To: Mayor Michel and Town Council

From: Michael Yerman, Director of Planning

Subject: **Avalanche Park Campground Cost Estimates and Traffic Study - Work Session**

Date: September 19, 2016

Background:
JVA Engineers and McDowell Engineering will be presenting their findings on three different options for campgrounds at Avalanche Park. Their studies are attached to this memo.

The Council will want to weigh the costs of each of the proposals and designs. The project will be presented again for the Council's consideration with the 5 year capital budget during a future budget work session. Dependent on the direction of the Council on which option the Town would like to pursue, the attached traffic study will be revised. The traffic study will be used by the Town to file for a CDOT Access permit once the project proceeds. The CDOT access permit will be an important part of a larger development application.

Direction needed at this time:
Staff needs direction from the Town Council on which campground option they would like the Staff to begin Planning for in the 2017-2022 5 year Capital Budget.

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M E M O

TO:	Michael Yerman, Town Planner	DATE:	September 8, 2016
FIRM:	Town of Crested Butte	JOB NO.	2387.3c
ADDRESS:	507 Maroon Avenue, PO Box 39 Crested Butte, Colorado 81224	PROJECT:	Avalanche Park Campground Access & Alternatives Analysis
		SUBJECT:	Concept Plan

Project Description

The Avalanche Park Campground Feasibility Study and Concept Plan in 2012. This study outlined the market analysis, campground development, and operations for a proposed campground within the limits of Avalanche Park boundary. JVA utilized this study to further development of several alternative site plans that incorporated various camping options, including tent camping only, tent and RV camping, and workforce camping. Along with developing the site plan for these options, JVA also developed an opinion of probable cost (estimate) for each scenario which incorporated the required amenities and utilities associated with each option. JVA worked with a traffic engineering firm, McDowell Engineering, to develop the access requirements for this site and with Town staff to develop the concept site plans. Below are the two major task associated with this scope of work:

1. Concept Site Plans and Estimates including Access to Hwy 135:
    a. Option 1 – Tent Camping Only
    b. Option 2 – Tent and RV Camping
    c. Option 3 – Workforce Camping

2. Traffic Impact Study for CDOT Access Permit Application

Campground Alternatives

Option 1 – Tent Camping Only: Includes 32 campsites including Host Camp Site, separate access from Gunnison County Public Works, water well with treatment, pit toilet relocated from Public Works Yard, looped gravel drive, site lighting with electrical service, and additional trailhead parking for Baxter Gulch. Estimated design and construction cost is approximately $650,000. A conceptual site plan and cost detailed estimate is attached for reference.

Option 2 – Tent and RV Camping: Includes 24 campsites including Host Camp Site and 16 RV sites, separate access from Gunnison County Public Works, Highway 135 widening including acceleration and deceleration lanes, water well with treatment and RV hookups, pit toilet relocated from Public Works Yard, looped gravel drive, site lighting with electrical service, and additional trailhead parking for Baxter Gulch. Estimated design

and construction cost is approximately $1,100,000. A conceptual site plan and cost detailed estimate is attached for reference.

Option 3 – Workforce Camping: Includes 24 campsites including Host Camp Site, separate access from Gunnison County Public Works, water well with treatment and restroom/shower facilities, onsite wastewater treatment system, looped gravel drive, site lighting with electrical service, and additional trailhead parking for Baxter Gulch. Estimated design and construction cost is approximately $940,000. A conceptual site plan and cost detailed estimate is attached for reference.

Summary

All three alternatives will require a significant capital cost to develop and should be considered for budgeting purposes. Cost could be alleviated by utilizing Town Staff for some of the site construction development. These estimates take into account the current market rates and pricing and may vary in time. The water rights of this site are undetermined at this time, so the cost associated with augmentation for developing a water well for the site will need to be further investigated. JVA did review options to bring Town utilities to the site but determined that is was cost prohibited. Option 2 - Tent and RV Camping and Option 3 – Workforce Camping cost are impacted mostly by the need for additional facilities and right-of-way improvements that are not required of Option 1 – Tent Camping Only.

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Boulder, CO 80302 Phone: 303.444.1951
www.jvajva.com E-mail: info@jvajva.com

NO.	DATE	DESD	DWN	REVISION DESCRIPTION

DESIGNED BY:	JGJ
DRAWN BY:	JGJ
CHECKED BY:	JSP
JOB #:	2387.3c
DATE:	SEPTEMBER 2016

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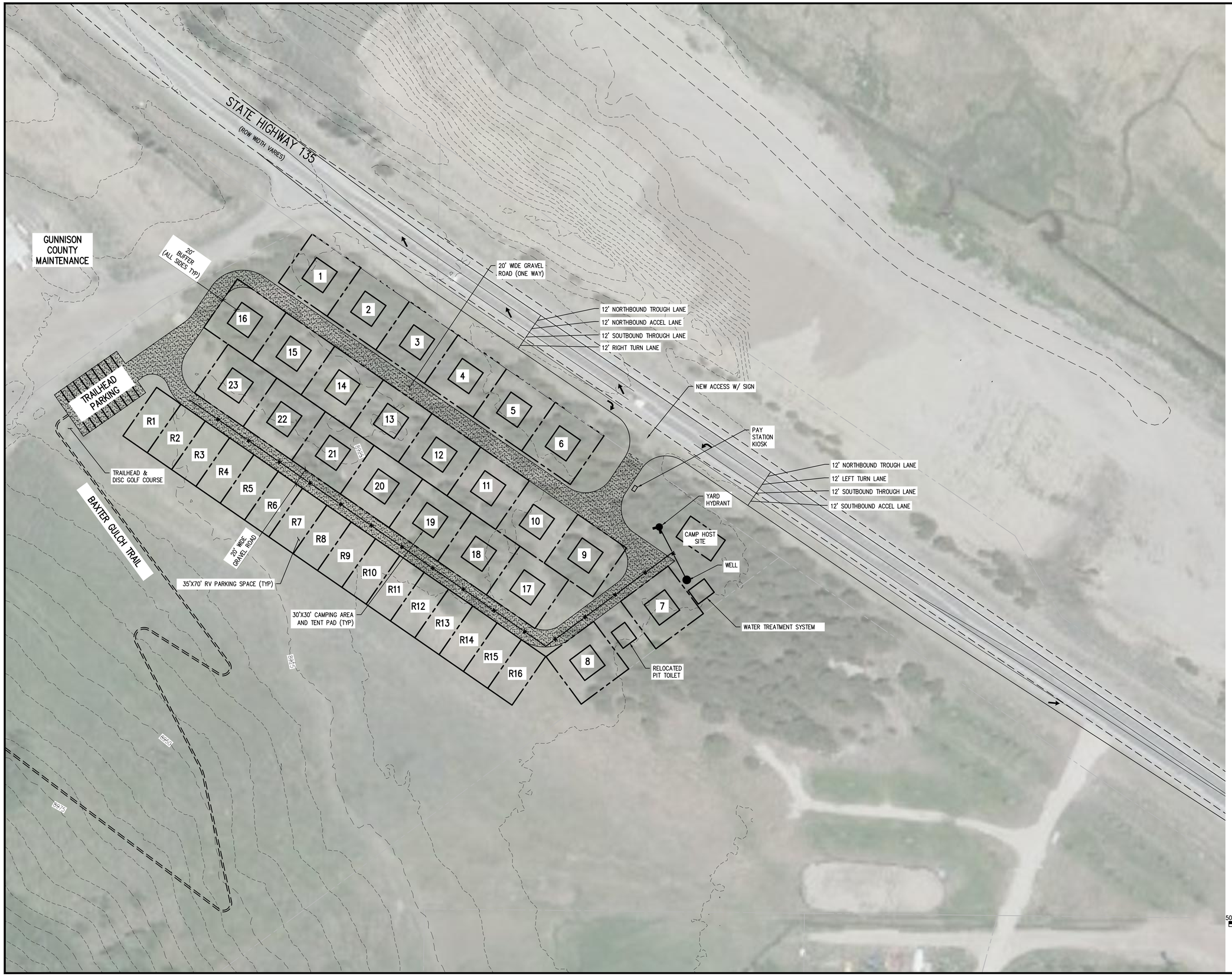
TOWN OF CRESTED BUTTE
AVALANCHE PARK CAMPGROUND
CRESTED BUTTE, COLORADO

OPTION 1 - TENT CAMPING ONLY

SHEET NO.

