



County of Los Alamos

1000 Central Avenue
Los Alamos, NM 87544

Agenda - Final Transportation Board

Thursday, November 1, 2018

5:30 PM

1000 Central Avenue, Room 110

1. **CALL TO ORDER / ROLL CALL**

2. **APPROVAL OF AGENDA**

3. **PUBLIC COMMENT**

This section of the agenda is reserved for comments from the public on items that are not otherwise included in this agenda.

Please Limit Public Comment to 3 Minutes.

4. **LIAISONS' REPORTS**

5. **APPROVAL OF MINUTES**

[11359-18](#) Approval of the October 4, 2018 Transportation Board Minutes

Presenters: Sriram Swaminarayan, Chair of the Transportation Board

Attachments: [DRAFT - October 4, 2018 - Transportation Board Meeting Minutes](#)

6. **OLD BUSINESS - Possible Action**

[11363-18](#) NM502 Project - Update and Introductions

Presenters: Eric Martinez, County Engineer

[11362-18](#) Diamond Drive Crossing - Update

Presenters: Daniel Erickson, Traffic and Streets Manager

[11360-18](#) LANL FY19 SEP East Jemez Road - NM 4 Intersection - Update

Presenters: Philo Shelton, Public Works Director

Attachments: [A - FY19 SEP East Jemez Road and NM 4 Intersection Report](#)

7. NEW BUSINESS**8. PROJECT UPDATES**

[11361-18](#) Public Works Staff/Project Update - October 2018

Presenters: Philo Shelton, Public Works Director

Attachments: [A - Public Works Update for October 2018](#)

9. CHAIRPERSON'S REPORT**10. FUTURE AGENDA ITEMS**

- * *Tsikumu Village Road Improvement Options*
- * *LANL Trail Map*
- * *Wildlife Issues*
- * *District 5 Traffic Engineer*
- * *NMDOT 502 Update*
- * *Flow Trail Update*
- * *Trinity Drive/35th Street Intersection Improvements*
- * *Public Works Design & Construction Standards Update*

11. ADJOURNMENT

If you are an individual with a disability who is in need of a reader, amplifier, qualified sign language interpreter, or any other form of auxiliary aid or service to attend or participate in the hearing or meeting, please contact the County Human Resources Division at 505-662-8040 at least one week prior to the meeting or as soon as possible.

Public documents, including the agenda and minutes can be provided in various accessible formats. Please contact the personnel in the Public Works Division at 505-662-8150 if a summary or other type of accessible format is needed.



County of Los Alamos

Staff Report

November 01, 2018

Los Alamos, NM 87544
www.losalamosnm.us

Agenda No.:

Index (Council Goals):

Presenters:

Legislative File: 11359-18

...Title

Approval of the October 4, 2018 Transportation Board Minutes

...Recommended Action

I move that the Transportation Board approve the October 4, 2018 minutes as presented.

OR

I move that the Transportation Board approve the October 4, 2018 minutes as amended.

...Attachments

A - DRAFT October 4, 2018 Meeting Minutes



County of Los Alamos

Minutes

Transportation Board

1000 Central Avenue
Los Alamos, NM 87544

Thursday, October 4, 2018

5:30 PM

1000 Central Avenue, Room 110

1. CALL TO ORDER / ROLL CALL

The October 4, 2018 Transportation Board Meeting was called to order at 5:30 p.m.

Present:

Sriram Swaminarayan, Chair
Don Machen, Vice-Chair

Members:

David Schiferl
Julie Bennett
Terrence Foecke
Nancy Barnes
Kyle Wheeler

Staff in attendance:

Jon Bulthuis, Deputy Public Works Department
Annette Granillo, Transit Division Manager
Eric Martinez, County Engineer
Dan Erickson, Traffic & Street Division Manager
Louise Romero, Office Manager

Members of the public in attendance:

Albert Thomas, Sr. Vice President Bohannon Huston
Eric Wrage, Bohannon Huston
Pete Maggiore, DOE/NNSA
Carol Brown, DOE/NNSA
Jason Lott, National Park Service

2. APPROVAL OF AGENDA

A motion was made by Member Wheeler, seconded by Member Machen that the October 4, 2018 agenda be approved as presented; motion passed unanimously.

3. PUBLIC COMMENT

No Public Comment

4. LIAISONS' REPORTS

Member Wheeler attended the Tourism Implementation Task Force meeting, a presentation was given by Atomic City Transit. Members will visit the White Rock Visitors Center next week.

Vice-Chair Machen did not provide a report.

5. APPROVAL OF MINUTES

[11252-18](#) A motion was made by Member Bennett, seconded by member Machen that the September 6, 2018 meeting minutes be approved as amended; motion passed unanimously, Member Wheeler abstained.

6. OLD BUSINESS**7. NEW BUSINESS**

[11253-18](#) **LANL FY19 SEP East Jemez Road - NM 4 Intersection
CONCEPT 1**

- Meets the State Access Management Manual for the 45 mph speed limit on NM4 and 55 mph on East Jemez Road
- Will replace the signal at the intersection

East bound

- would have a dual left turn
- One through lane to Tsakawi proposed parking (Forest Service)
- Free right turn lane
- 5 ft. shoulder
- Provide pedestrian access/crosswalks (northbound and southbound directions only)

Northbound (NM4)

- 2 through lanes
- Right turn lane
- Left turn lane to EJR
- A 4 ft. bike lane

Southbound NM4

- Free right onto EJR
- One through lane
- One left turn lane to proposed parking area
- 5 ft. shoulder

Westbound EJR (Tsakawi parking lot)

- Left out of parking area
- Through right turn combo to EJR
- Through in from EJR
- Extra lane for intersection lane alignment

CONCEPT 2

- Will replace the signal at the intersection

East bound

- One left turn
- One through/left lane
- Free right turn lane
- 5 ft. shoulder
- Provide pedestrian access/crosswalks (northbound and southbound directions only)

Northbound (NM4)

- two through lanes
- Right turn lane
- Left turn lane to EJR
- A 4ft. bike lane

Southbound NM4

- Right lane merge was shortened from 960 ft to 270 feet to not conflict with the LANL inspection site turnout
- Free right onto EJR
- One through lane
- One left turn lane to proposed parking area
- Merging lane is reduced to 730 ft. from 760 ft. (SMM guideline)
- 5 ft. shoulder

Westbound EJR (Tsakawi parking lot)

- Left out of parking area
- Through right turn combo to EJR
- Through in from EJR

CONCEPT 3

- Will replace the signal at the intersection

East bound

- Would have a dual left turn
- One through lane to Tsakawi proposed parking (Forest Service)
- Free right turn lane

- 5 ft. shoulder
- Provide pedestrian access/crosswalks (northbound and southbound directions only)

Northbound (NM4)

- One through lane
- Through/right turn
- Left turn lane to EJR
- Right turn
- 8 ft. shoulder that ends at the beginning of the right turn lane

Southbound NM4

- Right lane merge was shortened from 960 ft to 270 ft to not conflict with the LANL inspection site turnout
- Free right onto EJR
- One through lane
- One left turn lane to proposed parking area
- Merging lane is reduced to 730 ft. from 760 ft. (SMM guideline)
- 5 ft. shoulder

Westbound EJR (Tsakawi parking lot)

- Left out of parking area
- Through right turn combo to EJR
- Through in from EJR
- Extra lane for intersection lane alignment

CONCEPT 4

- Will replace the signal at the intersection
- Proposed speed limit reduction from 50 mph to 45 mph on NM4
- 35 mph eastbound on EJR

East bound

- Would have a dual left turn
- One through lane to Tsakawi proposed parking (Forest Service)
- Free right turn lane
- 5 ft. shoulder
- Provide pedestrian access/crosswalks (northbound and southbound directions only)

Northbound (NM4)

- One through lane
- Through/right turn
- Left turn lane to EJR
- Right turn to proposed parking area
- 5 ft. shoulder

Southbound NM4

- Free right onto EJR
- One through lane

- One left turn lane to proposed parking area
- 5ft. shoulder

Westbound EJR (Tsakawi parking lot)

- Left out of parking area
- Through right turn combo to EJR
- Through in from EJR
- Extra lane for intersection lane alignment

Thus, reducing turn lane lengths and merging tapers to limit the footprint of the intersection

11254-18**Going Electric**

- Time Line
 - June 12, 2018 - County Council approval to apply for Federal Transit Administration (FTA) No-Low Emissions grant.
 - August 24, 2018 - FTA announces grant award \$84.5 million to fifty-two projects in forty-one states with New Mexico being one of the states.
 - August 28, 2018 - Press release - Udall, Heinrich, Lujan support of grant award for 1.48 million dollars for electric powered bus and charging station procurement
 - March 2019 - receive grant contract from NMDOT and proceed with procurement
 - Why Electric Buses
 - Proterra 35-foot catalyst vehicle lifetime operational savings
 - Proterra catalyst electric vehicles achieve up to 20 MPG
 - Route 1 - Downtown Circulator
 - Operates 180 revenue miles per day
 - 30-minute service provided from 6:35 am until 6:56 pm
 - 15-minute (peak service) provided from 11:00 am to 12:58 pm
 - Route most visible by visitors and residents of Los Alamos and White Rock
 - Ability to advertise the “hidden gems” of the County
- Examples:
- Gateway to three National Parks
 - Fuller Lodge
 - Hiking and Biking Trails
 - Pajarito Mountain
 - Ability to implement Council goal of renewable and sustainable energy
 - What can the busses look like?
 - Electric bus charging stations

[11274-18](#)**Dan Erickson, Traffic & Streets Division Manager presented the FY19 Snow & Ice Control Plan**

- Purpose
- Mission Statement
- Storm Response Goal
- Personnel
- Staff Training
- Citizen's Concerns, Requests, & Emergencies
- Snow Notification Procedures
- Snow & Ice Control Operations
- Operational Safety
- General Operations
- Street & Sidewalk Prioritization
- Safe Routes to School
- Public Transit Routes
- County Facility Prioritization
- Residential Responsibilities
- Motorist's Responsibilities
- Mop Up Operations
- Property Damage
- Priority Maps
- Safe Routes to School Maps
- Transit Route Map
- Transit Service Modifications
- Sand and Salt Barrel Locations
- Snow Dump Locations
- Equipment Resources
- Human Resources

A motion was made by member Wheeler, seconded by Member Bennett that the FY19 Snow and Ice Control Plan be approved as presented; the motion passed unanimously.

8. PROJECT UPDATES[11255-18](#)

Jon Bulthuis, Deputy Public Works Director, presented updates regarding Public Works projects for September 2018.

9. CHAIRPERSON'S REPORT

Chair Swaminarayan did not have a report.

10. FUTURE AGENDA ITEMS

- LANL Trail Map
- Wildlife Issues
- District 5 Traffic Engineer
- NMDOT 502 Update
- Flow Trail Update
- Tsikumu Village Road Improvement Options
- Trinity Drive/35th Street Intersection Improvements
- Public Works Design & Construction Standards Update

11. ADJOURNMENT

A motion was made by Member Wheeler seconded by Member Machen that the October 4, 2018 meeting be adjourned at 7:00 p.m.; motion passed unanimously.

If you are an individual with a disability who is in need of a reader, amplifier, qualified sign language interpreter, or any other form of auxiliary aid or service to attend or participate in the hearing or meeting, please contact the County Human Resources Division at 505-662-8040 at least one week prior to the meeting or as soon as possible.

Public documents, including the agenda and minutes can be provided in various accessible formats. Please contact the personnel in the Public Works Division at 505-662-8150 if a summary or other type of accessible format is needed.



County of Los Alamos

Staff Report

November 01, 2018

Los Alamos, NM 87544
www.losalamosnm.us

Agenda No.:

Index (Council Goals):

Presenters:

Legislative File: 11363-18

...Title

NM502 Project - Update and Introductions

...Body

Eric Martinez will provide an update regarding the NM502 Project and introduce Sarah Anderson and Juan Rael, Engineering Project Manager's.



County of Los Alamos

Staff Report

November 01, 2018

Los Alamos, NM 87544
www.losalamosnm.us

Agenda No.:

Index (Council Goals):

Presenters:

Legislative File: 11362-18

...Title

Diamond Drive Crossing - Update

...Body

Dan Erickson, Traffic & Streets Division Manager will provide board members with an update of the Golf Course Crossing on Diamond Drive.

Background information

On September 6th, a presentation was brought before the Transportation Board regarding a study and possible solutions to improve the pedestrian crossing on Diamond Drive near the west end of the golf course. At this time many alternatives were presented, however, staff recommended the installation of a Rectangular Rapid Flashing Beacon (RFFB).

This same presentation was brought before the Golf Course Advisory Subcommittee (GCAS) on September 19th as well as the Parks and Recreation Board on October 11th. While no official recommendations were made, the committee and board members unanimously agreed that the installation of an RFFB at this crossing would be a prudent decision.

...Recommendation

I move that the Golf Course Crossing on Diamond Drive Project be presented to Council for consideration and potential funding.



County of Los Alamos

Staff Report

November 01, 2018

Los Alamos, NM 87544
www.losalamosnm.us

Agenda No.:

Index (Council Goals):

Presenters:

Legislative File: 11360-18

...Title

LANL FY19 SEP East Jemez Road - NM 4 Intersection - Update

...Body

Philo Shelton will provide an update regarding Option 5 for the NM 4 Intersection.

...Attachments

A - SEP East Jemez Road and NM 4 Intersection Report

TRAFFIC STUDY AND CONCEPT DESIGN EAST JEMEZ ROAD AND NM 4 INTERSECTION

DELIVERY ORDER No. 18

CONTRACT No. W912PP-15D-0024

DRAFT SUBMITTAL

OCTOBER 11, 2018

Prepared for:

U.S. Army Corps of Engineers
South Pacific Division
Albuquerque District

Prepared by:



**FY19 SEP EAST JEMEZ ROAD AND NM 4 INTERSECTION
LOS ALAMOS, NEW MEXICO
TRAFFIC STUDY AND CONCEPT DESIGN REPORT**

OCTOBER 11, 2018

DRAFT SUBMITTAL

Prepared by:

**3AEGREEN
7500 JEFFERSON ST NE
ALBUQUERQUE, NM 87109**

Prepared for:

**U.S. ARMY CORPS OF ENGINEERS
SOUTH PACIFIC DIVISION
ALBUQUERQUE DISTRICT**

PREPARED BY:


ERIC J. WRAGE, P.E., PTOE


OCTOBER 11, 2018

**FY19 SEP EAST JEMEZ ROAD AND NM 4 INTERSECTION
LOS ALAMOS, NEW MEXICO**

TRAFFIC STUDY AND CONCEPT DESIGN REPORT

TABLE OF CONTENTS

I.	INTRODUCTION AND SUMMARY	1
A.	Study Purpose.....	1
B.	Executive Summary	1
1.	Site Location and Study Area	1
2.	Principal Findings	2
II.	STUDY AREA CONDITIONS	4
A.	Existing Roadway and Multimodal Facility Description	4
1.	Roadway	4
2.	Horizontal and Vertical Geometry.....	4
3.	Drainage	8
4.	Utilities	9
5.	Geotechnical Investigation	10
6.	Right-of-Way	11
7.	Multi-Modal	11
B.	Data Sources	11
III.	ANALYSIS OF EXISTING CONDITIONS	12
A.	Traffic Counts	12
B.	Existing Traffic Conditions	12
C.	Existing Levels of Service.....	12
IV.	TRAFFIC AND IMPROVEMENT ANALYSIS	15
A.	2028 Build Intersection Capacity Analysis	15
B.	2038 Build Intersection Capacity Analysis	17
C.	East Jemez Road Westof NM 4 Considerations	17
1.	Impacts West of NM 4	17
2.	Westbound Merge	17
3.	Northbound Merge	18
D.	Design Options.....	18
1.	Option 1	20

2. Option 2	22
3. Option 3	24
4. Option 4	26
5. Option 5	28
V. CONCLUSIONS.....	30
A. Conclusions.....	30
B. Recommended Improvements.....	30
C. Next Steps.....	31

FIGURES

Figure 1 – Location / Existing Conditions.....	3
Figure 2 – East Jemez Road Existing Plan and Profile.....	5
Figure 3 – NM 4 Existing Plan and Profile	6
Figure 4 – 2016, 2028, 2038 AM (PM) Peak Hour Traffic Volumes	14
Figure 5 – Option 1	21
Figure 6 – Option 2	23
Figure 7 – Option 3	25
Figure 8 – Option 4	27
Figure 9 – Option 5	29

TABLES

Table 1 – Existing Horizontal Geometry	7
Table 2 – Existing Vertical Geometry	8
Table 3 – Existing Pavement Thickness	10
Table 4 – LOS Definitions	12
Table 5 – 2016 Existing Signalized Intersection Capacity Analysis Results.....	13
Table 6 – 2028 Build Signalized Intersection Capacity Analysis Results	16
Table 7 – 2038 Build Signalized Intersection Capacity Analysis Results	17

APPENDICES

Appendix A Existing Traffic Counts

Appendix B 2016 Existing Intersection Capacity Analysis

Appendix C 2028 Build Intersection Capacity Analysis

Appendix D 2038 Build Intersection Capacity Analysis

Appendix E Construction Cost Estimates

I. INTRODUCTION AND SUMMARY

The US Army Corps of Engineers (USACE), in support of the National Nuclear Security Administration and Los Alamos National Security, LLC (LANS), is evaluating the intersection of NM 4 and East Jemez Road (aka LANL Truck Route). The proposed project will evaluate needed improvements to the intersection, which will widen and reconfigure the existing three-way intersection of East Jemez Road and NM State Road 4 near Los Alamos, NM into a four-way intersection. The fourth leg will provide access to a proposed parking lot to be constructed by the National Park Service for the Tsankawi Ruins Trailhead. Work to be performed under this specific Delivery Order consists of pre-design activities including site survey, geotechnical investigation, and a traffic study.

A. STUDY PURPOSE

The purpose of the study is to evaluate the intersection operations for existing conditions, evaluate the addition of a fourth leg on the east side and identify improvements needed to support current traffic volumes, as well as, future growth expectations. A location / existing conditions map is shown in Figure 1.

A previous study of this intersection was conducted by Los Alamos County (LAC) in 2016. This study will validate and confirm the study prepared by Los Alamos County.

The New Mexico Department of Transportation (NMDOT) is currently conducting a corridor study of NM 4 in the vicinity of the intersection

B. EXECUTIVE SUMMARY

1. SITE LOCATION AND STUDY AREA

The site is located on Los Alamos National Laboratory in Santa Fe County.

The study will focus on the existing T-intersection of NM 4 and East Jemez Road, and the approaches to the intersection.

