Engineering Report:

Apache-Sitgreaves National Forests

Black Mesa Ranger District

Analysis of

National Forest System Roads (NFSRs)

#s 504 & 169

for Motorized Mixed Use Designation

Forest: **Apache-Sitgreaves** District: **Black Mesa**

Road Number: **504** → Road Name: **Heber Mormon Crossing**

Road Number: **169** → Road Name: **Deer Lake**

Introduction: The Long Draw Off-Highway Vehicle (OHV) Route is located in the "Rim Country" of Arizona. Within the Black Mesa Ranger District of Apache-Sitgreaves National Forests, the loop route is approximately 25 miles south of Winslow and 8 miles north of Forest Lakes, in Arizona. The OHV route is comprised entirely of open NFS roads, including roads open only to highway legal vehicles and roads open to all motor vehicles. The study segments discussed in this report represent portions of the two roads in the loop legally open only to "highway legal vehicles" as defined by Arizona State Law. According to Black Mesa Ranger District personnel, the Long Draw OHV route was built in the early 1990's with Arizona state parks OHV grant funds. The Long Draw OHV route is advertised on multiple websites, including the AZ Game & Fish Department's OHV statewide trails website (available @ http://www.azgfd.gov/outdoor_recreation/arizona_ohv_trails_places.shtml). The following information about the route is included on the website:

> Located on the Mogollon Rim northeast of Payson. The route is a 30-mile loop starting at either Long Draw North Trailhead (Chevelon Crossing) or Long Draw South Trailhead (Chevelon Lake). The route is restricted to street-legal /licensed vehicles. Trailhead includes staging area, toilets and campsite facilities. Area has many shared use routes open for off-highway vehicle use, including snowmobile trails. Ponderosa Pine Forest. Generally all seasons, however, routes may be closed due to winter snow.

Study Segment road data from the forest transportation atlas:

169 road: Beginning Mile Post: **11.0** Ending Mile Post: **20.8 (end of route)**

504 road: Beginning Mile Post: **16.9** Ending Mile Post: **18.4**

The following information is applicable to both roads:

Traffic Service Level: ☐ A ☒ B ☐ C ☐ D

Objective Maintenance Level: ☐ 1 ☐ 2 ☒ 3 ☐ 4 ☐ 5

Operational Maintenance Level: ☐ 1 ☐ 2 ☒ 3 ☐ 4 ☐ 5

Maintenance by: **Forest Service (FS)**

Non-Forest Service ROW or jurisdiction? ☐ Yes ☒ No

Any road use agreements, maintenance agreements, or other encumbrances?

☐ Yes ☒ No

Description of agreements or encumbrances:

N/A

Subject to Highway Safety Act? ☒ Yes ☐ No

Non-highway-legal vehicles currently permitted? ☐ Yes ☒ No

Is motorized mixed use consistent with State and local laws? ☒ Yes ☐ No

Description of road management objectives (RMOs), existing use, and proposed use:

At this time, no RMOs have been provided to the motorized mixed use engineering analysis team. The Apache-Sitgreaves National Forests engineering department plans to reissue new RMOs upon a travel management designation decision, scheduled for 2009.

The 504 road is used as an arterial route connecting Heber with Winslow, via AZ-99. The 169 road receives less traffic and is generally used as a comfortable alternative route to NFSR 34 and NFSR 504. Both roads are posted with horizontal markers and enforced as open only to highway legal traffic. Both

roads can be closed in winter due to snowy and icy conditions.

The Black Mesa Ranger District, along with the Apache-Sitgreaves National Forests, are in the process of planning for designations related to allowed motor vehicles uses across the unit.

Generally, maintenance level 3 thru 5 roads have been enforced as open only to highway legal vehicles on the unit.

Summary of Findings:

Implementing the universal mitigation measures, especially improved signing and better communication, will reduce crash probability.

Road mitigation should be prioritized regardless of mixed use, along with implementing a comprehensive communication, management, and enforcement plan. Associated implementation costs will depend on the designated allowed use for the road.