FIG-1



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DESIGNED BY:	JGJ
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JOB #:	2387.3c
DATE:	SEPTEMBER 2016

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TOWN OF CRESTED BUTTE
AVALANCHE PARK CAMPGROUND
CRESTED BUTTE, COLORADO

OPTION 2 - TENT AND RV CAMPING

SHEET NO.

FIG-2

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NO.	DATE	DESD	DWN	REVISION DESCRIPTION

DESIGNED BY:	JGJ
DRAWN BY:	JGJ
CHECKED BY:	JSP
JOB #:	2387.3c
DATE:	SEPTEMBER 2016

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TOWN OF CRESTED BUTTE
AVALANCHE PARK CAMPGROUND
CRESTED BUTTE, COLORADO

OPTION 3 - WORKFORCE CAMPING ONLY

SHEET NO.

FIG-3

JVA, Incorporated
1319 Spruce Street
Boulder, CO 80302
Ph: 303.444.1951
Fax: 303.444.1957

Job Name: Avalanche Campground
Job Number: 2387.3c
Date: 09/07/2016
By: CEC
Phase: Concept

Preliminary Opinion of Probable Costs For
Avalanche Campground, Crested Butte, CO - Option 1 - Tent Camping Only

	Quantity	Units	Unit Cost	Total
General Sitework				
Demo Existing Misc. Structures	1	LS	$10,000.00	$10,000.00
Clear and Grub	1.5	AC	$3,000.00	$4,500.00
Stripping and Stockpile topsoil	1.5	AC	$1,000.00	$1,500.00
Cut, Fill and Compact Onsite Material	1,500	CY	$5.00	$7,500.00
Traffic Control	1	LS	$3,500.00	$3,500.00
Seeding (20 lbs/AC)	1	AC	$2,000.00	$2,000.00
Campsite (Host Site, Tent pad, gravel parking, grading, fire pit/grill)	32	EA	$3,000.00	$96,000.00
Signage	1	LS	$5,000.00	$5,000.00
Wood Fencing	1,500	LF	$25.00	$37,500.00
Site Amenities (Picnic tables, dumpster, and bear box)	1	LS	$15,000.00	$15,000.00
Landscaping	1	LS	$15,000.00	$15,000.00
Entry Gate	1	EA	$3,000.00	$3,000.00
			General Sitework Subtotal	**$200,500.00**
Pavements				
Road Base - 6"	1,300	TONS	$45.00	$58,500.00
			Pavements Subtotal	**$58,500.00**
Utility - Water				
Well Drilling and Pump, and Augementation Plan*	1	EA	$75,000.00	$75,000.00
Yard Hydrant and Piping	1	LS	$5,000.00	$5,000.00
Water Treatment System	1	EA	$40,000.00	$40,000.00
			Utility - Water Subtotal	**$120,000.00**
Utility - Sanitary Sewer				
Relocate and Install Existing Restroom	1	LS	$20,000.00	$20,000.00
			Utility - Sanitary Sewer Subtotal	**$20,000.00**
Utility - Electrical				
Lighting	1	LS	$10,000.00	$10,000.00
Electrical Meter, Pole Mounted Transformer, and Service	1	EA	$15,000.00	$15,000.00
			Utility - Electrical Subtotal	**$25,000.00**
Erosion Control				
Silt Fence	1000	LF	$3.00	$3,000.00
Vehicle Tracking Control	1	EA	$3,000.00	$3,000.00
Erosion Control Maintenance (months)	4	EA	$1,000.00	$4,000.00
			Erosion Control Subtotal	**$10,000.00**
			Subtotal	**$434,000.00**
			Mobilization (6%)	$26,040.00
			Contingency (15%)	$65,100.00
			Contractor's OH&P (15%)	$78,775.00
			Engineering and Survey Design Fees (8%)	$48,315.00
			PROJECT TOTAL	**$652,230.00**

*Water Rights for the site are unknown at this time

JVA, Incorporated
1319 Spruce Street
Boulder, CO 80302
Ph: 303.444.1951
Fax: 303.444.1957

Job Name: Avalanche Campground
Job Number: 2387.3c
Date: 09/07/2016
By: CEC
Phase: Concept

Preliminary Opinion of Probable Costs For
Avalanche Campground, Crested Butte, CO - Option 2 - RV/Tent Camping

	Quantity	Units	Unit Cost	Total
General Sitework				
Demo Existing Misc. Structures	1	LS	$10,000.00	$10,000.00
Clear and Grub	1.5	AC	$3,000.00	$4,500.00
Stripping and Stockpile topsoil	1.5	AC	$1,000.00	$1,500.00
Cut, Fill and Compact Onsite Material	1,500	CY	$5.00	$7,500.00
Traffic Control	1	LS	$7,000.00	$7,000.00
Seeding (20 lbs/AC)	1	AC	$2,000.00	$2,000.00
Campsite (Host Site, Tent pad, gravel parking, grading, fire pit/grill)	23	EA	$3,000.00	$69,000.00
RV Campsite (Gravel parking, minor grading, fire pit/grill)	16	EA	$2,000.00	$32,000.00
Signage	1	LS	$5,000.00	$5,000.00
Wood Fencing	1,500	LF	$25.00	$37,500.00
Site Amenities (Picnic tables, dumpster, and bear box)	1	LS	$15,000.00	$15,000.00
Landscaping	1	LS	$15,000.00	$15,000.00
Entry Gate	1	EA	$3,000.00	$3,000.00
			General Sitework Subtotal	**$209,000.00**
ROW Improvements				
Asphalt Turn Lanes	1,700	TONS	$125.00	$212,500.00
Striping	3,700	LF	$1.50	$5,550.00
			Pavements Subtotal	**$218,050.00**
Pavements				
Road Base - 6"	1,300	TONS	$45.00	$58,500.00
			Pavements Subtotal	**$58,500.00**
Utility - Water				
Well Drilling and Pump, and Augementation Plan*	1	EA	$75,000.00	$75,000.00
Yard Hydrant and Piping	1	LS	$5,000.00	$5,000.00
Water Piping and Blow-off for RV Hook-up	1	LS	$35,000.00	$35,000.00
RV hook-up	16	EA	$750.00	$12,000.00
Water Treatment System	1	EA	$50,000.00	$50,000.00
			Utility - Water Subtotal	**$177,000.00**
Utility - Sanitary Sewer				
Relocate and Install Existing Restroom	1	LS	$20,000.00	$20,000.00
			Utility - Sanitary Sewer Subtotal	**$20,000.00**
Utility - Electrical				
Lighting	1	LS	$10,000.00	$10,000.00
RV Electrical Hook-up	16	EA	$500.00	$8,000.00
Electrical Meter, Pole Mounted Transformer, and Service	1	EA	$25,000.00	$25,000.00
			Utility - Electrical Subtotal	**$43,000.00**
Erosion Control				
Silt Fence	1000	LF	$3.00	$3,000.00
Vehicle Tracking Control	1	EA	$3,000.00	$3,000.00
Erosion Control Maintenance (months)	4	EA	$1,000.00	$4,000.00
			Erosion Control Subtotal	**$10,000.00**
			Subtotal	**$735,550.00**
			Mobilization (6%)	$44,135.00
			Contingency (15%)	$110,335.00
			Contractor's OH&P (15%)	$133,505.00
			Engineering and Survey Design Fees (8%)	$81,885.00
			PROJECT TOTAL	**$1,105,410.00**

*Water Rights for the site are unknown at this time

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Job Name: Avalanche Campground
Job Number: 2387.3c
Date: 09/07/2016
By: CEC
Phase: Concept

Preliminary Opinion of Probable Costs For
Avalanche Campground, Crested Butte, CO - Option 3 - Workforce Housing Only

