

Appendix B: Independent Functionality of the Grandview Interchange

**US 550 South Connection to US 160
SUPPLEMENT to the US Highway 160 from Durango to Bayfield EIS
APPENDIX B: INDEPENDENT FUNCTIONALITY
OF THE GRANDVIEW INTERCHANGE**

INDEX

Date	Correspondence
May 15, 2007	Letter [of consent] from Pauline Ellis (BLM) to Chris Horn (FHWA) re: permanent easement for US 160 project
September 3, 2008	Memorandum to Joe Duran (FHWA) from Keith Powers (CDOT R5) re: independent functionality of 4th Lane Project/Interchange on US 160
October 30, 2008	Memorandum to Douglas Bennet (FHWA) from Mike McVaugh (CDOT R5) re: justification for three-lane structure over US 160
December 12, 2008	Memorandum to Karla Petty (FHWA) from Douglas Bennett (FHWA) re: decision to allow continued construction of US 160 project



UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
COLUMBINE FIELD OFFICE
15 Burnett Court
Durango, CO 81301



RECEIVED BY
MAY 17 2007
PROGRAM ENG.

16042/16056
PARCEL # 11

2800 (CO820)
COC 0 2801

CERTIFIED MAIL-RETURN RECEIPT (7006 0810 0006 7169 6238)

Mr. Chris Horn
Federal Highway Administration
12300 W. Dakota Ave., Ste 180
Lakewood, CO 80228

MAY 15 2007

Dear Mr. Horn:

LETTER OF CONSENT

Project No: NH 160A-003, Project Code 16056
Highway 160 in Grandview, Colorado

On March 29th, 2007, we received your request for the appropriation of public lands of the United States within the State of Colorado for the purpose of issuing a highway easement deed. The deed would be to the Colorado Department of Transportation (CDOT) for the US Highway 160 and US Highway 550 Interchange in Grandview, Colorado, and is identified by CDOT as Project No: NH 160A-003, Project Code 16056.

This letter of Consent (LOC) will serve to authorize a permanent easement for reconstruction, operation, and maintenance of U.S. 160 and U.S. 550 across public lands under the authority of Section 317, Title 23, United States Code, (Public Law 85-767).

The area requested contains 4.190 acres and lies within:

New Mexico Principal Meridian
T. 34 N., R. 9 W., (North of Ute Line),
Section 10: NE 1/4
La Plata County, Colorado,

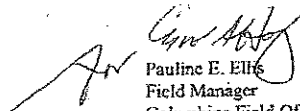
as depicted on Right of Way Plan of Proposed Federal Aid Project No. NH 160A-003, U.S. Highway No 160, prepared by Colorado Department of Transportation, dated March 20th, 2006, (5 sheets) enclosed.

In accordance with the provisions of the November, 2003, Memorandum of Understanding (MOU) between the Colorado Department of Transportation (CDOT); the Federal Highway Administration, Colorado Division (FHWA); the U.S. Department of Agriculture, Forest Service, Rocky Mountain Region (USFS); and the U.S. Department of Interior, Bureau of Land Management, Colorado State Office (BLM),

removal during the breeding season shall be surveyed for nests and approved for work by a qualified biologist prior to the initiation of work.

11. Construction activity in the vicinity of cultural site SLP1131.8 will be monitored by CDOT to ensure site avoidance and to minimize the potential for adverse effect.
12. The FHWA and CDOT will ensure continued legal and physical access to BLM lands on the south side of the Highway 160 project.
13. Any and all survey monuments that may become disturbed during construction shall be referenced, prior to disturbance, by a qualified professional surveyor for reestablishment.

Please contact Charlie Higby, BLM Realty Specialist, at (970) 385-1374, if you have any questions concerning this document.

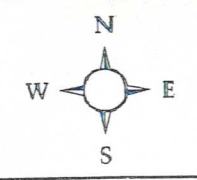
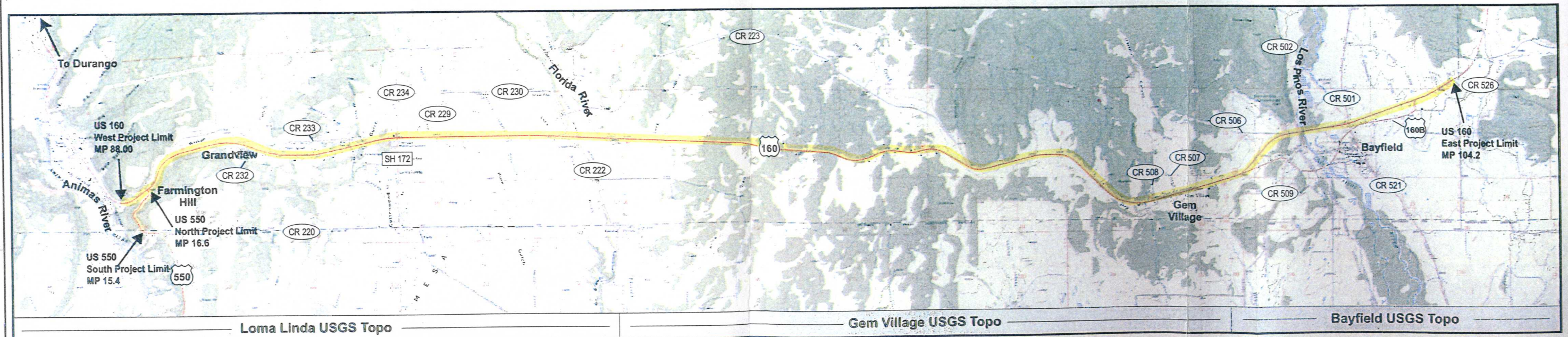
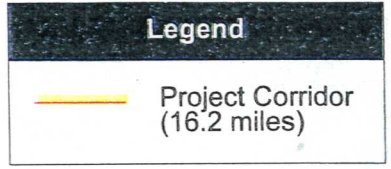

Pauline E. Ellis
Field Manager
Columbine Field Office

Enclosure: 1
5 sheets Right of Way Plans

cc: Brian L. Borge
CDOT
3803 N. Main Ave.
Durango, CO 81301

Existing US 160 – US 550 Interchange





US 160 Record of Decision

Figure 1.1
Project Location

MEMORANDUM

DEPARTMENT OF TRANSPORTATION



**PROGRAM ENGINEER
REGION 5**

3803 North Main Avenue
Suite 300
Durango, CO 81301
(970) 385-1400
(970) 385-1410 Fax

DATE: September 3, 2008

**TO: Joe Duran FHWA
Project File**

FROM: Keith Powers, R5 Program Engineer

SUBJECT: Independent Functionality of 4th Lane Project/Interchange on US 160

This memo describes how the current construction project, the US 160 4th Lane project, can function independent of the US 550 connection to US 160. Because it has independent functionality from the US 550 connection, it is not directly affected by the on-going Section 4(f) analysis for the Webb Ranch.

Project Description

The current construction project NH 1602-114, US 160 4th Lane was advertised for construction on February 7th, 2007, with a bid date of April 3rd, 2007. All required clearances were obtained from FHWA prior to the project being advertised. During the design phase there was extensive communication exchange between CDOT and FHWA, along with the City of Durango and La Plata County.

The contract award date was April 28th 2008 with a contract amount of \$29,267,100. The project's scheduled completion is the summer of 2010.

The major items in the scope of construction include:

1. Widening of the US 160 alignment to 4 lanes
2. The east bound off ramp (Ramp A) and bridge from US 160
3. The west bound off ramp (Ramp D) and bridge from US 160
4. The westbound on ramp (Ramp C) and bridge onto US 160
5. One of two bridges (Southbound) Across US 160.

Functionality without the US 550 Connection to the South

Attached is a figure of the interchange and how it will function for access to the north of US 160 without the US 550 connection. Traffic movements and access to and from north of US 160 are described as follows:

Eastbound US 160 would use Ramp A to go north or return west using the future round-about and Ramp C. Eastbound traffic could also use the roundabout and go South over US 160 and then east again using the future Ramp B.

Westbound traffic would use Ramp D to go north or return east using the roundabout, then south over US 160 and Ramp B to return east. Westbound traffic could also use Ramp C to return west.

From the north through the roundabout traffic would go west using Ramp C, go south across US 160 and go east using Ramp B or return north using the roundabout.

