticipated first full year of operation), to approximately 449,800 enplanements in 2022, representing an annual compounded growth rate of 9.1 percent overall (21.8 percent ACG from 2003-2007 and 5.1 percent ACG from 2007-2022). Estimated winter enplanements per ski visitor for the Airport would increase from a ratio of approximately 0.075 winter enplanements per skier in 2003 to approximately 0.105 winter enplanements per skier by 2022. Winter enplanements were projected to represent 100 percent of the Airport's enplanements in 2003, and decreasing thereafter to approximately 55 percent of total airport enplanements by 2022.

H.9 Projected Airline Activity Based on City Pair Market Analysis

Based on comments from the FAA, an additional forecasting methodology based on city pair market analyses was used to estimate future passenger enplanements and aircraft operations. This analysis used information from the existing agreement being developed between American Airlines and Mammoth Mountain (see attached Air Service Agreement), development of markets at the case study airports, and professional judgement and experience from Ricondo & Associates staff and Mr. Kent Myers, air service consultant to Mammoth Mountain. **Table H-26** presents enplanement and operations projects from the City Pair market analysis. The following points summarize key findings of this market analysis:

Table H-26
City Pair Market Analysis - Mammoth Lakes Airport

	Season	Aircraft	Avg. Seats	2002 Annual Departures	2002 Load Factor	2002 Enplanements	2007 Annual Departures	2007 Load Factor	2007 Enplanements	2012 Annual Departures	2012 Load Factor	2012 Enplanements	2017 Annual Departures	2017 Load Factor	2017 Enplanements	2022 Annual Departures	2022 Load Factor	2022 Enplanements
American Airlines Committed Service																		
Dallas/Ft. Worth	Winter	B-757	176	128	50.0%	11,300	300	65.0%	34,100	360	65.0%	40,700	420	65.0%	48,600	510	65.0%	58,000
Chicago O'Hare	Winter	B-757	176	128	50.0%	11,300	300	65.0%	34,100	360	65.0%	40,700	420	65.0%	48,600	510	65.0%	58,000
Subtotal				256		22,600	600		68,200	720		81,400	840		97,200	1,020		116,000
Regional Service																		
Southern California Region	Winter	RJ/Comm.	40	336	60.0%	8,100	368	65.0%	9,600	440	65.0%	11,500	530	65.0%	13,700	630	65.0%	16,400
Northern California Region	Winter	RJ/Comm.	40	224	60.0%	5,400	288	65.0%	7,500	350	65.0%	9,000	410	65.0%	10,700	490	65.0%	12,800
Subtotal				560		13,500	656		17,100	790		20,500	940		24,400	1,120		29,200
Non-Winter Airline Service																		
RJ / Commuter Aircraft	Rest of Year		40	0	--	0	516[1]	65.0%	13,400	620	65.0%	16,000	730	65.0%	19,100	880	65.0%	22,800
Jet Aircraft	Rest of Year		130	0	--	0	224[2]	65.0%	18,900	270	65.0%	22,600	320	65.0%	27,000	380	65.0%	32,200
Subtotal				0		0	740		32,300	890		38,600	1,050		46,100	1,260		55,000
Additional Hub Service																		
Additional Hub #1	Winter		130	0	--	0	224	55.0%	16,000	230	65.0%	19,100	270	65.0%	22,800	320	65.0%	27,200
Additional Hub #2	Winter		130	0	--	0	144	55.0%	10,300	150	65.0%	12,300	170	65.0%	14,700	210	65.0%	17,500
Subtotal				0		0	368		26,300	380		31,400	440		37,500	530		44,700
TOTALS				816		36,100	2,364		143,900	2,780		171,900	3,270		205,200	3,930		244,900

Winter Service =	16 Weeks		
Non-Winter Service =	36 Weeks		
16 weeks of 7 flights per week =	112 Flights	16 weeks of 14 flights per week =	224 Flights
16 weeks of 8 flights per week =	128 Flights	16 weeks of 16 flights per week =	256 Flights
16 weeks of 9 flights per week =	144 Flights	16 weeks of 18 flights per week =	288 Flights

[1] Equals 16 weeks with 21 flights per week and 20 weeks with 9 flights per week, for a total of 516 flights.
[2] Equals 16 weeks with 14 flights per week.

Source: Ricondo & Associates, Inc., Kent Myers, and committed service information from American Airlines.
Prepared by: Ricondo & Associates, Inc., October 2000.

- In order to provide another estimate of the level of activity that might be realized at the Airport, a City Pair Market Analysis was conducted. This analysis was based on the recently negotiated agreement with American Airlines, as well as other assumptions regarding additional airline service at the Airport. In general, this analysis serves as a "back-in" analysis whereby certain levels of daily or weekly flights to various markets are assumed. Based on these assumed service levels, basic assumptions regarding the number of aircraft seats and load factors are assumed to estimate the potential number of enplanements for each city pair examined.

  - In general, the following additional air service components were examined:

  - American Airlines Committed Service – Based on the recently negotiated agreement with American Airlines for air service at the Airport from 2003 through 2006.

  - Regional Service – Assumes that regional air service would be provided via regional/commuter aircraft, or regional jets, to the northern and southern California markets.

  - Non-Winter Service – Assumes that service would be provided throughout the remainder of the year (i.e., 36 weeks) by both regional/commuter and jet aircraft.

  - Additional Hub Service – Assumes that additional air service would be provided to two additional airline hubs.

  - From 2003 to 2006, the *American Airlines Committed Service* is based on the recently negotiated agreement with American, and results in an estimated 576 annual flights and nearly 66,000 estimated enplanements for the winter season in 2006. Beyond 2006, annual enplanements for the committed American Airlines service are estimated to increase at an annual compounded growth rate of 3.6 percent, which equals the growth rate projected for the nation by the FAA.[3] By 2022, approximately 116,000 annual enplanements are projected for the American Airlines service.

  - *Regional Service* assumes that service would be provided to via regional/commuter and/or regional jet aircraft to markets in Southern California (i.e., Los Angeles, San Diego, etc.), as well as Northern California (i.e., San Francisco, San Jose, etc.). Initially in 2003, 21 weekly flights were assumed to be provided to Southern California, while 14 weekly flights were assumed to be provided to Northern California. By 2007, 23 weekly flights were assumed to be provided to Southern California, while 18 weekly flights were assumed to be provided to Northern California. Based on these assumptions, approximately 13,500 enplanements are estimated to be accommodated via regional service in 2003, and 17,100 enplanements in 2007. Beyond 2007, annual enplanements for are estimated to increase at an annual compounded growth rate of 3.6 percent, which equals the growth rate projected for the nation by the FAA. By 2022, approximately 29,200 annual enplanements are projected to be accommodated via regional service.

  - *Non-Winter Service* was assumed to be provided beginning between 2003 and 2007 for the remaining 36 weeks throughout the year. This service could be provided to any number hub airports. In general, non-winter service was assumed to be provided via both regional/commuter and jet aircraft. Initially, 516 total flights were assumed via regional/commuter aircraft, while 224 total flights were assumed via jet aircraft[4]. Based on these assumptions, approximately 32,300 enplanements are estimated to be accommodated via regional service in 2007. Beyond 2007, annual enplanements for are estimated to increase at an annual compounded growth rate of 3.6 percent, which equals the growth rate projected for the nation by the FAA. By 2022, approximately 77,900 annual enplanements are projected to be accommodated via non-winter service.

- *Additional Hub Service* was assumed to be provided to two additional airline hubs, including the following potential hubs:

    - *Short-Range Hub Airports* – Phoenix and Seattle
    - *Mid-Range Hub Airports* – Minneapolis, Houston (Intercontinental), and St. Louis
    - *Long-Range Hub Airports* – Pittsburgh, Detroit, New York, and Atlanta

- Potential service from these hubs would likely be dependent on the airlines electing to provide service, as well as the location of the airline's hub, and potential aircraft they would use to service the Mammoth Lakes market. Nonstop hub service at each of the case study airports was initiated to either one or two major hub airports. As each airport's nonstop hub service matured, service to other major hub airports was added. In each case, the airport's hub service fully matured within a five to ten year period. While this type of maturity may not necessary occur for Mammoth Lakes, it is reasonable to assume that given time and the proper marketing by the region, the Airport could provide nonstop service to at least three or four major hub airports within a five to ten year period after the initiation of commercial service.

  It is assumed that an average aircraft size in the range of 130-seats, such as the B-737 series, or mix of B-757 and regional jets, would begin service to these additional hubs in 2007. Initially, 14 weekly flights were assumed to be provided to one hub, while 9 weekly flights were assumed for the second hub. Based on these flight assumptions, approximately 26,300 enplanements are estimated to be accommodated in 2007. Beyond 2007, annual enplanements are estimated to increase at an annual compounded growth rate of 3.6 percent, which equals the growth rate projected for the nation by the FAA. By 2022, approximately 44,700 annual enplanements are projected to be accommodated via additional hub service.

