



EXECUTIVE SUMMARY

The City of Rapid City, in cooperation with the Rapid City Area Metropolitan Planning Organization (MPO) has undertaken an access study of the Chapel Valley neighborhood in southwest Rapid City. Originally annexed in 1978, the 542-home neighborhood is located in a valley with steep forested slopes on all sides that isolate the residents from the surrounding area.

Because of its topography and vegetation, Chapel Valley residents are vulnerable to flooding and fire. The Chapel Lane Bridge over Rapid Creek currently provides the lone vehicular access to Chapel Valley. The bridge was submerged and collapsed in the flood of 1972. Rebuilt and recently improved, this single access leaves Chapel Valley’s 500-plus residents vulnerable to being stranded should it close for any reason. The twofold purpose of this project is:

- (1) To develop alternative alignments for the alternate means of access for the Chapel Valley area, and,
- (2) to determine the feasibility of providing an alternate access for the Chapel Valley area.

The results of the study are best understood in two stages:

The first stage, the **Draft Report**, involved a comprehensive evaluation of all possible access alternatives that could be constructed as a year-round City street, built to meet City roadway design standards. These alternatives were evaluated and compared against each other across a range of criteria to identify the most feasible alternative for second access. The Draft *Chapel Valley Access and Route Alignment Study*, submitted to the City of Rapid City Planning Commission for review, described the study process and recommendations.

The second stage, the **Addendum**, followed a special Rapid City Planning Commission meeting held on July 27, 2010 to review the Draft Report. At this meeting, the Planning Commission unanimously approved a motion requesting the consultant to re-focus the report on providing a safe exit and to review non-construction options to address emergency events. Further, they requested that an additional public meeting be held to review those options before reporting back to the Planning Commission. An Addendum was written to address the request of the Planning Commission.

This Executive Summary describes each stage of the study and provides recommendations.

Draft Report Summary

The project team cooperated with the public to develop a list of 14 possible alternate access alternatives. The alternatives, shown on **Figure S-1**, were developed to serve as year-round City streets, and, subsequently analyzed using the *City of Rapid City Street Design Criteria Manual* (City of Rapid City, June 1996 revision). An overall “footprint” was developed for each alternative, incorporating the amount of cut/fill earthwork needed to construct the alternative. Due to the significant slopes in the area, most of the alternatives required large earthwork quantities and impacted areas well beyond the pavement surface.



The list of 14 alternatives was reduced to four based on the following three critical questions: 1) Does the Alternative provide a second access, 2) Does the alternative meet City/State design criteria, and 3) Does the Alternative impact more than 20 properties(land and/or structures). The Level 1 screening results were presented to the public in November of 2009. The results of the initial screening are depicted graphically on **Figure S-2**. Each eliminated alternative is shown with its reason for screening. Property impacts in excess of 20 properties and structures served to eliminate four alternatives (A, C, D, E), one alternative does not provide a second access (M), slopes that did not meet the City’s requirement of vertical grades not exceeding 12 percent eliminated two alternatives (I, J), two alternatives were eliminated due to tight horizontal curves (below City’s minimum radius) (H, K), and one alternative was eliminated by falling short of SDDOT access spacing requirements along Jackson Boulevard.

