

Chapter 2

Alternatives

2.1 Introduction

Federal regulations and the National Environmental Policy Act (NEPA) require a comprehensive environmental review process, which includes identifying and evaluating viable alternatives that could meet the objectives of a proposed project. This thorough analysis is imperative to ensure potential alternatives have been explored and that any alternative capable of fulfilling the project's purpose, has not been disregarded prematurely. In accordance with the federal guidelines that mandate NEPA, a range of alternatives have been developed that may achieve the objectives of the Proposed Action. The following alternatives have been identified in the Program Definition Study (PDS), and in planning discussions after the PDS was developed, to meet FAA standards at Birmingham-Shuttlesworth International Airport (BHM).

2.2 Range of Alternatives

This section outlines different alternatives that would fulfill the identified Purpose and Need, as stated in **Chapter 1, Background, Purpose and Need**. Guidelines from 1050.1G were considered when analyzing the reasonable alternatives to the Proposed Action.

NEPA standards necessitate the examination of alternatives because certain elements of the Proposed Action may have environmental impacts that can be mitigated or eliminated through the integration of alternatively viable actions. NEPA also requires the consideration of a reasonable range of alternatives to the Proposed Action, and those alternatives must be technically and economically feasible and meet the purpose and need of the Proposed Action.

As previously described, the Proposed Action is intended to *enhance airfield safety, accommodate the future aircraft fleet mix, and meet airfield design standards*. Seven alternatives, including the No Action Alternative, were identified. The following list highlights the range of alternatives that are considered in this EA. Reference Appendix B for figures of the seven alternatives.

2.2.1 Alternative 1 - Village Creek Encapsulation in Place and Taxiway A Relocation to 400'

Alternative 1 includes the realignment of 7,700 linear feet of Taxiway A pavement to achieve a 400-foot separation from the runway centerline to the taxiway centerline. This alternative includes the encapsulation of 2,100 linear feet of Village Creek in place by constructing a concrete box culvert along its existing alignment.

2.2.2 Alternative 2 - Village Creek Relocation and Taxiway A Relocation to 400'

Alternative 2 includes the realignment of 7,700 linear feet of Taxiway A pavement to achieve a 400-foot separation from the runway centerline to the taxiway centerline. This alternative

also includes the relocation of approximately 3,200 linear feet of Village Creek by constructing an open-air creek parallel to its current alignment. Finally, Alternative 2 requires the relocation of the parallel VSR.

2.2.3 Alternative 3a - Village Creek Encapsulation In Place and Taxiway A Relocation to 500'

Alternative 3a includes the realignment of 7,700 linear feet of Taxiway A pavement to achieve a 500-foot separation from the runway centerline to the taxiway centerline, meeting ADG V design standards. This alternative includes the encapsulation of approximately 2,600 linear feet of Village Creek in place and Taxiway A would be relocated directly on top of the encapsulated Village Creek. Finally, Alternative 3a requires the relocation of the parallel VSR.

2.2.4 Alternative 3b - Village Creek Relocation and Encapsulation and Taxiway A Relocation to 500'

Alternative 3b includes the realignment of 7,700 linear feet of Taxiway A to achieve a 500-foot separation from the runway centerline to the taxiway centerline, meeting ADG V design standards. This alternative also includes the relocation and encapsulation of 2,500 linear feet of Village Creek. Finally, Alternative 3b requires the relocation of the parallel VSR.

2.2.5 Alternative 4 - Village Creek Relocation and Taxiway A Relocation to 500'

Alternative 4 includes the realignment of 7,700 linear feet of Taxiway A pavement to achieve a 500-foot separation from the runway centerline to taxiway centerline, meeting ADG V design standards. This alternative also includes the relocation of approximately 3,200 linear feet of Village Creek by constructing an open-air creek parallel to its current alignment. Finally, Alternative 4 requires the relocation of the parallel VSR.