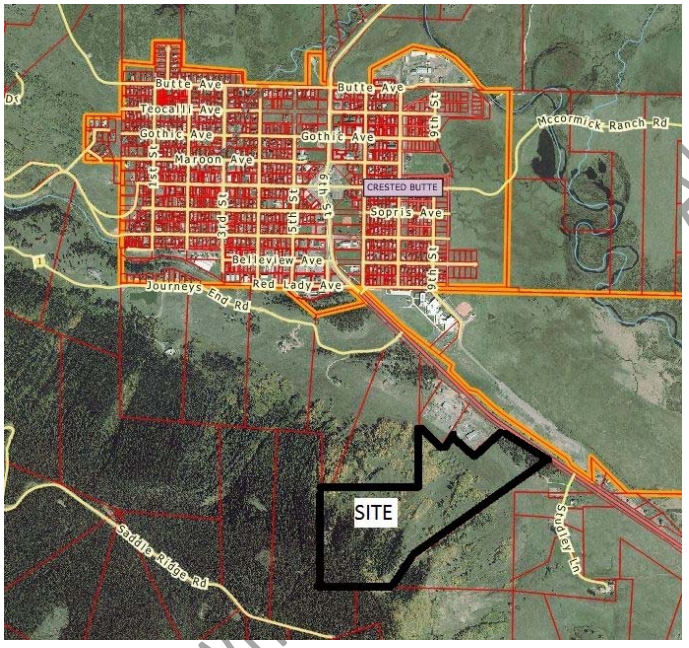
	Quantity	Units	Unit Cost	Total
General Sitework				
Demo Existing Misc. Structures	1	LS	$10,000.00	$10,000.00
Clear and Grub	2.0	AC	$3,000.00	$6,000.00
Stripping and Stockpile topsoil	2.0	AC	$1,000.00	$2,000.00
Cut, Fill and Compact Onsite Material	1,750	CY	$5.00	$8,750.00
Traffic Control (Construction)	1	LS	$3,500.00	$3,500.00
Trafic Control (Seasonal Move-in/Move-out)	2	EA	$2,500.00	$5,000.00
Seeding (20 lbs/AC)	1	AC	$2,000.00	$2,000.00
Workforce Campsite (Tent pad, gravel parking, minor grading, fire pit/grill)	23	EA	$3,500.00	$80,500.00
Signage	1	LS	$5,000.00	$5,000.00
Shower and Restroom Facility	1	LS	$50,000.00	$50,000.00
Wood Fencing	1,500	LF	$25.00	$37,500.00
Site Amenities (Picnic tables, dumpster, and bear box)	1	LS	$15,000.00	$15,000.00
Landscaping	1	LS	$15,000.00	$15,000.00
Entry Gate	1	EA	$3,000.00	$3,000.00
			General Sitework Subtotal	**$243,250.00**
Pavements				
Road Base - 6"	1,500	TONS	$45.00	$67,500.00
			Pavements Subtotal	**$67,500.00**
Utility - Water				
Well Drilling and Pump, and Augementation Plan*	1	EA	$75,000.00	$75,000.00
Yard Hydrant and Piping	1	LS	$5,000.00	$5,000.00
Water Piping	1	LS	$75,000.00	$75,000.00
Campsite Hook-up	23	EA	$750.00	$17,250.00
Water Treatment System	1	EA	$50,000.00	$50,000.00
			Utility - Water Subtotal	**$222,250.00**
Utility - Sanitary Sewer				
Septic Field	1	LS	$35,000.00	$35,000.00
			Utility - Sanitary Sewer Subtotal	**$35,000.00**
Utility - Electrical				
Lighting	1	LS	$10,000.00	$10,000.00
Campsite Hook-up	23	EA	$500.00	$11,500.00
Electrical Meter, Pole Mounted Transformer, and Service	1	EA	$25,000.00	$25,000.00
			Utility - Electrical Subtotal	**$46,500.00**
Erosion Control				
Silt Fence	1000	LF	$3.00	$3,000.00
Vehicle Tracking Control	1	EA	$3,000.00	$3,000.00
Erosion Control Maintenance (months)	4	EA	$1,000.00	$4,000.00
			Erosion Control Subtotal	**$10,000.00**
			Subtotal	**$624,500.00**
			Mobilization (6%)	$37,470.00
			Contingency (15%)	$93,675.00
			Contractor's OH&P (15%)	$113,350.00
			Engineering and Survey Design Fees (8%)	$69,520.00
			PROJECT TOTAL	**$938,515.00**

*Water Rights for the site are unknown at this time

Auxiliary Turn Lane Assessment
Transportation Impact Study

for

Avalanche Park Campground
Crested Butte, Colorado



September 7, 2016

PREPARED FOR:
Town of Crested Butte
507 Maroon Avenue
Crested Butte, CO 81224
Contact: Michael Yerman

PREPARED BY:
McDowell Engineering, LLC
PO Box 4259
Eagle, CO 81631
970.623.0788
Contact: Kari J. McDowell Schroeder, PE, PTOE
Project Number: M1231

DRAFT - Pending Town Alternative

Statement of Engineering Qualifications

Kari J. McDowell Schroeder, PE, PTOE is a Transportation and Traffic Engineer for McDowell Engineering, LLC. Ms. McDowell Schroeder has over nineteen years of extensive traffic and transportation engineering experience. She has completed numerous transportation studies and roadway design projects throughout the State of Colorado. Ms. McDowell Schroeder is a licensed Professional Engineer in the State of Colorado and has her certification as a Professional Traffic Operations Engineer from the Institute of Transportation Engineers.

DRAFT - Pending Town Selection of Final Alternative

Traffic Impact Analysis for the Avalanche Park Campground

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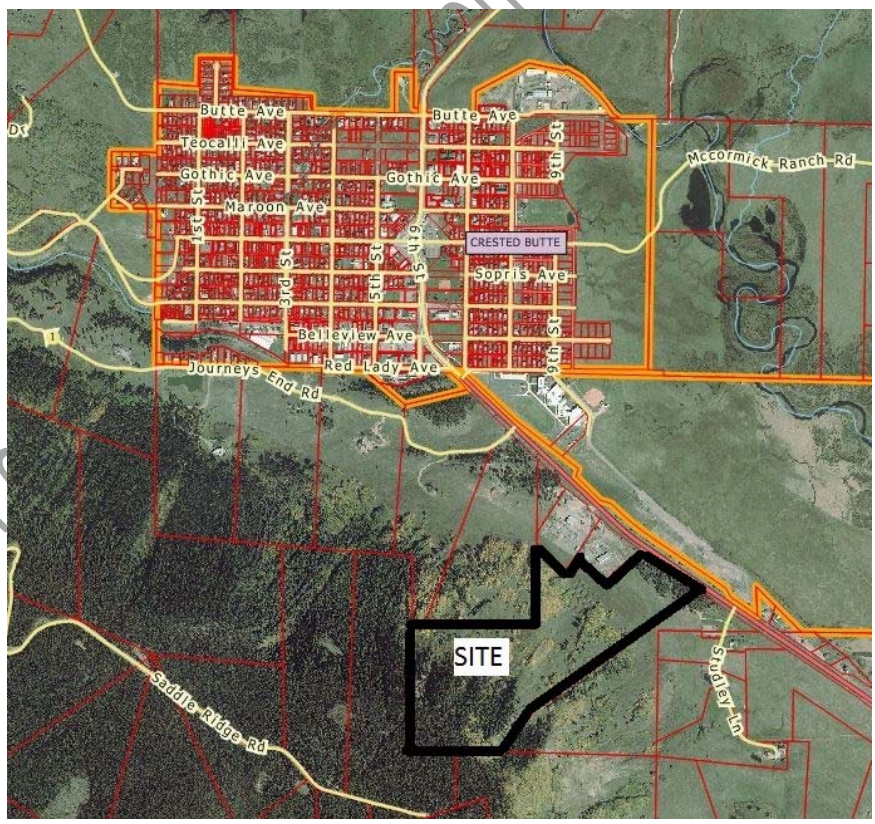
DRAFT - Pending Town Selection of Final Alternative

1.0 Project Description

McDowell Engineering has prepared this Level Two Auxiliary Turn Lane Assessment for a proposed Town Campground south of Crested Butte, Colorado. The purpose of this transportation impact analysis is to forecast and analyze the impacts of the additional traffic volumes associated with this project on the surrounding roadway network. Recommendations to mitigate any traffic impacts are also included. The analysis complies with Colorado Department of Transportation standards.

The applicant is proposing to develop a 24 space campground approximately one-half mile south of the entrance to the Town of Crested Butte on a 71-acre parcel (parcel number 3255-000-00-129). The site is accessed by the existing driveway serving the Gunnison County Maintenance Shop at 26601 Colorado State Highway 135. Refer to the Area Map in **Figure 1** and Site Plan in **Figure 2**. In addition, there is a 5-space parking lot at the trailhead of Baxter Gulch trail that is accessed by the shared driveway.