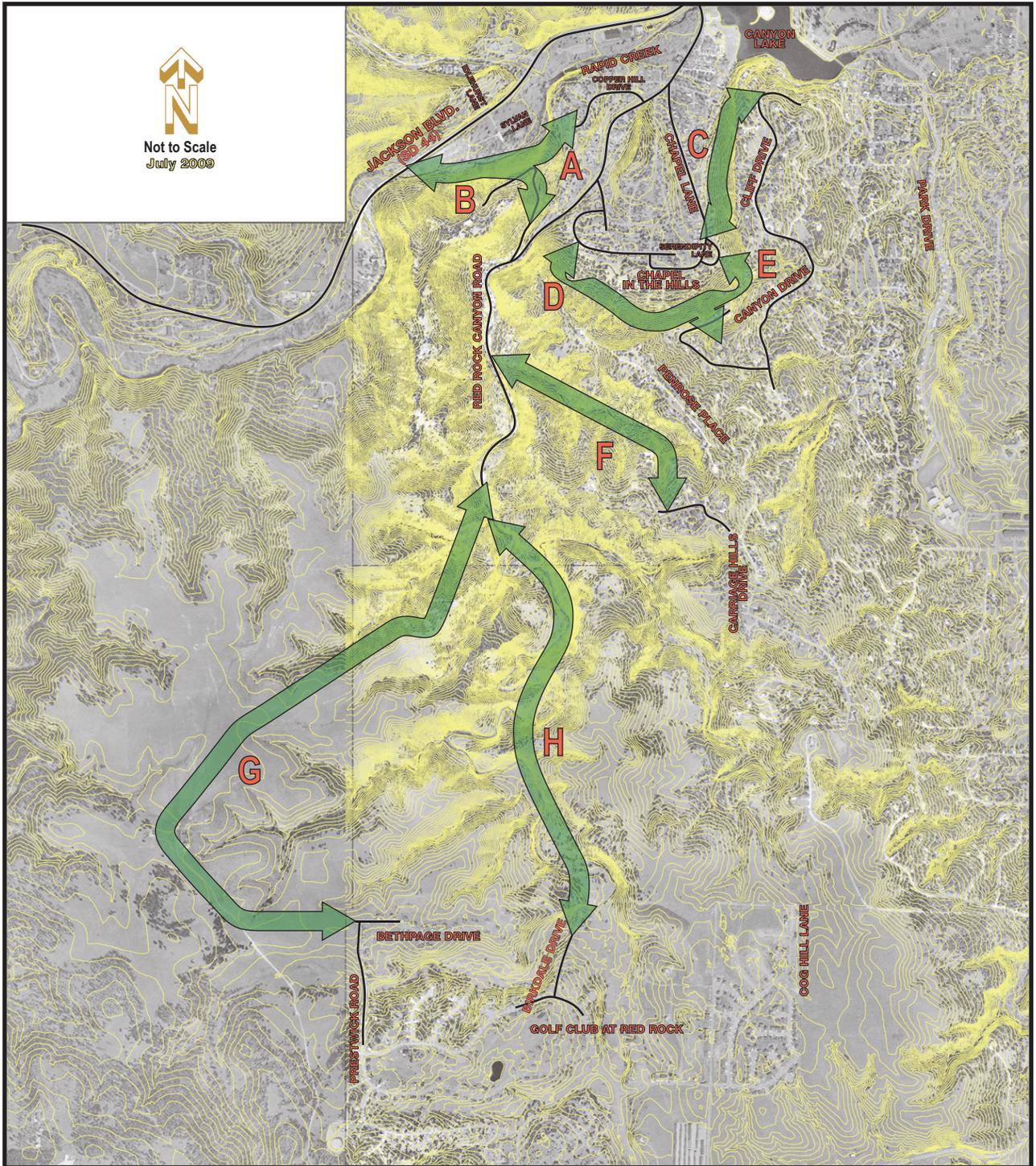
Following initial screening, alternatives B, F, F2, G, and No Action were evaluated based on screening criteria developed in cooperation with the Project Advisory Group and the public. **Table S-1** identifies the screening criteria and the scoring of each alternative.

Table S-1 Final Screening Scores

Final Screening Criteria	Alternative Ranking and Aggregate Score				
	ALIGNMENT B - Jackson to Red Rock Canyon	ALIGNMENT F - Red Rock Canyon to Carriage Hills	ALIGNMENT F2 - Red Rock Canyon to Penrose Place	ALIGNMENT G - Red Rock Canyon to Prestwick	NO ACTION
Impacts to Property Only	3.0	5.0	4.0	2.0	1.0
Impacts to Structures	4.0	1.5	5.0	3.0	1.5
Park and Trail impact	5.0	2.5	2.5	2.5	2.5
Impact on viewshed for ex. homes	2.0	4.0	4.0	4.0	1.0
Impact on treed acres	4.0	3.0	2.0	5.0	1.0
Drainage/Floodplain Issues	3.0	3.0	3.0	3.0	3.0
Provides two access points	2.5	2.5	2.5	2.5	5.0
Connects with regional roadway network	2.0	3.5	3.5	1.0	5.0
Cut-through traffic volumes	2.0	3.5	3.5	5.0	1.0
Fitness of Connecting Roads to serve additional traffic	2.0	4.5	4.5	3.0	1.0
Relative Construction Cost	3.0	2.0	4.0	5.0	1.0
Alternative Funding Availability	4.0	4.0	4.0	2.0	1.0
Geotechnical Feasibility	5.0	3.0	3.0	3.0	1.0
POINT TOTAL	41.5	42.0	45.5	41.0	25.0
Overall Alternative Rank	3	4	5	2	1