In general, these roads receive less traffic than other facilities within the ranger district. These roads are maintained to a standard allowing efficient passenger car through traffic at speeds up to 35mph for prudent drivers on straightaways. Based on speeds and their associated high risk for crash severity, designating the roads as open only to highway legal vehicles would provide the lowest crash probability.

Factors Considered:

1. Operator considerations:

- The Black Mesa ranger district provides a black and white brochure with useful information about the area. Information including topics such as "Where can I ride?", ethics, area descriptions, and a map are included.
- All motor vehicle operators need to be cognizant of the applicable state laws, and how they pertain to each age group, vehicle type, and national forest system road classification (see next bullet).
- State ATV Regulations: Riders can be any age if under adult supervision. ATV's can be ridden without supervision at age16 if you are licensed. No formal training is required. Operators under age 18 are required wear a helmet and eye protection. For more information, see the AZ Game and Fish Department's "Guide to Arizona Off-Highway Vehicle Laws, Rules, and Regulations", available @ http://www.gf.state.az.us/pdfs/outdoor_recreation/ohv/atv_brochure.pdf
- Forest Supervisor order requires that motor vehicles operated on horizontally

signed roads be street legal.

- Forest Supervisor order prohibits motor vehicle operation on roads closed by gates, barricades, berms, and/or signs.
- The current use on NFSRs 504 and 169 appears to be consistent with state law and forest policy for operational maintenance level 3 roads.
- The roads receive a variety of motorized traffic, including ATVs, RVs, pickups, trailers, and UTVs.
- The two trailheads are located at campgrounds that can only be accessed with highway legal vehicles from the main OHV loop.
- The 169 is generally well maintained, receives less traffic than NFSR 504, and provides a more comfortable ride than NFSR 504.
- NFSR 504 receives more thru traffic and also has sections of high crash severity due to steep embankments and sharp turns.
- *A quote from an OHV user found on* http://www.ridingarizona.com: "The way I am reading the forest restrictions, you would need to be street legal to ride in just about all of the National Forests. Things are getting closed down pretty quick at this time and only main forest roads are open for traffic."
- *Another quote from* http://www.ridingarizona.com: "The Chevelon/Heber Ranger District, located on the Mogollon Rim north east of Payson, offers many OHV opportunities. The Long Draw OHV Route is a 30 mile loop trail system starting at either the Long Draw North Trailhead (Chevelon Crossing) or the Long Draw South Trailhead (Chevelon Lake). The trailhead includes staging areas, toilets and campsite facilities that have been made possible through State OHV Fund grants. There are many other shared use roads open for OHV use and several snowmobile trails in this area."
- A final quote from the internet user community: "In Holbrook, the ATV enthusiast will have the opportunity to enjoy their sport at Long Draw OHV Route. To get to Long Draw OHV Route exit I-40 at the Highway 77 exit to travel to the entrance of Long Draw OHV Route located off Highway 377. Long Draw OHV Route, located in the Apache-Seagraves National Forest, Black Mesa Ranger District offers ATV enthusiasts a 30-mile loop as well as a staging area, toilets and campsites. For more information, contact the Black Mesa Ranger District at 928-535-4481." *From the article "Route 66 Plus ATVs in Arizona: The Perfect Vacation?", found at* http://www.associatedcontent.com/article/30017/route_66_plus_atvs_in_arizona.html

2. Crash history:

At this time, the R3 motorized mixed use engineering analysis team has not received any documented crash history. Based on discussions with the local FS ranger district, the area generally receives less traffic than other areas due to the remoteness and distance from major metropolitan areas.

3. Traffic volume and type:

Non-highway-legal vehicles:
☐ < 12 inch tread width ☐ < 50 inch tread width ☐ >50 inch tread width

Highway-legal vehicles:
☒ < 12 inch tread width ☒ < 50 inch tread width ☒ >50 inch tread width

☒ Passenger cars ☒ Commercial vehicles ☒ Recreation vehicles (RV's)

Vehicle distribution from a 2-hour study, beginning Thursday 8/2/07 @ 1300 and ending @ 1500

Passenger cars: 3

ATVs: 2

* Traffic counters in place 8/8/07 to 8/16/07. Awaiting results.