Figure 1: Area Map



DRAFT - Pending Final Alternative

Figure 2 - Site Plan

50 0 50 100
SCALE IN FEET

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Boulder, CO 80302 Phone: 303.444.1951
www.jvainc.com E-mail: info@jvainc.com

NO.	DATE	DRSD	DWN	REVISION DESCRIPTION

DESIGNED BY:	JGJ
DRAWN BY:	JGJ
CHECKED BY:	JSP
JOB #:	2387.3c
DATE:	JULY 2016

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TOWN OF CRESTED BUTTE
AVALANCHE PARK CAMPGROUND
CRESTED BUTTE, COLORADO

OPTION 2 - TENT AND RV CAMPING

SHEET NO.
FIG-2

2.0 Existing Conditions

2.1 Description of Existing Transportation System

State Highway 135 is a 27.5-mile-long state highway connecting Crested Butte to Gunnison and is the only paved road leading to Crested Butte. In the vicinity of the proposed project, SH 135 is a two-lane section with a posted speed limit of 45mph. It is classified by the Colorado Department of Transportation (CDOT) as an access category R-A, regional highway.

The proposed access is located 400-feet east of the existing Gunnison County Shop and 550-feet west of a private driveway.

Based on traffic counts, the peak-hour heavy vehicle percentage is 4.6% for this section of the highway.

2.2 Proposed Site Access Description

The subject property (parcel number 3255-000-00-129) will access to SH 135 via a new access located approximately 400-feet east of the existing Gunnison County Shop driveway as depicted on the Site Plan **(Figure 2)**.

2.3 Traffic Data Collection

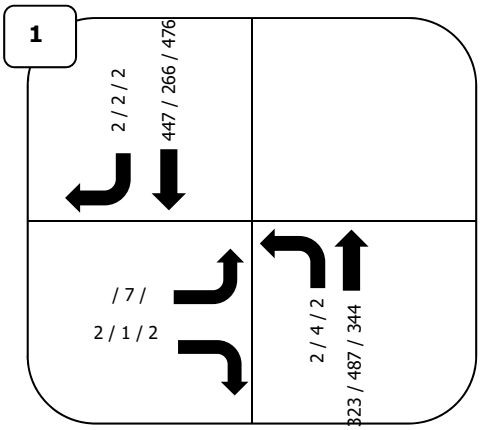
Traffic data was collected at the intersection of SH 135 and the existing Gunnison County Shop driveway on Thursday, June 2nd and 9th, 2016. Turning movement counts were collected from 7:00 – 9:00am and 4:00 – 6:00pm. The weather was clear.

The existing Year 2016 traffic volumes can be found in **Figure 3.**

In addition, existing traffic data was collected at the KOA campground in Silt in order to determine the trip generation rates for the proposed facility. Data was collected from Friday, June 17, 2016 to Sunday, June 19, 2016. This data was intended to capture the campground's peak weekend traffic volumes. During the data collection, it was noted that the campground's traffic was 31% passenger cars/pickups and 69% was recreational vehicles or trucks with trailers/campers. Passenger Car Equivalents (PCEs) were calculated per the *Access Code*. Refer to **Section 4.1** for additional information on the trip generation calculations.

DRAFT - Pending Town Selection of Final Alternative

Figure 3: Year 2016 Existing Traffic



McDowell Engineering LLC
Transportation Engineering Consultants

Project Number: M1231
Prepared by: BBG
Date: 7/15/2016
Crested Butte Campground
Crested Butte, Colorado

LEGEND :

SAT / AM / PM Volumes XX / XX / XX vph

Turning Movements

N
(NTS)

3.0 Future Traffic Projections

3.1 Background Infrastructure Assumptions

There are no known proposed development projects that would impact the SH 135 traffic projections significantly in the area of the proposed site access. In addition, no know infrastructure project are anticipated in the near future.

3.2 Background Traffic Growth

Year 2017 Background Traffic:

CDOT uses their published growth rate to forecast traffic volumes on their highways. Per CDOT, the SH 135 corridor is anticipated to have a 20-year growth factor of 1.43, which equates to a 1.80% annual growth rate. The June 2016 traffic data taken at the current site assess was forecasted to Year 2017 traffic volumes by applying the 1.80% growth rate.[1] No seasonal adjustment factor was utilized for CDOT's data on SH 135 as the data was collected in during a month that is considered peak traffic for the area.

Historic data from CDOT's Automated Traffic Recorder (ATR) located at SH 135, mile marker 3.4, near Gunnison (Station 000308) per their *Online Transportation Information System* (*OTIS*)[1] were reviewed to determine adjustment factors for Saturday traffic. The last three Thursdays and Saturdays of July 2015 were compared to determine an average factor to adjust Thursday SH 135 traffic data to Saturday volumes. This methodology was used to arrive at a Saturday adjustment factor of 0.93. Data for this derivation can be found in the **Appendix** of the report.

The weekday June 2016 traffic counts were adjusted using the Saturday factor to estimate volumes for the corresponding peak hours. The AM, PM, and Saturday peak hour volumes were then adjusted using the CDOT growth rate to determine the Year 2017 background traffic volumes.

The resulting Year 2017 background traffic volumes can be found in **Figure 4.**

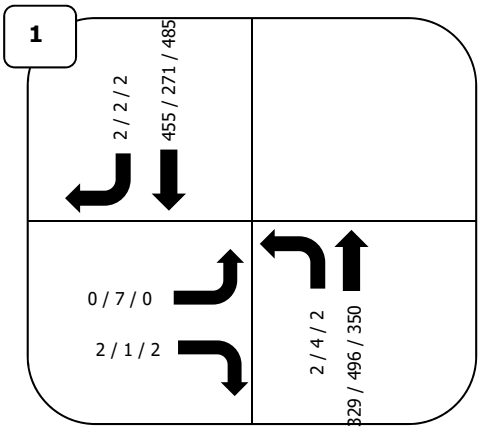
Year 2040 Background Traffic:

Similarly, the AM, PM, and Saturday Year 2016 peak hour volumes were then adjusted using the CDOT growth rate to determine the Year 2040 background traffic volumes.

The resulting Year 2040 background traffic volumes can be found in **Figure 5.**

DRAFT - Pending Town Selection of Final Alternative

Figure 4: Year 2017 Background Traffic



McDowell Engineering LLC
Transportation Engineering Consultants

Project Number: M1231
Prepared by: BBG
Date: 7/15/2016
Crested Butte Campground
Crested Butte, Colorado

LEGEND :

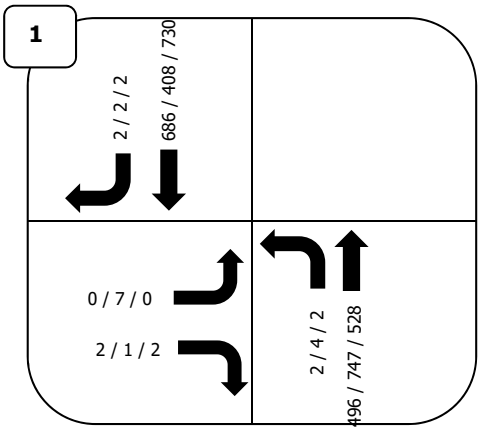
SAT / AM / PM Volumes XX / XX / XX vph

Turning Movements

N

(NTS)

Figure 5: Year 2040 Background Traffic



McDowell Engineering LLC
Transportation Engineering Consultants

Project Number: M1231
Prepared by: BBG
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Crested Butte Campground
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LEGEND :

SAT / AM / PM Volumes XX / XX / XX vph

Turning Movements

N

(NTS)

4.0 Project Traffic

4.1 Trip Generation for Proposed Land Use

The applicant is proposing to develop a 24 space campground on the subject parcel. The Institute of Transportation Engineers' (ITE) *Trip Generation Manual*[2] data for land use #416, Campground/Recreational Vehicle Park was evaluated to determine the anticipated trip generation for the proposed development.

The ITE *Trip Generation Handbook*[4], Section 3.4 Recommended Procedure for Estimating Trip Generation, indicates that use of the Weighted Average is not recommended for either the AM or the PM traffic volume. In such an instance, the ITE *Trip Generation Handbook*[4], states that local data shall be collected to determine a trip generation rate. The KOA campground in Silt, Colorado has 73 RV, tent, and cabin sites and is therefore considered a comparable facility to use in determining a trip generation rate. Data was collected at this location from Friday, June 17, 2016 to Sunday, June 19, 2016. This timeframe was intended to capture the campground's peak weekend traffic volumes.

<u>Project Trip Generation</u>

The data collected at the KOA campground in Silt was used to calculate trip generation rates for the proposed campground. The Silt KOA trip generation calculations are included in the **Appendix**. These rates were applied to the proposed 24 space campground to estimate the number of anticipated trips generated by the project.

The site access can anticipate 4 vehicles during the morning peak hour. The evening peak hour is anticipated to generate 4 vehicles. The Saturday peak hour is anticipated to generate 9 vehicles. Adjusted to account for large trucks the project will generate 4 PCEs during the morning peak hour, 6 PCEs during the afternoon peak hour, and 15 PCEs on Saturday.