The intersection evaluations include capacity analysis for the AM and PM peak hours for the following traffic conditions:

- Existing traffic. Currently this study used the 2016 traffic count provided by Los Alamos County. A 2018 traffic count will be performed to verify the data.
- 2038 Horizon Year with 20% increase in background traffic growth assumed based on input from LANS.

2. PRINCIPAL FINDINGS

The traffic analysis found the existing “overall” intersection operates with acceptable delay, however the vehicle queue for southbound-to-westbound in the AM peak hour, and the eastbound-to-northbound queue in the PM peak hour are substantial. In addition, the analysis found that several movements are approaching capacity, and likely occasionally exceed capacity. Therefore, improvements were considered to reduce delay and queue for specific movements, and provide capacity for future traffic growth. These improvements will result in acceptable delay and queues at the intersection.

The recommended improvements include adding a second eastbound left turn lane on East Jemez Road, a second northbound through lane on NM 4 and right and left turn bays for the proposed Tsankawi trailhead parking lot. Acceleration and deceleration lanes will be added to meet the requirements of the State Access Management Manual (SAMM).

Five Options for intersection improvements were evaluated that will accommodate existing, 2028, and 2038 traffic volumes.

Option 1 uses the existing alignments of NM 4 and East Jemez Road with the new lanes added. This Option is SAMM Compliant for the existing posted speeds.

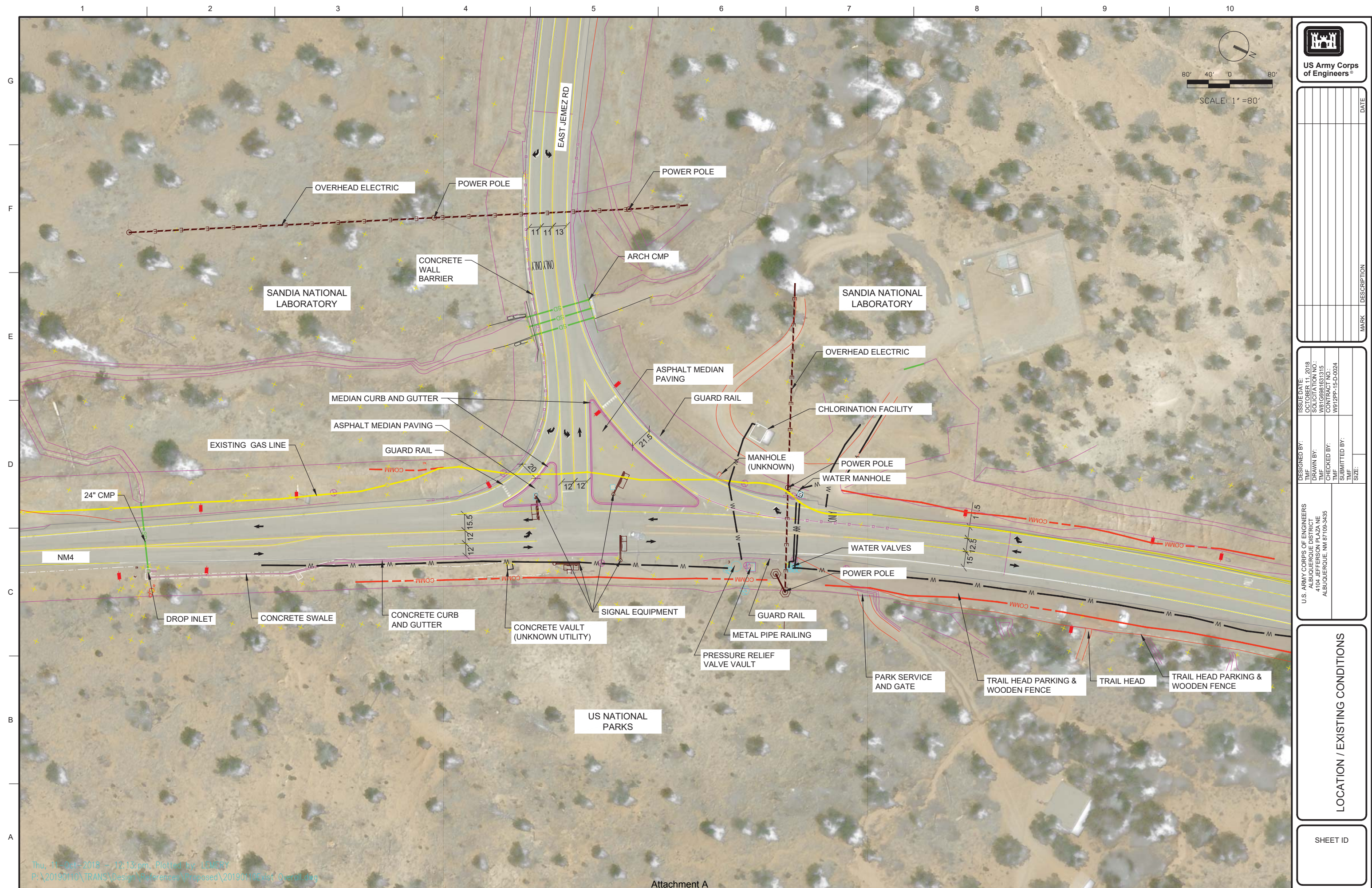
Option 2 has a 5° skewed intersection with shortened acceleration lanes southbound to avoid impacting San Ildefonso Pueblo lands and westbound to avoid impacts to the truck inspection station.

Option 3 has a 5° skewed intersection, with shortened acceleration lanes as described on Option 2 along with dedicated dual lefts on East Jemez Road for eastbound traffic turning North onto NM 4.

Option 4 is the same as Option 3 except that the posted speed northbound and eastbound are reduced to 45 mph and the acceleration and deceleration lengths are reduced accordingly.

Option 5 is the same as Option 4 except that the acceleration lanes northbound has been extended to the project limits to allow more merge time and the westbound acceleration lane is extended to become the right turn bay for the truck inspection station.

Based on input from the study team, the preferred alternative is Option 5, shown in Figure 9, on page 29.



II. STUDY AREA CONDITIONS

A. EXISTING ROADWAY AND MULTIMODAL FACILITY DESCRIPTION

1. ROADWAY

See Figure 1 for a graphic of the geometry which is described below.

The intersection currently is a 3-legged, signalized T-intersection, with East Jemez Road terminating at NM 4. There is a single eastbound left turn lane and single eastbound right turn lane both of which are approximately 650 feet long, from East Jemez Road onto NM 4. East Jemez road has approximately 8,000 vehicles per day. East Jemez Road is posted 55 mph approaching the intersection. However, realistically the project area is in a transition zone. Traffic will need to start slowing down between 500 and 600 feet prior to the intersection. The vehicular movements through the intersections are estimated to be 15 mph or less.

NM 4 is two lanes southbound until approximately 1,100 feet north of the intersection when the outside lane turns into a right turn lane and there is a single southbound lane through the intersection. Close to the intersection there is a raised curb between the lanes with delineators which are recently added by Los Alamos County to prevent last minute weaving maneuvers. There are channelization islands for the southbound and eastbound right turns. Northbound has a single left turn lane approximately 140 feet long and a single northbound through lane. NM 4 carries approximately 10,000 – 12,000 vehicles per day. NM 4 is posted 50 mph south of East Jemez Road and 45 mph north of the intersection.

The National Park Service intends to construct a parking lot for the Tsankawi Ruins Trailhead east of NM 4. The entrance to this parking lot will become the fourth leg of the intersection. This traffic study will consider proposed traffic from the trailhead parking in the analysis.

2. HORIZONTAL AND VERTICAL GEOMETRY

The existing horizontal and vertical geometry in the intersection area, shown in Figure 2 and Figure 3, was checked to see if it meets design criteria from the *2011 Edition of the Policy on Geometric Design of Highways and Streets* published by the American Association of State Highway and Transportation Officials (AASHTO Green Book). The design speed was assumed to be 5 mph greater than the posted speed which is a common practice. The assumed maximum super elevation was 6%. Drivers on East Jemez Road

naturally slow down since it is a T-intersection with no through movements. The existing right and left turn movements are assumed to be 15 mph or less. Traffic into the Tsankawi Ruins Trailhead parking lot is expected to be very low volume but when the intersection is converted to 4 legs there will be the occasional eastbound vehicle that goes through the intersection to the parking lot. The speed limit should be reduced approaching the intersection to account for the through movement as well as the need to slow down for the turning movements at the intersection. Table 1 below shows the existing horizontal curves and the calculated design speed for each using the criteria in the AASHTO Green Book. Curve numbers are shown on the respective existing geometry plan and profile sheet.

Table 1 – Existing Horizontal Geometry							
				SUPER ELEVATION emax=6%			
Curve Id	PC STA	PT STA	CURVE DIRECTION	RADIUS (FT)	EXISTING SUPER	DESIGN SPEED (mph)	Comment
East Jemez Rd							
1	104+92.13	110+93.34	LT	1400	Varies 3-4%	30	Deficient
2	112+23.94	113+85.55	LT	600	Varies 3-4%	20	Speed transition area
3	114+14.50	114+83.19	RT	500	Varies 1-0.5%	0-15	Speed transition area
NM 4							
4	213+59.31	232+36.65	RT	2900	Varies 4% LT and 7% RT	55	

Curve ID 1 occurs prior to the speed transition area needed for vehicles to slow down to make the turns at the intersection. The curve only has a calculated design speed of 30 mph. Likely the super elevation transition is also deficient. The existing horizontal geometry indicates that the posted speed limit should be 25 mph on East Jemez Road approaching the intersection. Curves 2 and 3 are within the deceleration length needed for a vehicle to comfortably slow to 15 mph.

Table 2 shows the existing vertical curves and the associated design speed for each. Curve numbers are shown on the respective existing geometry plan and profile sheet.

Table 2 – Existing Vertical Geometry						
			K -Value			
CURVE ID	PVC STA	VPT STA	CREST	SAG	DESIGN SPEED (mph)	Comment
East Jemez Rd						
1	103+15	107+15	238.31		65	
2	110+24.22	114+24.22		58.25	35	Speed Transition Area
3	115+08.87	115+58.41	21.21		30	At Intersection
NM 4						
4	200+00	208+00		154.39	60	
5	211+94.83	222+94.83	129.47		55	

Vertical curves 2 and 3 are within the speed transition area needed for vehicles to slow down to make the turns at the intersection. If the posted speed limit is as recommended, then the existing vertical curves would be acceptable on East Jemez Road.

3. DRAINAGE

In general, storm water flows from north to south. East Jemez Road has a deep sag vertical curve with a low point approximately 330' west of the intersection. There are two existing drainage structure crossings within the study area. There is a 24-inch culvert pipe under NM 4 at approximately 390 feet south of East Jemez Road. The pipe has a drop inlet on the east side. There is concrete roll curb on the east side from the center of the intersection for about 130 feet. The curb transitions to a valley gutter / rundown which continues to the drop inlet. There is also a multi-plate pipe under East Jemez Road about 180 feet west of NM 4. The pipe is assumed to be 18.25' x 7.5' arch as estimated in the Los Alamos County study. The multi-plate pipe has a headwall with riprap around it on the outlet. The



Photo 1 – Multi-Plate Pipe

inlet has a headwall with some channelization walls. The inlet headwall is severely eroded with exposed rebar as shown in the picture below. The invert on both sides of the road is buried.

4. UTILITIES

Existing utilities are shown on Figure 1, the Location / Existing Conditions Map. There are water, electric, communication, and gas lines in the project area.

The water facilities in the area are owned by Los Alamos County Department of Utilities. The Pajarito Mesa Well No. 1 is in the northwest quadrant of the intersection. There is a Chlorine Station Building in the same quadrant. These facilities should be far enough away from the road that they are not impacted. The supply line crosses the north approach to the intersection. Water lines head north, south and west



Photo 2 – Chlorine Station Building



Photo 3 – Chlorine Injection Facilities

after going through the Chlorine Injector Vault and Injector Piping. There are manholes and valves on both sides of NM 4 within the project limits. These lines serve the community of White Rock, Los Alamos National Laboratory (LANL), and the National Park Service.

There are overhead electric lines on the north and west approaches. These lines are owned by LANL.

There is underground electric for the traffic signal in the intersection. The control cabinet is on the east side of the intersection. There is a signal ahead warning flasher on NM 4 approaching the intersection in both directions.

There are communication lines on both the east and west side of NM 4. There are telephone pedestals in the project area.

There is a gas line on the west side of NM 4. There is a gas valve adjacent to the north approach of the intersection.

5. GEOTECHNICAL INVESTIGATION

A geotechnical investigation was performed by Terracon Consultants, Inc. in September 2018. Four test borings were advanced to depths of 6 to 16 ½ feet below the existing grade. One boring was done on each leg and one additional boring was done in the roadway near the existing multi-plate arch pipe. The results of the investigation are summarized in the following paragraphs. For more information, see the *Geotechnical Engineering Report, FY19 SEP East Jemez Road and NM4 Intersection Improvements*.

The existing pavement thickness is shown Table 3.

Table 3 – Existing Pavement Thickness		
Material	Existing Pavement Section Thickness (in)	
	East Jemez Road	NM 4
Hot Mix Asphalt	5.5 to 9.25	6 to 8.75
Aggregate Base Course	6 to 9	7.25 to 8
Total Pavement Section	11.5 to 18.25	13.25 to 16.75

The subsurface soil is generally sand with some silt, clay and gravel content. The material is non-plastic to low in plasticity. There is some fill material in the under the roadway. The remainder of the material is weathered volcanic tuff. No groundwater was observed.

The study concluded that the existing materials are suitable for the proposed reconstruction. The subgrade soils are considered to be relatively fair to good quality for roadway / pavement support. The existing pavement can be reused as engineered fill or be processed and blended into the existing subgrade.

The multi-arch plate pipe can be supported on prepared and compacted subgrade. Structural backfill should consist of imported A-1 or A-3 soils.

The recommended pavement thickness for new construction is 6 ½ inches of Hot Mix Asphalt over 6 inches of Aggregate Base Course.

6. RIGHT-OF-WAY

The existing roadways in the project area are on Department of Energy, Los Alamos National Laboratory property. NM 4 has an easement granted to the New Mexico Department of Transportation (NMDOT). The apparent width of the NM 4 right-of-way is 115 feet based on existing fence lines. The centerline of the existing road is approximately 20 feet closer to the east fence line.

The land immediately east of the right-of-way is owned by the National Park Service. The existing roadside parking for the Tsankawi Ruins Trailhead is within the apparent right-of-way easement.

The border of San Ildefonso Pueblo is located about 1000 feet south of the intersection. NM 4 through the Pueblo is also in an easement granted to NMDOT.

7. MULTI-MODAL

Currently there are no formal pedestrian or bicycle facilities on NM 4 or East Jemez Road, and the shoulders are narrow to non-existent. The NMDOT NM 4 study has plans to add a 5-foot shoulder on both sides of NM 4 to improve safety and provide a place for bicyclists and pedestrians. This study will also consider options for providing bicycle / pedestrian facilities especially on NM 4 since the NMDOT project intends to add 5 ft shoulders to the roadway.

Both the Los Alamos County 2017 Bicycle Master Plan and the National Park Service Bandelier Monument Plan indicate support for shoulders and/or multi-use path along NM 4 through the project intersection.

B. DATA SOURCES

The data used in this report consist of the traffic counts described below, survey and mapping provided by NMDOT, aerial photography from Google Earth®, utility information provided by Los Alamos County, information provided by LANS, and site visits.

III. ANALYSIS OF EXISTING CONDITIONS

A. TRAFFIC COUNTS

During the initial stages of the project, the USACE and LANS were performing a mill and inlay maintenance project on NM 4 near the intersection, as well as improvements to East Jemez Road. This roadway maintenance activity on East Jemez Road and NM 502 will prevent new traffic counts to be collected, as the maintenance projects are likely affecting driver decisions on what route to take to enter LANL property. These maintenance projects will be complete in mid-October. To maintain schedule, the traffic analysis to be performed for this study will initially use the same traffic counts collected with the previous LAC study, with modification for the 10-year and 20-year horizon requested to be evaluated. New traffic counts will be conducted in late October, after traffic can settle back into preferred routes. Please note that if these traffic counts are substantially larger than that collected by LAC, it is possible changes to the recommended improvements will be necessary.

B. EXISTING TRAFFIC CONDITIONS

Figure 4 is a summary of the existing peak hour traffic volumes, existing laneage, turning movements, and intersection level of service. The 2016 traffic counts from the Los Alamos County study are included in Appendix A.

C. EXISTING LEVELS OF SERVICE

The Sixth Edition of the *Highway Capacity Manual* (HCM) defines Level of Service (LOS) for signalized and unsignalized intersections as follows:

Table 4 – LOS Definitions			
Level of Service	Definition	Signalized (sec/veh)	Unsignalized (sec/veh)
A	Most vehicles do not stop.	<10	<10
B	Some vehicles stop.	>10 and <20	>10 and <15
C	Significant numbers of vehicles stop.	>20 and <35	>15 and <25
D	Many vehicles stop.	>35 and <55	>25 and <35
E	Limit of acceptable delay.	>55 and <80	>35 and <50
F	Unacceptable delay.	>80	>50

Level of Service D is the generally acceptable level of service in urban areas and when intersections operate below this level, improvements are generally considered, where feasible.

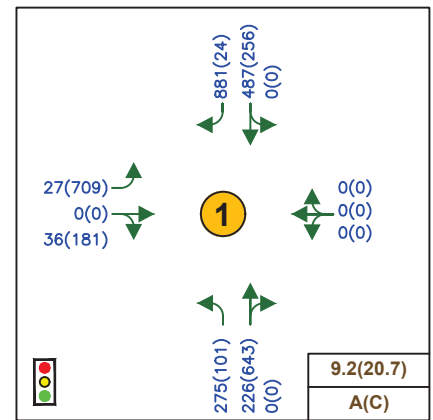
Existing intersection traffic volumes and lane geometry were analyzed using the Synchro version 10 software that uses the signalized intersection analysis methodology from the Sixth Edition of the HCM. Individual intersection output for the existing conditions analysis is included in Appendix B.

Table 5 shows the results for the signalized analysis for the existing 2016 traffic volumes, with the fourth leg added. The listed results are the average delay in seconds per vehicle, a weighted average of the delay for every vehicle that passes through the intersection in the peak hour evaluated. The table also lists the volume-to-capacity ratio (v/c) for the movement with the highest v/c ratio at the intersection. The v/c ratio is a ratio of the actual volume passing through the intersection (by movement – through, left, right, etc.) compared to the calculated capacity available to serve that movement. Volume-to-capacity ratios above 0.85 – 0.90 indicate that there are likely congestion problems occurring at the intersection. The last column in the table is the LOS, which is derived from Table 4, and is a letter grade that assesses the motorist's perception of delay. Signalized intersections have higher delay thresholds for each letter grade than do unsignalized intersections, as the assumption is that drivers will tolerate a longer delay knowing they will get to proceed within a relatively short period of time.