- When combined, the various components of air service assumed for the City Pair Market Analysis result in 36,100 annual enplanements in 2003, increasing to 143,900 enplanements in 2007, and to 244,900 annual enplanements by 2022. Overall, this enplanement growth represents an annual compounded growth rate of approximately 9.5 percent (31.8 percent ACG from 2003-2007 and 3.6 percent ACG from 2007-2022).

- By 2022, winter service is estimated to account for approximately 70 percent (189,900 enplanements), while non-winter service is estimated to account for the remaining 30 percent (55,000 enplanements).

- By comparison, beyond the initial five year startup period, the City Pair Growth Analysis is roughly 11 percent higher than the Low Case Scenario and 27 percent lower than the

Base Case Scenario presented earlier. **Table H-27** presents a summary of the various enplanements projections:

Table H-27

Mammoth Mountain Enplanement Forecast Comparison

Year	Base Case	Low Case	High Case	City Pair
2002	37,000	27,500	79,400	36,100
2007	159,900	90,400	213,100	143,900
2012	242,700	152,900	313,100	171,900
2017	287,500	183,200	377,100	205,200
2022	333,800	217,500	449,800	244,900

Source: Ricondo & Associates, Inc., July 2000.
Prepared By: Ricondo & Associates, Inc.

The exhibits on the following pages present the results of the three enplanement projection scenarios from the skier-day/case study analysis and the city pair market analysis. As shown in this comparison, in the first five years, the Base Case and City Pair are similar in enplanements. However, the slower growth rate of 3.6% beyond 2007 results in the City Pair long-term trend being between the Low Case and Base Case. The city pair market analysis is sensitive to the assumptions of the number of air carriers and number of cities served from Mammoth Yosemite Airport. The information provided above is based on the best available information from airline discussions regarding service at Mammoth Yosemite Airport and experience at other startup airport operations such as at Vail/Eagle County Airport. The addition of service of additional hub airports beyond those assumed above could result in similar long-term demand levels as the Base Case.[2]

H.10 General Aviation Forecasts

A forecast of general aviation activity was developed for the 1997 Environmental Impact Report (EIR). A review of this forecast was conducted by examining existing records (FAA Form 5010 dated 01/16/96) and interviewing personnel from airport management.

The airport manager confirmed the general aviation activity, that was forecasted in the 1997 EIR, has failed to materialize. These sources indicated that Mammoth Yosemite Airport experiences approximately 600 operations per month during peak seasons. General aviation activity reported on FAA Form 5010 for the 12 months ending July 1996, was 12,000 annual operations. However, based on interviews with the airport manager and FBO operator, the annual operations for 1999 was estimated to be 6,000.

Although the annual general aviation operations levels are well below the estimates in the FAA Terminal Area Forecast, it is anticipated that there would be growth in general aviation activity of about 3% annually over the next 20 years up to the 12,000 annual operations level of the FAA Terminal Area Forecast. This growth is anticipated as a result of recent construction of high quality hanger facilities at the Airport and the leasing of these hanger facilities to new airport users. Additional hanger development is also planned. **Table H-28** summarizes the general aviation

2 516 flights = 16 weeks with 21 flights per week and 20 weeks with 9 flights per week
4 224 flights = 16 weeks with 14 flights per week (summer season)

component for the forecast. It is also assumed that military operations would remain consistent with the FAA Terminal Area Forecast at 50 annual operations from year 2000 on.

Table H-28
General Aviation Operations Forecast

Year	General Aviation Annual Operations
2002	6,600
2007	7,600
2012	8,900
2017	10,300
2022	12,000

Source: Ricondo & Associates, Inc., July 2000.
Prepared By: Ricondo & Associates, Inc.

H.11 Summary of Forecasts

Table H-29 presents a summary of the comparison of the passenger and operations forecasts for each of the forecast scenarios developed in this study. **Table H-30** shows the FAA Terminal Area Forecast through 2012. The primary difference between the FAA Terminal Area Forecast and the forecast scenarios documented in this study lies in the reduced general aviation activity at the Airport and projected air carrier/commuter activity. The FAA Terminal Area Forecast was based in part on the limited data for past air carrier/commuter service and estimates of industry intentions. At the time that the FAA Terminal Area Forecast was developed, there was no commitment from the airline industry for commercial service to Mammoth Lakes. The forecast developed for the Airport has the advantage of knowledge that a member of the airline industry has committed, subject to airport improvements, to commercial service to Mammoth Lakes.

Table H-30
FAA Terminal Area Forecast

Annual Aircraft Operations					
Year	Air Carrier	Commuter	GA	Military	Total
2002	500	700	12,000	50	13,250
2007	500	700	12,000	50	13,250
2012	500	700	12,000	50	13,250

Source: Federal Aviation Administration (FAA)
Prepared by: Ricondo & Associates, Inc., October 2000.

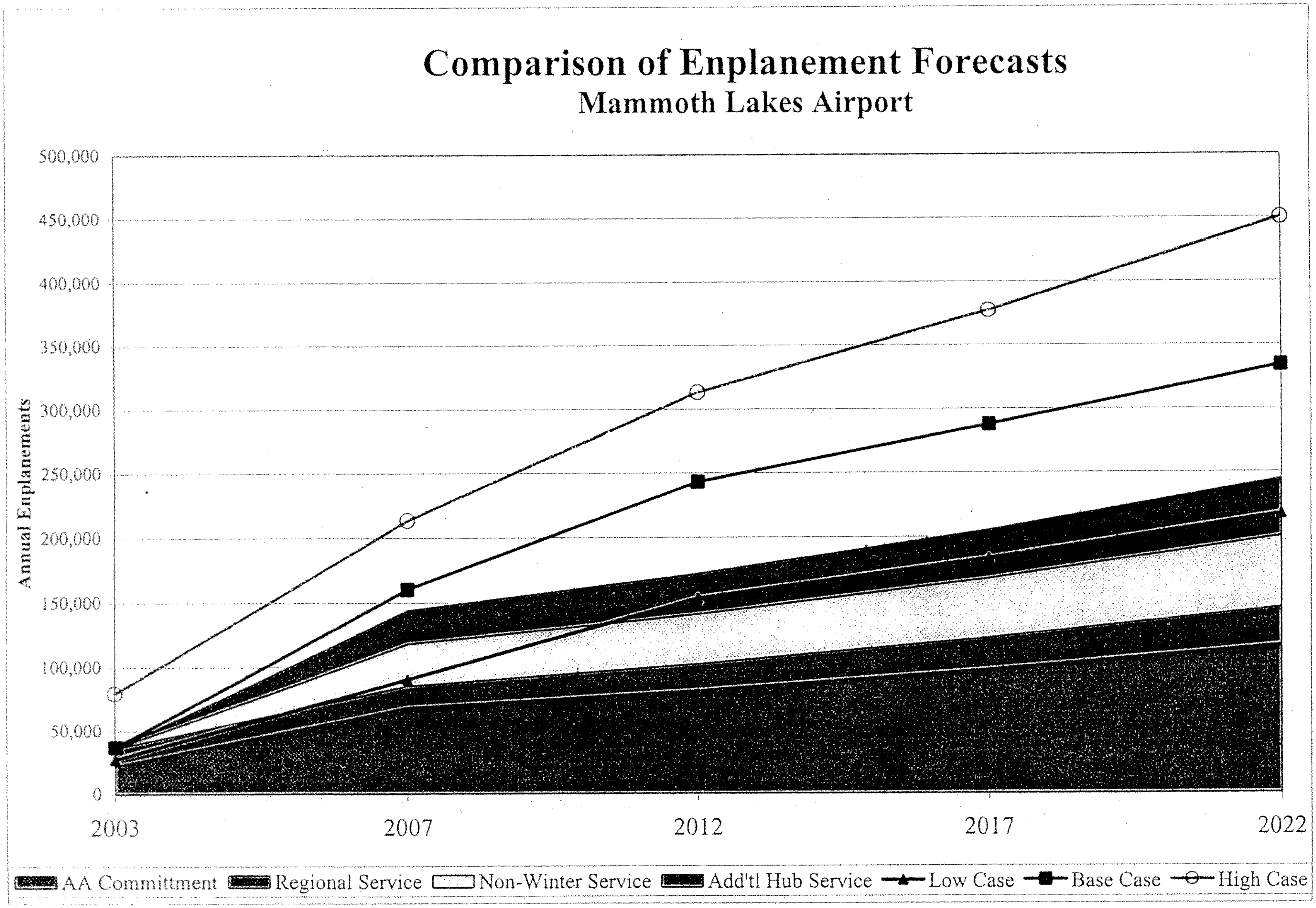
Forecasts were also prepared as part of the preparation of the Subsequent Environmental Impact Report for the Mammoth Lakes Airport Expansion, March 1997. These forecasts estimated 1,460 air carrier jet operations by 2005 and 2,920 by 2015 and overall operations growing from 29,010 in the year 2005 to 34,430 by 2015. Annual enplanements were anticipated to be 60,000 by 2005 and between 90,000 and 125,000 by 2015. These forecasts were based on the best available information at the time, which did not include the current Air Service Agreement from American Airlines.