The total driveway volume during the peak hour was calculated by totaling the existing driveway counts with the calculated trip generation (in PCEs) for the project. The total traffic on a weekday at project buildout is anticipated to be 20 PCEs during the morning peak hour, 12 PCEs during the evening peak hour. Saturday peak hour traffic is estimated to be 21 PCEs.

Refer to **Table 1** for trip generation calculations for the proposed development.

The Silt KOA calculations and **Table 1** also contains the "passenger car equivalent" calculations to account for the impact of larger vehicles that are expected to use the site access. Passenger Car Equivalents were based upon Section 2.3(4)(e) of the *State Highway Access Code (Access Code*.)

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McDowell Engineering LLC
Transportation Engineering Consultants

Project Number: M1231
Prepared By: KJS
Date: 7/20/2016
Revised:

Table 1 - Total Project Trip Generation
Avalanche Campground
Crested Butte, Colorado
Estimated Project-Generated Traffic[1]

							Average Weekday	Average Saturday	Morning Peak Hour				Evening Peak Hour				Saturday Peak Hour[6]			
									Inbound		Outbound		Inbound		Outbound		Inbound		Outbound	
ITE Code	Units	AM Peak Hour	PM Peak Hour	Avg. Weekday	Average Weekday	Average Saturday	Trips (vpd)	Trips (vpd)	% Trips	Trips	% Trips	Trips	% Trips	Trips	% Trips	Trips	% Trips	Trips	% Trips	Trips
Exising Land Use																				
Gunnison County Public Works[2] (in PCEs[6])		*driveway counts*								6		8		4		2		4		2
Proposed Land Use																				
Campground (in PCEs)	24 Units	0.26	0.25	0.63	1.51	2.36	36.24	56.64	55%	3	45%	3	64%	4	36%	2	48%	7	52%	8
Total Traffic at Shared Acces with Trailhead and County Public Works (in PCEs)										**9**		**11**		**8**		**4**		**11**		**10**

[1] Values obtained from *Trip Generation, 9th Edition,* Institute of Transportation Engineers, 2012.
[2] Existing Land Use trip generation based on driveway counts taken during peak hours on 6/2/2016 & 6/9/2016 reported in PCE
[3] ITE rates do not include average weekday for code #416
[4] Trailhead parking assumes 5 spaces with 1 trips inbound and 1 trips outbound during peak hour
[5] Saturday Peak Hour volumes are estimated by applying a Saturday Peak Hour factor of 0.939 to the PM Peak Hour rate.
[6] Passenger Car Equivalents are based upon Section 2.3(4)(e) of the State of Colorado's State Highway Access Code.
[7] Average Weeday and Saturday are not PCE

4.2 Directional Distribution

The distribution of project-generated vehicular traffic on SH 135 is influenced by several factors including the following:

- The location of the site relative to other facilities and the roadway network
- The configuration of the existing and proposed adjacent roadway network
- Relative location of neighboring population centers

Therefore, it is conservatively anticipated that 60% of the site traffic will be originating from the Town of Crested Butte to the north. The remaining 40% of traffic would be arriving from and returning to the south on SH 135 toward Gunnison. The anticipated directional distribution of project-generated traffic is depicted in **Figure 5**. Distribution is not anticipated to change from Year 2017 to Year 2040.

Sensitivity Analysis:

CDOT staff has requested several additional directional distribution scenarios as a sensitivity analysis. The alternate distribution analysis is included in **Table 2** detail the vehicle trips (in PCEs) that are anticipated from the proposed land use.

Table 2: Directional Distribution – Project Traffic Assignment Sensitivity Analysis

2040 Total Traffic Volumes (AM/PM)	Campground Directional Distribution at Site Access				
	70% north/ 30% south	60% north/ 40% south	50% north/ 50% south	40% north/ 60% south	CDOT Turn Lane Threshold
	EBL 5/2/2 vph EBR 2/1/1 vph NBL 2/1/1 vph SBR 5/2/3 vph	EBL 5/2/1 vph EBR 3/1/1 vph NBL 3/1/2 vph SBR 4/2/2 vph	EBL 4/1/1 vph EBR 4/1/1 vph NBL 4/2/2 vph SBR 4/2/2 vph	EBL 3/1/1 vph EBR 5/2/1 vph NBL 4/2/2 vph SBR 3/1/2 vph	* >50 vph >10 vph >25 vph

The traffic study's assumptions are based upon a 60%/40% split, as highlighted above.
Values are stated in PCEs (Passenger Car Equivalents) and vehicles per hour.
Check mark (✓) indicates that an auxiliary turn lane is required per the *Access Code*.
*Based upon assessment of safety and operation of an intersection.

4.3 Traffic Assignment and Total Traffic

When the trip generation expected for this site is applied to the estimated trip distribution, the result is the anticipated assignment of trips on the roadway system. **Figure 7** depicts the new vehicle trips that are anticipated from the proposed development.

The Year 2017 total traffic is the sum of Year 2017 background **(Figure 4)** traffic with **Figure 7** and can be seen in **Figure 8.**

Similarly, Year 2040 total traffic is the sum of **Figure 5** with **Figure 7** and can be seen in **Figure 9.**

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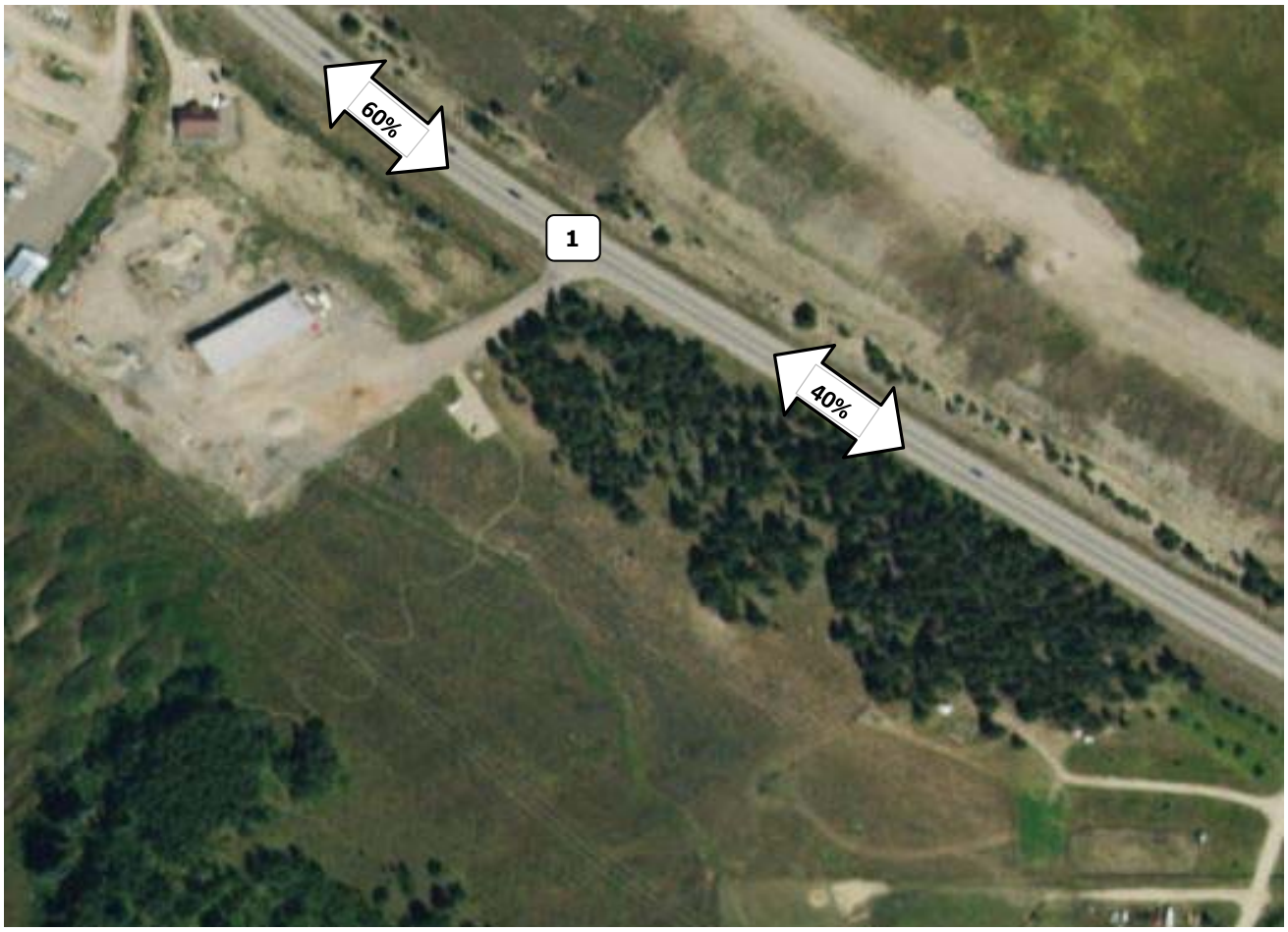
Figure 6: Project Generated Traffic Distribution