4. Speed - Anticipated average speed (85th percentile):

Tentatively 40mph based on observation and engineering judgment.

5. Road surface type:

NFSR 169: aggregate

NFSR 504: improved native material

6. Intersections with other roads and trails:

The study segments connect with a variety of lower standard roads. Some of these are included as part of the Long Draw OHV route. The sight distance at these intersections rate fair to good; however, the signing highlighting these junctions does not meet Manual on Uniform Traffic Control Devices (MUTCD) standards for highway safety act roads.

7. Other roadway factors:

- Roadway alignment was adequate for the assigned maintenance level; however, the steep and windy geometry of the NFSR 504 segment was much different than the straightaways encountered on the NFSR 169 segment.
- A traffic engineering study was recently completed for the 504 road and signing should be installed accordingly by the end of 2007.
- The traveled way on NFSR 169 goes from a double-lane width at the southern end of the study segment to a single-lane with turnouts design at the northern end of the segment.
- The portion of NFSR 504 in the study is generally a single-lane road.
- Summer and fall seasons will experience peak use, winter and spring can bring snowy and icy conditions along with snowmobile traffic.

8. Roadside conditions:

- Route identification markers, regulatory signs, and warning signs generally meet the standards in MUTCD. Recreation signing associated with the Long Draw OHV route generally does not meet the required roadway standards, and can pollute a clear message to roadway vehicle operators.
- There were numerous “no atv” stickers placed on FS signs in the study segments. This vandalism can confuse vehicle operators driving the roads being studied (see photos section).

9. Risk without mitigation:

NFSR 504:

Crash probability: ☐ High ☐ Med ☒ Low

Crash severity: ☒ High ☐ Med ☐ Low

Crash probability was assessed as low based on:

- Rates of speed, traffic volume, signing.

Crash severity was assessed as medium based on:

- Roadway geometry (steep embankments), difference in vehicle sizes, difference in speeds of OHVs and full-size passenger vehicles.

NFSR 169:

Crash probability: ☐ High ☐ Med ☒ Low

Crash severity: ☒ High ☐ Med ☐ Low

Crash probability was assessed as low based on:

- Traffic volume, good alignment, adequate sight distance, signing, communication.

Crash severity was assessed as high based on:

- Rates of speed, difference in vehicle sizes, difference in speeds of OHVs and full-size passenger vehicles.

Alternatives and Mitigation Measures:

For all situations, the following mitigation measures apply:

- Clear communication and education to the visitors on allowed uses, safe motor vehicle use, and natural resources (informational signing and kiosks, maps, website, etc.).
- Reduce “sign pollution”. Separate cluttered signing and avoid unnecessary items.
- Clear brush and shape cut-slopes along NFSR 504 to improve sight distance.

- Upgrade all signing on NFSR 504 and NFSR 169 to MUTCD standard, including recreation signing placed along the roadways.
- Cleanup and eliminate vandalism stickers that can confuse forest visitors using the area.
- Combine the appropriate enforcement measures with the allowed uses for the road.
- Educate law enforcement personnel on state laws; coordinate with other agencies to improve enforcement consistency.
- Utilize a monitoring program to better determine the appropriate management strategy for the types of use, new technologies, changes in visitor demands, and resource protection measures.

In addition, these mitigation measures would apply to the following alternatives. Although the following alternatives are not comprehensive for the situation, they represent the most likely and/or practical options based on engineering judgment.

Alternative 1: Designate the roads as "open to highway legal vehicles only". Continue to maintain the road in accordance with maintenance level 3 standards.

- Upgrade all roadway signing to MUTCD standards.
- Consider designing new trails, a new trailhead, and/or a new camping area to provide better opportunities for non-highway legal traffic to access the OHV loop. Adjacent maintenance level 1 and 2 roads could be used as motorized trails to accommodate non-highway legal vehicles.

Alternative 2: Designate the roads as "open to all motor vehicles", including highway legal and non-highway legal vehicles. Continue to maintain the road in accordance with maintenance level 3 standards.