2.2.6 Alternative 5 - Village Creek Relocation and Hybrid 400'/500' Taxiway A Relocation.

Alternative 5 includes the realignment of 7,700 linear feet of Taxiway A pavement to achieve a hybrid offset distance varying from 400 feet to 500 feet from the runway centerline to taxiway centerline, meeting ADG V design standards. This alternative includes the relocation of approximately 3,200 linear feet of Village Creek, and the relocation of the parallel VSR. This alternative was developed during planning discussions after the PDS was developed, therefore this alternative was not included in the PDS.

2.2.7 Alternative 6 - No Action

The No Action Alternative would result in the airfield configuration remaining as it is today, and the need to meet FAA design standards and enhance safety would not be addressed. Taxiway A and Village Creek would remain in the same location in the No Action Alternative. This alternative includes the reconstruction of Taxiway A in place, demolition of existing non-standard taxiway connectors, and constructing taxiway connectors that meet FAA design standards.

An initial review of this broad range of alternatives was conducted to identify the alternatives that are considered reasonable. Alternatives that are eliminated from further analysis are

described in **Section 2.3**. Alternatives that may meet the project need are carried forward for further analysis and are addressed in **Section 2.4**.

2.3 Alternatives Considered but Dismissed

This section briefly describes the reasons for elimination of the following alternatives in this EA:

- Alternative 1 – Village Creek Encapsulation in Place and Taxiway A Relocation to 400’
- Alternative 3a – Village Creek Encapsulation in Place and Taxiway A Relocation to 500’
- Alternative 3b – Village Creek Relocation and Encapsulation and Taxiway A Relocation to 500’

These alternatives were eliminated primarily because they are not economically feasible. The costs associated with encapsulation were estimated to be significantly higher than the open-air creek alternatives. Additionally, the anticipated adverse effects to Village Creek were significantly greater than the open-air creek alternatives (i.e., potential to decrease existing habitat connectivity and fish passage, and prohibiting the stream from accessing the floodplain).

2.4 Alternatives Carried Forward for Analysis

This section describes the alternatives being carried forward in the analysis of environmental impacts. An evaluation was performed to assess these alternatives on their technical and economic viability, as well as their effectiveness in fulfilling the project's Purpose and Need.

The PDS provides a detailed inventory of existing airfield facilities to establish baseline conditions for analysis. The PDS recommended improvements needed to address both the current and future fleet mix at BHM. In evaluating the factors that support the implementation of the Preferred Alternative, safety remains the priority. The following alternatives were chosen to be carried forward for analysis in this EA.

2.4.1 Alternative 2 - Village Creek Relocation and Taxiway A Relocation to 400’ (Preferred Alternative)

Alternative 2 involves the realignment of approximately 7,700 linear feet of Taxiway A pavement to achieve a maximum separation distance of 400 feet and the relocation of approximately 3,200 linear feet of Village Creek. In addition, this alternative includes the relocation of the parallel VSR, and the strengthening of taxiway pavements. This will involve constructing a new open-air creek parallel to the existing creek alignment. Alternative 2 fulfills the objectives as specified in the projects Purpose and Need.

Implementation of Alternative 2 will result in impacts to Village Creek, identified as a riverine by the U.S. Fish and Wildlife Service (USFWS). Effects to species residing in the creek have been investigated and potential impacts will be discussed in subsequent chapters. The total cost to complete Alternative 2 is estimated to cost approximately \$75.1 million in 2024 dollars, as shown in in **Table 2-1**. Refer to **Appendix F** for preliminary design plans.

2.4.2 Alternative 4 - Village Creek Relocation and Taxiway A Relocation to 500'

Alternative 4 involves the realignment of approximately 7,700 linear feet of Taxiway A pavement to achieve a maximum separation distance of 500 feet and the relocation of approximately 3,200 linear feet of Village Creek. In addition, this alternative includes the relocation of the parallel VSR. Alternative 4 fulfills the objectives as specified in the projects Purpose and Need.

Implementation of Alternative 4 will result in impacts to Village Creek, identified as a riverine by the USFWS. Effects to species residing in the creek have been investigated and potential impacts will be discussed in subsequent chapters. The total cost to complete Alternative 4 is estimated to cost approximately \$82.2 million in 2024 dollars, as shown in **Table 2-1**.