Not to Scale
July 2009



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Figure S-1
Initial Alternative Concepts



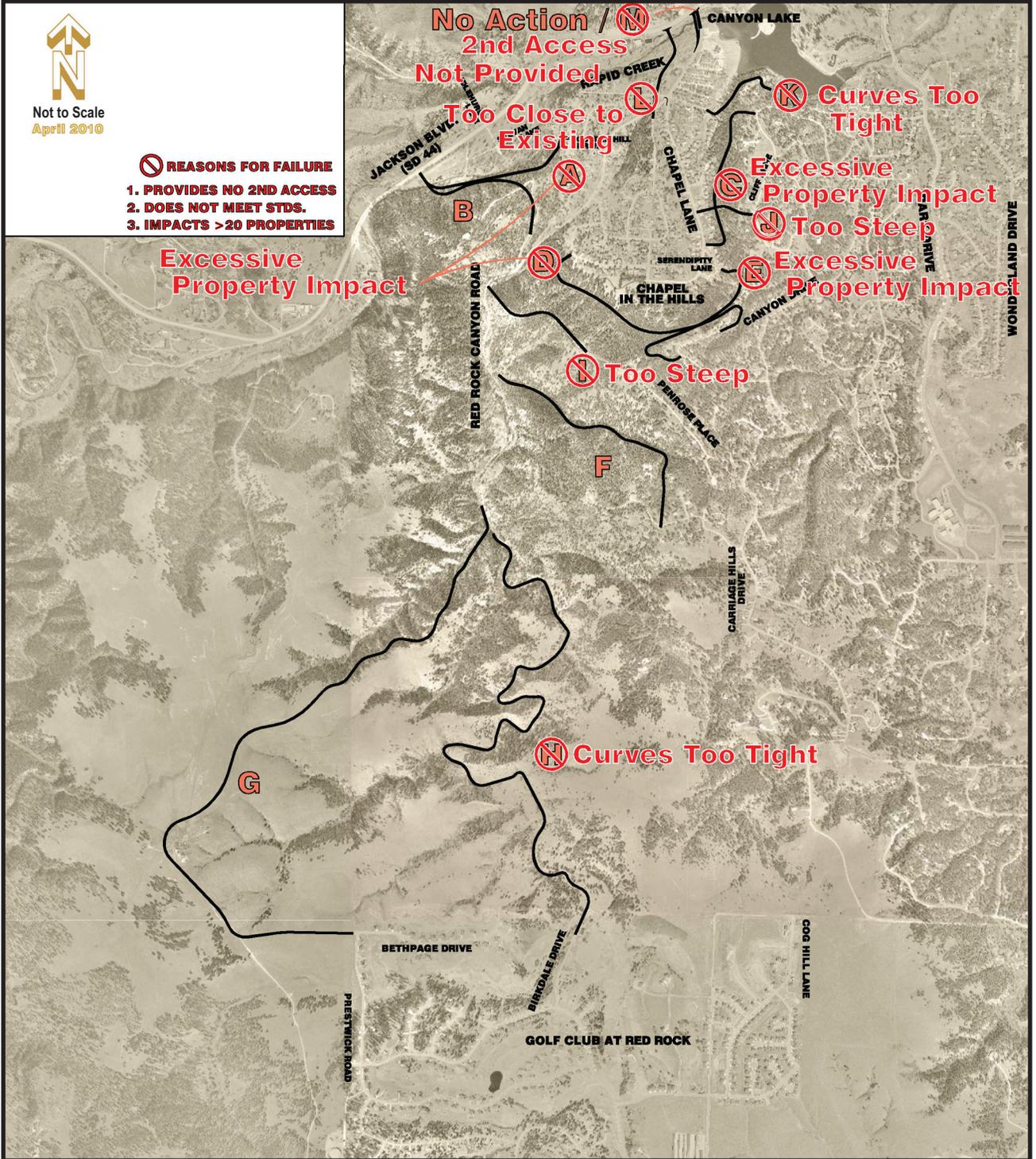
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Not to Scale
April 2010

- REASONS FOR FAILURE**
1. PROVIDES NO 2ND ACCESS
 2. DOES NOT MEET STDS.
 3. IMPACTS >20 PROPERTIES



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Figure S-2
Initial Screening Elimination





The alternatives were ranked by performance within each criterion. Alternatives could be ranked from 1.0 to 5.0 in a given category. The top performer in a category was typically ranked 1.0 with the poorest typically awarded a 5.0. Each criterion was equally weighted in the final evaluation. **Table S-1** provides the screening scores within each category. As shown in **Table S-1**, the No Action alternative performs best when measured across each of the 13 criteria. This is due to there being no direct impacts on property, cost and no direct environmental impact.