Table H-29

Summary of Projected Aviation Activity at Mammoth Lakes Airport
Years 2002, 2007, 2012, 2017, and 2022

Annual Airline Enplanement Projection	1999	2003	2007	2012	2017	2022
Base Case	--	37,000	159,900	242,700	287,500	333,800
Low Case	--	27,500	90,400	152,900	183,200	217,500
High Case	--	79,400	213,100	313,100	377,100	449,800
City Pair Market Analysis	--	36,100	143,900	171,900	205,200	244,900
ANNUAL AIRCRAFT OPERATIONS						
Base Case						
Air Carrier	--	600	2,420	3,800	4,360	5,000
Regional/Commuter/RJ	--	1,480	4,080	5,040	5,800	6,600
General Aviation/Military	6,050	6,650	7,650	8,950	10,350	12,050
Total Base Case Operations	6,050	8,730	14,150	17,790	20,510	23,650
Low Case						
Air Carrier	--	480	1,320	2,200	2,540	2,960
Regional/Commuter/RJ	--	460	1,160	1,900	2,220	2,580
General Aviation/Military	6,050	6,650	7,650	8,950	10,350	12,050
Total Low Case Operations	6,050	7,590	10,130	13,050	15,110	17,590
High Case						
Air Carrier	--	1,200	3,040	4,660	5,460	6,400
Regional/Commuter/RJ	--	3,440	5,440	6,500	7,580	8,940
General Aviation/Military	6,050	6,650	7,650	8,950	10,350	12,050
Total High Case Operations	6,050	11,290	16,130	20,110	23,390	27,390
City Pair Market Analysis						
Air Carrier	--	512	2,384	2,740	3,200	3,860
Regional/Commuter/RJ	--	1,120	2,344	2,820	3,340	4,000
General Aviation/Military	6,050	6,650	7,650	8,950	10,350	12,050
Total Market Analysis Operations	6,050	8,282	12,378	14,510	16,890	19,910

Source: Ricondo & Associates, Inc., Kent Myers, and American Airlines.
Prepared by: Ricondo & Associates, Inc, October 2000.


Comparison of Enplanement Forecasts
Mammoth Lakes Airport
Annual Enplanements
500,000
450,000
400,000
350,000
300,000
250,000
200,000
150,000
100,000
50,000
0
2003
2007
2012
2017
2022
AA Committment
Regional Service
Non-Winter Service
Add'tl Hub Service
Low Case
Base Case
High Case

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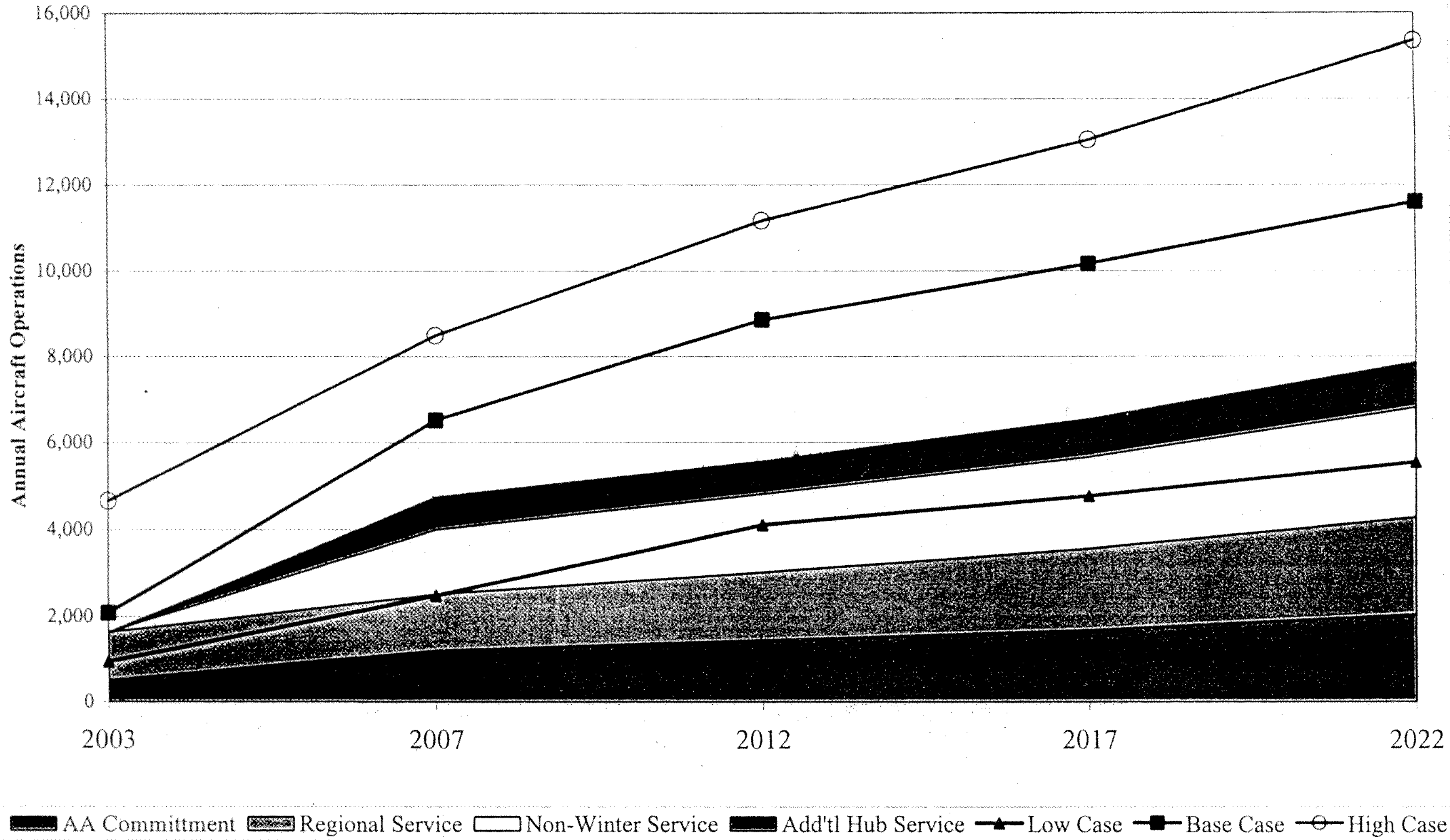
Comparison of Air Carrier Operations Forecasts

Mammoth Lakes Airport



AR 001399

Draft Biological Assessment for the Mammoth-Yosemite Airport Expansion Project Mono County, California