- Recognize that this situation would pre-empt state law.
- Install additional "share the road" signing to inform the public of the variable traffic and operator experience that can occur on the route.

Alternative 3: Designate the roads as "open to all motor vehicles", including highway legal and non-highway legal vehicles. Downgrade the road segments in accordance with maintenance level 2 standards.

- Based on the quality of the roads, the costs to downgrade, and the amount of thru traffic, this option is not practical at this time.

Final Comments:

Generally, national forest system trails should not be established on open national forest system roads. When this does occur, an effective communication and monitoring plan is critical to help address potential user conflicts and associated public safety concerns.

The available information related to the Long Draw OHV route attempts to address the complexities of allowed use. It is important that the signing on national forest system roads be consistent with the information provided to the public and that the signing conforms to the standards presented in the FS sign and poster guidelines (available @ http://fsweb.wo.fs.fed.us/eng/roads_trails/signs_05/index.htm). Maintaining proper trail signing on an open NFS road can present a challenge to those charged with implementing a meaningful sign plan that clearly conveys the managed allowed use.

In addition, roads managed under the highway safety act, including the study segments here, must comply with the standards in the MUTCD (available @ http://mutcd.fhwa.dot.gov/).

Maps & Photos:

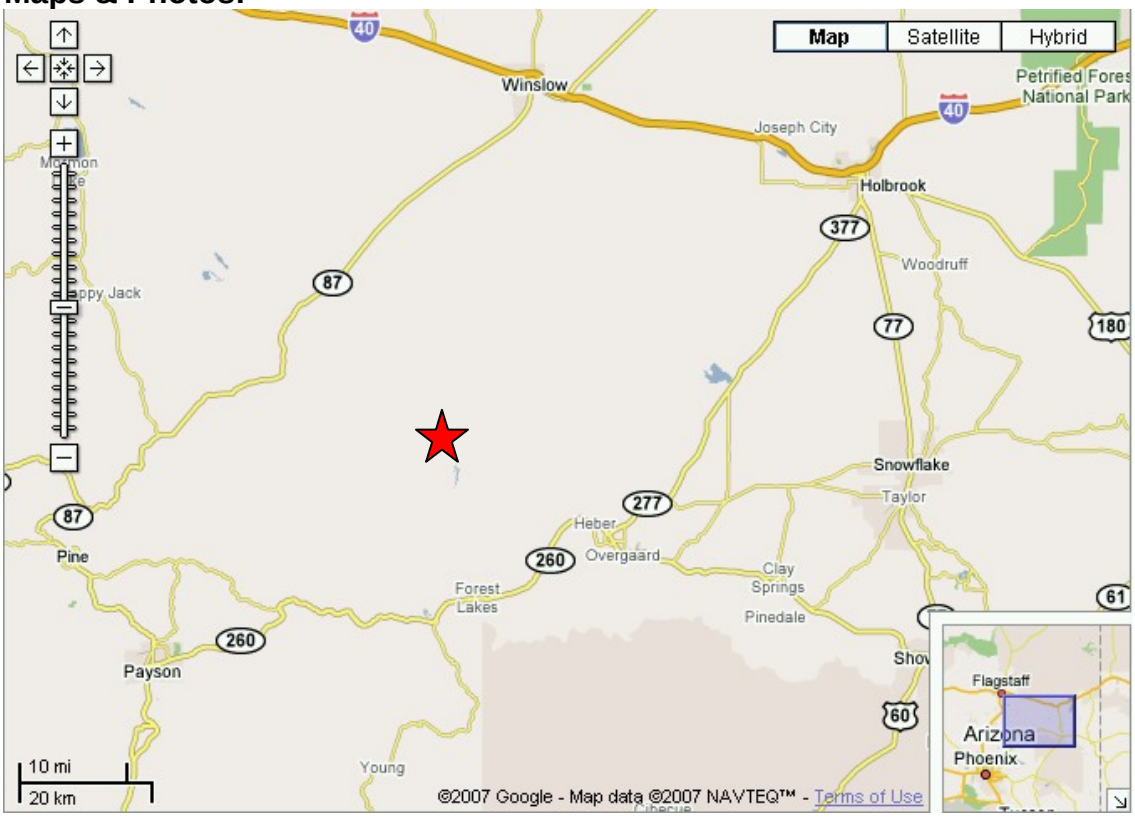


Figure 1: Vicinity map of study roads.