2.4.3 Alternative 5 - Village Creek Relocation and Hybrid 400'/500' Taxiway A Relocation

Alternative 5 involves the realignment of 7,700 linear feet of Taxiway A pavement to achieve a hybrid offset distance varying from 400 feet to 500 feet from the runway centerline to taxiway centerline, meeting ADG V design standards. This alternative includes the relocation of approximately 3,200 linear feet of Village Creek, and the relocation of the parallel VSR. This alternative was developed during planning discussions after the PDS was developed, therefore this alternative was not included in the PDS.

Implementation of Alternative 5 will result in impacts to Village Creek, identified as a riverine by the USFWS. Effects to species residing in the creek have been investigated and potential impacts will be discussed in subsequent chapters. The total cost to complete Alternative 5 is approximately \$78.6 million in 2024 dollars, as shown in **Table 2-1**.

2.4.4 Alternative 6 - No Action

NEPA standards require the assessment of a No Action Alternative. This allows for comparisons with other alternatives to fully understand their potential impacts. For this EA, the No Action Alternative will involve the reconstruction of taxiway pavements while maintaining the current runway and taxiway separation distance as it exists today. Per FAA recommendations, the No Action Alternative will correct non-standard geometries of associated taxiway connectors to meet FAA design standards. The No Action Alternative is estimated to cost approximately \$26.7 million in 2024 dollars, as shown in **Table 2-1**. The No Action Alternative will not meet the objectives of the project's Purpose and Need.

2.5 Alternatives Summary

A comparative matrix of Alternative 2, Alternative 4, Alternative 5, and the No Action Alternative is provided in **Table 2-1**. Although the No Action Alternative will not create environmental impacts, it will not address the safety needs at BHM or meet the objectives of the Purpose and Need. In addition to the No Action Alternative, the Alternatives being carried forward are as follows, and are presented in Appendix B, **Figure B2**, ALT 2- Village Creek Relocation and Taxiway A Relocation to 400-Feet, **Figure B5** ALT 4 - Village Creek Relocation

and Taxiway A Relocation to 500-Feet, and **Figure B6**, ALT 5 – Village Creek Relocation and Hybrid 400’/500’ Taxiway A Relocation.

Cost estimates for Alternative 2, Alternative 4, and the No Action Alternative originate from the PDS, which included both asphalt and concrete for rehabilitation and construction. Alternative 5 was developed during planning discussions, therefore cost estimates were not included in the PDS, however, costs are included in **Table 2-1**. The cost estimates provided in **Table 2-1** detail the asphalt costs; however, final determination of appropriate materials will be made during the design phase. Project components in **Table 2-1** include utility relocation (water and sewer), VSR relocation, Village Creek relocation and mitigation, building demolition, and other costs respective of each alternative. Design costs are not included in this table, only construction costs are reflected below.

TABLE 2-1

ALTERNATIVES CONSIDERATION MATRIX¹

Criteria	Alternative 2 400' offset (Preferred)	Alternative 4 500' offset	Alternative 5 400'/500' offset	Alternative 6 No Action
Corrects Non-Standard Geometry	Yes	Yes	Yes	No
Village Creek Relocation	Relocate 3,200 Linear Feet	Relocate 3,200 Linear Feet	Relocate 3,200 Linear Feet	None Required
Estimated Construction Duration	32 Months	36 Months	36 Months	18 Months
Anticipated Airport Property Impacts	Affects 1.5 acres of Kaiser Industry leaseholds	Affects 1.5 acres of Kaiser Industry leaseholds Affects cargo apron area – loss of one aircraft parking space	Constraints to the 400' offset section for operations involving ADG V or larger aircraft during CAT II and CAT III visibility minimums. Constraints with the 400' offset section at terminal ramp for operations involving ADG VI aircraft during all weather conditions.	None
Total Cost	\$75.1M	\$82.2M	\$78.6²	\$26.7M

¹ Program Definition Study, Garver June 2024² Total cost interpolated between Alternatives 2 and 4