Purpose and Need for Project

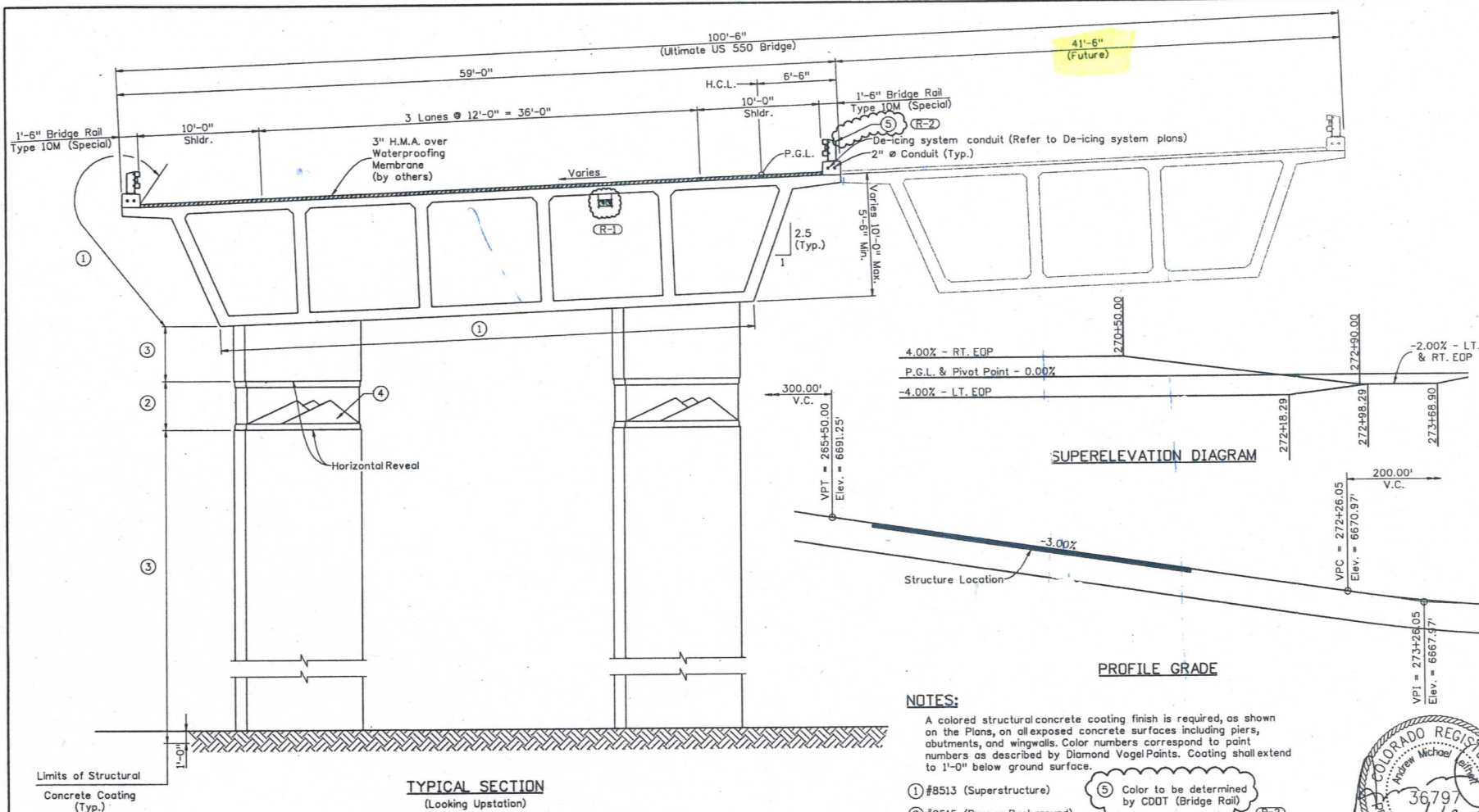
The Grandview Area Plan (2004) describes the anticipated development to the north and south of US 160 in the Grandview area. The Plan is a vision for 20 years and includes a regional retail center, hospital, three school sites, 5,467 single family and multi family housing units, a recreational park, and other amenities. The hospital was completed in 2007 and residential and commercial developments are on-going in the Grandview area.

With the current and proposed development in the Grandview area, the new interchange construction will serve the capacity need for future growth north of US 160. The intersection at County Road 233 (Three Springs Boulevard) east of the current project, only accommodates the first phase of the Three Springs Development. Two additional phases are planned which will require a grade separated interchange access to US 160 from this single development. In addition, other development is occurring separate from Three Springs on both the North and South sides of US 160 that will further support the need for a grade separated interchange in this corridor. Currently two banks and a several hundred unit home development have approved access permits to access US 160 from the south side through the Three Springs Boulevard signal. The current signalized intersection needs to be improved (Add a NB double left turn lane) as a result of these developments. Any additional significant development will force the intersection to operate at unacceptable level of service requiring alternate access to the highway to be constructed or use of the interchange currently being constructed to relieve traffic congestion and level of service deficiencies. (Mike McVaugh, personal communication, September 2, 2008). Other additional development in the area will require alternate accesses or use of the interchange.

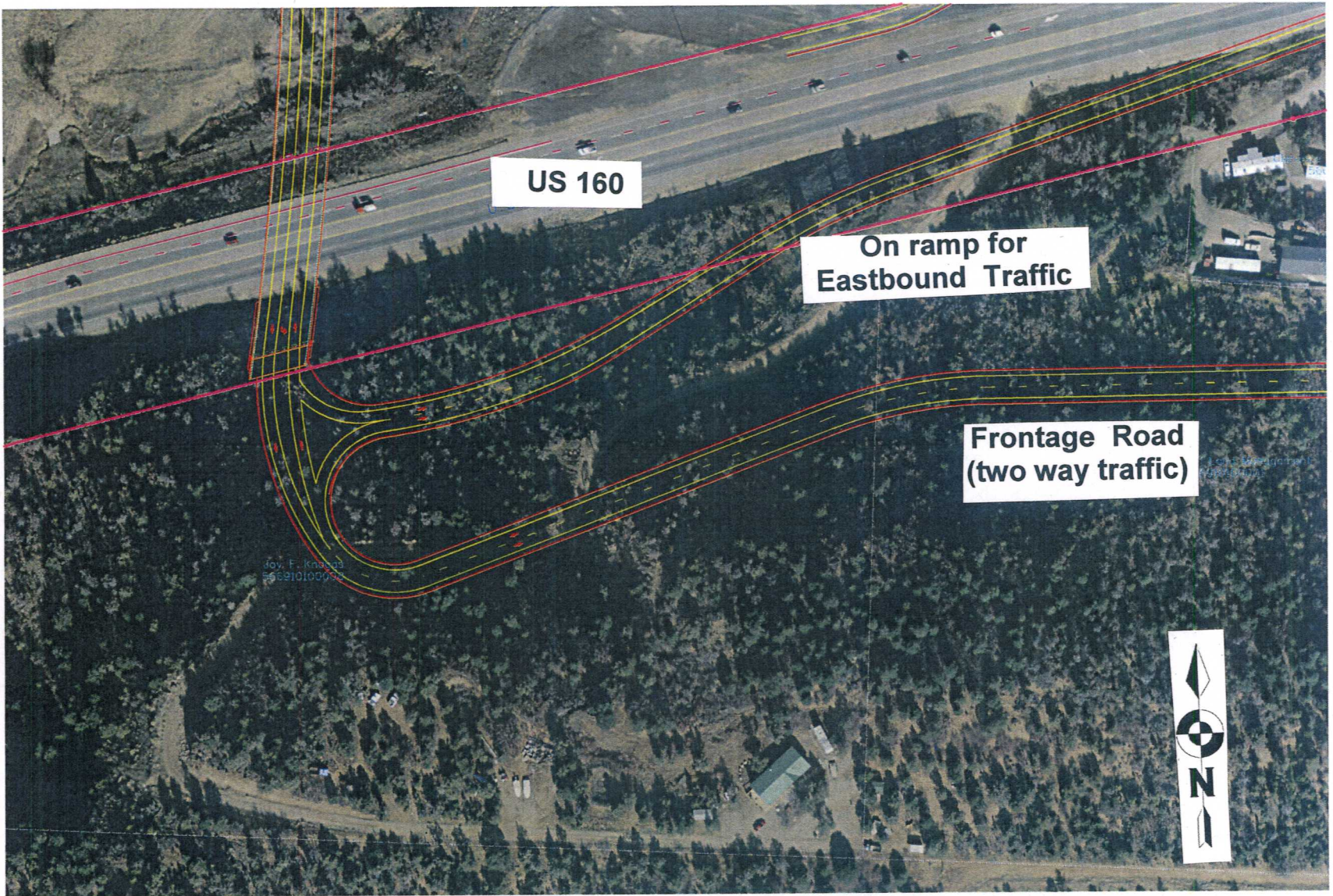
The interchange, even without the US 550 connection, is also needed for safety and access control. The Three Springs Boulevard intersection is currently the only public access point to the Mercy Regional Medical Center. The new interchange will provide a safer secondary access to the hospital which will shorten access time to the emergency room for traffic from the west. A second access to the hospital will also assure there is at least one access open to the hospital in the event either access is closed due to an accident, fire or other unforeseen incident. In addition, numerous parcels are developing along US 160 in the Grandview area. With increased traffic volumes, controlled access to either the interchange or Three Springs Boulevard is a safer alternative than at-grade full movement or right-in, right-out access to US 160.

The current construction project will serve the population growth and development to the north of US 160 with or without US 550 being realigned to the interchange. It will also provide safety benefits and improved access. The only missing items to make the interchange fully functional for access to the north are completion of the interchange earthwork/paving between the structures, Ramp B, and the round-about.

Design	INITIAL	DATE	INITIAL	DATE	Quantities	
					Checked By	Checked By
Designed By	GWK	08/08	Checked By	GWK	08/08	08/08
Checked By	GWK	08/08	Checked By	GWK	08/08	08/08



Print Date: 8/15/2008		Sheet Revisions		Colorado Department of Transportation		As Constructed		US 550 OVER US 160		Project No./Code	
File Name: 16042AG_TypSection_01.dgn		Date: 7/31/08		3803 North Main Avenue		No Revisions:		TYPICAL SECTION		NH 1602-114	
Horiz. Scale: 1:1		Comments: Added Conduits		Suite 200		Revised:		Designer: A. Leifheit		16042	
Unit Information 0221		7/31/08		Durango, CO 81301		Void:		Detailer: R. Artman		Sheet Number	
Unit Leader STW		8/14/08		Phone: 970-385-1440 FAX: 970-385-8365				Structure Numbers			
SEMA				Region 5				Sheet Subset: Bridge		Subset Sheets: B4 of B38	
WILSON & COMPANY				EJA							



US 160

**On ramp for
Eastbound Traffic**

**Frontage Road
(two way traffic)**



Duran, Joseph

From: Neet, Kerrie [Kerrie.Neet@DOT.STATE.CO.US]
Sent: Wednesday, August 06, 2008 11:22 AM
To: Reynolds, Richard; Powers, Keith; Cross, Steven; Jankowski, Paul; Eric Meyer; Archuleta, Edward; Duran, Joseph; Gibson, Stephanie
Cc: Peterson, Karen K
Subject: FW: US 160/550 Connection Archaeological Issue

Attachments: SEAS 08-108-10 Site Boundary.pdf



SEAS 08-108-10
 Site Boundary.p...