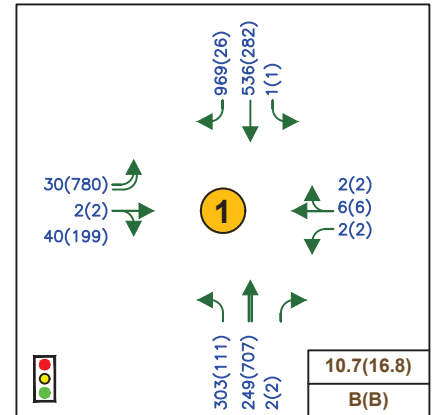
The results reported below were evaluated as semi-actuated traffic signal with a cycle length of 120 seconds. Figure 4 shows the number of lanes, movement LOS, traffic volumes, and overall intersection level of service for each intersection.

Table 5 – 2016 Existing Signalized Intersection Capacity Analysis Results						
Signalized Intersections	2016 AM Peak			2016 PM Peak		
	Delay (sec.)	V/C	LOS	Delay (sec.)	V/C	LOS
NM 4 and East Jemez Road	9.2	0.89	A	20.7	0.87	C
No movements LOS E or F						

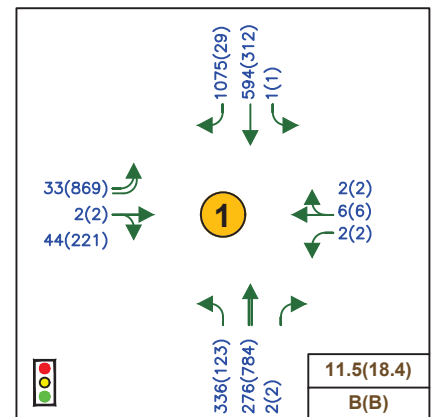
The table indicates the intersection operates at acceptable levels of service, though a review of the queues shown in the Appendix B for the southbound right in the AM peak hour, and the eastbound left in the PM peak hour are substantial, though they do not impact adjacent traffic. Several movements (SB right (AM), EB left (PM) and NB thru (PM)) are also approaching capacity with the existing geometry.



2016 Existing AM(PM)



2028 Proposed AM(PM)



2038 Proposed AM(PM)

LEGEND

- Thru Lanes (# as indicated)
- Turning Lanes (# as indicated)
- 1234(1234) AM(PM) Traffic Counts
- X(X) AM(PM) Level of Service (LOS)

IV. TRAFFIC AND IMPROVEMENT ANALYSIS

The following section will discuss the results of the future year traffic analysis. The project was requested to use an annual growth rate of 1% on the background traffic. For the 10-year analysis, this results in an increase of 10%. For a period of 20 years, the increase is 22%. This growth rate was agreed to by NNSA/LANS, as historical traffic growth on NM 4 has been flat for many years, based on historical NMDOT traffic volume data. As missions change at LANL it was considered appropriate to consider some traffic growth when considering improvements.

As the existing conditions analysis results in substantial congestion, delay and queue, improvements were considered at the intersection.

The analysis assumes the Tsankawi trailhead parking lot has been constructed, and the intersection now has four (4) legs.

A. 2028 BUILD INTERSECTION CAPACITY ANALYSIS

To improve delay, and reduce queue backup at the intersection, improvements are need at the intersection. These improvements include adding a second eastbound left turn lane on East Jemez Road. Another required improvement is a second northbound through lane on NM 4. A right turn bay is added for the Tsankawi trailhead parking lot. The State Access Management Manual (SAMM) requires a right turn bay for traffic volumes greater than five (5) during the peak hour. While traffic volumes are only estimated at this time, it was decided to add the right turn bay to improve the flow on the through lanes.

To convert the intersection to a four-legged intersection, an eastbound through lane or combination turn lane / through lane is needed on East Jemez Road, in addition to the two eastbound left turn lanes and dedicated eastbound right turn lane. A southbound left turn lane is also necessary to allow left turning traffic destined to the trailhead parking lot to slow, get out of the southbound through lane, and wait to enter the parking lot.

Also, due to volume, the southbound-to-westbound right turn lane from NM 4 onto East Jemez Road will have an acceleration lane to allow the entering traffic to accelerate to the posted speed and merge safely onto westbound East Jemez Road. The same is true for the eastbound-to-southbound right turn lane from East Jemez Road to NM 4. It too will have an acceleration lane, so turning traffic can get up to speed and merge safely onto southbound NM 4.

Figure 4 shows the laneage, traffic volumes, and level of service for the 2028 Build condition. Table 6 shows the summary of the results, with the Synchro results included in Appendix C.

Table 6 – 2028 Build Signalized Intersection Capacity Analysis Results						
Signalized Intersections	2028 Build AM Peak			2028 Build PM Peak		
	Delay (sec.)	V/C	LOS	Delay (sec.)	V/C	LOS
NM 4 and East Jemez	10.7	0.76	B*	16.8	0.75	B*
* - movements LOS E or F						

The results show the intersection will operate at acceptable delay in the 2028 Build scenario.

A review of the results in Appendix C will find the analysis suggests the LOS for the westbound left exiting the Tsankawi parking lot to operate at LOS E. This is due to this movement being a very low volume movement and operating as a protected-only left turn, due to opposing the dual eastbound left turns on East Jemez Road. Therefore, the movement only gets a small amount of green time, and then must wait as the rest of the movements are served, before the traffic signal cycle comes back around and provides the green arrow. This delay is considered acceptable due to the low volumes for this movement. This will only occur during the peak hours when the cycle length is high to serve the traffic volume. With lower cycle lengths during the day and off-peak, the delay for this movement will be lower.

B. 2038 BUILD INTERSECTION CAPACITY ANALYSIS

The same improvements needed to serve the 2028 traffic volumes will accommodate the 2038 volumes, so additional improvements are not required.

Table 7 shows the results for the signalized analysis for the 2038 traffic volumes with the mitigation improvements discussed above. Synchro results are included in Appendix D.

Table 7 – 2038 Build Signalized Intersection Capacity Analysis Results						
Signalized Intersections	2038 Build AM Peak			2038 Build PM Peak		
	Delay (sec.)	V/C	LOS	Delay (sec.)	V/C	LOS
NM 4 and East Jemez Road	11.5	0.80	B*	18.4	0.78	B*
* - movements LOS E or F						

The results indicate the intersection will continue to operate at acceptable levels of service with 2038 traffic volumes. As with the 2028 results, the westbound left exiting the Tsankawi trailhead parking lot is found to operate at LOS E. As described previously, this is acceptable due to the low volume of this movement.

C. EAST JEMEZ ROAD WEST OF NM 4 CONSIDERATIONS

1. IMPACTS WEST OF NM 4

The traffic volume for the headed westbound exiting the intersection is expected to approach 1,400 vehicles per hour in the 2038 scenario. This volume will result in significant congestion along East Jemez Road west of the intersection, as a one-lane uninterrupted flow highway is generally considered capable of carrying 1,640 vehicles per hour at LOS E. Therefore, intersections west of NM 4 may have high delay if the traffic does increase by 20%. This effect is more pronounced in the AM peak hour when the traffic volumes are slightly higher westbound (1,411 vph) than the eastbound PM volume (1,092 vph)

2. WESTBOUND MERGE

Due to the high traffic volume westbound in the AM peak hour, an analysis was conducted to evaluate the merging area from NM 4 to the LANL truck inspection station.

This section was evaluated as both a merge section and a weave section, as the analysis methods are slightly different, and both conditions are present. A merge is when

traffic must enter the through traffic stream, and a weave is when a vehicle must change lanes to reach their destination.

In this case, the southbound-to-westbound right turning traffic must merge into the single westbound through lane. For trucks entering from the south, these northbound-to-westbound trucks must weave in order to enter the truck inspection station (if the southbound-to-westbound lane is extended to the truck inspection station as will be described in some of the options presented below).

Highway Capacity Manual procedures for both weaves and merges require two lanes on the “mainline,” i.e., the lanes which are merged into or weaved from. This would be westbound East Jemez Road, which in this case has just a single lane. To attempt to represent the actual condition, the analysis was conducted with twice the northbound-to-westbound left turn volume (the “mainline” traffic volume). Only the AM peak hour was evaluated

Both this modified merge analysis and weave analysis resulted in LOS B and C, with the results included in the 2038 analysis section in the Appendix D.

3. NORTHBOUND MERGE

The northbound merge will not have the same issues as the westbound merge, as the traffic signal will meter the traffic, by preventing the eastbound-to-northbound traffic from entering at the same time as the northbound traffic. In the AM, the free-right allows the southbound-to-westbound traffic to enter the same time as the northbound-to-westbound. That cannot happen at the northbound departure left due to traffic signal operation.

The northbound merge distance has been set to NMDOT and AASHTO design criteria.

D. DESIGN OPTIONS

Five intersection options were developed in conjunction with the study team. All these options achieve the LOS and queue results as discussed above in the traffic analysis, as their geometries are comparable for traffic operations.

All the options have the required laneage discussed previously, however, they have different design speeds, skews, and multi-modal facilities. The options, described in more detail in the sections below, are as follows:

Option 1 uses the existing alignments of NM 4 and East Jemez Road with the new lanes added. This Option is SAMM Compliant for the existing posted speeds.

Option 2 has a 5° skewed intersection with shortened acceleration lanes southbound and to avoid impacting San Ildefonso Pueblo lands and westbound to avoid impacting the truck inspection station.

Option 3 has a 5° skewed intersection, with shortened acceleration lanes as described in Option 2 along with dedicated dual lefts on East Jemez Road for eastbound traffic turning north onto NM 4.

Option 4 is the same as Option 3 except that the posted speed northbound and eastbound are reduced to 45 mph and the acceleration and deceleration lengths are reduced accordingly.

Option 5 is the same as Option 4 except that the acceleration lanes northbound has been extended to the project limits to allow more merge time and the westbound acceleration lane is extended to the right turn bay for the truck inspection station.

. All the options have the following elements:

- NM 4: Dual northbound thru lanes (to accept the dual eastbound left turn lanes), a dedicated northbound to westbound left turn lane, and a dedicated northbound right turn lane to the proposed National Park Service access
- NM 4: A dedicated southbound to westbound channelized free right turn lane, a single southbound thru lane, and a dedicated southbound to eastbound left turn lane to the proposed National Park Service access
- The proposed National Park Service access has a single eastbound lane, a dedicated westbound to southbound left turn lane, and a westbound thru/right turn lane
- 5-foot shoulders are added throughout to match the typical section of the NMDOT NM 4 project and to provide an area for bicycles. Bicycle markings will not be added.
- All options require complete reconstruction of the existing signal and signal flasher on the north approach. The signal flasher on the south approach may need to be replaced do to age and condition. The flasher is within the limits of the NMDOT project and may be updated with that project.
- All turning movements can be made by a WB-67 semi-tractor trailer except the northbound to westbound movement. That movement is only designed for a WB-40, single unit truck, which matches the existing condition. Trucks can currently make the movement by taking some of the on-coming lanes which could continue to happen in non-peak hours. This movement can be improved by using mountable curb on the medians to allow trucks to drive up on the medians. In order to

- completely design for a WB-67, a median island would have to be added to NM 4 and the width of the westbound approach would have to be widened.
- The east side of NM 4 north of the intersection has been held to avoid impacting the existing chlorine injection manhole. There is a water manhole and a gas valve in the northwest quadrant that will be impacted with all of the options.

1. OPTION 1

Option 1, shown in Figure 5, is considered the “SAMM” compliant option, as it implements the NMDOT State Access Management Manual requirements for acceleration and deceleration lanes based on existing posted speed limits of the roadways.

This option has the following configuration for East Jemez Road: a dedicated single eastbound thru lane, a westbound left and a thru / right lane, dual eastbound to northbound left turn lanes, a dedicated eastbound to southbound free right turn lane, and a parallel westbound lane (from the southbound to westbound free right) that terminates at the right turn lane into the LANL Delivery Station.

Bicycle traffic would utilize the road shoulder for travel. A bike lane is created between the northbound thru lane and right turn lane.

Crosswalks were added to create bicycle crossing of East Jemez Road northbound and southbound.

This option results in approximately 256 feet of construction on San Ildefonso Pueblo lands.

Modifications/extension of the existing multi-plate pipe is required both north and south under East Jemez Road.

The east leg of the intersection will require additional right-of-way if constructed with this project. Horizontally the remainder of this option is within the apparent right-of-way, however, it is likely that the proposed toes of slope will be outside of the existing fence lines, particularly on the east side.

The engineer’s opinion of probable construction cost is \$4.28 million including New Mexico Gross Receipts Tax. A detailed cost estimate can be found in Appendix E. This does not include design, construction management and testing which is approximately an additional 20% of the cost.



FIGURE 5

2. OPTION 2

Option 2, shown in Figure 6, introduces a 5° skew to east/west legs of the intersection to smooth out the approach to the intersection and to move the intersection north, as requested by the National Park Service. The NM 4 alignment remains the same.

This option has the following configuration for East Jemez Road: A shared eastbound thru-left lane, a single dedicated eastbound to northbound left turn lane, single westbound thru lane, and a dedicated eastbound to southbound free right turn lane.

This option reduces the length of the eastbound-to-southbound right turn acceleration lane length and tightens up the transition to the northbound to westbound left turn in order to avoid construction on San Ildefonso Pueblo lands.

The length of the acceleration lane was maximized between the intersection and the Pueblo boundary for a length of 730 feet. It was assumed that vehicles would already be traveling at 15-20 mph due to the free right and did not need the additional length to get up to speed to enter NM 4. Design criteria from the AASHTO Green Book gives a length of 660 feet to get from 15 mph to 50 mph so the length is acceptable.

The southbound to westbound acceleration lane was designed at 35 mph since the horizontal and vertical geometry does not allow for a higher design speed. The traffic making this turn is fully merged into the westbound thru lane and then a right turn lane for the LANL Delivery Station is developed.

Bicycle facilities are consistent with Option 1.

This option requires extension of the existing multi-plate pipe to the north under East Jemez Road.

The east leg of the intersection will require additional right-of-way if constructed with this project. Horizontally the remainder of this option is within the apparent right-of-way, however, it is likely that the proposed toes of slope will be outside of the existing fence lines, particularly on the east side. The combined through-left turn on the west leg reduces the roadway footprint by approximately 12 feet.

The engineer's opinion of probably construction cost is \$3.86 million including New Mexico Gross Receipts Tax. A detailed cost estimate can be found in Appendix E. This does not include design, construction management and testing which is approximately an additional 20% of the cost.

3. OPTION 3

Option 3, shown in Figure 7, has the same skew as Option 2.

This option has the following configuration for East Jemez Road: A shared eastbound thru-right lane, a westbound left and thru / right lane, and dual eastbound to northbound left turn lanes.

The shared eastbound thru-right lane is considered acceptable as the eastbound thru lane will have low volume (to the Tsankawi parking lot) and the channelized right turn lane island provides storage for the one or two vehicles who may proceed east.

Modifications to acceleration lengths are consistent with Option 2.

No construction on San Ildefonso Pueblo lands would be required.

Bicycle traffic will utilize the road shoulders for travel.

Crosswalks are added to create bicycle crossings of East Jemez Road northbound and southbound. Bicyclists can choose to share the lane.

This option requires extension of the existing arch pipe to the north under East Jemez Road.

The east leg of the intersection will require additional right-of-way if constructed with this project. Horizontally the remainder of this option is within the apparent right-of-way, however, it is likely that the proposed toes of slope will be outside of the existing fence lines, particularly on the east side. The combined through-right turn on the west leg increases the footprint of the east leg by approximately 12 feet.

The engineer's opinion of probably construction cost is \$3.87 million including New Mexico Gross Receipts Tax. A detailed cost estimate can be found in Appendix E. This does not include design, construction management and testing which is approximately an additional 20% of the cost.

4. OPTION 4

Option 4, shown in Figure 8, has the same laneage, intersection skew, bicycle facilities, and impacts to the drainage structure as discussed in Option 3.

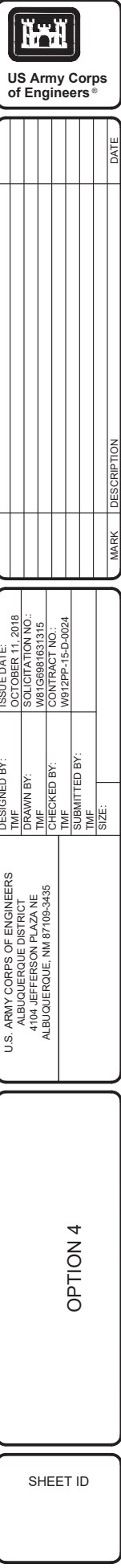
This option reduces the posted speed limit on northbound NM 4 to 45 mph. This allows a reduction of the acceleration and deceleration lane lengths to limit impacts and reduce construction costs.

This option would require a speed study to justify to the NMDOT that the speed limit on NM 4 south of the intersection could be reduced to 45 mph from the present 50 mph.

LANL would also be required to do a speed study to justify the reduction in speed on East Jemez Road.

The east leg of the intersection will require additional right-of-way if constructed with this project. Horizontally the remainder of this option is within the apparent right-of-way, however, it is likely that the proposed toes of slope will be outside of the existing fence lines, particularly on the east side. The shorter acceleration and deceleration lane lengths will reduce the roadway footprint.

The engineer's opinion of probably construction cost is \$3.56 million including New Mexico Gross Receipts Tax. A detailed cost estimate can be found in Appendix E. This does not include design, construction management and testing which is approximately an additional 20% of the cost.



5. OPTION 5

Option 5, shown in Figure 9, is consistent with Option 4 except that the northbound acceleration lane on NM 4 would be extended to the northernmost limits of construction, increasing the length from 550 feet to 910 feet to provide a longer merge for traffic turning left on East Jemez Road. In addition, the westbound acceleration lane on East Jemez Road would be extended to the truck inspection station and become a right turn only lane.

The east leg of the intersection will require additional right-of-way if constructed with this project. Horizontally the remainder of this option is within the apparent right-of-way, however, it is likely that the proposed toes of slope will be outside of the existing fence lines, particularly on the east side. The longer acceleration lane lengths will increase the roadway footprint.

The engineer's opinion of probably construction cost is \$3.6 million including New Mexico Gross Receipts Tax. A detailed cost estimate can be found in Appendix E. This does not include design, construction management and testing which is approximately an additional 20% of the cost.