Alternative G was selected as the recommended Most Feasible Alternative for providing an alternate access to Chapel Valley. This alternative's ability to serve within the City's Major Street plan, relatively low property impacts, and potential for developer funding provide advantages over other alternatives. **Figure S-3** depicts the Most Feasible Alternative preliminary conceptual layout. The alignment is shown with the cut and fill boundaries along its length. Based on this alignment, a conceptual opinion of probable costs to construct this roadway is approximately \$50 Million (excluding property and engineering costs or cost for improvements to existing facilities).

Based on public feedback and engineering analyses, there are a number of considerations that need to be addressed with implementation of the Most Feasible Alternative. These include drainage improvements to Red Rock Canyon Road, and design along the roadway to help mitigate higher traffic volumes and reduce travel speeds through residential areas.

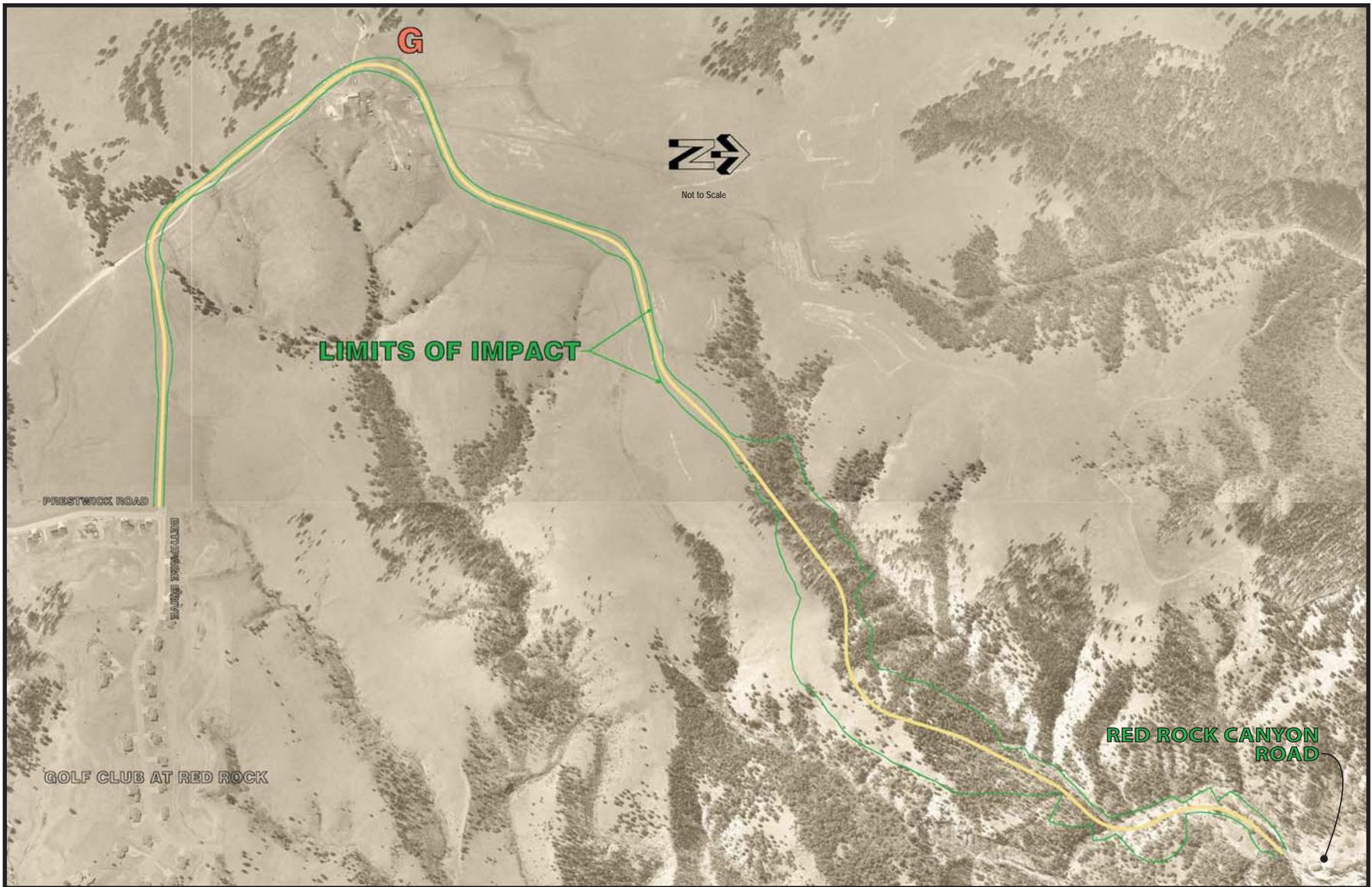
Addendum Summary

In July of 2010, the Draft *Chapel Valley Access and Route Alignment Study* was submitted to the City of Rapid City Planning Commission for review and approval. Following the submittal, on July 27, a Special Planning Commission Meeting was held to discuss the study. At the meeting, the Planning Commission unanimously approved a motion requesting the consultant (Felsburg Holt & Ullevig) to re-focus the report on providing a safe exit and to review non-construction options to address emergency events. Further they requested that an additional neighborhood meeting be held to review those options before reporting back to the Planning Commission.

Public comments on the draft report reinforced comments received at previous public meetings, including the concern that the recommended new alignment G would increase traffic volumes through the neighborhood and allow additional development, without improving emergency safety. Concern was also expressed regarding the high cost of constructing a second access.

Following public comment on the report at the meeting, the Planning Commission requested an updated report focused on safety for the existing residents rather than the development potential associated with a second access. To address this request, this addendum provides the following information:

- Emergency Management Planning – Identification of emergency management strategies, including hazard mitigation, emergency preparedness, emergency response, and recovery;