FYI.

Kerrie E. Neet
 Planning and Environmental Manager
 CDOT Region 5, 3803 North Main Ave., Suite 300 Durango, CO 81301
 (970) 385-1430 (phone)
 (970) 385-1410 (fax)
 kerrie.neet@dot.state.co.us

-----Original Message-----

From: Jepson, Daniel
Sent: Wednesday, August 06, 2008 11:10 AM
To: Neet, Kerrie
Subject: US 160/550 Connection Archaeological Issue

Kerrie -

Per our phone conversation this morning, following is a brief summary of actions taken on August 4 and 5, 2008 specific to the archaeological site (08-108-10) initially documented by Webb Ranch consultant Stratified Environmental & Archaeological Services (SEAS):

Staff Archaeologist Greg Wolff and I visited the recently acquired CDOT (former Knaggs) property atop Florida Mesa north of and adjacent to the Webb Ranch on the late afternoon of August 4 and again the morning of August 5. Our primary purpose was to ascertain if Ancestral Pueblo cultural remains associated with site 08-108-10, as documented by Doug Loebig of SEAS in July, extend onto CDOT property. Chipped stone, ground stone and ceramic artifacts were visible on CDOT land north of the boundary fence as well as on adjacent Bureau of Land Management property immediately to the east. Although we determined that the site extends onto BLM administered lands, we focused our efforts on the CDOT parcel and did not attempt to define a site boundary on the BLM property; I notified Bruce Bourcy, archaeologist at the San Juan Public Lands office in Durango, of the matter on the afternoon of August 4.

Greg and I conducted a non-systematic but thorough survey of the CDOT land and determined that cultural materials, while present, do not appear to be widespread or concentrated. The modern residential site--a main house and assorted out buildings, the latter of which had been demolished and largely removed as of our visit--had disturbed a sizable area, in the process probably destroying a part of the archaeological site. Regardless, very few prehistoric artifacts (less than 10) were observed north and west of the residence, including along the access road/driveway that parallels the Webb Ranch boundary fence; in addition, the topography north of the house drops off steeply, and no artifacts were noted in that area. Most of the artifacts on the CDOT parcel were located in a fairly small area to the east and south of the house in the vicinity of the property fence line, and as noted above also extending onto BLM land to the east. Not surprisingly, the site appears to be confined to the top of the mesa on the CDOT property (as well as on Webb property, as stated by Doug Loebig during a phone conversation I had with him this morning), and so is not in danger from the construction presently occurring along US 160 several hundred

feet downslope and to the north.

While Greg and I did not complete a formal intensive level survey of the CDOT parcel-- primarily because I want to ensure consistency in the site recordation process when our NPS consultant is ultimately dispatched to document and evaluate the sites SEAS identified, including 08-108-10--we nonetheless obtained a good handle on the condition of the property and likely extent of archaeological remains associated with the site. I've attached an aerial photo showing the CDOT parcel (encompassed by the red border) and the approximate site boundary (in blue) (note that you'll need to rotate the pdf in order to view it right side up). Again, please be aware this boundary is considered preliminary and therefore unofficial, but is based on my observations (for the state-owned parcel) as well as those of the SEAS archaeologist (for the Webb Ranch portion of the site); of course, we have not yet conducted an evaluation of the site within the Webb Ranch.

Please let me know if you have questions -

Dan Jepson
Senior Staff Archaeologist.



PRELIMINARY SITE BOUNDARY,
SEAS 08-108-10

MEMORANDUM

DEPARTMENT OF TRANSPORTATION

REGION 5, TRAFFIC AND SAFETY UNIT

3803 North Main Avenue
Suite 100
Durango, CO 81301
(970) 385-8360
(970) 385-8361 Fax



DATE: October 30, 2008

TO: Douglas Bennett, FHWA
Project File

FROM: Mike McVaugh, Region 5 Traffic & Safety Engineer

SUBJECT: Justification for Three-Lane Structure over US 160

This memo outlines why a three-lane structure is necessary over US 160 even if US 550 is never connected to the interchange. This memo also describes how the interchange and current intersection of US 160/US 550 could function in the event the US 550 connection remains at its current location. The following information is included in the memo:

- A description of development to the north and south of the interchange.
- A traffic analysis supporting the need for a turn lane in addition to two thru lanes on the bridge over US 160. The analysis indicates that three lanes are needed based on a 20-year design criteria and 2025 traffic volumes.
- Justification for why three lanes are needed across the bridge based on storage requirements for turning movements and AASHTO design criteria.
- Operational modifications that allow the existing US 160/US 550 intersection and the interchange to function safely under current conditions.

The original premise of the bridge currently under construction was to function as the future south bound lanes for the US 550 connection between US 160 and existing US 550 alignment at CR 220. Given the possibility that the alignment may not be viable for the future US 550 alignment, CDOT analyzed whether a three-lane bridge would be necessary for access to properties north and south of US 160. The lane configurations on the structure over US 160 would be a dedicated northbound thru lane, dedicated southbound thru lane, and an auxiliary southbound left-turn lane to eastbound US 160 (Figure 1).

Development to the North and South of US 160

The three-lane bridge can be utilized to function jointly with the future roadway connections north of the round-a-bout on the northside of US 160 and the frontage road on the south side of US 160 (Figure 2). The frontage road south of US 160 will service the BLM, private properties and business properties. Currently to the south of US 160, near the interchange, there are 68 single family homes, 75,200 square feet of commercial development including warehousing, general office, and car sales, and 30 acres of BLM public lands (Figure 3). CDOT committed to providing access to the BLM property to the south (see Letter of Consent in Attachment A). The access roads to the North of US 160 will connect the round-a-bout to the Three Spring development and hospital as well as provide a connection to C&J Gravel and High Lama Lane (Figure 2). The areas north and south of US 160 were identified in the Grandview Area Plan as Subareas I and II and were utilized in this memo for traffic projections (see Figure 4).

Traffic Analysis and Justification for a Left-Turn Lane

A traffic analysis was performed to assess the need for a three lane structure over US 160 based on access and development to the north and south of US 160. The analysis included evaluating current (2008) and future (2025) traffic generation for both the north and south sides of US 160 that would access the interchange over US 160. The additional left-turn lane is justified based on current Access Code requirements and AASHTO guidance for projected traffic volumes in 2025. A summary of the findings is listed below:

- The State of Colorado Highway Access Code left-turn auxiliary lane warrant for a frontage road is currently met. Based on current traffic data (2008), there would be 29 vehicles per hour (vph) making the left turn movement on the structure to US 160 in the PM peak hour and 25 vph is required for a left turn lane (See Attachment A, CDOT Traffic Analysis Assumptions and Notes, and Attachment B, Trip Generation Spreadsheets)
- The AASHTO Geometric Design of Highways and Streets (AASHTO Green Book), Chapter 9 Intersections - provides criteria for when the addition of a left turn lane is needed. Currently the lane addition is not met in the existing condition (2008). However, the additional left turn lane is needed in 2025 based on pm peak traffic volumes for both advancing and opposing traffic (see Table 1, Interchange Lane Warrant Summary in Attachment A).

Adding a left-turn lane is critical to assuring a safe operating condition on an elevated bridge. The 2003 NCHRP Report 500 – Volume 5 – A Guide for Addressing Unsignalized Intersection Collisions report states that accidents can be reduced by as much as 22 percent at a three-legged intersection when a left-turn lane is added. The reduction is realized when left-turn vehicles are no longer in the advancing thru lane potentially subjecting the turning vehicle to a rear-end accident. The left-turning driver is not compelled to take greater chances when making a left turn when they are given refuge while waiting to make a left turn. This study references the Harmelink 1967 study which has been adopted by the AASHTO Green Book in Chapter 9 Intersections Guide for Left-Turn Lanes on Two-Lane Highways. The NCHRP Report emphasizes that turn lanes need to be provided for both operational and safety benefits. This report supports the addition of the left-turn lane because of the safety benefits that would result from adding this turn lane.

Need for Three Lanes Across the Bridge

CDOT reviewed the turn-lane deceleration, taper and storage lengths for the left-turn lane. The left-turn lane will reside almost entirely on the bridge structure because the turning vehicles will begin their turning movement while on the bridge abutment resulting in all vehicle storage, lane tapers and deceleration lengths occurring on the bridge itself. According to AASHTO Green Book (page 805), traffic passing through an interchange should be afforded the same degree of utility and safety as that given on the approaching highways. In other words, if a turn lane is required to overlap onto the interchange because of the required length and storage, the structure should be designed wide enough to maintain the lane development and length to ensure safe operation of the highway. In this case, there will be 480 feet of left-turn lane development on the existing structure validating the planned width of the structure to accommodate a three-lane section of highway. It is not practical to design and build a variable-width structure given that the bridge needs to accommodate at least 480 feet for the turn lane and the bridge length is 530 feet.