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March 2001

Contents

Chapter 1

Introduction

Background

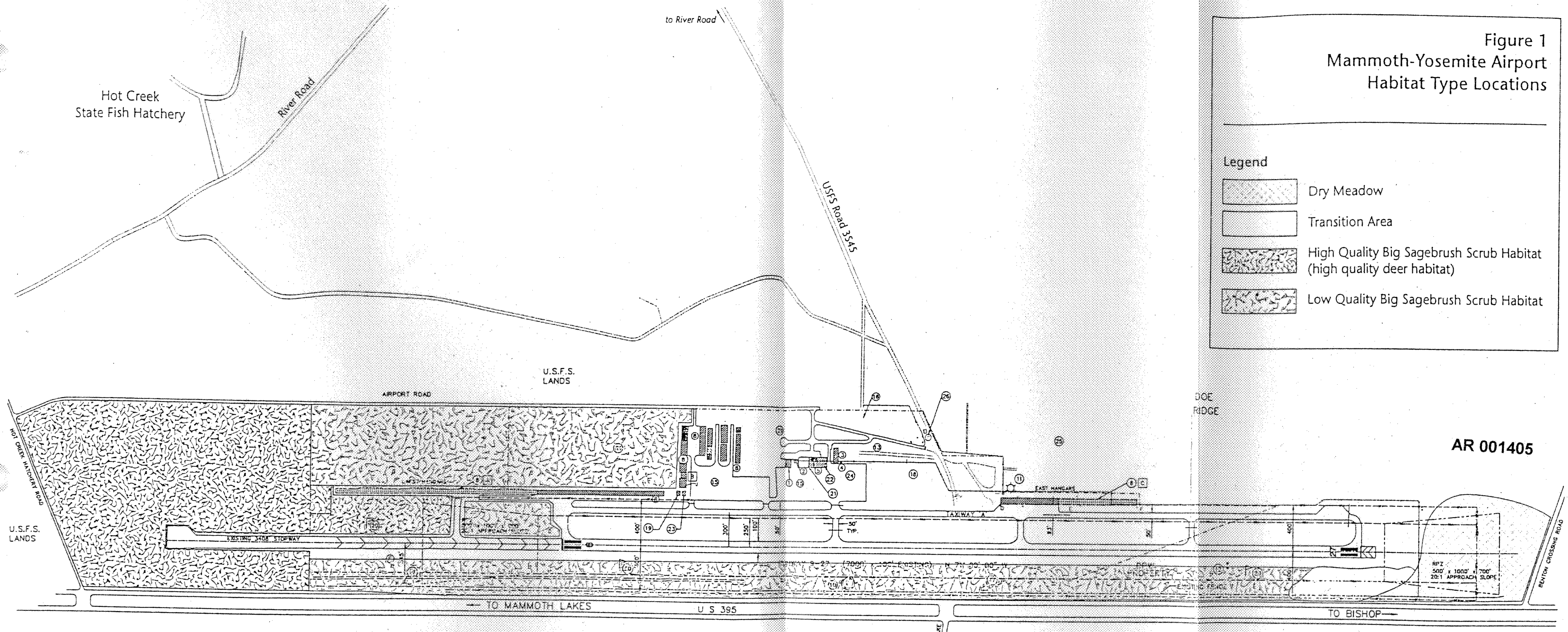
Jones & Stokes was retained by Reinard Brandley, Consulting Airport Engineer, to assist Mammoth-Yosemite Airport with biological resource issues related to the proposed expansion of the Mammoth-Yosemite Airport project in Mono County (Figure 1). The Federal Aviation Administration (FAA) is providing funding for this project; therefore, this biological assessment is being prepared in compliance with Section 7 of the federal Endangered Species Act of 1973 (ESA) (16 USC 1536). A portion of the project occurs on U.S. Forest Service (USFS) land; therefore, a USFS district biologist is reviewing the biological assessment to ensure that the document meets the requirements of the Inyo National Forest.

Consultation History

On November 22, 2000, Jones & Stokes requested a list from the U.S. Fish and Wildlife Service (USFWS) of federal candidate, proposed, and listed endangered or threatened species that could occur in the project area. A species list from USFWS was received on January 22, 2000 (Attachment A). This list includes the Owens tui chub (*Gila bicolor snyderi*), the Lahontan cutthroat trout (*Oncorhynchus clarki henshawi*), the bald eagle (*Haliaeetus leucocephalus*), and the Sierra Nevada bighorn sheep (*Ovis canadensis californianus*). All of these species are analyzed in this biological assessment.

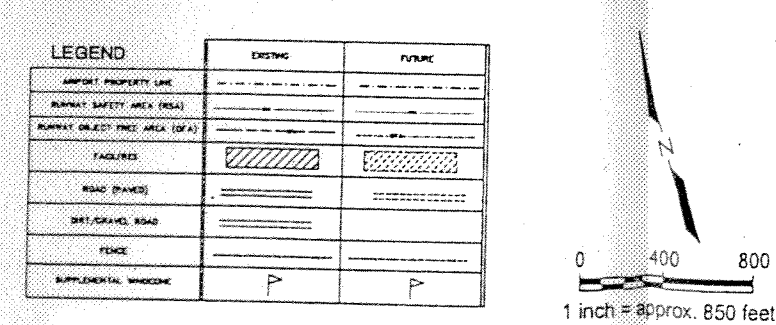
Jones & Stokes contacted USFWS biologist George Walker on November 30, 2000, to discuss the proposed project and its potential effects on the bald eagle and the Owens tui chub (Walker pers. comm.). It was

Figure 1
Mammoth-Yosemite Airport
Habitat Type Locations



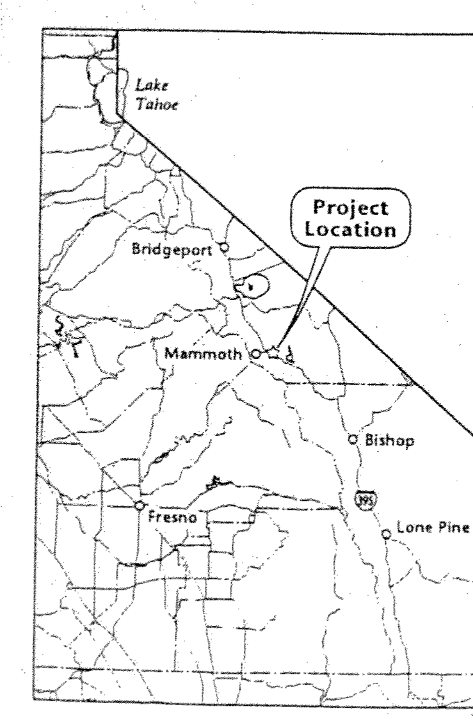
BUILDING INVENTORY

1	TERMINAL BUILDING	14	RESERVED
2	AIRPORT OFFICE	15	TIEDOWN APRON
3	ARFF / SNOW EQUIPMENT BUILDING	16	FUTURE AUTOMOBILE PARKING
4	ELECTRICAL VAULT	17	SIGNAGE AREA
5	FBO OFFICE (TO BE REMOVED)	18	FUTURE COMMERCIAL APRON
6	RESERVED	19	FUEL BUILDING
7	RESERVED	20	SUPPLEMENTAL WIND CONES
8	AIRCRAFT HANGARS	21	COMMERCIAL DEVELOPMENT AREA
9	RESERVED	22	AVIATION DEVELOPMENT AREA (HANGARS & FBO BUILDINGS)
10	WIND CONE AND SEGMENTED CIRCLE	23	NEW AV. GAS STORAGE, PHASE 1
11	AWOS TOWER	24	CORPORATE APRON
12	P.A.P.I.	25	GENERAL AVIATION APRON EXPANSION
13	FUTURE TERMINAL BUILDING SITE	26	WATER STORAGE FACILITY



Base map provided by:

Reinard W. Brandley
CONSULTING AIRPORT ENGINEER



determined that the project site was within the range for the species, suitable habitat was present at the site, and a biological assessment would be required to address the effects of the project on these species that are federally listed as threatened and endangered. The Lahontan cutthroat trout and the Sierra Nevada bighorn sheep were included in the analysis, as evidenced by their inclusion on the species list provided by USFWS and by the information exchanged at the meeting attended by USFWS biologists George Walker and Tim Thomas on January 19, 2001.

Objectives of the Biological Assessment

This biological assessment is being prepared in compliance with Section 7 of the U.S. Endangered Species Act of 1973 (16 USC 1536). Section 7 consultation with USFWS is required because FAA is providing federal funds for the proposed project. This biological assessment evaluates the potential direct, indirect, and cumulative effects of the Mammoth-Yosemite Airport expansion project on the bald eagle, the Owens tui chub, the Lahontan cutthroat trout, and the Sierra Nevada bighorn sheep, which are federally listed species.

The objectives of this biological assessment are to summarize the results of existing resource information, determine whether the species included in this biological assessment are likely to be adversely affected by the expansion project, and describe minimization measures that would reduce or avoid potential project effects on these species and their habitats.

Chapter 2
Project Description

The Town of Mammoth Lakes is pursuing an expansion of the existing facilities located at the Mammoth-Yosemite Airport. The project consists of the following components:

- strengthening the runway and taxiways to accommodate up to B-757-200 aircraft;
- widening the runway from 100 feet to 150 feet on its south side, thereby shifting the runway centerline 25 feet to the south;
- widening the parallel taxiway from 50 feet to 75 feet—20 feet on its south side and 5 feet on its north side;
- extending the runway 1,200 feet to the west to provide the necessary runway length for air-carrier aircraft operations (e.g., the B-757-200);
- extending the parallel taxiway to be consistent with the length of the runway extension;
- adding an air-carrier apron for 3 air-carrier aircraft;
- adding a 75-foot-wide connecting taxiway to access the air-carrier apron area;
- improving the security fencing from the existing 3-strand barbed wire fence to an 8-foot-high chain-link fence to meet FAA standards;
- developing passenger-terminal building facilities;
- constructing airport access-road improvements;
- creating an off-site mitigation area (6 acres);
- conducting all work during the summer months;

- expanding the automobile parking lot; and
- acquiring in fee simple and/or lease of lands owned by the City of Los Angeles Department of Public Works that currently occupy the eastern portion of the runway and taxiway system and a portion of the runway safety area.

Preliminary Illustrative Alternatives

As listed below, 9 preliminary alternatives have been identified and would be assumed in the Biological Assessment if they are initially determined to warrant further consideration. Alternatives 1–7, which pertain to the Mammoth-Yosemite Airport, are reviewed in this report; Alternatives 8 and 9 would not directly pertain to Mammoth-Yosemite Airport and are therefore not discussed after this chapter. These alternatives primarily address various runway extension alternatives.