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Figure S-3
Most Feasible Alternative Concept





- Emergency-only Alternatives Analysis – Updated analysis of several access routes assuming they can be built as more narrow, steep roads that would serve as emergency-only routes rather than full city streets. This analysis includes rating and screening of access alternatives alongside non-access alternatives; and
- Public Meeting Summary – Summary of a Public Open House held on October 20, 2010 to discuss the Draft Addendum.

Emergency Management Planning

A listing of potential emergency management strategies for use in Chapel Valley was developed with input and cooperation from a number of entities, including the general public, Pennington County Emergency Management, Rapid City Fire Department, Rapid City Growth Management, Rapid City Public Works, Rapid City Police Department and the Rapid City Metropolitan Planning Organization. This listing is preliminary, and may not include all possible strategies.

Emergency Management Strategies for Chapel Valley were organized into 3 phases: 1.) Hazard Mitigation, 2.) Emergency Preparedness, or 3.) Emergency Response. Table S-2 summarizes the strategies for future consideration. Implementation of these strategies will be a collaborative effort among City, County and State agencies. In order to implement these strategies, the formation of a Chapel Valley Emergency Management Task Force is recommended. This group would be comprised of Chapel Valley residents interested in pursuing emergency management strategies and Agency representatives experienced in emergency management.

Table S-2. Emergency Management Strategies

PHASE 1. HAZARD MITIGATION
<ul style="list-style-type: none"> • Hazard Identification • Fuel Reduction • Firewise Communities Program
PHASE 2. EMERGENCY PREPAREDNESS
<ul style="list-style-type: none"> • Advance Flood/Fire Warning Systems • Neighborhood Evacuation Plan <ul style="list-style-type: none"> • Household readiness • Wildfire Mitigation <ul style="list-style-type: none"> • Reverse 911 • Phone Tree • 2nd Access to Neighborhood for Emergency Only
PHASE 3. EMERGENCY RESPONSE
<ul style="list-style-type: none"> • Traffic Control Planning • Staging Areas



Emergency-Only Alternatives Analysis

Following the July 27, 2010 Planning Commission meeting, the access study was shifted to focus on the emergency-only characteristics of the access alternatives. The design criteria, previously set to match Rapid City's collector standards, were relaxed to reflect the characteristics of a route that would only be used for emergencies.