V. CONCLUSIONS

A. CONCLUSIONS

The traffic analysis found the existing “overall” intersection operates with acceptable delay, however the vehicle queue for southbound-to-westbound in the AM peak hour, and the eastbound-to-northbound queue in the PM peak hour are substantial. In addition, the analysis found that several movements are approaching capacity, and likely occasionally exceed capacity. Therefore, improvements were considered to reduce delay and queue for specific movements, and provide capacity for future traffic growth. These improvements will result in acceptable delay and queues at the intersection.

It should be noted, that during the peak hour, the traffic signal cycle length is 120 seconds to provide time to clear the majority of the waiting traffic. Due to this cycle length, and that the westbound left exiting the Tsankawi parking lot has low volume and will be operating as a protected-only left turn, the westbound left will have high delay and LOS E during these periods. This is because, as the westbound left turning volume is low, the green time provided to this movement is also low. This will only occur during the peak hours when the cycle length is high to serve the traffic volume. With lower cycle lengths during the day and off-peak, the delay for this movement will be lower.

B. RECOMMENDED IMPROVEMENTS

To improve delay, and reduce queue backup at the intersection, improvements are needed at the intersection. The recommended improvements include adding a second eastbound left turn lane on East Jemez Road, a second northbound through lane on NM 4 and right and left turn bays for the proposed Tsankawi trailhead parking lot. Acceleration and deceleration lanes will be added to meet the requirements of the State Access Management Manual (SAMM).

Based on input from the study team, the preferred alternative is Option 5, the 5° skewed intersection with reduced posted speeds and a longer acceleration lane northbound and two lanes westbound. To convert the intersection to a four-legged intersection, an eastbound through lane is added on East Jemez Road which is a combined eastbound through / right movement with a channelized right turn at the intersection. In addition, two eastbound left turn lanes are needed. A southbound left turn lane is necessary on NM 4 to allow left turning traffic destined to the trailhead parking lot to slow, get out of the southbound through lane, and wait to enter the parking lot.

Also, due to volume, the southbound-to-westbound right turn lane from NM 4 onto East Jemez Road will have an acceleration lane to allow the entering traffic to accelerate to speed and merge safely with the northbound to westbound traffic on East Jemez Road. This acceleration lane will be extended to the truck inspection station and become a right turn only lane. The eastbound-to-southbound right turn lane from East Jemez Road to NM 4 will also have an acceleration lane so turning traffic can get up to speed and merge safely onto southbound NM 4.

C. NEXT STEPS

A traffic count will be completed In October 2018 to validate the 2016 count provided by Los Alamos County.

A speed study is needed to support the recommended reduction in speed limit to 45 mph.

Retaining walls may be needed to minimize impacts to any archaeological sites, however it is considered that these walls will apply equally to each option.

A cultural resource survey, biological survey and environmental clearance are needed to examine the impacts of the roadway footprint. There are known cultural sites in the southwest quadrant of the intersection. There is also the potential for cultural sites on the east side of the right-of-way. Adjustments such as shifting the roadway or adding walls may need to be considered during final design.

Since the existing multi-plate pipe appears to be heavily sedimented, hydrology and hydraulic analysis should be done during preliminary design to verify the capacity of the pipe. The pipe should be cleaned out in order to function properly. If the analysis shows that the pipe meets capacity with a limited factor of safety, then analysis should be performed to evaluate the sediment load and determine if additional capacity is needed.

APPENDIX A EXISTING TRAFFIC COUNTS



Los Alamos County
101 Camino Entrada
Bldg 1, Rm 216
Los Alamos, New Mexico, United States 87544
505-662-8176
Public Works/Traffic & Streets

Count Name: NM4/EJemez
3 16
Site Code:
Start Date: 03/17/2016
Page No: 1

Turning Movement Data

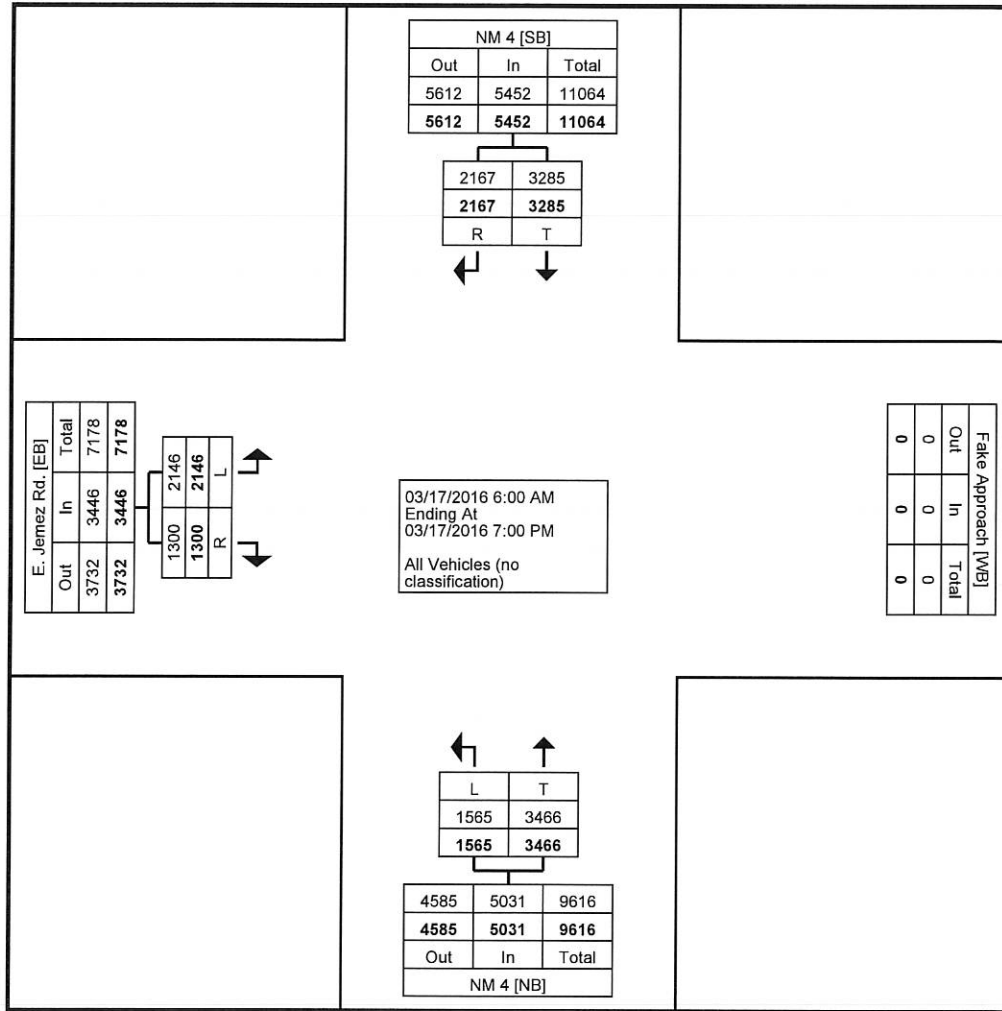
Start Time	NM 4 Southbound				NM 4 Northbound			E. Jemez Rd. Eastbound				Int. Total
	Right	Right on Red	Thru	App. Total	Thru	Left	App. Total	Right	Right on Red	Left	App. Total	
6:00 AM	73	0	86	159	10	18	28	0	2	3	5	192
6:15 AM	115	4	134	253	24	28	52	0	1	11	12	317
6:30 AM	189	15	154	358	31	31	62	0	6	7	13	433
6:45 AM	251	2	154	407	34	31	65	1	2	8	11	483
Hourly Total	628	21	528	1177	99	108	207	1	11	29	41	1425
7:00 AM	227	15	119	361	49	54	103	0	5	5	10	474
7:15 AM	175	44	103	322	70	91	161	6	2	6	14	497
7:30 AM	151	16	111	278	73	99	172	19	1	8	28	478
7:45 AM	131	12	95	238	61	60	121	19	6	6	31	390
Hourly Total	684	87	428	1199	253	304	557	44	14	25	83	1839
8:00 AM	88	11	88	187	72	48	120	1	18	7	26	333
8:15 AM	74	11	53	138	86	54	140	4	10	16	30	308
8:30 AM	65	7	48	120	60	52	112	1	22	11	34	266
8:45 AM	43	4	45	92	72	32	104	2	19	13	34	230
Hourly Total	270	33	234	537	290	186	476	8	69	47	124	1137
9:00 AM	30	0	41	71	49	32	81	5	5	11	21	173
9:15 AM	41	2	52	95	37	35	72	7	10	7	24	191
9:30 AM	23	1	42	66	56	34	90	2	16	6	24	180
9:45 AM	18	0	45	63	41	27	68	6	5	10	21	152
Hourly Total	112	3	180	295	183	128	311	20	36	34	90	696
10:00 AM	16	0	41	57	45	14	59	4	13	9	26	142
10:15 AM	11	0	43	54	31	23	54	4	9	4	17	125
10:30 AM	11	2	50	63	33	17	50	5	12	7	24	137
10:45 AM	14	2	51	67	45	25	70	2	12	7	21	158
Hourly Total	52	4	185	241	154	79	233	15	46	27	88	562
11:00 AM	8	5	51	64	47	24	71	1	15	17	33	168
11:15 AM	8	6	55	69	45	23	68	2	13	15	30	167
11:30 AM	10	2	57	69	45	32	77	5	13	8	26	172
11:45 AM	7	2	50	59	42	19	61	7	16	15	38	158
Hourly Total	33	15	213	261	179	98	277	15	57	55	127	665
12:00 PM	9	2	48	59	47	26	73	3	20	19	42	174
12:15 PM	6	3	52	61	46	20	66	3	21	22	46	173
12:30 PM	14	2	62	78	59	24	83	0	26	10	36	197
12:45 PM	11	1	34	46	44	17	61	8	25	11	44	151
Hourly Total	40	8	196	244	196	87	283	14	92	62	168	695
1:00 PM	7	3	51	61	44	27	71	4	6	9	19	151
1:15 PM	5	5	39	49	42	24	66	8	14	13	35	150
1:30 PM	8	3	27	38	37	28	65	4	17	12	33	136
1:45 PM	6	5	53	64	54	18	72	11	9	18	38	174
Hourly Total	26	16	170	212	177	97	274	27	46	52	125	611
2:00 PM	12	1	49	62	58	19	77	9	7	24	40	179
2:15 PM	8	0	43	51	46	20	66	4	15	18	37	154
2:30 PM	16	1	48	65	31	22	53	4	19	23	46	164
2:45 PM	9	4	36	49	54	23	77	13	24	37	74	200
Hourly Total	45	6	176	227	189	84	273	30	65	102	197	697
3:00 PM	5	1	65	71	54	22	76	19	18	45	82	229
3:15 PM	3	1	65	69	65	22	87	13	23	49	85	241
3:30 PM	0	4	43	47	99	29	128	23	17	83	123	298
3:45 PM	3	0	51	54	110	26	136	13	22	97	132	322
Hourly Total	11	6	224	241	328	99	427	68	80	274	422	1090
4:00 PM	4	8	63	75	124	21	145	25	8	192	225	445
4:15 PM	4	2	59	65	163	24	187	27	11	206	244	496
4:30 PM	1	7	66	74	159	20	179	29	14	170	213	466
4:45 PM	3	1	57	61	147	34	181	30	25	197	252	494
Hourly Total	12	18	245	275	593	99	692	111	58	765	934	1901
5:00 PM	3	3	74	80	174	23	197	22	23	136	181	458
5:15 PM	3	6	71	80	146	31	177	29	38	171	238	495
5:30 PM	5	4	80	89	167	22	189	29	28	112	169	447
5:45 PM	1	2	78	81	126	32	158	35	31	99	165	404
Hourly Total	12	15	303	330	613	108	721	115	120	518	753	1804
6:00 PM	1	0	51	52	67	23	90	12	34	68	114	256

6:15 PM	3	0	60	63	47	25	72	4	18	41	63	198
6:30 PM	2	0	52	54	49	18	67	17	20	25	62	183
6:45 PM	4	0	40	44	49	22	71	9	24	22	55	170
Hourly Total	10	0	203	213	212	88	300	42	96	156	294	807
Grand Total	1935	232	3285	5452	3466	1565	5031	510	790	2146	3446	13929
Approach %	35.5	4.3	60.3	-	68.9	31.1	-	14.8	22.9	62.3	-	-
Total %	13.9	1.7	23.6	39.1	24.9	11.2	36.1	3.7	5.7	15.4	24.7	-
All Vehicles (no classification)	1935	232	3285	5452	3466	1565	5031	510	790	2146	3446	13929
% All Vehicles (no classification)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0



Los Alamos County
101 Camino Entrada
Bldg 1, Rm 216
Los Alamos, New Mexico, United States 87544
505-662-8176
Public Works/Traffic & Streets

Count Name: NM4/EJemez
3_16
Site Code:
Start Date: 03/17/2016
Page No: 3



Turning Movement Data Plot



Los Alamos County
 101 Camino Entrada
 Bldg 1, Rm 216
 Los Alamos, New Mexico, United States 87544
 505-662-8176
 Public Works/Traffic & Streets

Count Name: NM4/EJemez
 3_16
 Site Code:
 Start Date: 03/17/2016
 Page No: 4

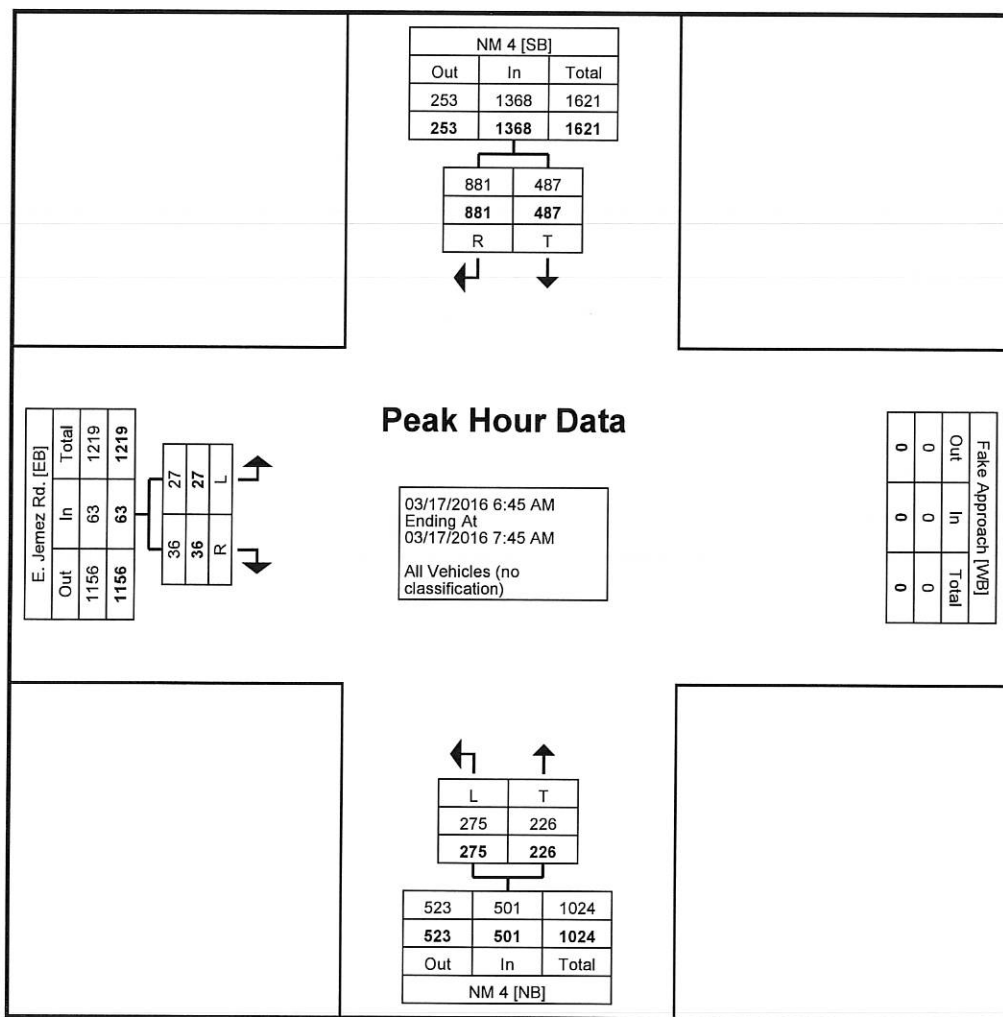
Turning Movement Peak Hour Data (6:45 AM)

Start Time	NM 4 Southbound				NM 4 Northbound			E. Jemez Rd. Eastbound				Int. Total
	Right	Right on Red	Thru	App. Total	Thru	Left	App. Total	Right	Right on Red	Left	App. Total	
6:45 AM	251	2	154	407	34	31	65	1	2	8	11	483
7:00 AM	227	15	119	361	49	54	103	0	5	5	10	474
7:15 AM	175	44	103	322	70	91	161	6	2	6	14	497
7:30 AM	151	16	111	278	73	99	172	19	1	8	28	478
Total	804	77	487	1368	226	275	501	26	10	27	63	1932
Approach %	58.8	5.6	35.6	-	45.1	54.9	-	41.3	15.9	42.9	-	-
Total %	41.6	4.0	25.2	70.8	11.7	14.2	25.9	1.3	0.5	1.4	3.3	-
PHF	0.801	0.438	0.791	0.840	0.774	0.694	0.728	0.342	0.500	0.844	0.563	0.972
All Vehicles (no classification)	804	77	487	1368	226	275	501	26	10	27	63	1932
% All Vehicles (no classification)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0



Los Alamos County
101 Camino Entrada
Bldg 1, Rm 216
Los Alamos, New Mexico, United States 87544
505-662-8176
Public Works/Traffic & Streets

Count Name: NM4/EJemez
3_16
Site Code:
Start Date: 03/17/2016
Page No: 5



Turning Movement Peak Hour Data Plot (6:45 AM)



Los Alamos County
 101 Camino Entrada
 Bldg 1, Rm 216
 Los Alamos, New Mexico, United States 87544
 505-662-8176
 Public Works/Traffic & Streets