Alternative 1. No Action: Retain Runway 9-27 at its existing length of 7,000 feet, and do not make any further improvements to the airport except for maintenance or improvements required by FAA for safety measures.

Alternative 2. Proposed Action—8,200-Foot Runway: Extend Runway 9-27 to the west to a length of 8,200 feet, and widen the runway to 150 feet, thereby shifting the runway centerline 25 feet to the south.

Alternative 3. Extend Runway to 9,000 Feet: Extend Runway 9-27 to the west to a length of 9,000 feet and widen the runway to 150 feet, thereby shifting the runway centerline 25 feet to the south.

Alternative 4. Extend Runway Beyond 9,000 Feet: Extend Runway 9-27 to the west to a length greater than 9,000 feet and widen the runway to 150 feet, thereby shifting the runway centerline 25 feet to the south.

Alternative 5. Extend Runway to the East: Extend Runway 9-27 to the east to a length of 8,200 feet, 9,000 feet, or greater than 9,000 feet.

Alternative 6. Widen Runway, but Retain Existing Length of 7,000 Feet: Retain Runway 9-27 at its existing length of 7,000 feet, but widen the runway to 150 feet, thereby shifting the runway centerline 25 feet to the south.

Alternative 7. Widen the Runway Without Shifting the Runway 25 Feet to the South: Widen Runway 9-27 equally on the north and south sides, retaining the existing centerline.

Alternative 8. Develop Another Airport in the Region: Develop air-carrier facilities at an airport in the region other than Mammoth-Yosemite Airport. (This alternative is not reviewed in this report.)

Alternative 9. Use Alternate Modes of Transportation: Continue to assume that major access to the Mammoth Lakes region would be via private vehicle, bus, or a new rail system. (This alternative is not reviewed in this report.)

Chapter 3

Habitat Evaluation Methods

The methods for determining presence of federally listed species in the project area involved a review of literature for species on the USFWS list, a review of records from the California Department of Fish and Game's (DFG's) Natural Diversity Database (CNDDB)(2000), a field visit to the project site, and discussions with agency biologists (USFS biologist Richard Perloff, Bureau of Land Managment biologist Steve Nelson, and USFWS biologist George Walker). The habitat assessment methods used focused on determining the presence or absence of suitable habitat conditions for special-status species. Field visits to the project site were conducted by Jones & Stokes personnel. The purpose of these field visits was to:

- describe general site characteristics,
- evaluate the suitability of wildlife habitats for federally listed species, and
- identify sensitive biological resources that could lead to constraints on airport expansion activities.

AR 001410

Chapter 4
Species Accounts

This chapter describes the status, the distribution and habitat requirements, and the reasons for the decline of the Owens tui chub, Lahontan cutthroat trout, bald eagle, and the Sierra Nevada bighorn sheep.

Description of the Action Area

The project site is located within the East Sierra Nevada Region of the Great Basin Floristic Province at approximately 7,080 to 7,130 feet elevation. Much of the project survey area lies close to Mammoth-Yosemite Airport, U.S. Highway 395, and Airport Road and has been disturbed by these developments.

The project site is dominated by mostly disturbed big sagebrush scrub and includes a nonjurisdictional dry meadow located between the east end of the airport runway and Benton Crossing Road.

These biological communities are described below and depicted in Figure 1.

Big Sagebrush Scrub

Big sagebrush scrub is the predominant plant community in the project study area. Much of this community in the study area has been disturbed by construction and maintenance of airport facilities, an access road, and highway facilities.

The big sagebrush scrub community occupies well-drained upland sites on sandy to gravelly soils and is dominated by shrubs and scattered grass and herb species. Dominant shrub species are big sagebrush (*Artemisia tridentata*), antelope bitterbrush (*Purshia tridentata*), and rubber rabbitbrush

(*Chrysothamnus nauseosus*), with scattered desert peach (*Prunus andersonii*) and horsebush (*Tetradymia canescens*). Rabbitbrush is the dominant shrub in some areas. Common grass species include cheatgrass (*Bromus tectorum*), needle-and-thread (*Hesperostipa comata* ssp. *comata*), Indian ricegrass (*Achnatherum hymenoides*), and squirreltail (*Elymus elymoides*). Commonly encountered native herbs include sulphur buckwheat (*Eriogonum umbellatum* ssp. *subaridum*), buckwheat (*E. elatum* var. *elatum*), spurred lupine (*Lupinus argenteus*), Eriastrum (*Eriastrum sparsiflorum*), Nuttall's tiquilia (*Tiquilia nuttallii*), mentzelia (*Mentzelia* sp.), cryptantha (*Cryptantha circumcissa*), prickly phlox (*Leptodactylon pungens*), Stansbury's phlox (*Phlox stansburyi*), groundsmoke (*Gayophytum diffusum*), nama (*Nama* sp.), and others. Ruderal nonnative species include goosefoot (*Chenopodium* sp.), amaranth (*Amaranthus* sp.), and woolly mullein (*Verbascum thapsus*).

The following wildlife species were observed in big sagebrush scrub habitat: gopher snake (*Pituophis melanoleucus*), sage thrasher (*Oreoscoptes montanus*), green-tailed towhee (*Pipilo chlorurus*), common raven (*Corvus corax*), black-billed magpie (*Pica pica*), rock wren (*Salpinctes obsoletus*), Nuttall's cottontail (*Sylvilagus nuttallii*), and California ground squirrel (*Spermophilus beecheyi*). Wildlife that prefer big sagebrush scrub habitat include sagebrush lizard (*Sceloporus graciosus*), Brewer's sparrow (*Spizella breweri*), black-tailed jackrabbit (*Lepus californicus*), and mule deer (*Odocoileus hemionus*).

Nonwetland, Dry Meadow

Within the project area, nonwetland dry meadow is associated with the eastern portion of the project area between the east end of the runway and Benton Crossing Road. This community supports hydrophytic vegetation and exhibits low chroma (10YR 2/1), which is a hydric soil indicator. The site lacks primary or secondary indicators of hydrology and therefore does not meet the definition of a jurisdictional wetland. Water appears to enter the site in the form of seasonal snowmelt and overland runoff from adjacent highway and runway surfaces. A small, artificially excavated drainage feature drains surface runoff toward the site from the north margin of U.S. Highway 395. Although the site does not qualify as a jurisdictional wetland, it does perform limited wetland functions, such as stormwater sediment and pollution retention and wildlife forage.

Wetland and nonwetland habitat was evaluated using the wetland indicator status system developed by Reed (1988), as follows:

OBL Obligate. Occur almost always under natural conditions in wetlands.

FACW Facultative wetland. Usually occur in wetlands, but occasionally found in nonwetlands.

FAC Facultative. Equally likely to occur in wetlands or nonwetlands.

FACU Facultative upland. Usually occur in nonwetlands, but occasionally found in wetlands.

The dry meadow is dominated by mostly native hydrophytic rhizomatous grass and grasslike species, including Baltic rush (*Juncus balticus*) (OBL), straight-leaved rush (*Juncus orthophyllus*) (FACW), clustered field sedge (*Carex praegracilis*) (FACW-), Nebraska sedge (*Carex nebrascensis*) (OBL), and Kentucky bluegrass (*Poa pratensis*) (FACU). Common herbaceous forbs include long-stalked clover (*Trifolium longipes*) (FACW), long-stalked starwort (*Stellaria longipes* var. *longipes*) (OBL), Missouri iris (*Iris missouriensis*) (OBL), and dandelion (*Taraxacum officinale*) (FACU). Also present are a few scattered interior rose (*Rosa woodsii*) (FAC-) and several small willow shrubs (*Salix sp.*) (> FAC).

Species using dry meadow habitat include killdeer (*Charadrius vociferus*), western meadowlark (*Sturnella neglecta*), and sage grouse (*Centrocerucus urophasianus*). Most of the wildlife species found in the adjacent big sagebrush scrub habitat (described above) would also forage in the dry meadow habitat.

Description of Affected Species

Owens Tui Chub

Status and Distribution

The Owens tui chub is federally listed as an endangered species. The subspecies is 1 of several cyprinids found throughout the Great Basin and Pacific Ocean drainages (Moyle 1976). The Owens tui chub is endemic to the Owens River basin in Mono County and is restricted to 5 isolated locations:

- Hot Creek headsprings,

- Owens River Gorge downstream from Crowley Lake,
- springs and seeps of Cabin Bar Ranch along the west shore of Owens Lake,
- Owens Valley Native Fish Sanctuary, and
- Little Hot Creek.