McDowell Engineering LLC
Transportation Engineering Consultants

Project Number: M1220
Prepared by: BBG
Date: 4/27/2016
Crested Butte Horse Park
Gunnison, Colorado

LEGEND :

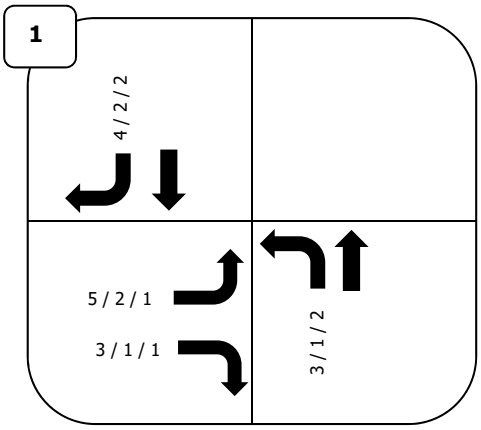
AM / PM Volumes XX / XX

Turning Movements

N

(NTS)

Figure 7: Assignment of Project Generated Traffic



McDowell Engineering LLC
Transportation Engineering Consultants

Project Number: M1231
Prepared by: BBG
Date: 7/15/2016
Crested Butte Campground
Crested Butte, Colorado

LEGEND :

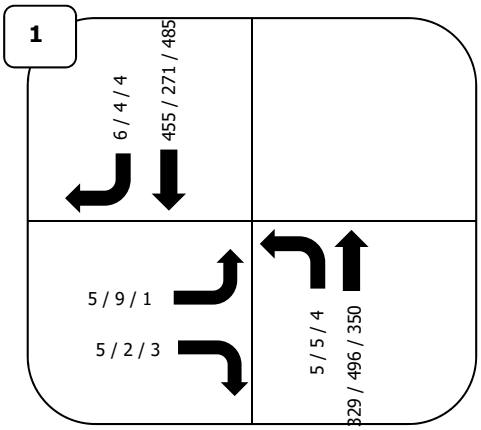
SAT / AM / PM Volumes XX / XX / XX vph

Turning Movements

N

(NTS)

Figure 8: Year 2017 Total Traffic



McDowell Engineering LLC
Transportation Engineering Consultants

Project Number: M1231
Prepared by: BBG
Date: 7/15/2016
Crested Butte Campground
Crested Butte, Colorado

LEGEND :

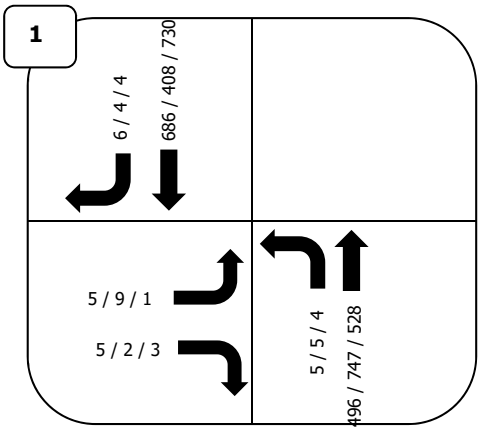
SAT / AM / PM Volumes XX / XX / XX vph

Turning Movements

N

(NTS)

Figure 8: Year 2017 Total Traffic



McDowell Engineering LLC
Transportation Engineering Consultants

Project Number: M1231
Prepared by: BBG
Date: 7/15/2016
Crested Butte Campground
Crested Butte, Colorado

LEGEND :

SAT / AM / PM Volumes XX / XX / XX vph

Turning Movements

N

(NTS)

5.0 Transportation Impact Analysis

5.1 State Highway Access Permits

Section 2.6(3) of the *State Highway Access Code*[3] (*Access Code*) requires a new access permit when there is a land use change and/or the driveway volume is anticipated to increase by more than twenty percent. Therefore, a new State Highway Access Permit will be required for the proposed access for this property (parcel #3255-000-00-129).

5.2 State Highway Turn Lane Analysis

The *State Highway Access Code* establishes the need for auxiliary turn lanes. Several criteria apply when determining the traffic volume thresholds. SH 135 is a two-lane highway with a posted speed limit of 45mph in the vicinity of the proposed project site. It is classified by the Colorado Department of Transportation (CDOT) as an access category R-A, regional highway. Per Section 3.10(7) of the *Access Code*, auxiliary turn lanes are required for more than 10vph making a left turn movement, 25vph making a right turn movement, and 50vph making a right turn acceleration onto the highway.

Based upon the Year 2040 total traffic volumes at the site access, no auxiliary deceleration or acceleration lanes will be required for the site. Details for this analysis are shown in **Table 2**.

<u>Acceleration Lanes:</u> Section 3.11(4)(d) and 3.5 of the *Access Code* states that an acceleration lane is generally not required unless the access will serve a high percentage of large trucks and need additional auxiliary lanes to accommodate these vehicles. Based upon the Silt KOA campground's traffic data, a campground in this region can anticipate 31% passenger cars and 69% recreational vehicles or trucks with trailers/campers. Therefore, an analysis of a truck with a loaded trailer's acceleration onto SH 135 was reviewed. It is assumed that a truck pulling a camper would have similar acceleration characteristics to the data provided for a truck and horse trailer combination.

The *NCHRP Report 505 – Review of Truck Characteristics as Factors in Roadway Design* (*NCHRP 505*) was referenced to determine the impacts of the truck with horse trailer at the SH 135/Site Access intersection. The truck and horse trailer's weight-to-power ratio is calculated using the following data:

- Chevy 2500 Duramax Diesel Weight = 7,700lbs
- Loaded 3 Horse Trailer Weight = 3,000lbs
- Horses – 3@1,200lbs = 3,600lbs
- Total Loaded Gross Vehicle Weight = 14,300lbs
- Horsepower of Chevy 2500 Duramax Diesel = 360hp
- Weight-to-Power Ratio = 40lb/hp

NCHRP 505's Table 29 was used to interpolate the anticipated acceleration capabilities of the loaded truck with horse trailer based upon its weight-to-power ratio

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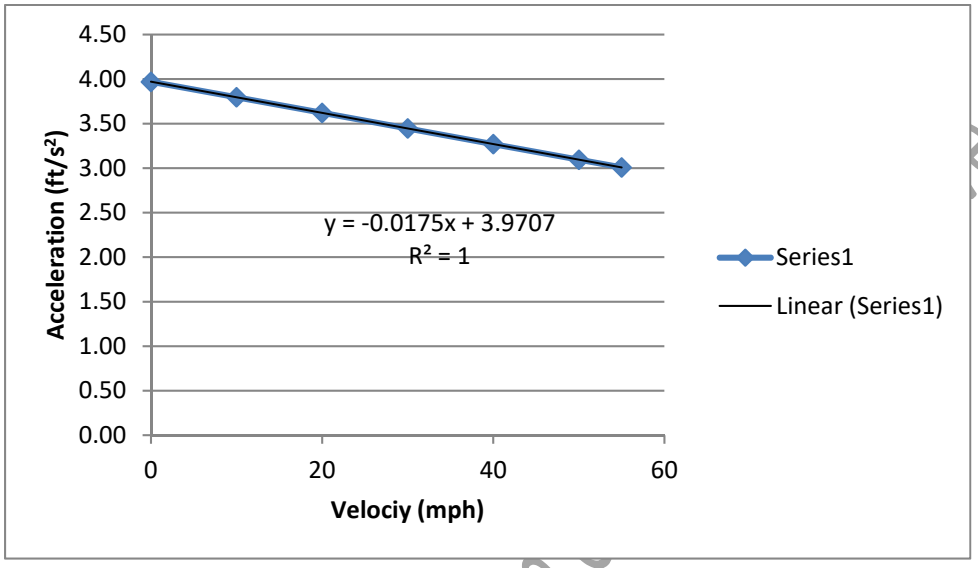
of 40lb/hp. A best-fit equation was determined in Excel based upon the observed lineal relationship. This equation yielded a correlation coefficient (r value) of 0.999, representing an excellent fit.