Operational Effects between the US 160/US 550 Intersection and the Interchange

CDOT considered the possibility that the existing US 160/US 550 intersection might remain in operation even after the interchange was made functional. The only operational inefficiency identified was the weaving conflicts of vehicles leaving US 160 to access the interchange with vehicles turning from US 550 to go eastbound on US 160. In order to prevent this vehicular conflict, CDOT would need to install a signal pole and head to control the eastbound movement from US 550 onto US 160 and not allow a right turn while the light is red. This would effectively control US 550 right-turn vehicle movements so that they only enter US 160 when eastbound traffic on US 160 is stopped by the signalized intersection. This would eliminate this conflict from occurring with little impact to the operation of the intersection.

Summary

Based on present and future traffic volumes for access to the north and south of US 160, CDOT has determined that the interchange will be needed for development to the north and south of US 160 independent of whether US 550 is connected to the interchange. The addition of this facility will support and be supported by the continued traffic growth in the Grandview Corridor. Three lanes are needed on the bridge over US 160 including a left-turn lane based on current requirements in the Access Code and AASHTO guidance for projected traffic volumes in 2025. The lane would need to be included across the bridge because it needs to be at least 480 feet for deceleration, taper and storage on a 530-foot bridge, and it is not practical to build a variable width bridge. In addition, it is unreasonable to construct this structure as a two-lane section when in 17 years it will need to be widened to three-lanes even without a US 550 connection. Should US 550 be realigned to this structure sooner, the need for a three-lane section will be immediate due to the increased traffic volumes from US 550.

CC: Michael Davies, FHWA Program Delivery Engineer
Stephanie Gibson, FHWA Environmental Program Manager
Joe Duran, FHWA Operations Engineer
Pam Hutton, CDOT Chief Engineer
Richard Reynolds, CDOT Region 5 Transportation Director
Kerrie E. Neet, CDOT Region 5 Planning and Environmental Manager

Attachment A
CDOT Traffic Analysis Assumptions and Notes

Attachment A
CDOT Traffic Analysis Assumptions and Notes

- The analysis in this memo included the existing properties that would use the bridge to access US 160 or to cross US 160 from north to south. These properties are identified and highlighted in Figure 4. Once the properties were identified, CDOT used the ITE Trip Generation Manual to determine trip generation for each of the existing properties. The trip generation calculations are included in Attachment B.
- Directional trip distribution (75% to Durango, 20% to Bayfield, and 5% crossing the highway) onto the highway was kept consistent with the trip distribution methodologies that are currently being used in the Grandview Corridor. This trip distribution was agreed to by CDOT, the City of Durango, and La Plata County for this corridor. This distribution was also used in the Grandview Area Plan which was a key factor in trip generation for the US 160 EIS.
- The current (2008) trip distribution assumed no traffic from the existing Three Springs Phase 1 development would use this interchange. This would be out-of-direction travel for vehicles to go west only to use the interchange to go east on US 160 when they can currently access US 160 from a signalized intersection directly south of the development.
- **State of Colorado Highway Access Code** – The assumption was made that the roadway using the bridge is a frontage road based on the consolidation of accesses south of US 160. According to the State of Colorado, State Highway Access Code Section 3.13(4)(a) Auxiliary Lane Requirements for a Frontage Road, A left-turn lane is required for any access with a projected peak hour left ingress turning volume of 25 vph. The trip generation for the current condition shows a left turn volume of 29 vph in the PM peak hour, meeting this warrant.
- **AASHTO Green Book Chapter 9** - Intersections, Page 685, Exhibit 9-75, Guide for Left-Turn Lanes on Two-Lane Highways. CDOT assumed a low-speed roadway using 40MPH as the lowest speed available for this analysis by AASHTO. This low speed was assumed because the access would only be to local development.
 - **Current Condition** - The Advancing vehicles are 127 vph in the PM peak. The percentage of left turns in the Advancing PM peak is 23 percent or 29 vph. The opposing vehicles are 90 vph in the PM peak hour. According to AASHTO guidance, the opposing vehicle trips shall be at least 100 vph which is ten vehicles higher than the existing trips. Also, the current advancing trips (127 vph) are below the standard 390 vph in the guideline for 20% left-turning vehicles. Under current conditions, the suggested guidance minimums are not met for a left-turning lane.
 - **Future 2025 Condition** – Based upon the US 160 EIS traffic trips and the additional Subarea II trips from the southside of US 160, the future 2025 advancing vehicles will increase to 347 vph in the PM peak by the year 2025 (exceeds AASHTO GREEN BOOK guidance of 340 vph), with 49 percent (170 vph) of the vehicles making a left turn at this location. In addition, the opposing vehicles will increase to 133 vph (exceeds AASHTO Green Book guidance of 100 vph). The PM peak trips trigger a lane warrant according to AASHTO in the year 2025 at this intersection.
- **2003 NCHRP Report 500 – Volume 5** – A Guide for Addressing Unsignalized Intersection Collisions - Objective 17.1B Reduce the Frequency and Severity of Intersection Conflicts through Geometric Design Improvements – Strategy 17.1 B1 – Provide Left-Turn Lanes at Intersections (P). This report emphasizes the potential benefit of reducing left-turn related accidents by as much as 22 percent for a three-legged intersection when a left-turn lane is added. The reduction is realized when left-

turn vehicles are no longer in the advancing thru lane potentially subjecting the turning vehicle to a rear-end accident. Additionally, the left turning driver is not compelled to take greater chances when making a left turn when they are given refuge while waiting to make a left turn. This study references the Harmelink 1967 study which has been adopted by AASHTO Green Book in Chapter 9 Intersections Guide for Left-Turn Lanes on Two-Lane Highways. The study emphasizes that turn lanes need to be provided for both operational and safety benefits. Considering the high frequency of left turns that will be made both in 2008 (23 percent) and the 2025 analysis (49 percent), the addition of a left turn lane for safety and operation is justified.

- **Left Turn Lane Length Determinations** – CDOT used the AASHTO Green Book Chapter 9 to determine left turn lane lengths along with the CDOT Design Manual.
 - **Turn Lane Taper Length** - Turn lane tapers should be developed at a taper rate of 8:1 to 15:1 (longitudinal:transverse). Using a standard 12-foot width turn lane and a 12:1 taper, the taper length is 144 feet in length.
 - **Turn Lane Deceleration Length** – Turn lane deceleration length is determined based upon design speed for the roadway. Based on a design speed of 40 mph, the deceleration length is 275 feet according to the AASHTO Green Book.
 - **Turn Lane Storage Length** – Turn lane storage length is calculated by taking the peak turning hour volume and determining how many vehicles will queue in the turn lane over a two-minute period. In the year 2025, the two-minute vehicle queue will be six vehicles ($170\text{vph}/60\text{ min} \times 2\text{min} = 5.67\text{ vehicles}$). Due to the existing gravel pit operation that has expressed a desire to gain access to US 160 via this interchange, it is assumed one of the six vehicles will be a large truck. The storage length was then determined by assuming each car will need 25 feet of storage and the truck will need at least 80 feet of storage. This calculates to 205 feet of storage ($80 + (25 \text{ times } 5) = 205\text{ feet}$).
 - **Total Length of the Turn Lane** – According to the AASHTO Green Book, Chapter 9 (page 714), the total length of the auxiliary lane is the sum of the length of the three components. However, it is common practice to combine the deceleration and taper lengths since deceleration occurs during the taper transition. As a result, the recommended length of the left-turn lane is the sum of the deceleration length and storage length or 480 feet for the year 2025 turning trips.

Table 1
Interchange Lane Warrant Analysis

Current 2008 Trips

27-Oct-08

Subarea I

	SB Thru	SB Left	NB Thru	NB Right
AM	4	17		
PM	7	29		

Subarea II

	SB Thru	SB Left	NB Thru	NB Right
AM	99		51	13
PM	91		90	22

Current 2008 Intersection Summary

	SB Thru	SB Left	NB Thru	NB Right
AM	103	17	51	13
PM	98	29	90	22

Advancing Traffic

AM	120
PM	127

Trips not met < 340 vph

Opposing Traffic

AM	51
PM	90

Trips not met < 100 vph

Future 2025 EIS Trips plus Subarea II

Subarea I (From EIS)

	SB Thru	SB Left	NB Thru	NB Right
AM	28	110		
PM	43	170		

Subarea II

	SB Thru	SB Left	NB Thru	NB Right
AM	147		76	19
PM	134		133	33

Future 2025 I

SB
AM

PM

Advancing Traffic

AM

PM

Opposing Traffic

AM

PM

*I'm not sure
where the 2008
Subarea I*

US 160 EIS Trips for Subarea I

Total Trips		Right	Thru	Left
AM	550	412	28	110
PM	850	637	43	170

Attachment B
Trip Generation Spreadsheets

Grandview Sub Area I - Current (2008)

Development Name: SUB AREA I	Development Access:	US 160
Date Received:	Highway Access:	EW
Date Reviewed:	Direction:	RA
Engineer: McVaugh/Horn/Cuthbert	Highway Category:	