Critical habitat for the Owens tui chub includes two areas: (1) the Owens River and 50 feet on each side of the river from Long Valley Dam downstream for a distance of 8 stream miles; and (2) a portion of Hot Creek and its outflows and those areas of land within 50 feet of all sides of the springs, their outflows, and the portion of Hot Creek (50 FR 31594).

Reasons for Decline

The reasons for the decline of the Owens tui chub have been attributed to the introduction of the Lahontan tui chub into Crowley Lake (Miller 1973). Hybridization of the Lahontan tui chub and the Owens tui chub has spread throughout the lower reaches of the Owens River system. Only those populations of Owens tui chub that are isolated by barriers have not hybridized. Predation by exotic species and water development have also led to the decline of native populations (Williams 1985).

Habitat Requirements

Tui chubs are mainly found in the middle spring of the Hot Creek headsprings and were particularly abundant in a small backwater area covered with ample vegetation and no flow (McEwan 1990). Diet analysis showed that chubs are opportunistic generalist feeders, and their principal food sources (chironomid larvae, caddisfly larvae, and detritus) are eaten at all times of the year. Most of these food sources are found in aquatic vegetation. Vegetation also is suspected to play an important role for predator avoidance and water velocity displacement.

Tui chub spawn from late winter to early summer. They spawn in areas with aquatic vegetation.

Occurrence in the Project Area

The nearest occurrence of the Owens tui chub is located at Hot Creek headsprings, approximately 0.75 mile northwest of the airport runway.

Lahontan Cutthroat Trout

Status and Distribution

The Lahontan cutthroat trout were federally listed as an endangered species on October 13, 1970, but were reclassified as a threatened species on July 16, 1975 (40 FR 29864 [1975]). A recovery plan was prepared for the Lahontan cutthroat trout by USFWS (1995).

This cutthroat trout subspecies is endemic to the Lahontan basin in northern Nevada, eastern California, and Southern Oregon. Their historic ranges comprised Carson City, Churchill, Douglas, Elko, Eureka, Humboldt, Lander, Lyon, Mineral, Nye, Pershing, Storey, and Washoe Counties in Nevada; Alpine, El Dorado, Lassen, Mono, Nevada, Placer, and Sierra Counties in California; and Harney and Malheur Counties in Oregon (58 FR 11061 [1993]).

Reasons for Decline

Loss of riparian vegetation, channelization, human development, and water management have exacerbated these temperature fluctuations as the alterations of the river environment expose more surface water to solar radiation and to convective heat exchange with the air (Dickerson and Vinyard 1999). Reduced flows have decreased the species' access to spawning habitat.

Lahontan cutthroat have hybridized with Yellowstone cutthroat and rainbow trout so extensively that there are only few genetically isolated populations of uncertain purity (McAfee 1966, Moyle 1976). This hybridization either decreases the phenotypic variability or allows the rainbow trout phenotype to become dominant (Moyle 1976). In addition, it reduces the Lahontan cutthroat fitness by producing a less fertile offspring (McAfee 1966).

Habitat Requirements

Lahontan cutthroat trout live under temperature fluctuations that range between 5°C to 20°C per day (Dickerson and Vinyard 1999). Lahontan cutthroat trout are slow-growing fish; they seldom live longer than 9 years or reach lengths of 61 centimeters (cm) (Moyle 1976). They migrate short distances upstream from lake habitat into stream habitat to spawn from April through July (depending on water temperature and flow conditions) in their second to fourth year of life. Spawning substrate includes washed gravels in riffle habitat. Although mortality rates are high after spawning, some individuals may survive to spawn in subsequent years.

After hatching, the young fish (alevins) remain in the gravel until the yolk sac has been absorbed, at which time, they move into the water column, seeking lower water velocities. Juveniles remain in the stream habitat for about 1 year and then begin migrating downstream toward the lake habitat where they rear until adulthood. However, some individuals may remain in stream habitat throughout their life cycle (Moyle 1976).

Freshwater invertebrates and terrestrial insects are the main diet for juvenile and adult cutthroat trout. In streams, the fish select the food as the invertebrates drift by. In lakes, they feed on insects at the surface and on zooplankton; however, when this is less abundant, they will feed on bottom-dwelling insect larvae, crustaceans, and snails. Larger trout will feed on small fish, as well (Moyle 1976).

Occurrence in the Project Area

Lahontan cutthroat trout inhabit the Lahontan Drainage, with the southern end of its range just below the Walker River (U.S. Fish and Wildlife Service 1995). USFS information indicates that the closest population of Lahontan trout is 6 miles north of the project site in O'Harrel Canyon Creek, a tributary to the Owens River (Perloff pers. comm.).

Bald Eagle

Status and Distribution

The bald eagle is federally listed as a threatened species. Historically, it nested throughout California; however, the current bald eagle nesting distribution is mostly restricted to mountainous habitats in the northern third of the state, primarily in the northern Sierra Nevada, Cascade Range, and northern Coast Ranges (California Department of Fish and Game 1992). As a result of reintroduction programs, bald eagles have recently nested in mainland southern and central California and on Santa Catalina Island. Bald eagles winter at lakes and reservoirs and along river systems throughout most of central and northern California and in a few southern California localities (California Department of Fish and Game 1992).

The breeding population of bald eagles in California is increasing in both numbers and range, and the winter population appears stable. In 1972, there were only 26 known active bald eagle territories in California (Thelander 1974). In 1981, 50 breeding bald eagle pairs were known to occupy territories in California. By 1992, the number of breeding bald eagle pairs had increased to 99.

In 1981, the bald eagle breeding range in California included portions of 8 counties. By the early 1990s, the breeding range in California had expanded to portions of 19 counties. Although the winter population of bald eagles in California varies from year to year, it may exceed 1,000 birds in some winters (California Department of Fish and Game 1992).

Because the population status of the bald eagle has improved in most of the country, USFWS is considering removing the bald eagle from the threatened species list.

Reasons for Decline and Recovery

Early declines in bald eagle populations have been attributed to human persecution and disturbance and to destruction of riparian, wetland, and coniferous forest habitats (Detrich 1986). The most important factor that contributed to the decline of bald eagle populations, however, was environmental contamination resulting from the introduction of dichloro-diphenyl-dichloroethylene (DDE), a metabolite of the agricultural pesticide dichloro-diphenyl-trichloroethane (DDT), into the food chain (Detrich 1985).

Various legal and management measures, including the banning of DDT in 1972 and development and implementation of the Pacific Bald Eagle Recovery Plan (U.S. Fish and Wildlife Service 1986) and local bald eagle management plans, have contributed to the continuing recovery of the bald eagle breeding population in California (California Department of Fish and Game 1992).

Habitat Requirements

Bald eagle nesting territories in California are found primarily in ponderosa pine and mixed conifer forests (Lehman 1979). Ponderosa pine is the tree most often used for nesting (Lehman 1979), although nest sites have been observed in a variety of tree species (Jurek 1990).

Bald eagle nest sites are always associated with a lake, river, or other water body and are usually within 1 mile of water. Nests are usually constructed in a tree that provides an unobstructed view of the water body and almost always is the dominant or codominant tree in the surrounding stand (Lehman 1979). Snags and dead-topped live trees are important habitat components in a bald eagle nesting territory, providing perch and roost sites.

Bald eagles winter along rivers, lakes, and reservoirs that support adequate fish or waterbird prey and have mature trees or large snags available for perch sites. This species often roosts communally during the winter, typically in mature trees or snags with open branching structures. Winter roost areas are usually isolated from human disturbance.

Occurrence in the Project Area

A pair of wintering bald eagles has been observed by DFG personnel to perch on telephone poles near the study area at the Hot Creek Fish Hatchery. USFS biologists have recorded up to 6 bald eagles at one time during the winter months at Laurel Pond located approximately 1 mile southwest of the project site (Perloff pers. comm.). Bald eagles have also been recorded in the project vicinity along Convict Creek, Hot Creek, and the alkali ponds and flats east of the project area (Perloff pers. comm.). No nesting by bald eagles are known to occur in the project area (Perloff pers. comm.). The Bureau of Land Management biologists have observed wintering bald eagles foraging in the project vicinity at the alkali ponds area, around Crowley Lake, and along Convict Creek (Nelson pers. comm.). Wintering birds likely roost at the Alpers fish hatchery located approximately 7 miles northwest of the project site, but birds may also roost along Hot Creek gorge approximately 2 miles from the airport and at Convict Lake approximately 2 miles from the airport (Perloff pers. comm.).

Sierra Nevada Bighorn Sheep

Status and Distribution

The Sierra Nevada bighorn sheep is federally listed as endangered. The Sierra Nevada bighorn sheep is 1 of 3 bighorn sheep subspecies to occur in California and is considered a distinct vertebrate population segment. Although this species' pelage exhibits a great deal of color variation, it is similar in appearance to other desert-associated bighorn sheep. They range from almost white to fairly dark brown, with a white rump. Both males and females have permanent horns, with males possessing larger horns and female horns lacking coiling (Buechner 1960).