Count Name: NM4/EJemez
 3_16
 Site Code:
 Start Date: 03/17/2016
 Page No: 6

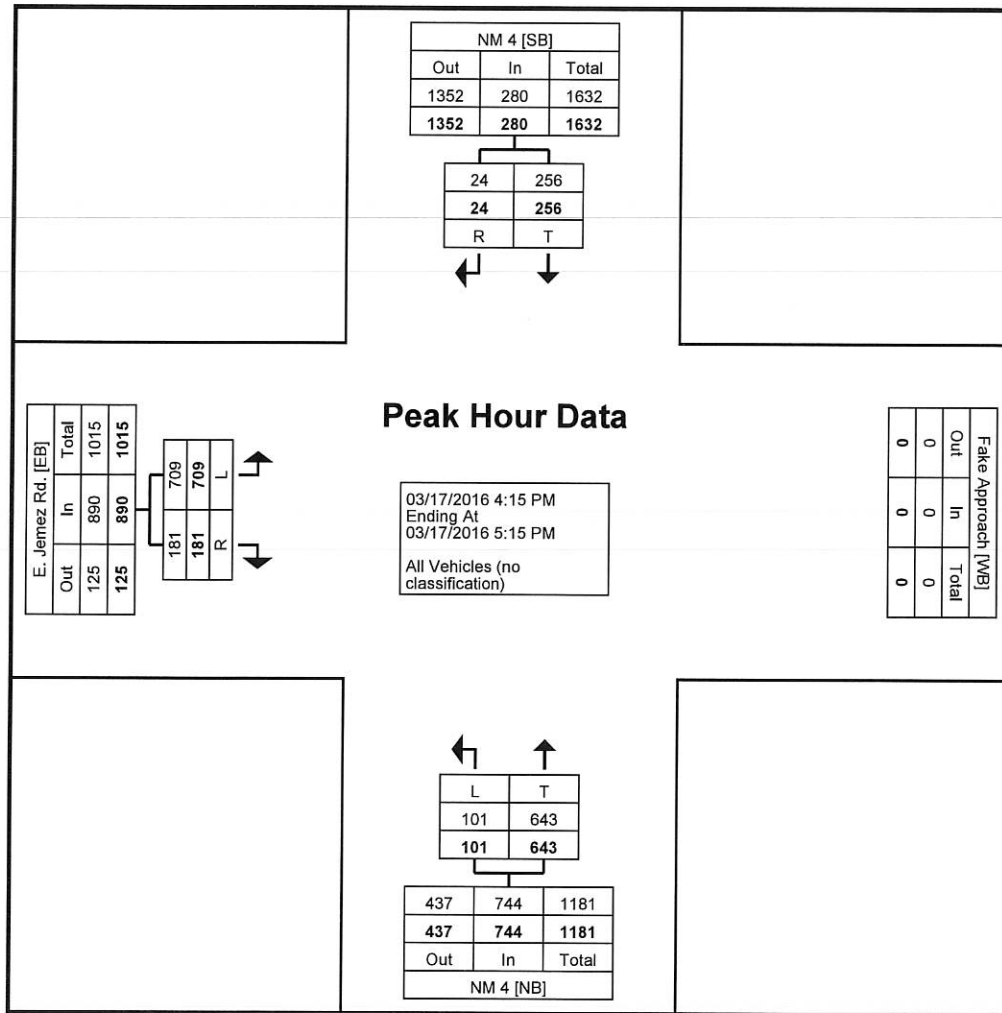
Turning Movement Peak Hour Data (4:15 PM)

Start Time	NM 4 Southbound				NM 4 Northbound			E. Jemez Rd. Eastbound				Int. Total
	Right	Right on Red	Thru	App. Total	Thru	Left	App. Total	Right	Right on Red	Left	App. Total	
4:15 PM	4	2	59	65	163	24	187	27	11	206	244	496
4:30 PM	1	7	66	74	159	20	179	29	14	170	213	466
4:45 PM	3	1	57	61	147	34	181	30	25	197	252	494
5:00 PM	3	3	74	80	174	23	197	22	23	136	181	458
Total	11	13	256	280	643	101	744	108	73	709	890	1914
Approach %	3.9	4.6	91.4	-	86.4	13.6	-	12.1	8.2	79.7	-	-
Total %	0.6	0.7	13.4	14.6	33.6	5.3	38.9	5.6	3.8	37.0	46.5	-
PHF	0.688	0.464	0.865	0.875	0.924	0.743	0.944	0.900	0.730	0.860	0.883	0.965
All Vehicles (no classification)	11	13	256	280	643	101	744	108	73	709	890	1914
% All Vehicles (no classification)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0



Los Alamos County
101 Camino Entrada
Bldg 1, Rm 216
Los Alamos, New Mexico, United States 87544
505-662-8176
Public Works/Traffic & Streets

Count Name: NM4/EJemez
3_16
Site Code:
Start Date: 03/17/2016
Page No: 7



Turning Movement Peak Hour Data Plot (4:15 PM)




















APPENDIX B
2016 EXISTING INTERSECTION CAPACITY
ANALYSIS

HCM 6th Signalized Intersection Summary

1: NM 4 & East Jemez/Future Parking

LANL NM 4 / East Jemez Improvements Study




















2016 AM Existing

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	27	0	36	0	0	0	275	226	0	0	487	881
Future Volume (veh/h)	27	0	36	0	0	0	275	226	0	0	487	881
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1841	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1841
Adj Flow Rate, veh/h	28	0	37	0	0	0	284	233	0	0	502	908
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	4	2	2	2	2	2	2	2	2	2	2	4
Cap, veh/h	206	0	85	0	100	0	462	1507	0	0	1219	1017
Arrive On Green	0.05	0.00	0.05	0.00	0.00	0.00	0.08	0.81	0.00	0.00	0.65	0.65
Sat Flow, veh/h	1753	0	1585	0	1870	0	1781	1870	0	0	1870	1560
Grp Volume(v), veh/h	28	0	37	0	0	0	284	233	0	0	502	908
Grp Sat Flow(s),veh/h/ln	1753	0	1585	0	1870	0	1781	1870	0	0	1870	1560
Q Serve(g_s), s	1.0	0.0	1.4	0.0	0.0	0.0	2.8	1.8	0.0	0.0	8.2	31.1
Cycle Q Clear(g_c), s	1.0	0.0	1.4	0.0	0.0	0.0	2.8	1.8	0.0	0.0	8.2	31.1
Prop In Lane	1.00		1.00	0.00		0.00	1.00		0.00	0.00		1.00
Lane Grp Cap(c), veh/h	206	0	85	0	100	0	462	1507	0	0	1219	1017
V/C Ratio(X)	0.14	0.00	0.44	0.00	0.00	0.00	0.61	0.15	0.00	0.00	0.41	0.89
Avail Cap(c_a), veh/h	608	0	448	0	529	0	730	2714	0	0	2144	1789
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	0.00	0.00	0.00	1.00	1.00	0.00	0.00	1.00	1.00
Uniform Delay (d), s/veh	29.1	0.0	29.4	0.0	0.0	0.0	5.2	1.4	0.0	0.0	5.3	9.3
Incr Delay (d2), s/veh	0.3	0.0	3.5	0.0	0.0	0.0	1.3	0.0	0.0	0.0	0.2	3.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	0.7	0.0	1.1	0.0	0.0	0.0	0.6	0.0	0.0	0.0	3.3	10.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	29.4	0.0	32.9	0.0	0.0	0.0	6.6	1.4	0.0	0.0	5.5	12.5
LnGrp LOS	C	A	C	A	A	A	A	A	A	A	A	B
Approach Vol, veh/h	65			0				517			1410	
Approach Delay, s/veh	31.4			0.0				4.3			10.0	
Approach LOS	C							A			A	
Timer - Assigned Phs	2			4		5		6		8		
Phs Duration (G+Y+Rc), s	56.1			7.9		9.9		46.2		7.9		
Change Period (Y+Rc), s	4.5			4.5		4.5		4.5		4.5		
Max Green Setting (Gmax), s	92.9			18.1		15.0		73.4		18.1		
Max Q Clear Time (g_c+I1), s	3.8			3.4		4.8		33.1		0.0		
Green Ext Time (p_c), s	1.3			0.1		0.6		8.7		0.0		
Intersection Summary												
HCM 6th Ctrl Delay	9.2											
HCM 6th LOS	A											

HCM 6th Signalized Intersection Summary 1: NM 4 & East Jemez/Future Parking

LANL NM 4 / East Jemez Improvements Study

2016 PM Existing

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	709	0	181	0	0	0	101	643	0	0	256	24
Future Volume (veh/h)	709	0	181	0	0	0	101	643	0	0	256	24
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1841	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1841
Adj Flow Rate, veh/h	739	0	189	0	0	0	105	670	0	0	267	25
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	4	2	2	2	2	2	2	2	2	2	2	4
Cap, veh/h	915	0	740	0	873	0	393	772	0	0	547	456
Arrive On Green	0.47	0.00	0.47	0.00	0.00	0.00	0.06	0.41	0.00	0.00	0.29	0.29
Sat Flow, veh/h	1753	0	1585	0	1870	0	1781	1870	0	0	1870	1560
Grp Volume(v), veh/h	739	0	189	0	0	0	105	670	0	0	267	25
Grp Sat Flow(s),veh/h/ln	1753	0	1585	0	1870	0	1781	1870	0	0	1870	1560
Q Serve(g_s), s	29.0	0.0	5.4	0.0	0.0	0.0	2.9	24.4	0.0	0.0	8.8	0.9
Cycle Q Clear(g_c), s	29.0	0.0	5.4	0.0	0.0	0.0	2.9	24.4	0.0	0.0	8.8	0.9
Prop In Lane	1.00		1.00	0.00		0.00	1.00		0.00	0.00		1.00
Lane Grp Cap(c), veh/h	915	0	740	0	873	0	393	772	0	0	547	456
V/C Ratio(X)	0.81	0.00	0.26	0.00	0.00	0.00	0.27	0.87	0.00	0.00	0.49	0.05
Avail Cap(c_a), veh/h	1756	0	1500	0	1770	0	447	1268	0	0	987	823
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	0.00	0.00	0.00	1.00	1.00	0.00	0.00	1.00	1.00
Uniform Delay (d), s/veh	18.3	0.0	12.0	0.0	0.0	0.0	16.1	20.0	0.0	0.0	21.7	18.9
Incr Delay (d2), s/veh	1.8	0.0	0.2	0.0	0.0	0.0	0.4	3.8	0.0	0.0	0.7	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	15.2	0.0	3.0	0.0	0.0	0.0	1.9	14.9	0.0	0.0	6.4	0.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	20.1	0.0	12.2	0.0	0.0	0.0	16.5	23.8	0.0	0.0	22.4	19.0
LnGrp LOS	C	A	B	A	A	A	B	C	A	A	C	B
Approach Vol, veh/h	928			0				775				292
Approach Delay, s/veh	18.5			0.0				22.8				22.1
Approach LOS	B							C				C
Timer - Assigned Phs	2			4		5	6	8				
Phs Duration (G+Y+Rc), s	35.2			39.3		8.9	26.3	39.3				
Change Period (Y+Rc), s	4.5			4.5		4.5	4.5	4.5				
Max Green Setting (Gmax), s	50.5			70.5		6.7	39.3	70.5				
Max Q Clear Time (g_c+I1), s	26.4			31.0		4.9	10.8	0.0				
Green Ext Time (p_c), s	4.3			3.8		0.0	1.5	0.0				
Intersection Summary												
HCM 6th Ctrl Delay												
20.7												
HCM 6th LOS												
C												

APPENDIX C
























2028 BUILD INTERSECTION CAPACITY ANALYSIS

HCM 6th Signalized Intersection Summary

1: NM 4 & East Jemez/Future Parking

LANL NM 4 / East Jemez Improvements Study

2028 AM Build with Parking

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	27	2	36	2	5	2	275	226	2	1	487	881
Future Volume (veh/h)	27	2	36	2	5	2	275	226	2	1	487	881
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1841	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1841
Adj Flow Rate, veh/h	39	2	0	2	6	2	312	256	2	1	502	0
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	4	2	2	2	2	2	2	2	2	2	2	4
Cap, veh/h	148	105		5	21	7	554	1836	14	575	664	
Arrive On Green	0.04	0.06	0.00	0.00	0.02	0.02	0.15	0.51	0.51	0.00	0.36	0.00
Sat Flow, veh/h	3401	1870	1585	1781	1342	447	1781	3614	28	1781	1870	1560
Grp Volume(v), veh/h	39	2	0	2	0	8	312	126	132	1	502	0
Grp Sat Flow(s),veh/h/ln	1700	1870	1585	1781	0	1790	1781	1777	1865	1781	1870	1560
Q Serve(g_s), s	0.5	0.0	0.0	0.0	0.0	0.2	3.9	1.6	1.6	0.0	9.9	0.0
Cycle Q Clear(g_c), s	0.5	0.0	0.0	0.0	0.0	0.2	3.9	1.6	1.6	0.0	9.9	0.0
Prop In Lane	1.00		1.00	1.00		0.25	1.00		0.02	1.00		1.00
Lane Grp Cap(c), veh/h	148	105		5	0	28	554	903	948	575	664	
V/C Ratio(X)	0.26	0.02		0.41	0.00	0.29	0.56	0.14	0.14	0.00	0.76	
Avail Cap(c_a), veh/h	2405	1906		214	0	772	1026	2109	2213	784	1659	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(l)	1.00	1.00	0.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	19.3	18.6	0.0	20.8	0.0	20.3	7.5	5.4	5.4	8.6	11.9	0.0
Incr Delay (d2), s/veh	0.9	0.1	0.0	46.8	0.0	5.5	0.9	0.1	0.1	0.0	1.8	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	0.3	0.0	0.0	0.1	0.0	0.2	1.3	0.5	0.6	0.0	5.4	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	20.2	18.7	0.0	67.5	0.0	25.8	8.4	5.5	5.5	8.6	13.6	0.0
LnGrp LOS	C	B		E	A	C	A	A	A	A	B	
Approach Vol, veh/h	41			A			10			570		
Approach Delay, s/veh	20.2						34.2			7.1		
Approach LOS	C						C			A		
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	4.6	25.7	4.6	6.9	10.9	19.3	6.3	5.1				
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5				
Max Green Setting (Gmax), s	5.0	49.5	5.0	42.5	17.5	37.0	29.5	18.0				
Max Q Clear Time (g_c+I1), s	2.0	3.6	2.0	2.0	5.9	11.9	2.5	2.2				
Green Ext Time (p_c), s	0.0	1.4	0.0	0.0	0.7	2.9	0.1	0.0				

Intersection Summary

























HCM 6th Ctrl Delay	10.7
HCM 6th LOS	B

Notes

Unsignalized Delay for [EBR, SBR] is excluded from calculations of the approach delay and intersection delay.

HCM 6th Signalized Intersection Summary 1: NM 4 & East Jemez/Future Parking

LANL NM 4 / East Jemez Improvements Study 2028 PM Proposed With Parking

													
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations	 							 					
Traffic Volume (veh/h)	709	2	181	2	5	2	101	643	2	1	256	24	
Future Volume (veh/h)	709	2	181	2	5	2	101	643	2	1	256	24	
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0	
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Work Zone On Approach	No			No			No			No			
Adj Sat Flow, veh/h/ln	1841	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1841	
Adj Flow Rate, veh/h	812	2	0	2	6	2	116	737	2	1	293	0	
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	
Percent Heavy Veh, %	4	2	2	2	2	2	2	2	2	2	2	4	
Cap, veh/h	1078	616		5	21	7	377	1107	3	240	422		
Arrive On Green	0.32	0.33	0.00	0.00	0.02	0.02	0.08	0.30	0.30	0.00	0.23	0.00	
Sat Flow, veh/h	3401	1870	1585	1781	1342	447	1781	3636	10	1781	1870	1560	
Grp Volume(v), veh/h	812	2	0	2	0	8	116	360	379	1	293	0	
Grp Sat Flow(s),veh/h/ln	1700	1870	1585	1781	0	1790	1781	1777	1869	1781	1870	1560	
Q Serve(g_s), s	10.7	0.0	0.0	0.1	0.0	0.2	2.3	8.8	8.8	0.0	7.2	0.0	
Cycle Q Clear(g_c), s	10.7	0.0	0.0	0.1	0.0	0.2	2.3	8.8	8.8	0.0	7.2	0.0	
Prop In Lane	1.00		1.00	1.00		0.25	1.00		0.01	1.00		1.00	
Lane Grp Cap(c), veh/h	1078	616		5	0	27	377	541	569	240	422		
V/C Ratio(X)	0.75	0.00		0.41	0.00	0.29	0.31	0.67	0.67	0.00	0.69		
Avail Cap(c_a), veh/h	2700	1973		179	0	647	581	1410	1483	416	1308		
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Upstream Filter(I)	1.00	1.00	0.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	
Uniform Delay (d), s/veh	15.3	11.2	0.0	24.8	0.0	24.2	12.6	15.1	15.1	15.1	17.7	0.0	
Incr Delay (d2), s/veh	1.1	0.0	0.0	47.0	0.0	5.7	0.5	1.4	1.3	0.0	2.1	0.0	
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
%ile BackOfQ(95%),veh/ln	5.9	0.0	0.0	0.2	0.0	0.2	1.3	5.3	5.6	0.0	4.9	0.0	
Unsig. Movement Delay, s/veh													
LnGrp Delay(d),s/veh	16.3	11.2	0.0	71.8	0.0	29.9	13.1	16.5	16.4	15.1	19.7	0.0	
LnGrp LOS	B	B		E	A	C	B	B	B	B	B		
Approach Vol, veh/h	814		A		10		855				294		A
Approach Delay, s/veh	16.3				38.3		16.0				19.7		
Approach LOS	B				D		B				B		
Timer - Assigned Phs	1	2	3	4	5	6	7	8					
Phs Duration (G+Y+Rc), s	4.6	19.7	4.6	20.9	8.5	15.7	20.3	5.3					
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5					
Max Green Setting (Gmax), s	5.0	39.5	5.0	52.5	9.7	34.8	39.5	18.0					
Max Q Clear Time (g_c+I1), s	2.0	10.8	2.1	2.0	4.3	9.2	12.7	2.2					
Green Ext Time (p_c), s	0.0	4.4	0.0	0.0	0.1	1.5	3.1	0.0					

Intersection Summary

HCM 6th Ctrl Delay	16.8
HCM 6th LOS	B

Notes


























Unsignalized Delay for [EBR, SBR] is excluded from calculations of the approach delay and intersection delay.