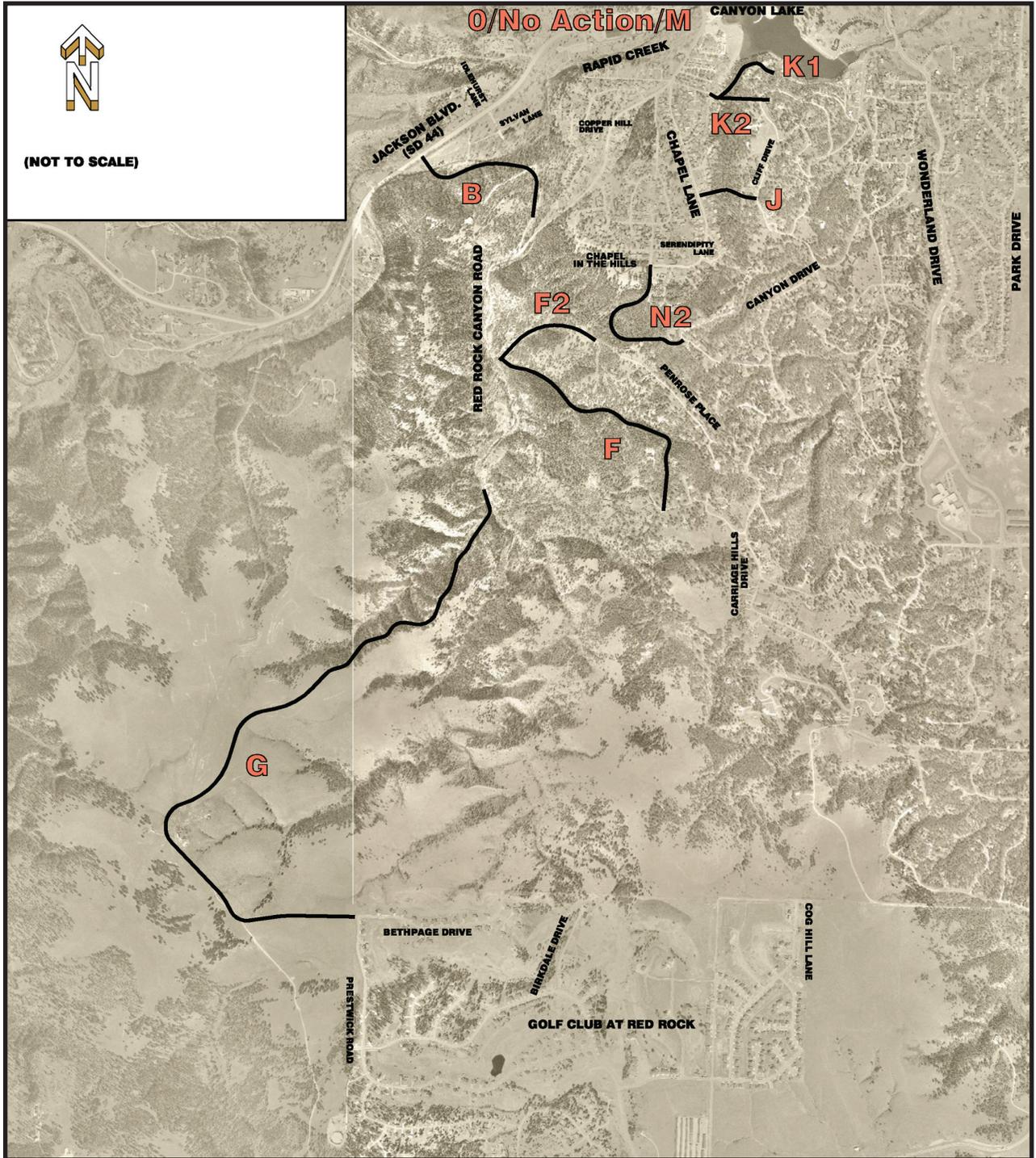
Alternatives previously eliminated due to excessive property impacts or not providing a second access were not considered as potential emergency-only routes. The emergency-only alternatives are depicted on **Figure S-4**. The eleven (11) alternatives include 8 second access alternatives and 3 non-access alternatives. The non-access alternatives are the No Action alternative, Alternative M and Alternative O. Alternative M would provide storm flow improvements to the existing Chapel Lane bridge. Alternative O would implement the emergency management strategies outlined in **Table S-2**.

Following the July 27 Planning Commission meeting, alternatives N2 and K2 were recommended by the Project Advisory Group. These options were included in the updated screening process and are depicted on **Figure S-4**.