Reasons for Decline

Historically, in California, their range included the eastern slope and a portion of the western slope of the Sierra Nevada from Sonora Pass in Mono County south to Walker Pass in Kern County (Wehausen 1980). Disease is believed to be the factor most responsible for the disappearance of Sierra Nevada bighorn sheep subpopulations (65 FR 1:20). Today 5 disjunct subpopulations occupy the eastern escarpment of the Sierra Nevada in Mono and Inyo Counties. These populations occur at Lee Vining Canyon, Wheeler Crest, Mount Baxter, Mount Williamson, and Mount Langley (65 FR 1:20).

Currently, the number of Sierra Nevada bighorn sheep comprising these 5 subpopulations is thought to total no more than 125 animals. Disease, mountain lion predation, and loss of genetic variability because of the small number and isolated nature of the population are threatening the continued existence of the Sierra Nevada bighorn sheep (65 FR 1:20).

Habitat Requirements

During summer, Sierra Nevada bighorn sheep live in the alpine and subalpine zones (10,000–14,000 feet). They forage in open spaces with low-growing vegetation near steep slopes and canyons that are rough, rocky, and sparsely vegetated. These rugged areas are used as escape cover, bedding, and lambing sites. In winter, they move to high, wind-swept ridges or migrate to the lower elevation sagebrush-steppe habitat (4,790 feet) to escape deep snow and find more nutritious forage. During the winter months, they also exhibit a preference for south-facing slopes (Wehausen 1980).

Occurrence in the Project Study Area

The population of bighorn sheep that is closest to the project site is located in Lee Vining Canyon and Wheeler Crest (Perloff pers. comm.). The Wheeler Crest bighorn sheep population is located approximately 12 miles southeast of the airport, and the Lee Vining sheep population is located approximately 20 miles northwest of the airport.

Chapter 5

Potential Effects of the Proposed Project

This section describes the potential direct effects of the proposed Mammoth-Yosemite Airport expansion project on the local and regional populations of Owens tui chub, Lahontan cutthroat trout, bald eagle, and Sierra Nevada bighorn sheep. The primary direct effect mechanisms considered for this biological assessment were the expansion of the runway, placement of the fence around the runway, and direct disturbance or mortality to listed species.

Indirect effects of the proposed project include potential contamination of groundwater from accidental fuel or chemical spills, groundwater pumping at the airport, potential plane crashes into Hot Creek headsprings or the fish hatchery that result in fuel spills and groundwater contamination, potential fuel spill risk associated with fuel trucks traveling to the airport, and potential increase or decrease in the number of automobile travelers on U.S. Highway 395 as a result of a change in travel types to the ski resort from auto to plane.

Direct and Indirect Effects on the Owens Tui Chub

Construction activities at the airport would be confined to the airport runway area. No disturbance to habitat occupied by Owens tui chub would occur as a result of the project. Therefore, the project would have no direct effect on this listed fish.

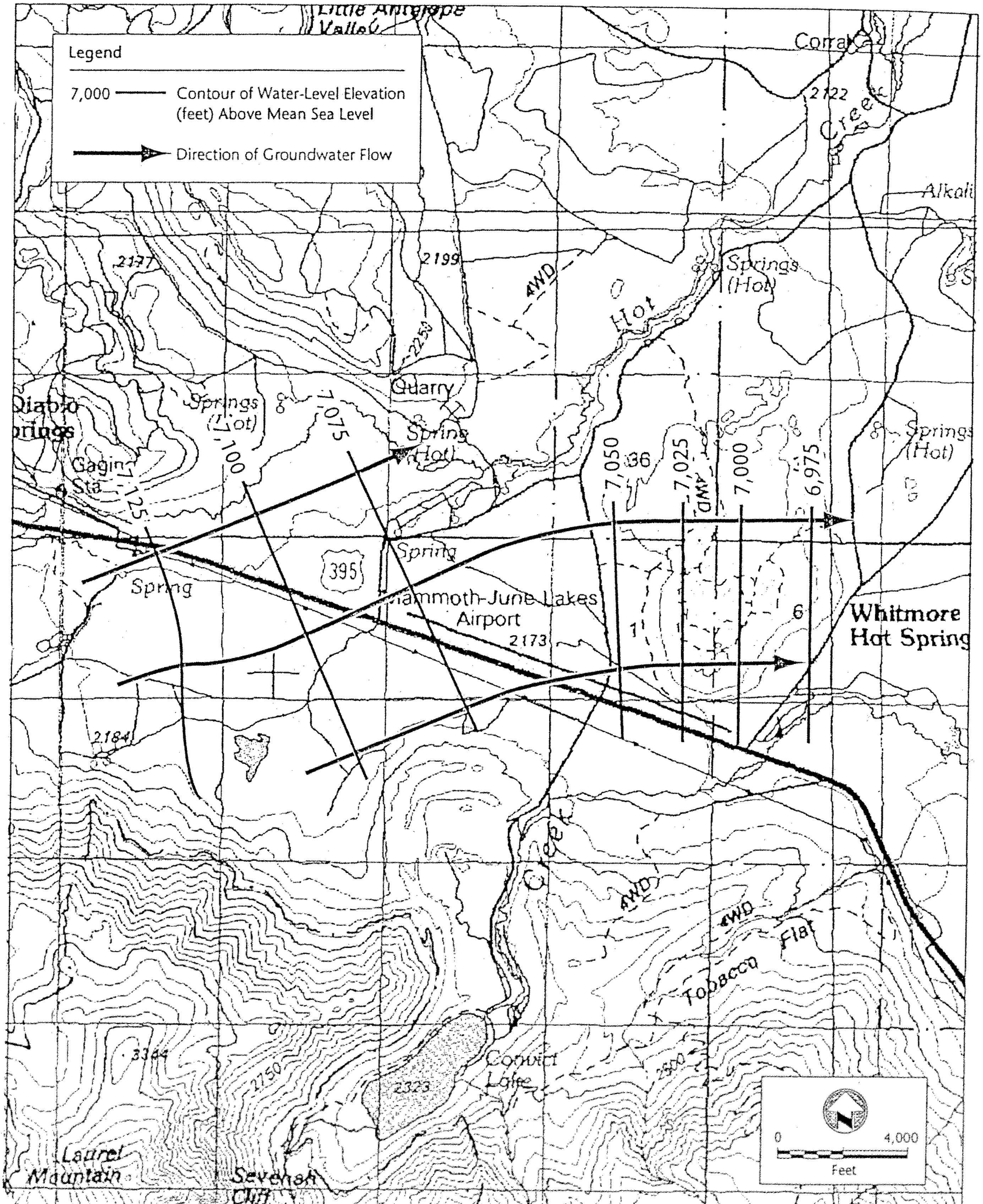
An extensive groundwater study was conducted by Kenneth D. Schmidt and Associates in October 1996 for the Mammoth Community Water District Reclaimed Water Project. The groundwater study reported that groundwater flows travel in an easterly direction throughout the project vicinity (Figure 2). Because the Hot Creek headsprings are located northwest of the airport, there is no groundwater flow or water quality that can be affected by airport operations. The hydrology studies were summarized in the comments and responses of the Subsequent Environmental Impact Report and Updated Environmental Assessment for the Mammoth Lakes Airport (Reinardt Brandley, Consulting Airport Engineer 1997). It was determined in that document that the groundwater extraction for the entire airport property including the proposed project and the Hot Creek Development would not affect the Hot Creek fish hatchery springs. Therefore, the project would have no indirect effect on the availability of water for the Owens tui chub.

Fuel trucks traveling to the airport would turn off of Hot Creek Hatchery Road onto Airport Road (Figure 1). The fuel trucks would not travel past the Hot Creek hatchery located approximately 0.75 mile north of the airport. The probability of an accidental fuel spill from a fuel delivery truck crash is extremely remote. In the unlikely event of a spill along the travel route, groundwater flow would carry any seepage away from the Hot Creek hatchery springs (Figure 2).

Direct and Indirect Effects on Lahontan Cutthroat Trout

No direct effects on Lahontan cutthroat would result from the project. The closest Lahontan cutthroat population is more than 6 miles from the project site.

As discussed above for Owens tui chub, the groundwater study reported that groundwater flows travel in an easterly direction throughout the project vicinity (Figure 2). Because O'Harrel Canyon Creek is more than 6 miles northwest of the airport and on the other side of the valley, neither groundwater flows nor water quality could be affected by airport operations. The flight path at the airport is about 2 miles from the closest population of cutthroat trout. At their closest point to the cutthroat populations, the proposed jet aircraft would be flying at an altitude of 10,000 feet above ground on departure and 5,000 feet on approach. The potential for an aircraft to crash into O'Harrel Canyon Creek and affect water quality is extremely remote. Therefore, based on the distance of the closest population of Lahontan cutthroat trout from the airport and on the direction of water flow in Long Valley (in the opposite direction from the Lahontan trout



Source: Kenneth D. Schmidt and Associates Groundwater Quality Consultants Freson, California 1996.