APPENDIX D

2038 BUILD INTERSECTION CAPACITY ANALYSIS

HCM 6th Signalized Intersection Summary 1: NM 4 & East Jemez/Future Parking

LANL NM 4 / East Jemez Improvements Study 2038 AM Build with Parking

														
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR		
Lane Configurations	 				 			 						
Traffic Volume (veh/h)	27	2	36	2	5	2	275	226	2	1	487	881		
Future Volume (veh/h)	27	2	36	2	5	2	275	226	2	1	487	881		
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0		
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00		
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		
Work Zone On Approach	No			No			No			No				
Adj Sat Flow, veh/h/ln	1841	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1841		
Adj Flow Rate, veh/h	34	3	0	3	6	3	346	284	3	1	613	0		
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97		
Percent Heavy Veh, %	4	2	2	2	2	2	2	2	2	2	2	4		
Cap, veh/h	130	99		7	22	11	523	2020	21	604	767			
Arrive On Green	0.04	0.05	0.00	0.00	0.02	0.02	0.15	0.56	0.56	0.00	0.41	0.00		
Sat Flow, veh/h	3401	1870	1585	1781	1176	588	1781	3602	38	1781	1870	1560		
Grp Volume(v), veh/h	34	3	0	3	0	9	346	140	147	1	613	0		
Grp Sat Flow(s),veh/h/ln	1700	1870	1585	1781	0	1764	1781	1777	1864	1781	1870	1560		
Q Serve(g_s), s	0.5	0.1	0.0	0.1	0.0	0.2	4.5	1.8	1.8	0.0	13.6	0.0		
Cycle Q Clear(g_c), s	0.5	0.1	0.0	0.1	0.0	0.2	4.5	1.8	1.8	0.0	13.6	0.0		
Prop In Lane	1.00		1.00	1.00		0.33	1.00		0.02	1.00		1.00		
Lane Grp Cap(c), veh/h	130	99		7	0	33	523	997	1045	604	767			
V/C Ratio(X)	0.26	0.03		0.41	0.00	0.27	0.66	0.14	0.14	0.00	0.80			
Avail Cap(c_a), veh/h	1964	1594		188	0	672	914	1943	2038	788	1547			
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		
Upstream Filter(I)	1.00	1.00	0.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00		
Uniform Delay (d), s/veh	22.1	21.2	0.0	23.5	0.0	22.9	8.6	4.9	4.9	8.2	12.2	0.0		
Incr Delay (d2), s/veh	1.1	0.1	0.0	33.3	0.0	4.3	1.4	0.1	0.1	0.0	2.0	0.0		
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
%ile BackOfQ(95%),veh/ln	0.3	0.1	0.0	0.2	0.0	0.2	1.6	0.6	0.7	0.0	7.6	0.0		
Unsig. Movement Delay, s/veh														
LnGrp Delay(d),s/veh	23.2	21.4	0.0	56.8	0.0	27.1	10.0	5.0	5.0	8.2	14.2	0.0		
LnGrp LOS	C	C		E	A	C	B	A	A	A	B			
Approach Vol, veh/h	37		A	12			633			614		A		
Approach Delay, s/veh	23.0			34.5			7.8			14.2				
Approach LOS	C			C			A			B				
Timer - Assigned Phs	1	2	3	4	5	6	7	8						
Phs Duration (G+Y+Rc), s	4.6	31.0	4.7	7.0	11.7	23.9	6.3	5.4						
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5						
Max Green Setting (Gmax), s	5.0	51.7	5.0	40.3	17.6	39.1	27.3	18.0						
Max Q Clear Time (g_c+I1), s	2.0	3.8	2.1	2.1	6.5	15.6	2.5	2.2						
Green Ext Time (p_c), s	0.0	1.5	0.0	0.0	0.8	3.8	0.1	0.0						

Intersection Summary

HCM 6th Ctrl Delay	11.5
HCM 6th LOS	B

























Notes

Unsignalized Delay for [EBR, SBR] is excluded from calculations of the approach delay and intersection delay.

HCM 6th Signalized Intersection Summary 1: NM 4 & East Jemez/Future Parking

LANL NM 4 / East Jemez Improvements Study

2038 PM Proposed With Parking

													
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Traffic Volume (veh/h)	709	2	181	2	5	2	101	643	2	1	256	24	
Future Volume (veh/h)	709	2	181	2	5	2	101	643	2	1	256	24	
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0	
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Work Zone On Approach	No			No			No			No			
Adj Sat Flow, veh/h/ln	1841	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1841	
Adj Flow Rate, veh/h	901	3	0	3	6	3	128	817	3	1	325	0	
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	
Percent Heavy Veh, %	4	2	2	2	2	2	2	2	2	2	2	4	
Cap, veh/h	1148	658		7	22	11	357	1163	4	214	457		
Arrive On Green	0.34	0.35	0.00	0.00	0.02	0.02	0.08	0.32	0.32	0.00	0.24	0.00	
Sat Flow, veh/h	3401	1870	1585	1781	1176	588	1781	3631	13	1781	1870	1560	
Grp Volume(v), veh/h	901	3	0	3	0	9	128	400	420	1	325	0	
Grp Sat Flow(s),veh/h/ln	1700	1870	1585	1781	0	1764	1781	1777	1868	1781	1870	1560	
Q Serve(g_s), s	13.3	0.1	0.0	0.1	0.0	0.3	2.8	11.0	11.0	0.0	8.9	0.0	
Cycle Q Clear(g_c), s	13.3	0.1	0.0	0.1	0.0	0.3	2.8	11.0	11.0	0.0	8.9	0.0	
Prop In Lane	1.00		1.00	1.00		0.33	1.00		0.01	1.00		1.00	
Lane Grp Cap(c), veh/h	1148	658		7	0	33	357	569	598	214	457		
V/C Ratio(X)	0.78	0.00		0.41	0.00	0.27	0.36	0.70	0.70	0.00	0.71		
Avail Cap(c_a), veh/h	2467	1792		160	0	569	490	1225	1288	370	1172		
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Upstream Filter(I)	1.00	1.00	0.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	
Uniform Delay (d), s/veh	16.7	11.7	0.0	27.7	0.0	27.0	13.8	16.6	16.6	16.3	19.3	0.0	
Incr Delay (d2), s/veh	1.2	0.0	0.0	33.6	0.0	4.4	0.6	1.6	1.5	0.0	2.1	0.0	
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
%ile BackOfQ(95%),veh/ln	7.7	0.0	0.0	0.2	0.0	0.3	1.7	6.9	7.3	0.0	6.2	0.0	
Unsig. Movement Delay, s/veh													
LnGrp Delay(d),s/veh	17.9	11.7	0.0	61.3	0.0	31.5	14.4	18.2	18.2	16.3	21.4	0.0	
LnGrp LOS	B	B		E	A	C	B	B	B	B	C		
Approach Vol, veh/h	904		A		12		948				326		A
Approach Delay, s/veh	17.9				38.9		17.7				21.3		
Approach LOS	B				D		B				C		
Timer - Assigned Phs	1	2	3	4	5	6	7	8					
Phs Duration (G+Y+Rc), s	4.6	22.4	4.7	24.2	8.8	18.1	23.3	5.5					
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5					
Max Green Setting (Gmax), s	5.0	38.5	5.0	53.5	8.5	35.0	40.5	18.0					
Max Q Clear Time (g_c+I1), s	2.0	13.0	2.1	2.1	4.8	10.9	15.3	2.3					
Green Ext Time (p_c), s	0.0	4.9	0.0	0.0	0.1	1.7	3.5	0.0					

Intersection Summary

HCM 6th Ctrl Delay	18.4
HCM 6th LOS	B

Notes

Unsignalized Delay for [EBR, SBR] is excluded from calculations of the approach delay and intersection delay.

HCS7 Freeway Merge Report

Project Information

Analyst	EJW	Date	10/2/2018
Agency	BHI	Analysis Year	2016
Jurisdiction	LANL	Time Period Analyzed	2016 AM Peak
Project Description	NM 4 / East Jemez Road Westbound Merge		

Geometric Data

	Freeway	Ramp
Number of Lanes (N)	2	1
Free-Flow Speed (FFS), mi/h	45.0	25.0
Segment Length (L) / Acceleration Length (LA), ft	500	270
Terrain Type	Level	Level
Percent Grade, %	-	-
Segment Type / Ramp Side	Highway/CD Roadway	Right

Adjustment Factors

Driver Population	All Familiar	All Familiar
Weather Type	Non-Severe Weather	Non-Severe Weather
Incident Type	No Incident	-
Final Speed Adjustment Factor (SAF)	1.000	1.000
Final Capacity Adjustment Factor (CAF)	1.000	1.000
Demand Adjustment Factor (DAF)	1.000	1.000

Demand and Capacity

Demand Volume (V_i), veh/h	452	881
Peak Hour Factor (PHF)	0.94	0.94
Total Trucks, %	0.00	10.00
Single-Unit Trucks (SUT), %	-	-
Tractor-Trailers (TT), %	-	-
Heavy Vehicle Adjustment Factor (f_{HV})	1.000	0.909
Flow Rate (v_i), pc/h	481	1031
Capacity (c), pc/h	3800	1900
Volume-to-Capacity Ratio (v/c)	0.40	0.54

Speed and Density

Upstream Equilibrium Distance (L_{EQ}), ft	-	Density in Ramp Influence Area (D_R), pc/mi/ln	15.2
Distance to Upstream Ramp (L_{UP}), ft	-	Speed Index (M_s)	0.325
Downstream Equilibrium Distance (L_{EQ}), ft	-	Flow Outer Lanes (v_{OA}), pc/h/ln	-
Distance to Downstream Ramp (L_{DOWN}), ft	-	On-Ramp Influence Area Speed (S_R), mi/h	44.0
Prop. Freeway Vehicles in Lane 1 and 2 (P_{FM})	1.000	Outer Lanes Freeway Speed (S_o), mi/h	-
Flow in Lanes 1 and 2 (v_{12}), pc/h	481	Ramp Junction Speed (S), mi/h	44.0
Flow Entering Ramp-Infl. Area (v_{R12}), pc/h	1512	Average Density (D), pc/mi/ln	17.2
Level of Service (LOS)	B	Attachment A	

HCS7 Freeway Merge Report

Project Information

Analyst	EJW	Date	10/2/2018
Agency	BHI	Analysis Year	2038
Jurisdiction	LANL	Time Period Analyzed	2016 AM Peak
Project Description	NM 4 / East Jemez Road Westbound Merge		

Geometric Data

	Freeway	Ramp
Number of Lanes (N)	2	1
Free-Flow Speed (FFS), mi/h	45.0	25.0
Segment Length (L) / Acceleration Length (LA), ft	500	270
Terrain Type	Level	Level
Percent Grade, %	-	-
Segment Type / Ramp Side	Highway/CD Roadway	Right

Adjustment Factors

Driver Population	All Familiar	All Familiar
Weather Type	Non-Severe Weather	Non-Severe Weather
Incident Type	No Incident	-
Final Speed Adjustment Factor (SAF)	1.000	1.000
Final Capacity Adjustment Factor (CAF)	1.000	1.000
Demand Adjustment Factor (DAF)	1.000	1.000

Demand and Capacity

Demand Volume (V_i), veh/h	563	1097
Peak Hour Factor (PHF)	0.94	0.94
Total Trucks, %	0.00	10.00
Single-Unit Trucks (SUT), %	-	-
Tractor-Trailers (TT), %	-	-
Heavy Vehicle Adjustment Factor (f_{HV})	1.000	0.909
Flow Rate (v_i), pc/h	599	1284
Capacity (c), pc/h	3800	1900
Volume-to-Capacity Ratio (v/c)	0.50	0.68

Speed and Density

Upstream Equilibrium Distance (L_{EQ}), ft	-	Density in Ramp Influence Area (D_R), pc/mi/ln	18.0
Distance to Upstream Ramp (L_{UP}), ft	-	Speed Index (M_s)	0.333
Downstream Equilibrium Distance (L_{EQ}), ft	-	Flow Outer Lanes (v_{OA}), pc/h/ln	-
Distance to Downstream Ramp (L_{DOWN}), ft	-	On-Ramp Influence Area Speed (S_R), mi/h	44.0
Prop. Freeway Vehicles in Lane 1 and 2 (P_{FM})	1.000	Outer Lanes Freeway Speed (S_o), mi/h	-
Flow in Lanes 1 and 2 (v_{12}), pc/h	599	Ramp Junction Speed (S), mi/h	44.0
Flow Entering Ramp-Infl. Area (v_{R12}), pc/h	1883	Average Density (D), pc/mi/ln	21.4
Level of Service (LOS)	B	Attachment A	

HCS7 Freeway Weaving Report

Project Information

Analyst	EJW	Date	10/2/2018
Agency	BHI	Analysis Year	2016
Jurisdiction	LANL	Time Period Analyzed	0216 AM Peak
Project Description	NM 4 / East Jemez Intersection Improvements		

Geometric Data

Number of Lanes (N), ln	2	Segment Type	Highway/CD Roadway
Short Length (L _s), ft	270	Number of Maneuver Lanes (N _{WL}), ln	2
Weaving Configuration	One-Sided	Ramp-to-Freeway Lane Changes (LC _{RF}), lc	1
Terrain Type	Level	Freeway-to-Ramp Lane Changes (LC _{FR}), lc	0
Percent Grade, %	-	Ramp-to-Ramp Lane Changes (LC _{RR}), lc	0
Interchange Density (ID), int/mi	0.10	Cross Weaving Managed Lane	No

Adjustment Factors

Driver Population	All Familiar	Final Speed Adjustment Factor (SAF)	1.000
Weather Type	Non-Severe Weather	Final Capacity Adjustment Factor (CAF)	1.000
Incident Type	No Incident	Demand Adjustment Factor (DAF)	1.000

Demand and Capacity

	FF	RF	RR	FR
Demand Volume (V _i), veh/h	452	881	0	0
Peak Hour Factor (PHF)	0.94	0.94	0.94	0.94
Total Trucks, %	0.00	10.00	0.00	0.00
Heavy Vehicle Adjustment Factor (f _{HV})	1.000	0.909	1.000	1.000
Flow Rate (v _i), pc/h	481	1031	0	0
Weaving Flow Rate (v _w), pc/h	1031	Freeway Max Capacity (c _{IFL}), pc/h/ln		2200
Non-Weaving Flow Rate (v _{NW}), pc/h	481	Density-Based Capacity (c _{IDL}), pc/h/ln		1453
Total Flow Rate (v), pc/h	1512	Demand Flow-Based Capacity (c _W), pc/h		3519
Volume Ratio (VR)	0.682	Weaving Segment Capacity (c _w), veh/h		2906
Minimum Lane Change Rate (LC _{MIN}), lc/h	1031	Adjusted Weaving Area Capacity, pc/h		3098
Maximum Weaving Length (L _{MAX}), ft	10030	Volume-to-Capacity Ratio (v/c)		0.49

Speed and Density

Non-Weaving Vehicle Index (I _{NW})	1	Average Weaving Speed (S _w), mi/h	33.2
Non-Weaving Lane Change Rate (LC _{NW}), lc/h	0	Average Non-Weaving Speed (S _{NW}), mi/h	33.9
Weaving Lane Change Rate (LC _w), lc/h	1031	Average Speed (S), mi/h	33.4
Total Lane Change Rate (LC _{AI}), lc/h	1031	Density (D), pc/mi/ln	22.6
Weaving Intensity Factor (W)	0.650	Level of Service (LOS)	B

HCS7 Freeway Weaving Report

Project Information

Analyst	EJW	Date	10/2/2018
Agency	BHI	Analysis Year	2040
Jurisdiction	LANL	Time Period Analyzed	2040 AM Peak (25% growth)
Project Description	NM 4 / East Jemez Intersection Improvements		

Geometric Data

Number of Lanes (N), ln	2	Segment Type	Highway/CD Roadway
Short Length (L _s), ft	270	Number of Maneuver Lanes (N _{WL}), ln	2
Weaving Configuration	One-Sided	Ramp-to-Freeway Lane Changes (LC _{RF}), lc	1
Terrain Type	Level	Freeway-to-Ramp Lane Changes (LC _{FR}), lc	0
Percent Grade, %	-	Ramp-to-Ramp Lane Changes (LC _{RR}), lc	0
Interchange Density (ID), int/mi	0.10	Cross Weaving Managed Lane	No

Adjustment Factors

Driver Population	All Familiar	Final Speed Adjustment Factor (SAF)	1.000
Weather Type	Non-Severe Weather	Final Capacity Adjustment Factor (CAF)	1.000
Incident Type	No Incident	Demand Adjustment Factor (DAF)	1.000

Demand and Capacity

	FF	RF	RR	FR
Demand Volume (V _i), veh/h	563	1097	0	0
Peak Hour Factor (PHF)	0.94	0.94	0.94	0.94
Total Trucks, %	0.00	10.00	0.00	0.00
Heavy Vehicle Adjustment Factor (f _{HV})	1.000	0.909	1.000	1.000
Flow Rate (v _i), pc/h	599	1284	0	0
Weaving Flow Rate (v _w), pc/h	1284	Freeway Max Capacity (c _{IFL}), pc/h/ln		2200
Non-Weaving Flow Rate (v _{NW}), pc/h	599	Density-Based Capacity (c _{DWL}), pc/h/ln		1453
Total Flow Rate (v), pc/h	1883	Demand Flow-Based Capacity (c _{DW}), pc/h		3519
Volume Ratio (VR)	0.682	Weaving Segment Capacity (c _w), veh/h		2906
Minimum Lane Change Rate (LC _{MIN}), lc/h	1284	Adjusted Weaving Area Capacity, pc/h		3099
Maximum Weaving Length (L _{MAX}), ft	10030	Volume-to-Capacity Ratio (v/c)		0.61

Speed and Density

Non-Weaving Vehicle Index (I _{NW})	2	Average Weaving Speed (S _w), mi/h	31.9
Non-Weaving Lane Change Rate (LC _{NW}), lc/h	0	Average Non-Weaving Speed (S _{NW}), mi/h	31.2
Weaving Lane Change Rate (LC _w), lc/h	1284	Average Speed (S), mi/h	31.7
Total Lane Change Rate (LC _{AI}), lc/h	1284	Density (D), pc/mi/ln	29.7
Weaving Intensity Factor (W)	0.773	Level of Service (LOS)	C