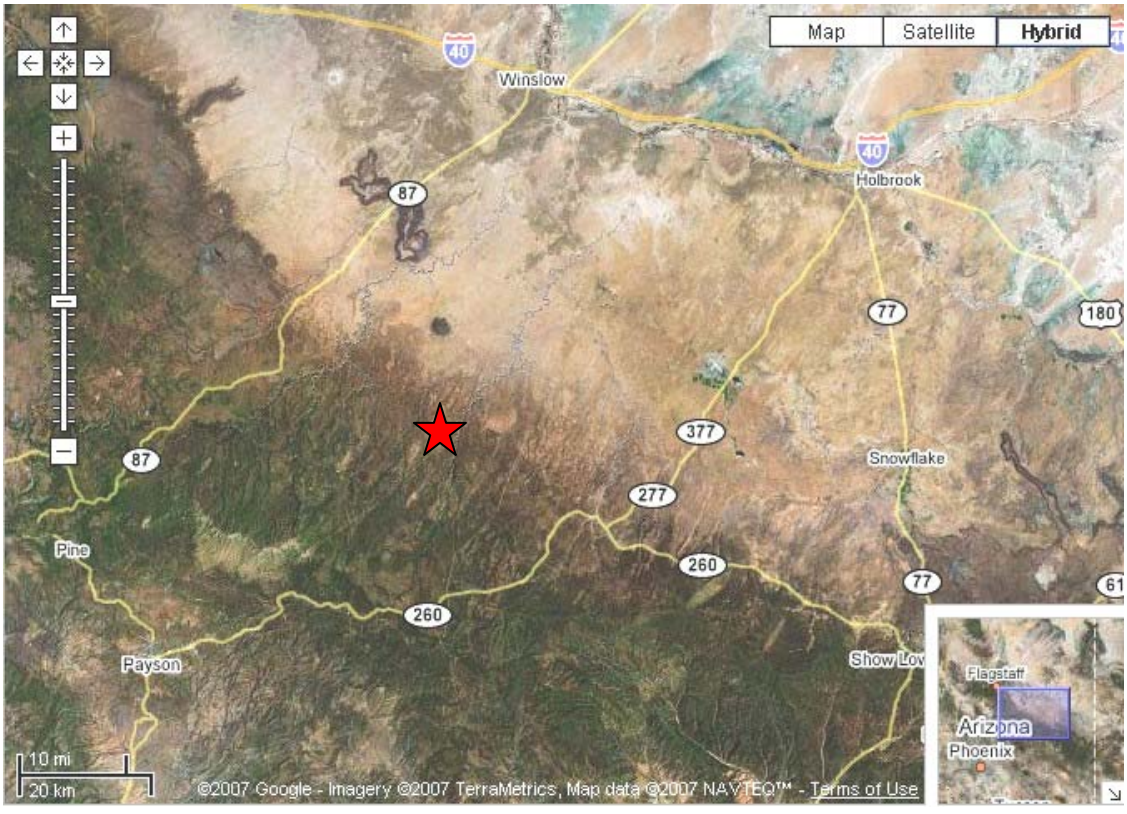


Figure 2: Hybrid image map of study roads.