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Jones & Stokes

Figure 2
Regional Direction of Groundwater Flow

population), the proposed project is unlikely to have any effect on the Lahontan cutthroat trout.

Direct and Indirect Effects on Bald Eagles

Bald eagles do not nest in the project vicinity; however, up to 6 bald eagles have been observed at one time during the winter months within 1 mile of the project site. The closest potential roosting area is approximately 2 miles from the project site (Hot Creek gorge)(Perloff pers. comm.). Aircraft departures and arrivals at Mammoth-Yosemite Airport have a low potential to strike foraging bald eagles.

No roost sites are known to occur at the project site. The closest likely roost site to the airport is near Alpers fish hatchery, more than 7 miles northwest of the project site and outside the flight path. Bald eagles have been reported perching on telephone poles at the Hot Creek fish hatchery approximately 0.75 mile from the project site. No additional perch areas have been identified in the project site.

Winter use of the project vicinity by bald eagles is largely concentrated north to northeast of the project site and outside the flight path for aircraft. Bald eagle use in the project vicinity is primarily along Hot Creek, the alkali ponds, Laurel Pond, and Crowley Reservoir (Perloff pers. comm., Nelson pers. comm.).

There have been no reported bird strikes at the airport in the last 10 years (Cleary pers. comm.). This is likely the result of several factors, including a limited amount of plane traffic, low densities of birds, and the lack of weather conditions, such as fog, that tend to increase the risk of bird strikes.

The proposed project is projected to generate two daily flight operations from air-carrier jet aircraft in 2002, growing to 14 daily operations in 2022. At present, there are roughly 8,000 departures and landings annually.

Takeoffs and landings are important when discussing bird strikes including bald eagles because 79% of reported bird strikes between 1990 and 1999 occurred below 1,000 feet above ground, of which 40% occurred on the ground (Cleary pers. comm). The class of aircraft was not evaluated separately in the FAA's bird strike data; however, the class of plane use in the proposed project (air-carrier jet aircraft) has a steeper takeoff path and higher cruising altitude than the majority of small planes currently using the airport. Thus, the proposed plane usage would spend less time at low altitudes where bird strikes are most common.

Grubb and Bowerman (1997) reported disturbances and response characteristics for 3,122 bald eagle-plane interactions among three types of aircraft (light plane, jet aircraft, and helicopters) during a study conducted in Arizona (1983–1985) and Michigan (1989–1990) (Grubb and Bowerman 1997). No apparent bald eagle strikes occurred during the study. This research concluded that distance of the aircraft to the birds was the most important factor related to disturbance. Bald eagles showed no flight responses (96% in Arizona; 95% in Michigan) when the median distance to aircraft was greater than 1,150 feet. In terms of the proposed project, the closest distance to the nearest potential bald eagle perch site on Hot Creek is 3,960 feet which is more than twice the distance that almost all eagles showed no flight response in the Grubb and Bowerman (1997) study.

Given the lack of any bird air strikes at Mammoth-Yosemite Airport in the last 10 years, the low number of eagles in the project vicinity, the primary location of bald eagle use outside the flight path, the small amount of increase in flight operations, and the limited amount of time the planes are at low altitudes, the proposed project is unlikely to result in any incidental take of bald eagles. Because bald eagles occasionally roost near the project site (Hot Creek) and forage in the project vicinity, the chance of a bald eagle injury or mortality from an aircraft strike, however remote, cannot be ruled out.

Construction-related activities to expand the airport runway are unlikely to directly affect the bald eagle. Construction at the airport is scheduled to occur in summer when bald eagles are generally not present in the project vicinity.

No indirect effects on bald eagles are expected to result from the proposed project.

Direct and Indirect Effects on Sierra Nevada Bighorn Sheep

Based on the existing flight path, the closest the flight path comes to known Sierra Nevada bighorn sheep habitat is 3 miles. Jet aircraft would fly at an elevation of approximately 5,000 feet above runway elevation on departure and 2,500 feet above runway elevation on approach on the portion of the flight path closest to the sheep population. Based on the large distance and elevation of planes approaching and departing from Mammoth-Yosemite

Airport to the bighorn sheep use areas, it is unlikely that the sheep would be affected by jet aircraft.

Indirect effects on Sierra Nevada bighorn sheep could include disturbance to sheep and avoidance of preferred use areas due to an increase in the number of tourists arriving by jet aircraft to the Mammoth Lakes area and backpacking into the high Sierras where bighorn sheep occur. This indirect effect is unlikely to occur due to the location of the bighorn sheep use areas. The sheep primarily use USFS lands designated as wilderness areas. USFS strictly controls the number of back-country permits that are issued for the wilderness area travel. The potential increase in the number of tourists arriving at the Mammoth Lakes area would therefore have no effect on the quota of back-country use permits issued by USFS. Furthermore, USFS does not permit entry into some bighorn sheep use areas in the Sierra Nevada between July 1 and December 15 to reduce potential disturbance to sheep.

Cumulative Effects

Two development projects, the 2000 Sierra Business Park and the 1997 Hot Creek Development project are planned for the project vicinity. Environmental documentation prepared for these projects indicate that there would be no direct, indirect, or cumulative impacts on Owens tui chub, Lahontan cutthroat trout, bald eagle, or Sierra Nevada bighorn sheep.

Planned growth in the project vicinity within the range of wintering bald eagles is centered primarily in and around the Town of Mammoth Lakes (Intrawest Resort developments and Eastern Sierra College Center), with scattered developments proposed at Crowley Lake (Lakeridge Ranch Estates) and west of U.S. Highway 395 (Sherwin/Snowcreek ski area and Sierra Business Park). The conversion to urban uses may eliminate bald eagle foraging habitat. The project would contribute to conversion to other uses of a small quantity (10.5 acres) of undeveloped lands; therefore, it would likely contribute to the removal of low-quality foraging habitat. Because bald eagles prefer to forage near water bodies including creeks, reservoirs, and alkali ponds, and because the proposed project would affect none of those habitats, the cumulative effects resulting from the proposed project would not affect bald eagles.

Determination

It has been determined that the proposed project would not affect Owens tui chub, Lahontan cutthroat trout, Sierra Nevada bighorn sheep, or their designated critical habitat.

Due to the remote chance of a bald eagle collision with a jet carrier aircraft, the project as proposed may affect but is not likely to adversely affect the bald eagle. The project would not affect any designated critical habitat for the bald eagle.

Chapter 6
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Appendix A. U.S. Fish and Wildlife Service Species List Dated January 31, 2001

United States Department of the Interior

FISH AND WILDLIFE SERVICE

Ventura Fish and Wildlife Office
2493 Portola Road, Suite B
Ventura, California 93003

January 31, 2001

Steven Avery
Jones & Stokes
2600 V Street
Sacramento, CA 95818-1914

Subject: Species List for Mammoth Lakes Airport Expansion Project, Mono County, California

Dear Mr. Avery:

This letter is in response to your request, dated November 22, 2000, and received in our office on December 4, 2000, for information on threatened and endangered species which may be present in or near the vicinity of the Mammoth Lakes Airport Expansion Project in Mono County, California.

This response fulfills the requirements of the U.S. Fish and Wildlife Service (Service) under section 7(c) of the Endangered Species Act of 1973, as amended (Act). The Federal Aviation Administration (FAA), as the lead federal agency for the proposed action, has the responsibility to review its proposed activities and determine whether any listed species may be affected. If the proposed action requires the preparation of an environmental impact statement, the FAA has the responsibility to prepare a biological assessment to make a determination of the effects of the action on the listed species. If the FAA determines that a listed species is likely to be adversely affected, it should request, in writing through our office, formal consultation pursuant to section 7 of the Act. Informal consultation may be used to exchange information and resolve conflicts with respect to threatened or endangered species prior to a written request for formal consultation. During this review process, the FAA may engage in planning efforts but may not make any irreversible commitment of resources. Such a commitment could constitute a violation of section 7(d) of the Act.

The only known federally listed species which may occur in the vicinity of or be affected by the Mammoth Lakes Airport Expansion Project are the federally threatened Lahontan cutthroat trout (*Oncorhynchus clarki henshawi*), and the federally endangered bald eagle (*Haliaeetus leucocephalus*), Sierra Nevada bighorn sheep (*Ovis canadensis nelsoni*), and Owens tui chub (*Gila bicolor snyderi*). Critical habitat has been designated for the Owens tui chub at Hot Creek. Only listed species receive protection under the Act. However, other sensitive species should be considered in the planning process in the event they become listed or proposed for listing prior to