Alternatives J (20 percent grade) and K2 (23 percent grade) were eliminated due to grades exceeding 16 percent, the maximum grade for emergency vehicles. The remaining nine alternatives were rated for performance in each of ten screening criteria. The screening criteria are:

- Impacts to property only
- Impacts to structures
- Impact on viewshed for existing homes
- Impact on treed acres
- Drainage/floodplain issues
- Provides two access points
- Cut-through traffic volumes
- Fitness of Connecting Roads to serve additional traffic
- Relative construction cost
- Geotechnical Feasibility

The alternatives were rated by performance within each criterion using a ranking method. The scoring methodology ensured that each criterion would be equally weighted in the final evaluation and no single criterion would lead to an inordinate difference between alternatives.



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Figure S-4
Emergency Only Alternatives



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Table S-3 provides the screening scores within each category and the final tally for each emergency-only alternative.

Table S-3. Screening Scores

	EMERGENCY-ONLY ALTERNATIVE								
	ALIGNMENT B - Jackson to Red Rock Canyon	ALIGNMENT F - Red Rock Canyon to Carriage Hills	ALIGNMENT F2 - Red Rock Canyon to Penrose Place	ALIGNMENT G - Red Rock Canyon to Prestwick	ALIGNMENT K1 - Guest Road to Calle Baja	Alternative M - Bridge Storm Flow Improvements	ALIGNMENT N2 - Glendale Lane to Canyon Drive	Alternative O - Emergency Mngmt. Planning	NO ACTION
POINT TOTAL	60.5	63.0	58.5	62.0	57.5	31.5	60.0	29.0	28.0
Overall Alternative Rank	7	9	5	8	4	3	6	2	1

As shown in Table S-3, the three alternatives that would not provide a second access (The No Action, Bridge Storm Flow Improvements and Emergency Management Planning (O) alternatives) rank highest of the emergency only options. Of the emergency-only access alternatives, it is important to note that all of the options would be extremely challenging to construct. All require significant earthwork and would impact valuable property and/or structures. Public discussion of second access alternatives to date has been contentious, and no clear favored alternative has emerged. Alternative K1 ranks best in screening performance. However, its footprint would significantly impact properties, structures and Canyon Lake.

Public Meeting Summary

A public meeting, the fourth Open House of the project, was held on October 20, 2010 following the online posting of the Addendum. A total of 58 people plus project team members attended the meeting. Attendees were generally pleased by the Addendum as a means of addressing emergency conditions in Chapel Valley. The public were supportive of implementing emergency management strategies and constructing a second, emergency only access to Chapel Valley. Several people were interested in participating in the Emergency Management Task Force.



Study Recommendations

Based on the Draft Report and Addendum, the following actions are recommended:

1. Implement Alternative O, Emergency Management Planning: This action would require minimal capital investment and would result in improved emergency readiness among Chapel Valley residents. Though the No Action Alternative ranks above Alternative O, the No Action would not improve emergency conditions. Implementation of Alternative O would require participation from Chapel Valley residents who would form the Emergency Management Task Force. Several Chapel Valley residents have indicated interest in participating, and it is recommended that the Task Force be formed immediately following completion of this study.
2. Review the need for storm flow capacity improvements through the existing Chapel Lane bridge over Rapid Creek. Named Alternative M, these improvements could increase flow capacity during a flood, perhaps via a new culvert beneath Chapel Lane south of the bridge.
3. If a second access for emergency use only is desired, Alternative K1 ranks best among the six emergency-only options. Alternative K1, however, holds only a 1 point advantage over the nearest alternative and several alternatives are closely clustered in the final scoring. It is evident that even a slight change to one of the screening measures could identify a different leading option. A more detailed engineering study is required to define the impacts and additional public meetings would be necessary before moving forward.
4. If a full-year City street is to be planned and constructed, Alternative G was selected as the recommended Most Feasible Alternative for providing an alternate access to Chapel Valley. This alternative's ability to serve within the City's Major Street plan, relatively low property impacts, and potential for developer funding provide advantages over other alternatives. Based on public feedback and engineering analyses, there are a number of considerations that need to be addressed with implementation of the Most Feasible Alternative. These include drainage improvements to Red Rock Canyon Road, and design along the roadway to help mitigate higher traffic volumes and reduce travel speeds through residential areas.