Figure 10: Acceleration Rate for a 40lb/hp Truck



Using this data, the 36' long vehicle is anticipated to clear the 66' hazard zone (intersection) in 7.25 seconds. The truck will reach a velocity of 45mph by 19.45 seconds.

The probability of SH 135 having critical gaps of 7.25 seconds or 19.45 seconds in length was determined using Section 8.3.1 of the FHWA research publication *Revised Monograph on Traffic Flow Theory - Unsignalized Intersection Theory* by Troutbeck and Brilon. The analysis was performed for both Year 2017 traffic volumes and Year 2040 traffic volumes. Calculations to support the acceptable gap analysis are included in the **Appendix.** The results can be found in **Table 5**.

Table 3: Probability of Acceptable Gap in Traffic to Accommodate a Truck & Trailer

	Year 2017		Year 2040	
	Clear Hazard Zone	Reach 45mph	Clear Hazard Zone	Reach 45mph
Probability (%)	18%	4%	8%	<1%
Average Wait for an Acceptable Gap	0.7 minutes	4 minutes	1.2 minutes	14 minutes

Based on this analysis, acceleration lanes for both the right and left turns would improve safety of truck and camper combinations entering SH 135 from the proposed access.

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5.3 Sight Distance

This section of SH 135 is on a tangent alignment with to the east, however, to the west there is a crest vertical curve that limits sight distance. Sight distance from the existing Gunnison County Shop driveway was field-measured from a point 10 feet back from the edge of the roadway. AASHTO's[7] criteria for measuring sight distance was followed.

To the west sight distance was measured to be 513-feet:

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To the east sight distance was measured to be 1,736-feet:

Table 4-2 of the *Access Code* requires 765-feet of entering sight distance for a Multi-Unit Truck on a two-lane roadway with a posted speed of 45-mph. In order to meet the CDOT required sight distance, it is recommended that the site access be located a minimum of 260-feet to the east of the existing Gunnison County Shop Access. This would provide 773-feet of sight distance to the west and 1,476-feet to the east which exceeds the CDOT requirement in both directions.

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5.4 Access Criteria

The proposed access shall be constructed per Section 4 of the *Access Code.* Gunnison County regulations will also apply.

The proposed access will be located 400-feet east of the existing Gunnison County Shop access and 550-feet west of a private driveway.

This spacing meets or exceeds the requirements of Section 4.4 of the *Access Code* for access spacing.

5.5 Pedestrian and Bicycle Accommodations

Given the proximity of the proposed Campground to the Town of Crested Butte and the recreational focus of the area, it is anticipated that the campground will attract pedestrians and cyclists to use the highway to travel between the campground and the Town. State Highway 135 has a wide shoulder but pedestrian access on the paved portion of the right-of-way is a significant safety concern.

Some alternative means of travel between the campground and the Town should be evaluated for safety purposes as the campground gains popularity. Some options to consider include:

- A separated multi-use path adjacent to SH 135 within CDOT right-of-way.
- A pedestrian/bicycle crossing of SH 135 to access a new multi-use path located on Town property above the Town gravel pit and the Community School.
- A multi-use path located in an easement through private property.

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6.0 Recommendations and Conclusions

The proposed Avalanche Park Campground is anticipated to be successfully accommodated into the greater roadway system with the recommended improvements.

Trip Generation:

The site access can anticipate 4 vehicles during the morning peak hour. The evening peak hour is anticipated to generate 4 vehicles. The Saturday peak hour is anticipated to generate 9 vehicles. Adjusted to account for large trucks the project will generate 4 PCEs during the morning peak hour, 6 PCEs during the afternoon peak hour, and 15 PCEs on Saturday.

The total driveway volume during the peak hour was calculated by totaling the existing driveway counts with the calculated trip generation (in PCEs) for the project. The total traffic on a weekday at project buildout is anticipated to be 20 PCEs during the morning peak hour, 12 PCEs during the evening peak hour. Saturday peak hour traffic is estimated to be 21 PCEs.

State Highway Access Permits:

A new State Highway Access Permit will be required for the proposed site access to SH 135 located 260-feet east of the existing Gunnison County Shop access.

Auxiliary Turn Lanes:

The traffic volumes generated by this development do not require the construction of auxiliary turn lanes on SH 135. However, in combining the anticipated high volume of recreational vehicle and trucks with campers or trailers with the characteristics of SH 135 characteristics and its traffic forecasts; it is recommended that auxiliary lanes for right and left turns onto SH 135 in addition to right and left turn deceleration lanes into the site be constructed based on the expected large vehicles that will use the site.

Access Construction:

The proposed site access has adequate sight distance in both directions that exceeds the 765-feet requirement in Table 4-2 of the *Access Code*. This sight distance is measured from a point 10 feet back from the edge of the roadway.

The proposed access shall be constructed per Section 4 of the *Access Code.* Gunnison County regulations will also apply.

Pedestrian and Bicycle Accommodations:

Given the proximity of the proposed Campground to the Town of Crested Butte and the recreational focus of the area, it is anticipated that the campground will attract pedestrians and cyclists to use the highway to travel between the campground and

DRAFT - Pending Town Selection of Final Alternative

the Town. State Highway 135 has a wide shoulder but pedestrian access on the paved portion of the right-of-way is a significant safety concern.

Some alternative means of travel between the campground and the Town should be evaluated for safety purposes as the campground gains popularity.

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7.0 Alternative Campground Operation Analysis

The Town of Crested Butte has also considered alternative site development scenarios for the site. A cursory review of the potential impact for each alternative site design was conducted and is included below.

7.1 Alternative 2 – Summer Workforce Housing

If operated as summer workforce housing, the campground would be anticipated to operate similarly to a mobile home park. Residents would commute to and from town on a daily basis but campers would not be expected to arrive or depart on a regular basis. The traffic distribution would also be expected to be much different than if operated as a campground. It would be expected that 90% of peak hour trips would be to/from Crested Butte.

The ITE *Trip Generation Manual*[2] data for land use #240, Mobile Home Park, was used to estimate the anticipated trip generation for the proposed development.

Based upon the assumptions above, if operated for employee housing the project can be anticipated to generate 115 vehicle trips per day (vpd) on the average weekday and 115 vpd on the average Saturday. Peak hour traffic on a weekday is anticipated to be 22 vehicles per hour (vph) during the morning peak hour, 19 vph during the evening peak hour. Peak hour traffic on a Saturday is anticipated to be 19 vph.

In analyzing the need for auxiliary turn lanes for this alternative scenario the PM peak hour was evaluated. By applying the ITE land use rate for entering/exiting and the assumed directional distribution it is anticipated that there would be 1 vph making a northbound left turn into the site and 11 vph making a southbound right turn into the site. These volumes are significantly below the CDOT requirements of 10 vph and 25 vph respectively.

In addition, with the exception of move in / move out days the anticipated traffic would be passenger cars.

If this alternative is pursued further, this study should be updated to further evaluate the full impact of the proposed use. It would be expected that Temporary Traffic Control may be needed on days when a significant volume of campers would be moving into or out of the campground.

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7.2 Alternative 3 – Tent Only Camping

If operated as tent only campground, it is assumed that there would be no recreational vehicles or large trailers accessing the site with the exception of the Camp Host. Therefore, data collected at the Silt KOA was adjusted to remove PCEs and only account for passenger cars. The traffic distribution would also be expected to be similar to the RV campground operations described above.

Based upon the assumptions above, if operated for tent only camping the project can be anticipated to generate 47 vehicle trips per day (vpd) on the average weekday and 73 vpd on the average Saturday. Peak hour traffic on a weekday is anticipated to be 5 vehicles per hour (vph) during the morning peak hour, 5 vph during the evening peak hour. Peak hour traffic on a Saturday is anticipated to be 12 vph.

In analyzing the need for auxiliary turn lanes for this alternative scenario the Saturday peak hour was evaluated. By applying the calculated rate for entering/exiting and the assumed directional distribution it is anticipated that there would be 1 vph making a northbound left turn into the site and 3 vph making a southbound right turn into the site. These volumes are significantly below the CDOT requirements of 10 vph and 25 vph respectively.

If this alternative is pursued further, this study should be updated to further evaluate the full impact of the proposed use.

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8.0 Appendix

Reference Documents

1. OTIS Traffic Data. Colorado Department of Transportation. http://apps.coloradodot.info/dataaccess/

2. *Highway Capacity Manual.* Transportation Research Board, 2010.