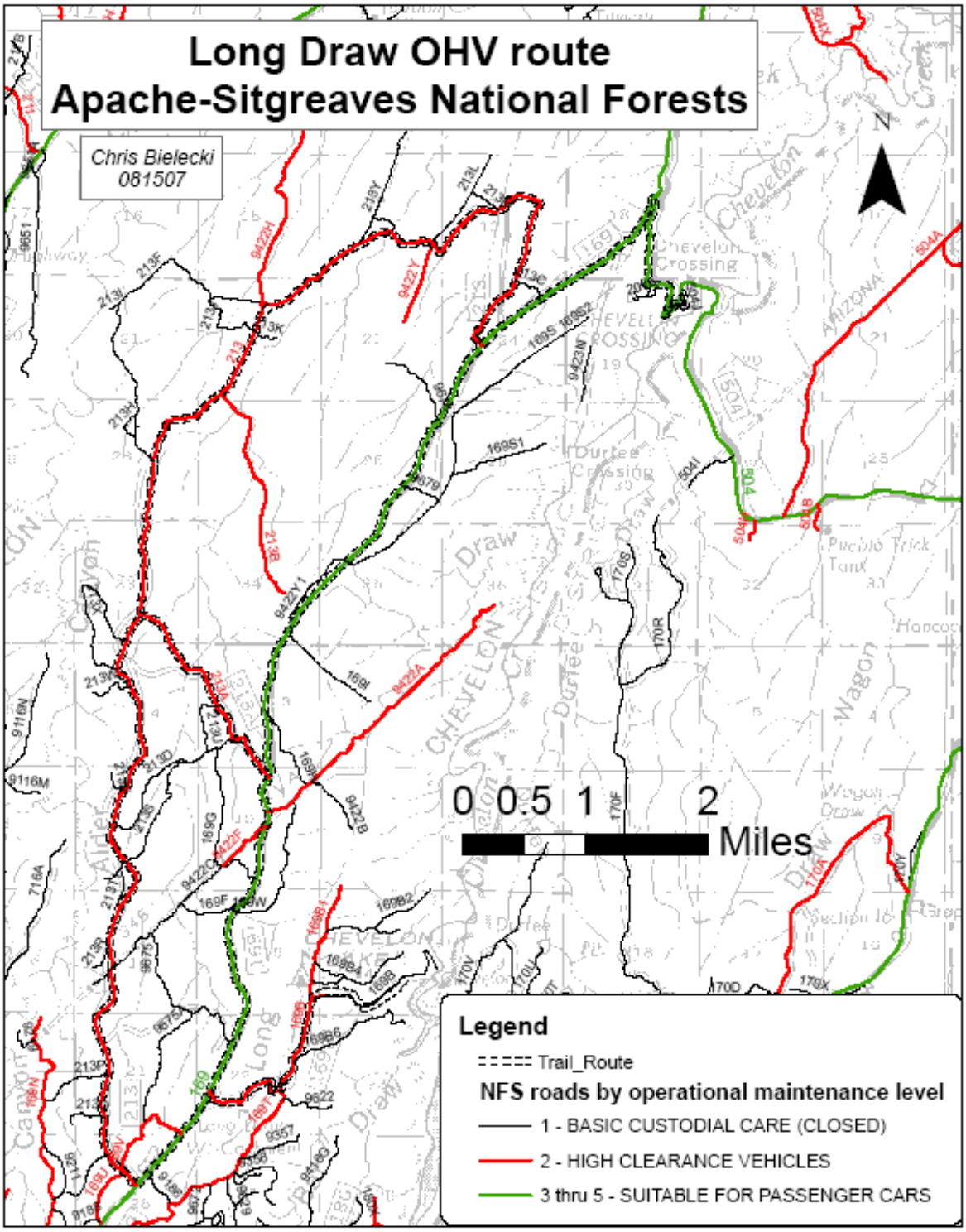


Figure 3: Long Draw OHV route system map.

Figure 4: NFSR 504 at intersection with Chevelon Canyon campground.

Figure 5: NFSR 169 straightaway.

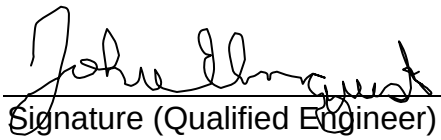
Figure 6: Confusing road signs on NFSR 169.

Figure 7: Curve along NFSR 504, above Chevelon Canyon.

Figure 8: Intersection with NFSR 169 and NFSR 213.

Figure 9: Drop-off shoulder on NFSR 504.

Figure 10: Detail of drop-of shoulder, NFSR 504.



8/15/07

Signature (Qualified Engineer) Date
John Elmquist
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