Year 2008

TRIP RATES AND VOLUMES

Region 5 Traffic Impact Study Spreadsheet

Year 2008				PM PEAK HOURS																										
Development Type	Land Use Code	# Of Units	DU? ksf?	Weekday			AM Peak Hour of Adj Traffic 7AM and 9AM			PM Peak Hour of Adj Traffic 4 PM and 6 PM			Weekday AM Peak Hour of Generator			Weekday PM Peak Hour of Generator			Saturday			Saturday Peak Hour of Gen			Sunday			Sunday Peak Hour of Gen		
				In	Out		In	Out		In	Out		In	Out		In	Out		In	Out		In	Out		In	Out		In	Out	
Warehousing	150	22.4	ksf	4.96	50%	50%	0.45	82%	18%	0.51	24%	76%	0.57	59%	41%	0.61	8%	92%	1.22	50%	50%	0.12	64%	36%	0.79	50%	50%	0.07	52%	48%
				56		56		8	2		3	9		8	5		1	13		14	14		2	1		9	9		1	1
Auto Body	840	7	ksf	7.00	50%	50%	2.94	65%	35%	3.38	50%	50%	3.22	60%	40%	4.01	51%	49%	0.00	0%	0%	0.00	0%	0%	0.00	0%	0%	0.00	0%	0%
				25	25			13	7		12	12		14	9		14	14		0	0		0	0		0	0		0	0
SFH	210	1	DU	9.57	50%	50%	0.75	25%	75%	1.01	64%	36%	0.77	25%	75%	1.02	64%	36%	10.09	50%	50%	0.94	54%	46%	8.78	50%	50%	0.86	53%	47%
				5	5			0	1		1	0		0	1		1	0		5	5		1	0		4	4		0	0
Warehousing	150	135.73	ksf	4.96	50%	50%	0.45	82%	18%	0.51	24%	76%	0.57	59%	41%	0.61	8%	92%	1.22	50%	50%	0.12	64%	36%	0.79	50%	50%	0.07	52%	48%
				337	337			50	11		17	53		46	32		7	76		83	83		10	6		54	54		5	5
Single Family	210	8	DU	9.57	50%	50%	0.75	25%	75%	1.01	64%	36%	0.77	25%	75%	1.02	64%	36%	10.09	50%	50%	0.94	54%	46%	8.78	50%	50%	0.86	53%	47%
				38	38			2	5		5	3		2	5		5	3		40	40		4	3		35	35		4	3
Mini Storage	151	26	ksf	2.50	50%	50%	0.15	59%	41%	0.26	51%	49%	0.28	48%	52%	0.29	53%	47%	2.33	50%	50%	0.40	50%	50%	1.78	50%	50%	0.30	50%	50%
				33	33			2	2		3	3		3	4		4	4		30	30		5	5		23	23		4	4
Gravel Pit	120	60	Ac	6.75	50%	50%	1.98	60%	50%	2.16	50%	50%	6.41	50%	50%	4.22	50%	50%	0.00	0%	0%	0.00	0%	0%	0.00	0%	0%	0.00	0%	0%
				203	203			59	59		65	65		192	192		127	127		0	0		0	0		0	0		0	0
Oil/Gas Wells*	988	10	EA	2.00	50%	50%	0.00	0%	0%	0.00	0%	0%	0.00	0%	0%	0.00	0%	0%	0.00	0%	0%	0.00	0%	0%	0.00	0%	0%	0.00	0%	0%
				10	10			0	0		0	0		0	0		0	0		0	0		0	0		0	0		0	0
				0.00	0%	0%	0.00	0%	0%	0.00	0%	0%	0.00	0%	0%	0.00	0%	0%	0.00	0%	0%	0.00	0%	0%	0.00	0%	0%	0.00	0%	0%
				0	0			0	0		0	0		0	0		0	0		0	0		0	0		0	0		0	0
				0.00	0%	0%	0.00	0%	0%	0.00	0%	0%	0.00	0%	0%	0.00	0%	0%	0.00	0%	0%	0.00	0%	0%	0.00	0%	0%	0.00	0%	0%
				0	0			0	0		0	0		0	0		0	0		0	0		0	0		0	0		0	0
				0.00	0%	0%	0.00	0%	0%	0.00	0%	0%	0.00	0%	0%	0.00	0%	0%	0.00	0%	0%	0.00	0%	0%	0.00	0%	0%	0.00	0%	0%
				0	0			0	0		0	0		0	0		0	0		0	0		0	0		0	0		0	0
				0.00	0%	0%	0.00	0%	0%	0.00	0%	0%	0.00	0%	0%	0.00	0%	0%	0.00	0%	0%	0.00	0%	0%	0.00	0%	0%	0.00	0%	0%
				0	0			0	0		0	0		0	0		0	0		0	0		0	0		0	0		0	0
Trip Volumes				In	Out		In	Out		In	Out		In	Out		In	Out		In	Out		In	Out		In	Out		In	Out	
				705	705		135	86		105	145		264	247		159	236		172	172		22	16		125	125		14	13	
Total =					1409																									

*Assumptions: 1. UDOT Study calculates operating wells generate 0.25 truckloads/day. Each truckload is 1-trip in and 1-trip out, each truck is equivalent to 1 passenger car equivalents. Also each well generates 2 passenger trips/day for monitoring. Therefore each well generates 2 roundtrips/day. Note: during well development this number is approx 250 x higher.

Trip Volumes			Directional Splits				Trip Distribution			
Select Maximum Peak Hour Gener			Thru		Lt		Thru		LT	
AM	IN (NB)	135	0%	0%	0%	0%	0	0	0	0
	Out (SB)	86	0%	5%	20%	0%	0	4	17	0
PM	IN (NB)	105	0%	0%	0%	0%	0	0	0	0
	Out (SB)	145	0%	5%	20%	0%	0	7	29	0

Grandview Sub Area II - Current (2008)

Development Name: Grandview Sub Area II	Development Access: Interchange/Intersection
Date: October 26, 2008	Highway Access: US 160
	Direction: EW
Engineer: McVaugh/Horn/Pickren/Cuthbert	Highway Category: NRA

TRIP RATES AND VOLUMES

Region 5 Traffic Impact Study Spreadsheet

Development Type	Land Use Code	# Of Units	DU? ksf?	Weekday			AM Peak Hour of Adj Traffic 7AM and 9AM			PM Peak Hour of Adj Traffic 4 PM and 6PM			Weekday AM Peak Hour of Generator			Weekday PM Peak Hour of Generator			Saturday			Saturday Peak Hour of Generator			Sunday			Sunday Peak hour of Generator		
				rate	In	Out	rate	In	Out	rate	In	Out	rate	In	Out	rate	In	Out	rate	In	Out	rate	In	Out	rate	In	Out	rate	In	Out
Single Family	210	68	DU	9.57	50%	50%	0.75	25%	75%	1.01	64%	36%	0.77	25%	75%	1.02	64%	36%	10.09	50%	50%	0.94	54%	46%	8.78	50%	50%	0.86	53%	47%
				325	325		13	38		44	25		13	39		44	25		343	343		35	29		299	299		31	27	
Warehousing	150	11.08	KSF	4.96	50%	50%	0.45	82%	18%	0.51	24%	76%	0.57	59%	41%	0.61	8%	92%	1.22	50%	50%	0.12	64%	36%	0.79	50%	50%	0.07	52%	48%
Geffe - 507005				27	27		4	1		1	4		4	3		1	6		7	7		1	0		4	4		0	0	
General Office	710	11.08	KSF	11.01	50%	50%	1.56	88%	12%	1.49	17%	83%	1.56	88%	12%	1.49	17%	83%	2.37	50%	50%	0.41	54%	46%	0.98	50%	50%	0.14	58%	42%
Geffe - 507005				61	61		15	2		3	14		15	2		3	14		13	13		2	2		5	5		1	1	
Car Sales	841	25.8	KSF	37.50	50%	50%	2.21	73%	27%	2.80	40%	60%	1.84	54%	46%	2.50	45%	55%	21.03	50%	50%	2.97	51%	49%	10.48	50%	50%	0.00	0%	100%
Guieterrez - 506156				484	484		42	15		29	43		26	22		29	35		271	271		39	38		135	135		0	0	
Public Land	417	30	AC	0.20	50%	50%	0.00	0%	0%	0.00	0%	0%	0.15	57%	43%	0.26	44%	56%	5.65	50%	50%	0.34	48%	52%	6.44	50%	50%	0.42	34%	66%
				3	3		0	0		0	0		3	2		3	4		85	85		5	5		97	97		4	8	
Car Sales	841	10.1	KSF	37.50	50%	50%	2.21	73%	27%	2.80	40%	60%	1.84	54%	46%	2.50	45%	55%	21.03	50%	50%	2.97	51%	49%	10.48	50%	50%	0.00	0%	0%
Skyway Auto				189	189		16	6		11	17		10	9		11	14		106	106		15	15		53	53		0	0	
Warehousing	150	14.524	KSF	4.96	50%	50%	0.45	82%	18%	0.51	24%	76%	0.57	59%	41%	0.61	8%	92%	1.22	50%	50%	0.12	64%	36%	0.79	50%	50%	0.07	52%	48%
Frito Lay/Fisher				36	36		5	1		2	6		5	3		1	8		9	9		1	1		6	6		1	0	
General Office	710	2.7	KSF	11.01	50%	50%	1.56	88%	12%	1.49	17%	83%	1.56	88%	12%	1.49	17%	83%	2.37	50%	50%	0.41	54%	46%	0.98	50%	50%	0.14	58%	42%
Enterprise Rental				15	15		4	1		1	3		4	1		1	3		3	3		1	1		1	1		0	0	
	0			0.00	0%	0%	0.00	0%	0%	0.00	0%	0%	0.00	0%	0%	0.00	0%	0%	0.00	0%	0%	0.00	0%	0%	0.00	0%	0%	0.00	0%	0%
				0	0		0	0		0	0		0	0		0	0		0	0		0	0		0	0		0	0	
	0			0.00	0%	0%	0.00	0%	0%	0.00	0%	0%	0.00	0%	0%	0.00	0%	0%	0.00	0%	0%	0.00	0%	0%	0.00	0%	0%	0.00	0%	0%
				0	0		0	0		0	0		0	0		0	0		0	0		0	0		0	0		0	0	
				0.00	0%	100%	0.00	0%	100%	0.00	0%	100%	0.00	0%	100%	0.00	0%	100%	0.00	0%	100%	0.00	0%	100%	0.00	0%	100%	0.00	0%	100%
				0	0		0	0		0	0		0	0		0	0		0	0		0	0		0	0		0	0	
				In	Out		In	Out		In	Out		In	Out		In	Out		In	Out		In	Out		In	Out		In	Out	
Trip Volumes				1141	1141		99	64		91	112		79	80		93	110		837	837		99	91		600	600		37	37	
Total =					2282																									