APPENDIX E

CONSTRUCTION COST ESTIMATES

9/26/2018
US CORP OF ARMY ENGINEERS
EAST JEMEZ RD/NM4 INTERSECTION MPROVEMENTS, LOS ALAMOS COUNTY

STUDY- ESTIMATE PROBABLE CONSTRUCTION COST

CONTRACT ITEM NO.	CONTRACT ITEM	UNIT	UNIT BID PRICE	OPTION 1		OPTION 2		OPTION 3		OPTION 4		OPTION 5		
				QTY	TOTAL	QTY	TOTAL	QTY	TOTAL	QTY	TOTAL	QTY	TOTAL	
201000	CLEARING AND GRUBBING	L S	\$14,700.00	1	\$20,000.00	1	\$20,000.00	1	\$20,000.00	1	\$20,000.00	1	\$20,000.00	
203100	BORROW	CY	\$30.00	3,790.00	\$113,700.00	2,165.00	\$64,950.00	2,165.00	\$64,950.00	2,165.00	\$64,950.00	2,165.00	\$64,950.00	
207000	SUBGRADE PREPARATION	SY	\$3.00	29,400.00	\$88,200.00	25,600.00	\$76,800.00	25,800.00	\$77,400.00	22,000.00	\$66,000.00	22,700.00	\$68,100.00	
303000	BASE COURSE	TON	\$30.00	9,300.00	\$279,000.00	8,100.00	\$243,000.00	8,200.00	\$246,000.00	7,000.00	\$210,000.00	7,200.00	\$216,000.00	
403700	OPEN GRADED FRICTION COURSE COMPLETE	TON	\$99.00	917.00	\$90,783.00	800.00	\$79,200.00	804.00	\$79,596.00	686.00	\$67,914.00	709.00	\$70,191.00	
407000	TACK COAT MATERIAL	TON	\$830.00	10.00	\$8,300.00	9.00	\$7,470.00	9.00	\$7,470.00	8.00	\$6,640.00	8.00	\$6,640.00	
408100	PRIME COAT	TON	\$700.00	56.00	\$39,200.00	48.00	\$33,600.00	49.00	\$34,300.00	42.00	\$29,400.00	43.00	\$30,100.00	
423282	HMA SP III COMPLETE	TON	\$112.00	10,400.00	\$1,164,800.00	9,100.00	\$1,019,200.00	9,100.00	\$1,019,200.00	7,800.00	\$873,600.00	8,000.00	\$896,000.00	
570024	24" CULVERT PIPE	LF	\$120.00	110.00	\$13,200.00	110.00	\$13,200.00	110.00	\$13,200.00	110.00	\$13,200.00	110.00	\$13,200.00	
570025	24" CULVERT PIPE END SECTION	LF	\$761.00	1	\$761.00	1	\$761.00	1	\$761.00	1	\$761.00	1	\$761.00	
601000	REMOVAL OF STRUCTURES AND OBSTRUCTIONS	L S	\$35,000.00	1	\$35,000.00	1	\$35,000.00	1	\$35,000.00	1	\$35,000.00	1	\$35,000.00	
601110	REMOVAL OF SURFACING	SY	\$6.00	17,994.33	\$107,966.00	16,553.52	\$99,321.13	16,833.74	\$101,002.47	14,812.78	\$88,876.67	14,812.78	\$88,876.67	
603281	SWPPP PLAN PREPARATION AND MAINTENANCE	L S	\$5,000.00	1	\$5,000.00	1	\$5,000.00	1	\$5,000.00	1	\$5,000.00	1	\$5,000.00	
606001	SINGLE FACE W-BEAM GUARDRAIL	LF	\$35.00	1,346.00	\$47,110.00	1,346.00	\$47,110.00	1,346.00	\$47,110.00	1,346.00	\$47,110.00	1,346.00	\$47,110.00	
606052	END TREATMENT TL-3 END TERMINAL	EACH	\$2,500.00	2.00	\$5,000.00	2.00	\$5,000.00	2.00	\$5,000.00	2.00	\$5,000.00	2.00	\$5,000.00	
606053	END TREATMENT W-BEAM END ANCHOR	EACH	\$1,200.00	3.00	\$3,600.00	3.00	\$3,600.00	3.00	\$3,600.00	3.00	\$3,600.00	3.00	\$3,600.00	
606055	END TREATMENT DRIVEWAY END ANCHOR	EACH	\$1,387.50	1	\$1,387.50	1	\$1,387.50	1	\$1,387.50	1	\$1,387.50	1	\$1,387.50	
606061	DRAINAGE STRUCTURE PROTECTION SYSTEM	LF	\$45.00	187.50	\$8,437.50	187.50	\$8,437.50	187.50	\$8,437.50	187.50	\$8,437.50	187.50	\$8,437.50	
607200	REMOVE AND REBUILD BARBED WIRE FENCE	LF	\$3.60	500.00	\$1,800.00	500.00	\$1,800.00	500.00	\$1,800.00	500.00	\$1,800.00	500.00	\$1,800.00	
608204	CONCRETE MEDIAN PAVEMENT 4"	SY	\$65.00	399.78	\$25,985.56	443.33	\$28,816.67	401.67	\$26,108.33	401.67	\$26,108.33	401.67	\$26,108.33	
609318	CONCRETE SLOPED CURB AND GUTTER 6" X 18"	LF	\$13.00	400.00	\$5,200.00	441.00	\$5,733.00	408.00	\$5,304.00	407.00	\$5,291.00	407.00	\$5,291.00	
609330	CONCRETE SLOPED CURB AND GUTTER 6" X 30"	LF	\$22.00	366.00	\$8,052.00	380.00	\$8,360.00	387.00	\$8,514.00	387.00	\$8,514.00	387.00	\$8,514.00	
618000	TRAFFIC CONTROL MANAGEMENT	L S	\$25,000.00	1	\$25,000.00	1	\$25,000.00	1	\$25,000.00	1	\$25,000.00	1	\$25,000.00	
621000	MOBILIZATION	L S	\$240,000.00	1	\$240,000.00	1	\$240,000.00	1	\$240,000.00	1	\$240,000.00	1	\$240,000.00	
623011	MEDIAN DROP INLET TYPE I (RURAL) H=0'0" TO 3'0"	EACH	\$5,385.75	1	\$5,385.75	1	\$5,385.75	1	\$5,385.75	1	\$5,385.75	1	\$5,385.75	
701030	REMOVE AND RESET PANEL SIGN	EACH	\$130.91	21.00	\$2,749.11	21.00	\$2,749.11	21.00	\$2,749.11	21.00	\$2,749.11	21.00	\$2,749.11	
702810	TRAFFIC CONTROL DEVICES FOR CONSTRUCTION	LS	\$50,000.00	1	\$50,000.00	1	\$50,000.00	1	\$50,000.00	1	\$50,000.00	1	\$50,000.00	
704000	RETROREFLECTORIZED PAINTED MARKINGS 4"	LF	\$0.24	80,148.00	\$19,235.52	77,418.00	\$18,580.32	75,675.00	\$18,162.00	65,706.00	\$15,769.44	67,938.00	\$16,305.12	
715015	REMOVE AND RESET TRAFFIC WARNING ASSEMBLY	EACH	\$698.00	1	\$698.00	1	\$698.00	1	\$698.00	1	\$698.00	1	\$698.00	
716XXX	TRAFFIC SIGNAL/LIGHTING COMPLETE	LS	\$300,000.00	1	\$300,000.00	1	\$300,000.00	1	\$300,000.00	1	\$300,000.00	1	\$300,000.00	
801000	CONSTRUCTION STAKING BY THE CONTRACTOR	LS	\$36,000.00	1	\$36,000.00	1	\$32,000.00	1	\$32,000.00	1	\$29,000.00	1	\$29,000.00	
5712XX	18.25'SX7.5'R STRUCTURAL PIPE ARCH	LF	\$1,200.00	55.00	\$66,000.00	32.00	\$38,400.00	36.00	\$43,200.00	36.00	\$43,200.00	36.00	\$43,200.00	
XXXX	UTILITY RELOCATES (ALLOWANCE)	LS	\$250,000.00	1	\$250,000.00	1	\$250,000.00	1	\$250,000.00	1	\$250,000.00	1	\$250,000.00	
SUBTOTAL					\$3,067,550.94		\$2,770,559.98		\$2,778,335.66		\$2,550,392.30		\$2,584,404.98	
MISCELLANEOUS ITEMS- 30%					\$920,265.28		\$831,167.99		\$833,500.70		\$765,117.69		\$775,321.49	
NEW MEXICO GROSS RECIEPTS TAX 7.125%					<u>\$284,131.91</u>		<u>\$256,623.12</u>		<u>\$257,343.34</u>		<u>\$236,230.09</u>		<u>\$239,380.51</u>	
TOTAL					\$4,271,948.12		\$3,858,351.09		\$3,869,179.70		\$3,551,740.08		\$3,599,106.99	
USE					\$4,280,000.00		\$3,860,000.00		\$3,870,000.00		\$3,560,000.00		\$3,600,000.00	
This estimate of construction cost is only an opinion. BHI cannot & does not guarantee that proposals, bids, or actual Construction Costs will not vary from this opinion. Unit bid prices were obtained from recent project information provided by LANL and LAC. NMDOT Unit Bid Prices were used where that data was not available.														
Items that may effect this estimate are potential time of day restrictions, night work and LANL permitting requirements.														



County of Los Alamos

Staff Report

November 01, 2018

Los Alamos, NM 87544
www.losalamosnm.us

Agenda No.:

Index (Council Goals):

Presenters:

Legislative File: 11361-18

...Title

Public Works Staff/Project Update - October 2018

...Attachments

A - Public Works Update - October 2018

In the Works....

Public Works Update – October 2018

Administration Division

Transportation Board



The Transportation Board meets the first Thursday of the month at 5:30 p.m. Meetings are held at 1000 Central Avenue, Room #110.

October 4, 2018 Transportation Board Meeting Highlights

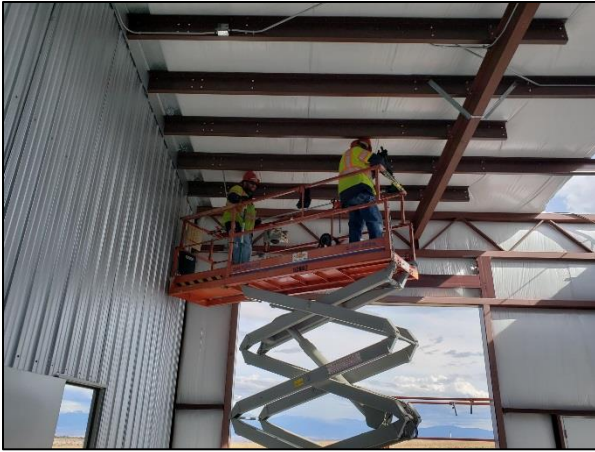
- ✚ Annette Granillo, Transit Manager provided board members with a presentation on the award from the Department of Transportation in the amount of \$1.485 million through Low or No Emission Grant Program to purchase new zero-emission battery electric buses.
- ✚ Dan Erickson, Traffic & Streets Manager provided board members with the FY19 Snow & Ice Control Plan.
- ✚ Albert Thomas, Senior Vice President of Bohannon Huston provided board members with a presentation on the Supplemental Environmental Project (SEP) – East Jemez Road/NM4 Intersection.

Airport Division

Airport Hangar Project

Crews continue to assemble the hangar building doors and sheathing the walls. Roofing activities have resumed following the installation of an approved safety system. Facility and Traffic electricians have begun their portion of the work. Overall completion sits at approximately 75%.





Traffic Electricians install conduit in the new hanger







Crews install roofing on the new hanger structure

Young Eagles Event



Experimental Aircraft Association (EAA) Chapter 691, known as the "Green Chili Chapter", hosted a Young Eagles Event September 22nd. According to the EAA, the Young Eagles program provides youth, between the ages 8 and 17, their first free ride in an airplane. It's the only program of its kind, with the sole mission of introducing and inspiring kids to the world of aviation. These flights, made possible through the generosity of EAA member volunteers, has provided more than 2 million young people with a free introductory flight. And this year's event in Los Alamos has added 37 excited and inspired youth to that ever-growing number!

Custodial Division

-  The Custodial Division supported 303 events during the month of October.
-  The upholstery was shampooed at the Nature Center this month.
-  Floor work was completed at Pajarito Cliffs Site and the Municipal Building.
-  Exterior window cleaning will begin this month and conclude in November.

Engineering & Project Management Division

Server Room Cooling Improvements

The engineer analyzed the performance data after the modifications were made to the server room and controls to see if installing the bypass valve in the condensing unit would be warranted. The purpose of the bypass valve is to reduce compressor cycling. The valves were installed on one of the two condenser units. The installation of the second recirculation valves started on October 22nd and is completed.

Municipal Building HVAC

An evaluation was completed by a 3rd party engineer to establish the cause of the HVAC noise, they have since recommend solutions. Jaynes and their sub-contractors have agreed to perform the work which entails replacement of ducts throughout the building identified as those causing the noise.

The engineer's analysis report showed restrictions in the supply and return ducts in certain areas were causing high velocity through the ducts, oscillations in the airflow through the supply fans, and oscillations of the sheet metal ducts. These restrictions also caused a higher than necessary fan speed on one roof top unit causing even more vibrations.

The planned work on the building was completed August 8th. Some additional sealing of HVAC ducts was completed in early October to close some noisy air leaks. The engineer is also working on parameters to slow down the fan speeds of the AC units to reduce the vibration and noise. Results will determine if more work is needed on the ducts.

White Rock Senior Meals Center Kitchen Equipment Upgrade

This project utilizes a grant from the State Aging and Long-Term Services Department to install additional kitchen equipment to improve the in house and delivered meals capacity. The Invitation for Bids was advertised on September 16th and closed on October 4th. Los Alamos County is in the process of submitting a Notice of Obligation to ALTSD following some coordination. The installation of the kitchen equipment is expected to be done in January 2019.

Fire Station 6 Restroom Remodels

The restrooms at Fire Station 6 (Airport) will be refurbished as it has been a little over 10 years since they were last re-done and are looking worn. Riskin and Associates, one of the County's on-call architects, completed design. Staff is holding off on advertising the project until Fire Station 3 is underway to see if any additional funding will be needed, or if Fire Station 6 will have enough funding to move forward. This should be decided by the end of the year.

Fire Station 3



The project includes reroofing, as well as a new wall system, window replacement and HVAC system modifications to better insulate and control the temperature in the bunkrooms. Bids were received and awarded to Kha'po construction by Council at the July 10th meeting.

Kha'po Construction crews began work demolishing the west wing bunkrooms and ceilings. Work on the exterior insulated finish system (EIFS) framing

has also started. Roof top work is slated to begin the week of October 22nd and continue for approximately 4-5 weeks. Substantial completion is scheduled for January 30, 2018.

Mesa Library HVAC Improvements

The main public area of the library is scheduled to be closed from August 20th to December 3. Public Works and Community Services Department staff are working closely to provide alternative accommodations to the public so that many library services are mostly maintained during this time. Library staff has relocated to other County Facilities (the "Zone", Fuller Lodge 2nd Floor West Wing for Youth Services and White Rock Branch Library).

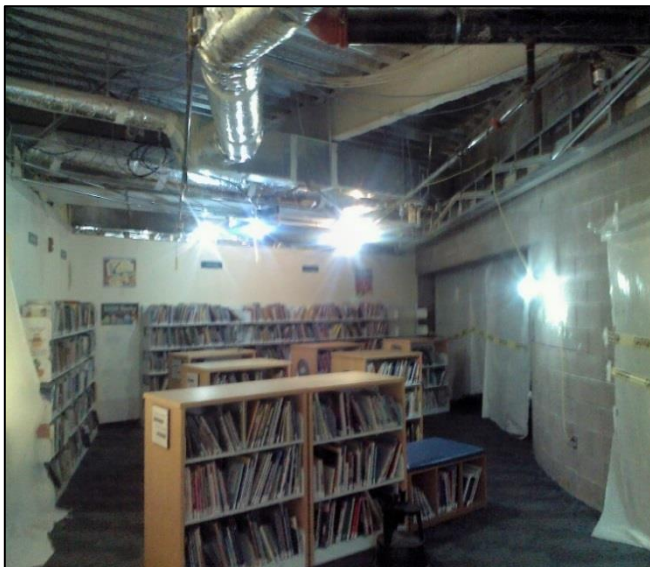
Work is continuing with the following:

- Much of the demolition work has been completed.
- New penetrations for the HVAC system were cut in various locations to provide better return air flow
- Existing duct cleaning is scheduled to be completed on October 23rd.
- The new boilers have been delivered and are in the process of being installed.
- The existing front-end ductwork is about 95% removed in anticipation of new duct panels arriving the week of Oct 22.
- Work has begun on the Chiller pad expansion and will require relocating the power supply for the library parking lot lights which conflicts with the new pad.
- Insulating and powering of the numerous new control valves is on-going and should be mostly complete the week of Oct 22.
- The heating and cooling coils have arrived and will be installed after the new intake panels.
- The chillers have been delivered and are awaiting completion of the pad for installation.

- The new intake structure except for the new louvers, some minor facing and backfill is complete.
- The relocation of the electric feeds, the new transformer and the gas line work is mostly complete. The CID gas and electrical inspectors have approved the installation.
- Framers are on site setting up the ceilings that were removed to accommodate new duct work.
- Temporary heat for the Zone has been generously provided by the contractor as they had an extra heater in their yard. It was thought the Zone had complete HVAC, but it does not have heating.
- The new lighting packages are on order



County personnel is ensuring that the library will be completed on time as scheduled by continued coordination and communication. The library moving dates to re-occupy will occur during the week after Thanksgiving with one final move from Fuller Lodge the week of December 10th to be able to provide access to Picture Books. The contract milestone has been extended to November 28th to accommodate some unforeseen work, but the library is still on schedule to re-open December 4th. There is additional change order work that will be covered by existing contingency that is currently being negotiated for work that will not affect the re-opening.





New return air penetration (smaller holes)



New air intake structure



Youth area – duct cleaning equipment



Teen area – new ceiling to be installed



New boilers



New gas meter and transformer (upper)

LAPD Remodel for Sheriff's Office

A new office space for the County Sheriff's office is being designed inside the Justice Center to allow the public better access. The new entrance will be on the Trinity side of the station. It will consist of an office for the Sheriff and one office space for an Administrative position. Currently, visitors to the Sheriff's office need to be escorted through the Records area, which is not ideal, either for the visitors or staff. Construction drawings have been received and are under review. Construction should be complete before the end of the year.

On Call Construction Services

An RFP is being developed to provide on-call facility work as needed for smaller projects that are small in scale to go out to bid individually or that need to be fast-tracked. Remodels, smaller mechanical, electrical and plumbing jobs would fall into this category, generally less than \$200,000 each, many being \$50,000 or less.

Canyon Rim Trail Phase 3

The County has been working with the consultant to prepare to obtain easements with the private owners, by first obtaining property appraisals, within the project limits between Knecht Street and the 20th Street Extension. A presentation was made to the membership at the American Legion, one of the properties where an acquisition is needed. They will respond pending the appraised value. Souder, Miller & Assoc. has been in the process of obtaining a contract with an appraiser as per our contract, this was obtained on October 22nd. A kick-off meeting with all parties will be held and appraisals will be scheduled before the end of the month.

Canyon Rim Trail Underpass

The project was awarded federal FY2018 funding under the Transportation Alternatives Program (TAP) for project study and design in the amount of \$320,000 and FY2020 TAP funding for project construction in the amount of \$2,020,000 for a total award of \$2,340,000.

A kick-off meeting with Wilson and Company was held on April 26 to begin the design process for this project. Preliminary Alignments have been received by staff. The first public meeting will be held July 26th at the Arts in Public Places Board, followed up by an August 2nd presentation to the Transportation Board and August 9th presentation to Parks & Recreation Board to discuss the scoping report and conceptual design. Minor feedback was obtained and will be considered. The consultant has now submitted the 60% design, and a design review meeting was held with the whole project team on September 18th. A follow-up design meeting is scheduled for October 22nd for utility and ROW coordination. It is anticipated that various utility relocations are forthcoming and being that this project crosses through NMDOT Right-of-Way maintenance agreements will be required.