NOTES:

1. 60% used for Guieterrez and Skyway because it is a Used Car Lot
2. Used General office for Enterprise rental, which is conservative

Peak Hour Trip Volumes			Directional Splits				Peak Hr Trip Distribution				Weekday trip Dist		
			N	S	LT/RT	Thru	N	S	LT/RT	Thru	LT/RT Thru		
In(SB)	AM	99	0%	0%	0%	100%	0	0	0	99	1029	0	1029
Out NB)		64	0%	0%	20%	80%	0	0	13	51	1029	206	823
In(SB)	PM	91	0%	0%	0%	100%	0	0	0	91			
Out NB)		112	0%	0%	20%	80%	0	0	22	90			

Grandview Sub Area II - 2025

Development Name:	Grandview Sub Area II	Development Access:	Interchange/Intersection
Date:	October 26, 2008	Highway Access:	US 160
Engineer:	McVaugh/Horn/Pickren/Cuthbert	Direction:	EW
		Highway Category:	NRA

TRIP RATES AND VOLUMES

Region 5 Traffic Impact Study Spreadsheet

Development Type	Land Use Code	# Of Units	DU? ksf?	Weekday			AM Peak Hour of Adj Traffic 7AM and 9AM			PM Peak Hour of Adj Traffic 4 PM and 6PM			Weekday AM Peak Hour of Generator			Weekday PM Peak Hour of Generator			Saturday			Saturday Peak Hour of Generator			Sunday			Sunday Peak hour of Generator				
				rate	In	Out	rate	In	Out	rate	In	Out	rate	In	Out	rate	In	Out	rate	In	Out	rate	In	Out	rate	In	Out	rate	In	Out		
Single Family	210	68.0	DU	9.57	50%	50%	0.75	25%	75%	1.01	64%	36%	0.77	25%	75%	1.02	64%	36%	10.09	50%	50%	0.94	54%	46%	8.78	50%	50%	0.86	53%	47%		
				325	325		13	38		44	25		13	39		44	25		343	343		35	29		299	299		31	27			
Warehousing	150	11.1	KSF	4.96	50%	50%	0.45	82%	18%	0.51	24%	76%	0.57	59%	41%	0.61	8%	92%	1.22	50%	50%	0.12	64%	36%	0.79	50%	50%	0.07	52%	48%		
Geffe - 507005				27	27		4	1		1	4		4	3		1	6		7	7		1	0		4	4		0	0			
General Office	710	11.1	KSF	11.01	50%	50%	1.56	88%	12%	1.49	17%	83%	1.56	88%	12%	1.49	17%	83%	2.37	50%	50%	0.41	54%	46%	0.98	50%	50%	0.14	58%	42%		
Geffe - 507005				61	61		15	2		3	14		15	2		3	14		13	13		2	2		5	5		1	1			
Car Sales*	841	25.8	KSF	37.50	50%	50%	2.21	73%	27%	2.80	40%	60%	1.84	54%	46%	2.50	45%	55%	21.03	50%	50%	2.97	51%	49%	10.48	50%	50%	0.00	0%	100%		
Guietierrez - 506156				484	484		42	15		29	43		26	22		29	35		271	271		39	38		135	135		0	0			
Public Land	417	30.0	AC	0.20	50%	50%	0.00	0%	0%	0.00	0%	0%	0.15	57%	43%	0.26	44%	56%	5.65	50%	50%	0.34	48%	52%	6.44	50%	50%	0.42	34%	66%		
				3	3		0	0		0	0		3	2		3	4		85	85		5	5		97	97		4	8			
Car Sales*	841	10.1	KSF	37.50	50%	50%	2.21	73%	27%	2.80	40%	60%	1.84	54%	46%	2.50	45%	55%	21.03	50%	50%	2.97	51%	49%	10.48	50%	50%	0.00	0%	0%		
Skyway Auto				189	189		16	6		11	17		10	9		11	14		106	106		15	15		53	53		0	0			
Warehousing	150	14.5	KSF	4.96	50%	50%	0.45	82%	18%	0.51	24%	76%	0.57	59%	41%	0.61	8%	92%	1.22	50%	50%	0.12	64%	36%	0.79	50%	50%	0.07	52%	48%		
Frito Lay/Fisher				36	36		5	1		2	6		5	3		1	8		9	9		1	1		6	6		1	0			
General Office*	710	2.7	KSF	11.01	50%	50%	1.56	88%	12%	1.49	17%	83%	1.56	88%	12%	1.49	17%	83%	2.37	50%	50%	0.41	54%	46%	0.98	50%	50%	0.14	58%	42%		
Enterprise Rental				15	15		4	1		1	3		4	1		1	3		3	3		1	1		1	1		0	0			
	0			0.00	0%	0%	0.00	0%	0%	0.00	0%	0%	0.00	0%	0%	0.00	0%	0%	0.00	0%	0%	0.00	0%	0%	0.00	0%	0%	0.00	0%	0%		
				0	0		0	0		0	0		0	0		0	0		0	0		0	0		0	0		0	0			
	0			0.00	0%	0%	0.00	0%	0%	0.00	0%	0%	0.00	0%	0%	0.00	0%	0%	0.00	0%	0%	0.00	0%	0%	0.00	0%	0%	0.00	0%	0%		
				0	0		0	0		0	0		0	0		0	0		0	0		0	0		0	0		0	0			
				0.00	0%	100%	0.00	0%	100%	0.00	0%	100%	0.00	0%	100%	0.00	0%	100%	0.00	0%	100%	0.00	0%	100%	0.00	0%	100%	0.00	0%	100%		
				0	0		0	0		0	0		0	0		0	0		0	0		0	0		0	0		0	0			
				In	Out		In	Out		In	Out		In	Out		In	Out		In	Out		In	Out		In	Out		In	Out			
Trip Volumes				1141	1141		99	64		91	112		79	80		93	110		837	837		99	91		600	600		37	37			
Total =					2282																											
2025 Trip Volumes				1688	1689		147	95		134	166																					
1.48 GF*					3377																											
																		Peak Hour Trip Volumes				Directional Splits				Peak Hr Trip Distribution				Weekday trip Dist		
																		N S LT/RT Thru				N S LT/RT Thru				LT/RT Thru						
In(SB)																		AM 147				0% 0% 0% 100%				0 0 0 147				1688 0 1688		

Peak Hour Trip Volumes				Directional Splits				Peak Hr Trip Distribution				Weekday trip Dist			
				N	S	LT/RT	Thru	N	S	LT/RT	Thru				
In(SB)	AM	147		0%	0%	0%	100%	0	0	0	147	1688	0	1688	
Out NB)		95		0%	0%	20%	80%	0	0	19	76	1689	338	1351	
In(SB)	PM	134		0%	0%	0%	100%	0	0	0	134				
Out NB)		166		0%	0%	20%	80%	0	0	33	133				

NOTES:

- 60% used for Guietierrez and Skyway because it is a Used Car Lot
- Used General office for Enterprise rental, which is conservative
- GF 2025 = $((1-1.56)/20) \times 17 = 0.48$. $1+0.48 = 1.48$ (from CDOT DTD Website)



U.S. Department
of Transportation

**Federal Highway
Administration**

Memorandum

Subject: Decision to Allow Continued Construction of US 160 Project During the Preparation of Section 4(f) Evaluation, Re-initiation of Consultation under Section 106 of the National Historic Preservation Act, and Reevaluation of the Environmental Impact Statement

Date: December 12, 2008

From: Douglas Bennett, P.E.
Colorado Division Office
Lakewood, CO

RECEIVED

DEC 18 2008

REG. 5 - RTD OFFICE

To: Karla S. Petty, P.E.
Colorado Division Office
Lakewood, CO

I am writing to explain why I have decided to allow the current construction activity on US 160 in southern Colorado to continue pending the outcome of the on-going Section 4(f) Evaluation, Re-initiation of Consultation under Section 106 of the National Historic Preservation Act, and Reevaluation of the Environmental Impact Statement. The additional environmental work, on a separate segment of highway, was undertaken because of several changes since the Record of Decision. First, the property owners have allowed for a gas well to be constructed on the identified, proposed alignment of US 550 across the Webb Ranch, resulting in a slight alignment shift of the preferred alternative. Second, the entire Webb Ranch has been determined to be eligible for the National Register of Historic Places, whereas the original determination was that only the ranch buildings were eligible for that description. Finally, the owners of the Webb Ranch allege, and we are evaluating the allegations, that previously unknown archeological artifacts have been discovered and sites may be eligible for listing on the National Register.

These recent developments related to the Webb Ranch have led to additional Section 106 consultation, and a Section 4(f) evaluation related to the Webb Ranch, which will result in a reevaluation of the EIS. This affects only a limited portion of the overall project, namely the US 550 realignment, and it is appropriate to proceed with improvements to US 160. I have determined that the on-going construction of the US 160 widening project and interchange east of the existing US 160/550 intersection should continue despite the above changes and despite the objections / concerns of the owners of the Webb Ranch. The Webb's representative also questioned the bridge under construction, more specifically the need for the width of the bridge and the independence of the bridge construction from the potential US 550 connection. What follows will detail what is currently under construction, why this construction is necessary and

appropriate, and the relationship between what is under construction and the potential for future US 550 access at this location.

Current Construction

As described in the EIS, the need to address existing safety concerns and to provide sufficient capacity for future traffic volumes resulted in plans to provide the affected public with four lanes for traffic on US 160 for over 16 miles, from west of Durango to east of Bayfield. The resulting planned improvement is shown on the map in Attachment J, which was taken from the Record of Decision for the project. At present there are three lanes at the western end of the current project, immediately east of the existing intersection of US 160 and US 550. The third lane provides additional storage for vehicles waiting at the traffic light to go west, through the light and on to Durango. Four lanes are provided from the existing US 550 intersection westerly into Durango as the traffic volumes warrant four lanes. This existing condition is shown in the map in Attachment I. The current construction contract will provide a fourth lane on US 160 from this intersection eastwards through the new interchange now under construction west of the new hospital and is often referred to as the "Four-laning Project". Thus, there will be four lanes from east of the new interchange, west to Durango.

This same construction contract also provides for the building of several bridges that will serve to create a new interchange just west of the new hospital. The details of the limits and type of construction being undertaken with this initial contract are more fully described in the construction contract on file in our office. This new interchange, to be completed on future contracts, will provide access to US 160 for the properties north and south of US 160, including the new hospital. These connections to the existing road network are shown on Attachment A. All portions of the interchange currently under construction will be used by traffic going to and from the development north and south of US 160 (Attachment B).

The current construction of several bridges is only a portion of what is needed to provide the full interchange to serve local properties. Further construction will be needed to complete the grading and paving of ramps, the roundabout, and street connections in order to open the interchange to traffic. It is expected that the current construction will be complete in late 2009 or early 2010. Further construction to complete the interchange would likely follow completion of this current construction. It is fairly typical that the entire interchange is not being completed in the first contract. The construction of bridges is specialized and substantially different from the construction of roadways. This type of project is often separated into multiple contracts at a single location. Further, as is the case here, funding is limited and the funds for the remaining roadway construction are not immediately available at this time, but are anticipated in the near future. Funds from land developers may well be available upon completion of the current construction as well. The map provided as Attachment A shows the current construction in green and future construction to complete the interchange in yellow and blue.

Purpose of Current Construction: Addressing Capacity, Access and Safety Needs on US 160

One of the attached maps (Attachment C), has been in common use to show the proposed realignment of US 550 across the Webb Ranch as presented in the EIS. This proposed realignment of US 550 is subject to our on-going environmental review. The map labeled Attachment A also shows the interchange currently under construction. This interchange, while also serving to provide access to the property north and south of US 160, would connect US 550 to US 160 if this alignment is ultimately selected for US 550 at the end of the on-going review.

This map does not show the large areas of land north and south of US 160 that are expected to be developed in the future and the planned construction of a frontage road on the south side of US 160. This land has been zoned for land use that will allow significant growth of the Durango region; the new hospital has already been built and future plans for this area include businesses, three schools and 5400 housing units north of US 160 and significant growth, although much smaller, to the south of US 160. This anticipated development is detailed in the CDOT letter of October 30, 2008 (*See Attachment D*, the letter from McVaugh to Bennett). The area of planned development and growth, as defined by local planning officials, is shown on the map with red shading (Attachment B).

This anticipated growth will result in greater traffic on US 160. The growth will also create a need to improve access to US 160. (*See Attachment E*, CDOT letter of September 3, 2008, Powers to Duran). The greater demand for access has resulted in planning for interchanges rather than multiple driveways or intersections. The planned development north and south of US 160 is a main reason the interchange under construction will have independent utility and be necessary for handling traffic and providing safe access. This holds true even if the review results in a US 550 alignment that does not connect with US 160 at this location. In fact, the land use north of US 160 is driving the planning and construction of three interchanges in the immediate area – the one shown on the map and two more further to the east, as described in the EIS on pages 2-34 and 2-38. The new regional hospital is just to the east and is currently served with a signalized intersection on US 160; the interchange currently under construction will provide a secondary, western access to the hospital. (*See Attachment A*, which provides a map of these connecting roads.) Further growth around the hospital will be served by the upgrading the closer, existing intersection to an interchange.

On the south side of US 160, a frontage road is planned east of the current construction. (*See Attachment A*, for map showing the planned Frontage road in blue). This facility was included in the US 160 EIS, as was the adjacent on-ramp for east-bound US 160 traffic. This frontage road will provide access to the property to the east, which is currently partially developed and for which further, future development is planned. For example, the Bureau of Land Management (BLM) has sought and obtained commitments from FHWA and the state to maintain access to their parcel near the interchange as the highway improvements take place. A copy of this commitment is included in the Attachment E package. The BLM may ultimately sell this parcel to the private sector for development, as it is isolated from other Federal land holdings.

To improve safety, this frontage road will eliminate traffic entering US 160 from driveways at multiple locations that require traffic to cross on-coming traffic to travel west to Durango. Without controlling access, that is, eliminating driveways and providing access via interchanges, this roadway segment would become increasingly less safe as the volumes of traffic increase in coming years. Details of the CDOT study of the traffic projections and impacts are provided in and referenced in the CDOT letter of September 3, 2008 from Powers to Duran, Attachment E. To address the capacity and safety needs, the interchange under construction is necessary regardless of the US 550 alignment selected and is shown on the attached map (Attachment A). The widening of US 160 between US 550 and Bayfield is needed to address the growing demand for inter and intra-regional travel as this area outside Durango develops. This widening is needed to address both capacity and safety needs.

Relationship of Potential US 550 Realignment to Current Construction

The bridge currently under construction will provide access to the south side of US 160 and to the on ramp for east-bound traffic entering US 160. The bridge will not, however, provide for a connection to US 550, as that would require two additional lanes to provide the full width of four lanes on US 550, as described in the EIS. With regard to construction of a bridge to serve as a connection with US 550, only one of two needed bridges over US 160 is being constructed at this time. The other bridge over US 160 will only be built on another, future contract if the Section 4(f) evaluation and the NEPA re-evaluation support the US 550 alignment across the Webb Ranch. Compliance with Section 106 of the National Historic Preservation Act would also be necessary. This option for a second bridge is shown on the plans for the current construction in light grey, without a support column, and labeled "future" on the plan sheet. (Attachment F). Note that the designation on the construction plans of a "future" bridge was made prior to the identification of the Webb Ranch as historic and the need to study other alternatives for a connection to US 550. It does not now indicate plans to construct this second bridge, merely where the structure would be, if ever built.

To summarize, with regard to the current construction, no ramps or structures are being constructed that would only be necessary if the US 550 alignment connects at this location. The current construction does not 1) predetermine realignment of US 550; or 2) preclude keeping US 550 on its current alignment; or 3) preclude an alternate realignment and interchange somewhere else along US 160.

The bridge structure now under construction will provide three lanes for traffic; it will also provide full shoulders on each side of the bridge. The bridge under construction will be 56 feet wide to accommodate the three needed lanes and two shoulders. This width is justified by the need for two-way traffic serving the planned frontage road on the south side of US 160 and the need for a left-turn lane for traffic making the south-to-eastbound turning movement. This layout or plan view is shown on Attachment G. This layout does not show the termination of the two thru lanes at the connection with the frontage road, which would be just off the bottom of the page. As described above, this bridge would not accommodate the lanes needed if, at a later time, it is determined that US 550 is to interchange at this location and cross the Webb Ranch.

I have evaluated the need for this bridge to accommodate two-way traffic and the left turn lane, using traffic data provided by CDOT, (*See Attachment E*, CDOT letter of September 3, 2008, Powers to Duran) and have determined this is an appropriate bridge design regardless of whether the US 550 alignment later connects to this US 160 location.