North Mesa Phase 2 Improvements (Cumbres del Sol Subdivision)

This North Mesa pavement rehabilitation project is located on Camino(s) Manzanita/Mora/Cereza. The project entailed a new asphalt roadway, new compacted base, and intermittent concrete sidewalk, drive pads, curb & gutter, ADA curb ramps. The project has reached final completion and is fully open to the residents. The Contractor has completed working on corrective punch list

items as well as the landscaping in disturbed areas. Final project closeout is being worked on now. The project was completed \$20,000 under budget.

Tsikumu Village

Tsikumu Village is programmed in Fiscal year 2019 for roadway maintenance. This project will include pavement preservation, along with intermittent concrete work as needed on Sioux Street, Cheyenne, Iroquois, Seminole, Yuma, and Ute Street. The maintenance treatment is being evaluated currently to fit within the budget. Alternatives are being developed currently. A selected alternative is anticipated in late 2018, upon which a design will be derived. Construction is anticipated in Spring of 2019.

Tracts A-13/A-12 LASO Offsite Improvements Project

A kick-off meeting with Santa Fe Engineering was held on October 18th to begin the design phase of this project. This project includes a traffic study to evaluate general geometry and an assessment of improvements to support future development at NM 502 (Trinity Drive) and 35th Street. The next project tasks include scheduling a scoping meeting with NMDOT in early November and submittal of the 30% design documents in December 2018.

DP Road and Utility Infrastructure Improvements Project

The USDOT BUILD (Better Utilizing Investments to Leverage Development) Grant application was submitted on July 19, 2018, for the DP Road and Utility Infrastructure Improvements Project. The request was for \$5 million for new asphalt road surfacing, pavement markings, concrete sidewalks, curb and gutter, ADA curb ramps, drive pads, storm drains, street lighting, and landscaping improvements. One million dollars was also requested for the replacement of the existing utilities (gas, water and electric) that will be impacted by the roadway construction. The grant awards are scheduled to be announced by December 18, 2018.

NM 4/East Jemez Rd. (Truck Route) Intersection

Staff continues to work with DOE, NMDOT Bandelier, and Army Corps of Engineers to program, design and construct intersection upgrades to improve capacity and safety. The USACE has entered into a design contract with Bohannon Huston, a Civil design consultant, to study and design the intersection. The final traffic study and concept design was submitted for stakeholder comments on October 11th. A follow-up meeting with all stakeholders will be held on October 30th to discuss next steps. The report documented a preliminary estimate for the preferred alignment of \$3.6Million including NMGR. DOE will evaluate whether or not the remaining SEP funds available would be sufficient to construct the project.

NM 502 Reconstruction, Knecht St. to Tewa Loop

Staff continues to coordinate with NMDOT on this state lead project. NMDOT bid the project for a fourth time on August 17th and received two bidders. A pre-construction meeting was held on October 13th with all project stakeholders. The contractor, Star Paving, has requested a winter suspension in hopes of beginning the project on March 1, 2019. The NMDOT has not yet granted this request, however, it appears to be highly likely for the March 1st start.

Environmental Services Division

Los Alamos County Landfill Gas (LFG) Update

This is a summary of results for September 2018 methane monitoring for the Los Alamos County closed landfill.

1. The monitoring probes near the boundary of the landfill ranged in methane concentrations from 0.0 (MP-8R, MP-9R, MP-11R and MP-12R) to 0.5 (MP-10R) percent gas in air.
2. The landfill gas extraction wells that are part of the newly active GCCS ranged in methane concentrations from 2 (EW-2R) to 54.7 (EW-16) percent gas in air.
3. The LFG vents and gas probes previously monitored and tracked during our monthly compliance monitoring at Los Alamos are not part of this month's data. These extraction locations have been recently decommissioned following the site's transition to the permanent GCCS system that started-up on July 12, 2018.

Curbside Yard Trimmings Roll Cart Update

The yard trimmings roll cart program began on July 9, 2018. Environmental Services staff delivered over 3,600 roll carts, this is over 50% of the residential customer base. During the first four months of collection Environmental Services collected approximately 290 tons of yard material.

October Eco Challenge



Los Alamos County Council proclaimed October, Eco Challenge month and Los Alamos County Green Team has been busy promoting this event to the community and LAC staff. Tiffany Pegoda and Kirsten Bell of the Los Alamos County Green Team helped promote this event at Customer Service Event on October 3. The Eco Challenge helps show participants that small actions can make a big difference.

Yard Trimming Program Award



The Environmental Services Division received 2018 New Mexico Recycling and Solid Waste Award for Diversion Project of the Year. The award was presented by New Mexico Recycling Coalition Director Sarah Pierpont and accepted Public Works Director Philo Shelton, Environmental Services Manager Angelica Gurule, and Environmental Services Superintendent Armando Gabaldon during a ceremony in late September at the New Mexico Recycling & Solid Waste Conference.

Homecoming Parade

Environmental Services had a truck displaying artwork created by Tony Jaurique and Emma Cartelli, Chamisa Elementary and Tabitha Pegoda, Aspen Elementary. The artists walked the parade route handing out candy, showing off their work, and reminding residents to Recycle Right.



Residential Sustainability Report



Residential Sustainability Report

Service Period: September 2018



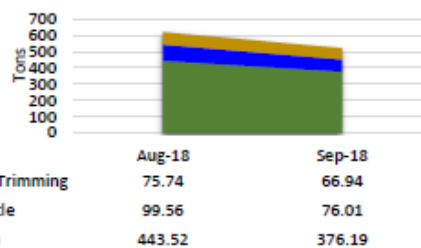
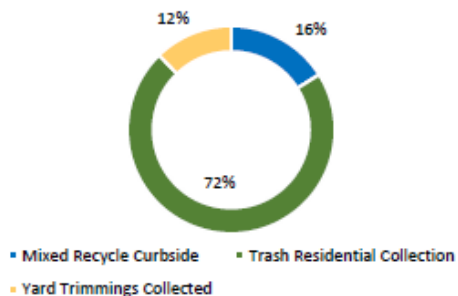
LOS ALAMOS

August Diversion Rate: 28% - September Diversion Rate: 28%

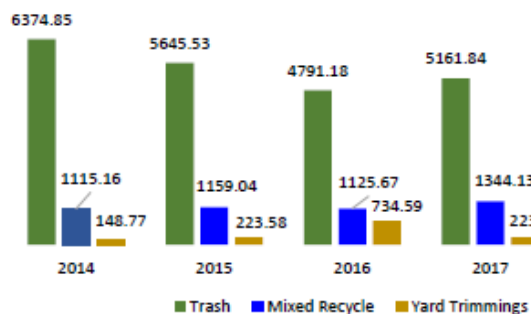
A 0% change in Diversion

The *diversion rate* is the percent of materials recycled and composted.

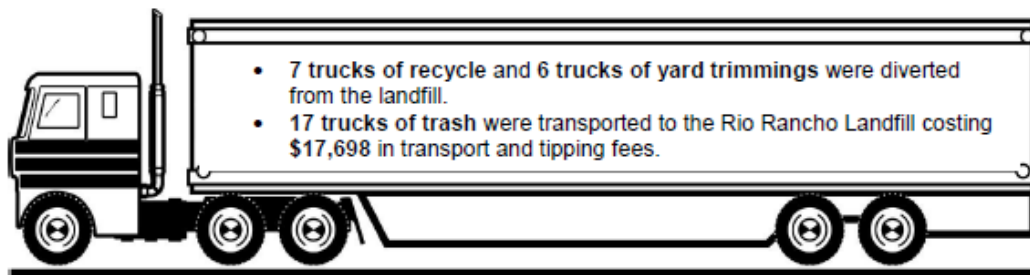
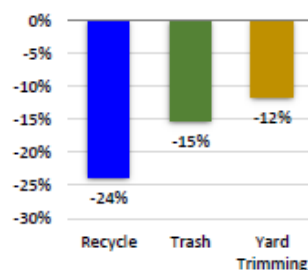
Monthly Collection Report



Annual Collection Report



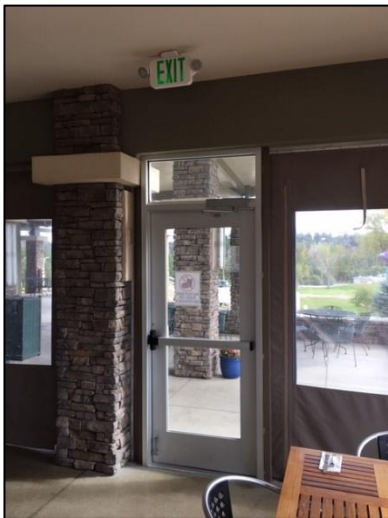
% Change Previous Month



For more information contact Environmental Services Division at 505.662.8163 or email solidwaste@lacnm.us

Facilities Division

Golf Course Patio Exit Signs & Emergency Lighting



Facilities staff installed two new exit signs - equipped with emergency lighting - at the east and west exterior doors of the patio area used by Cottonwood on the Greens. This installation was needed to comply with building code requirements given that the area is enclosed by canvass siding and plastic zip-up windows to make the patio space useful for the restaurateur.

MUNIS Work Order Request Training

The Facilities Manager continues to work throughout the County to assist and train staff in the creation of work orders for facilities maintenance needs. Although the system, when in full operation, will be a great tool that will allow users the ability to directly enter and check on the status of requests, just like in the other MUNIS work areas, there is a learning curve that we are currently working through. Thanks to all for your patience in this transition and feel free to contact Facilities staff if you have questions.

Access Control and Lock Change-Outs for Voting Locations



The Facilities Division has been working to assure open access to voting locations in Los Alamos County by updating access control programs that automatically open and lock facilities at pre-determined times of day. In addition, some new locksets have been installed in locations where poll workers may need a physical key.

Request for Proposals – Lifts and Cranes



County staff in various departments make use of a number of lifts and cranes to assist in the work being done every day. The Fleet Division is one such group that uses vehicles lifts and overhead cranes to maintain the fleet of vehicles used in the delivery of service to the public. Other work groups that make use of such equipment include the

Traffic Division and the Utilities Department. The RFP that the Facilities Division currently has out is to select a contractor that can do both repair and preventative maintenance to such specialized equipment ensuring that it will operate safely and without issue when needed.

Fleet Division



New Altec Digger Derrick truck for Utilities Department. This unit is 6-wheel drive to get in to rough areas for repair of power lines and the ability to set or replace polls. Has a lifting capacity of 30k pounds, sheave height of 50ft, and a horizontal reach of 40 ft.



Traffic & Streets Division

Micro-seal Project in White Rock



IPR Ltd, the contractor hired to resurface several roads in White Rock is shown working in Pajarito Acres. They are applying a micro-seal coating in Pajarito Acres, La Senda and on Rover Blvd starting at Grand Canyon Drive moving toward Meadow and looping around Meadow to Grand Canyon. Earlier in October IPR Ltd. Crack-sealed these areas in preparation for the micro-seal. The project should complete by October 31st weather permitting.



Before and after micro-seal application photos of Monte Rey South in Pajarito Acres near the intersection of NM 4.

Snow & Ice Control Conference and “Rodeo” in Loveland, Colorado

Three Traffic and Streets employees traveled to Loveland Colorado for the annual Snow and Ice Conference. Daniel Campos Jr., Senior Equipment Operator, Joseph Trujillo, Senior Equipment Operator, Chris Armijo, Equipment Operator all competed in the Rodeo at the conference. They attended sessions on snow and ice control and performed well in the competition.



Daniel Campos Jr. front-end loader competition.



Joseph Trujillo skid-steer competition



Loveland Colorado competition course



Chris Armijo Skid-steer

- ✚ Administration is working on coordinating another Traffic Control Technician and Supervisor Class and another Flagger Training. This will most likely occur late November.
- ✚ Signs and marking crew have been washing curbs countywide in preparation for vendor Accu-stripe to come paint curbs.
- ✚ Traffic and Streets will be conducting a Snow and Ice training for the upcoming snow season on November 5th at the PCS Training Room.

Transit Division



The Transit Division has completed the 2018 Bandelier Shuttle season. The season provided service from May 17, 2018 and will continued through October 17, 2018. Shuttle service was provided seven days a week every 30 minutes Monday through Friday and 20-minute service Saturday and Sunday. During Balloon Fiesta week, Atomic City Transit included informational announcements for visitors of Bandelier National

Park. Some announcements included information on Bradbury Science Museum, Nature Center, Gateway to the 3 national parks, Trails and Scenic Overlooks.

The monthly ridership for September 2018 was a total of 17,475 with a total of 96,157 for the season so far. A total of 14,378 miles were performed during this season through September 2018. Bandelier had 96,157 trips for the 2018 season.

Thank you to the Bandelier Ranger staff for a successful shuttle season.

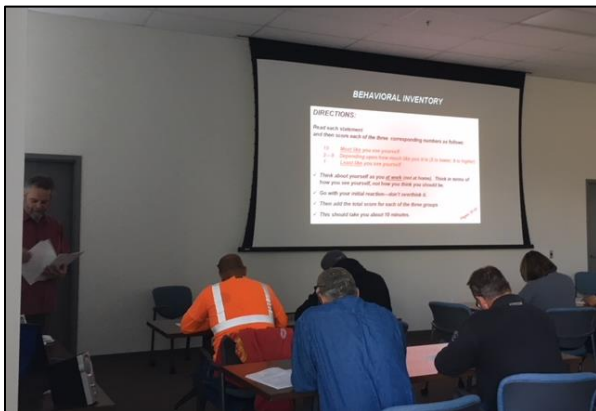
Transit Division provided shuttle service to Ullrfest



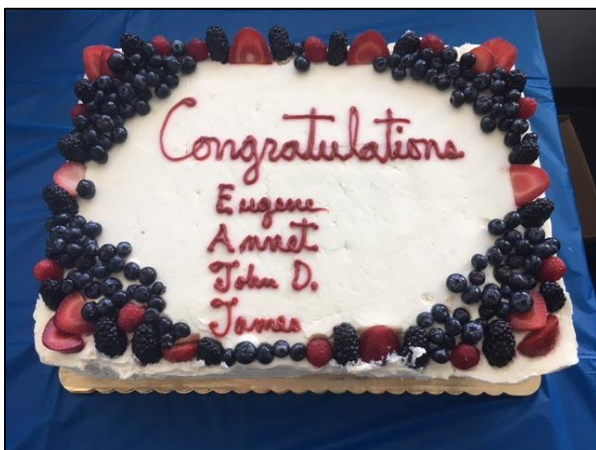
Shuttle service provided safe and efficient transportation to and from the event. The event was well attended with the following ridership.

Date	Service Name	Operator	Unit	Adult	Student	Senior	Bicycle	Lift Use	ADA	Unlined Passenger Trips
9/29/18	Ullrfest	Operator 1	4104	187	17	0	1	0	0	205
9/29/18	Ullrfest	Operator 2	4123	38	7	0	0	0	0	45
9/29/18	Ullrfest	Operator 3	4161	46	10	20	0	0	0	76
9/29/18	Ullrfest	Operator 4	4101	210	36	0	1	0	0	247
9/29/18	Totals			481	70	20	2			573

Customer Service Training



On October 8, 2018, Atomic City Transit and Environmental Service staff took some time for yearly training. This year Customer Service Excellence training by Bob Davis-Mayo was selected. ACT staff took the day to learn how to detect personalities and pressure points for customers and how best to assist them.



Atomic City Transit took some time this month to celebrate County and Atomic City Transit longevity awards. This year the following employees received awards and cake. Thank you to our employees for their dedication and excellent performance.

Annet Acomb – 10 years with LA County & 10 years with ACT

James Barela – 10 years with LA County & 10 years with ACT



John Danforth – 10 years with LA County & 10 years with ACT



Cliff Cisneros – 10 years with LA County



Corinne Salazar – 10 years with LA County



Terry Burge – 10 years with LA County

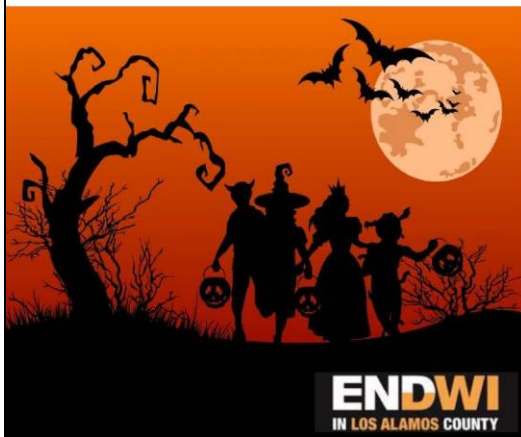


Ramon Trujillo - 10 years with LA County

Mark Hughes – 10 years with LA County

Charles Flowers – 5 years with LA County

Eugene Ortiz – 5 years with LA County & 5 years with ACT



Reservations Accepted:

Friday, 10/26
7:00 AM - 8:00 PM
Saturday, 10/27
5:00 PM - 12:30 AM

Free Bus Ride Services
to and from locations in Los
Alamos & White Rock

Halloween Buzz Bus

Saturday, October 27th

6:00 PM - 12:30 AM

Don't Drink and Drive... Dial - A- Ride

To Request a Ride Call:

505-661-RIDE (7433)

First come, First Serve, So Call Early



Atomic City Transit is partnering with LAC DWI Council to bring you a very happy and safe Halloween season. Atomic City Transit will be providing the Buzz Bus, Saturday October 27, 2018 for a safe ride home. The fare and scares are free so make your reservations early and make sure you get home safe. Service is provided from 6:00 pm to 12:30 am throughout Los Alamos County.



From: Kate Kettering <katekettering@gmail.com>

Sent: Tuesday, October 02, 2018 9:34 AM

To: LACPW <lacpw@lacnm.us>

Subject: Re: Request for Public Works Service

Thank you to the Traffic & Streets crew for providing excellent customer service.

Louise,

Thank you for taking care of this so quickly! The sidewalks look great and are much safer.

Kate

On Thu, Sep 20, 2018 at 12:55 PM Kate Kettering <katekettering@gmail.com> wrote:

Dear Louise,

Per our conversation, I'm forwarding this request to clear the sidewalk of two overhanging trees. These trees are blocking pedestrian access and citizens are walking in the bike lane to get around them. They are located on the north side of Diamond Drive between the Shell gas station and Mountain Elementary School.

I've attached photos to aid in locating the obstacles.

Thank you for your kind attention to this matter. Please contact me if you desire more information.

Kate Kettering

505-412-3165