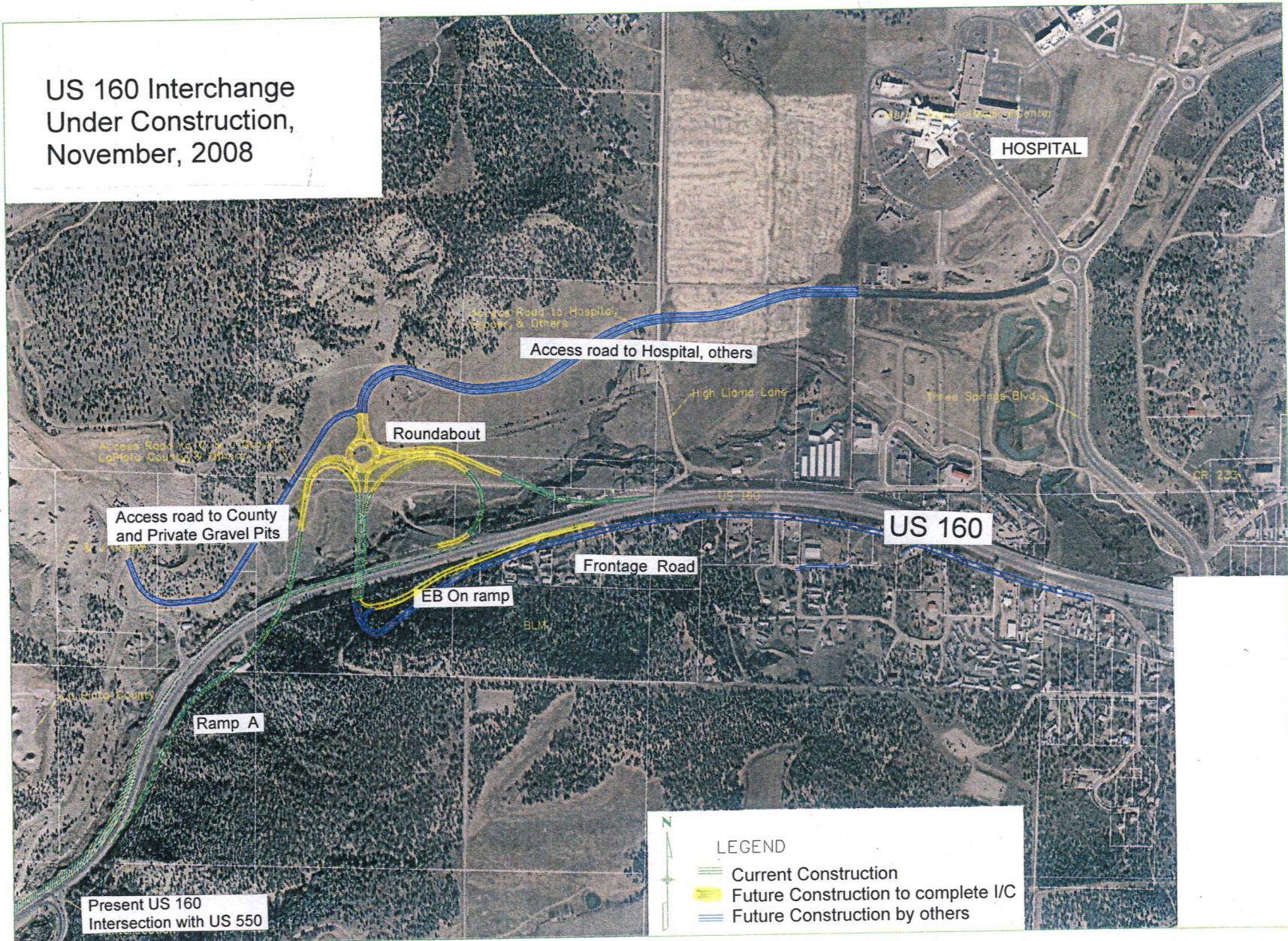
With regard to the potential for harm to archeological sites in the vicinity of the current construction, the current activities are limited to the northernmost portion of the land to the south of US 160. At this point, the land farther south (primarily the Webb Ranch), is about 100 feet higher in elevation and beyond the limits of the current construction. I base this on review of the construction plans (on file in our office) and personal observations at the construction site. This higher ground and the artifacts found on it will not be disturbed by the current construction and would remain untouched if the reevaluation were not supportive of the Webb Ranch realignment of US 550. Further, a site investigation by CDOT personnel states no artifacts have been found at the lower elevation where construction is taking place. This effort has been documented and is provided as Attachment H. If any such artifacts *are* found, any potential harm will be addressed by ceasing construction and undertaking a further archeological survey, in accord with contract specifications for the construction contract.

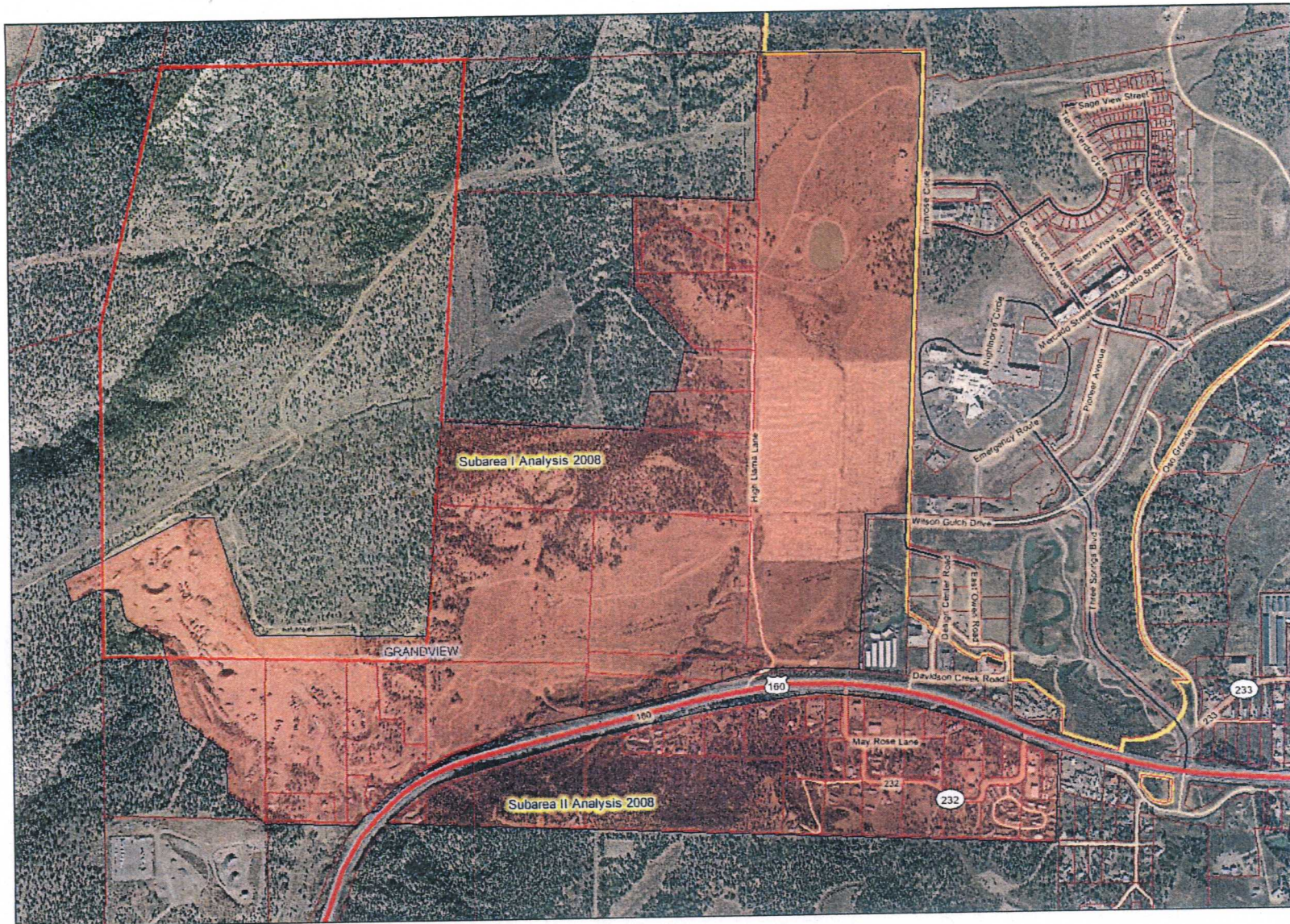
I have also evaluated possible conflicts between the current construction project and potential preclusion of US 550 realignment alternatives. The only potential conflict would be with maintaining the current US 550 alignment and the construction of Ramp A, the US 160 off ramp for eastbound traffic just east of the current US 160 / US 550 intersection. Ramp A is shown on the map provided as Attachment A. A short, substandard weave distance that would be created for traffic turning east from the existing US550 alignment (if left in place on a modified realignment or no-build alternative) and the ramp termini for US 60 traffic exiting for the new Ramp A). The CDOT Regional Traffic Engineer has verbally advised that such a conflict could be resolved, if it were ever to become reality, with an additional traffic signal head to the signal light at this intersection and with revised signal timing at this location. This signal would control north-to-eastbound traffic entering the intersection. I agree with this determination that this reasonable solution, which would separate the traffic through signal timing, means the construction underway does not preclude continued use of the present US 550 alignment.

As detailed above, I have evaluated the traffic needs of the corridor, the need for interchanges in this developing area outside Durango, the projected growth north and south of US 160 in the vicinity of the interchange, and the details of the on-going construction such as bridge width. I have personally reviewed the growth projections, traffic predictions, plans for the project, justification for the bridge width, and connecting roadway systems. I have visited the active construction site and reviewed photographs of the site and construction underway. I have reviewed the State's September 3, 2008 and October 30, 2008 letters on the subject (Attachments D and E) along with other documents on file. I have considered the comments and input provided by and on behalf of the owners of the historic Webb Ranch. I have determined that the interchange project is not directly affected by the separate 4(f) analysis for the possible realignment of US550 across the Webb Ranch, south of the interchange under construction. The present construction project is providing for 1) widening of a short segment of US 160 and 2) the initial phase of an independent and useful interchange on US 160 that will serve users north and south of US 160, even without providing an interchange for US 550 traffic at this location at some indeterminate time.

- Attachment A - Map of US 60 Interchange under construction (9/08) and
Local roadway system, existing and planned
- Attachment B - Map of planned development area on US 60
- Attachment C - Proposed US 60/US 550 Interchange as shown in EIS
- Attachment D - CDOT letter of October 30, 2008
- Attachment E - CDOT letter of September 3, 2008
- Attachment F - Plan sheet showing bridge under construction and
Second bridge needed if US 550 connects here
- Attachment G - Bridge layout - bridge over US 60 serving on ramp and
Frontage road.
- Attachment H - CDOT documentation of construction site review by Archeologist
- Attachment I - Aerial photo of Existing US 160/US 550 Intersection
- Attachment J - Map depicting entire US 160 project

US 160 Interchange Under Construction, November, 2008





La Plata County, CO

Map Scale
1 inch = 800 feet

Figure 4

Disclaimer: The information is provided as is without warranty of any kind, either express or implied, including but not limited to the implied warranties of merchantability and fitness for a particular purpose. In no event shall La Plata County be liable for any damages whatsoever including direct, indirect, incidental, consequential, loss of business profits or special damages.

US 160 – US 550 Interchange Shown in Final EIS