3. *State Highway Access Code.* State of Colorado, 2002.

4. *Trip Generation Handbook.* Institute of Transportation Engineers, 2012.

5. *Avalanche Park Campground Concept Plan.* Consultron 3000, 2012.

6. *Town of Crested Butte Avalanche Park Campground Feasibility Study.* Town of Crested Butte Parks & Recreation, 2012.

7. *A Policy on Geometric Design of Highways and Streets, 6th Edition.* American Association of State highway and Transportation Officials, 2011.

Included Documents

1. Scoping correspondence with CDOT, July 2016.

2. CDOT OTIS Traffic Data.

3. Traffic Counts, June 2016

4. Saturday Peak Hour Factor Calculation

5. Event Operations and Truck Acceleration / Deceleration email, May 2016.

6. Silt KOA Camp Ground Traffic Counts

DRAFT - Pending Town Selection of Final Alternative

Ben Gerdes <ben@mcdowelleng.com>

Crested Butte Camp Ground Scoping

2 messages

Ben Gerdes <ben@mcdowelleng.com> Thu, Jul 7, 2016 at 8:21 AM
To: Kent Harbert <Kent.Harbert@state.co.us>
Cc: Kari McDowell Schroeder <kari@mcdowelleng.com>

Kent,

Please review the attached Scoping Form for the Crested Butte Campground located on SH 135 south of Crested Butte. Please let me know if you have questions or require additional information.

Thanks, Ben

Ben Gerdes, PE
Traffic / Transportation Engineer

McDowell Engineering, LLC

Eagle • Broomfield • Grand Junction

Phone: 970.366.9502
email: ben@mcdowelleng.com
www,mcdowelleng.com

2016-07-07 McDowell Engineering Traffic Study Scoping Form - Crested Butte Camp Ground.pdf
5692K

Harbert, Kent <kent.harbert@state.co.us> Mon, Jul 11, 2016 at 3:06 PM
To: Ben Gerdes <ben@mcdowelleng.com>
Cc: Kari McDowell Schroeder <kari@mcdowelleng.com>, Daniel Roussin <Daniel.Roussin@state.co.us>

Ben,

- From my review of *ITE Trip Generation Handbook, §3.4 Recommended Procedure for Estimating Trip Generation,* use of the Weighted Average is not recommended for either either the AM or the PM traffic volume. You may use those rates if you apply engineering judgment and include your logic or justification in the report. Or, you can establish a local rate.

- Are the vehicles from the Gunnison County Public Works yard reported correctly? It is expected that the two large vehicles would be outbound from the yard in the morning and inbound to the yard in the afternoon.

- Sharing the access with the County Public Works yard is good. Documentation of an agreement or easement for the sharing of the access will need to be provided by the permitee.

Thanks, *Kent*

T. Kent Harbert, PE
Access Engineer
CDOT Region 3, Traffic and Safety Residency

COLORADO
Department of Transportation
Region 3

222 South 6th Street, Room 100, Grand Junction, CO 81501-3794
Phone: 970.683.6279 Cell: 970.812.6768 Fax: 970.683.6290
kent.harbert@state.co.us | www.codot.gov | www.cotrip.org

[Quoted text hidden]

Crested Butte Campground, Trip Gen check.pdf
31K

ITE Trip Generation Handbook, §3.4 Recommended Procedure for Estimating Trip Generation

Project:	Crested Butte Campground
Location:	Crested Butte
Analyst:	tkh
Highway:	135
Mile Pt:	26.69
ITE Code:	416
Land Use:	Campground/RV Park

Land Use Code consistency: Document the actual and/or presumed characteristics of development site consistent with land use code and contrast with similar categories.

Campground

Is the development under analysis consistent with the description in the land use code?

Yes or No: y

Average Vehicle Trip Ends vs:	Occupied Camp Sites			
On a:	Weekday; A.M. Peak Hour of Generator			
Size:	24	Page no.:	738	ITE Trip Generation Report, 9th Edition
Number of Studies:	6			
Directional Distribution:	36% entering		64% exiting	
Average rate:	0.25			
Standard Deviation:	0.50		Std. Dev. / Avg. =	200%
R^2:	0.92			
Data range (end of fitted curve or average rate lines):	min.:	21	max.:	265
Fitted Curve Equation, Linear: T = aX + b	a =		b =	
Fitted Curve Equation, Logarithmic: Ln(T) = aLn(X) + b	a =	0.81	b =	-0.5

Is the line that corresponds to the weighted average rate within the cluster of data points near the size of the development? (Note: If there are no data points near the site size, but there are good matches at somewhat smaller and somewhat larger sizes, assume the answer is yes.) Yes or No: y

Is the line corresponding to the regression equation within the cluster of data at the size of the development in question? (Note: If there are no data points near the site size, but there are good matches at somewhat smaller and somewhat larger sizes, assume the answer is yes.) Yes or No: y

~~Are most of the points along the regression line with few erratic data points (i.e., outliers)?~~

~~Yes or No:~~

Use the Regression Equation

Results rounded up to next: 1

Weighted Average: ~~T = 24 x 0.25~~ ~~T = 6 trip ends per hour~~

~~3 entering~~ ~~3 exiting~~

Regression Equation: Ln(T) = 0.81 x Ln(24) + (-0.5) T = 8 trip ends per hour

3 entering 5 exiting

Regression Equation Caution: The regression equation typically yields a line with a y-intercept. For an independent variable with a low value (i.e., near zero), the regression equation might produce a trip ends estimate that is illogical. In such a case the analyst should use the weighted average trip rate to estimate trip ends.

ITE Trip Generation Handbook, §3.4 Recommended Procedure for Estimating Trip Generation

Project:	Crested Butte Campground
Location:	Crested Butte
Analyst:	tkh
Highway:	135
Mile Pt:	26.69
ITE Code:	416
Land Use:	Campground/RV Park

Land Use Code consistency: Document the actual and/or presumed characteristics of development site consistent with land use code and contrast with similar categories.

Campground

Is the development under analysis consistent with the description in the land use code?

Yes or No: y

Average Vehicle Trip Ends vs:	Occupied Camp Sites			
On a:	Weekday; P.M. Peak Hour of Generator			
Size:	24	Page no.:	739	ITE Trip Generation Report, 9th Edition
Number of Studies:	3			
Directional Distribution:	62%	entering	38%	exiting
Average rate:	0.41			
Standard Deviation:	0.64		Std. Dev. / Avg. =	156%
R^2:	*			
Data range (end of fitted curve or average rate lines):		min.:	21	max.: 135
~~Fitted Curve Equation, Linear: T = aX + b~~		~~a =~~		~~b =~~
~~Fitted Curve Equation, Logarithmic: Ln(T) = aLn(X) + b~~		~~a =~~		~~b =~~

~~Is the line that corresponds to the weighted average rate within the cluster of data points near the size of the development? (Note: If there are no data points near the site size, but there are good matches at somewhat smaller and somewhat larger sizes, assume the answer is yes.)~~ ~~Yes or No:~~ ~~y~~

~~Is the line corresponding to the regression equation within the cluster of data at the size of the development in question? (Note: If there are no data points near the site size, but there are good matches at somewhat smaller and somewhat larger sizes, assume the answer is yes.)~~ ~~Yes or No:~~

~~Are most of the points along the regression line with few erratic data points (i.e., outliers)?~~

~~Yes or No:~~

Collect local data for the land use being analyzed and establish a local rate (Condition 5).

Results rounded up to next: 1

Weighted Average: ~~T = 24 x 0.41~~ ~~T = 10 trip ends per hour~~

~~7 entering~~ ~~3 exiting~~

Regression Equation: ~~N/A~~

Regression Equation Caution: The regression equation typically yields a line with a y-intercept. For an independent variable with a low value (i.e., near zero), the regression equation might produce a trip ends estimate that is illogical. In such a case the analyst should use the weighted average trip rate to estimate trip ends.

Traffic Study Scoping Form

Contact Information	
Consultant Name: Tele: E-mail:	McDowell Engineering; Kari McDowell Schroeder, PE, PTOE 970-623-0788 kari@mcdowelleng.com
Developer/Owner Name:	Crested Butte Campground / Joel Price, JVA, Inc.

Project Information	***(Attach proposed Site Plan)***				
Project Name:	Crested Butte Campground				
Project Location:	Parcel # 325500000129, Highway 135, Crested Butte, CO (Gunnison County) (located ~1,800 SW of Journey's End Rd.)				
Project Description: Application type (rezoning, subdivision), acreage, new or re-development, etc.	Change in land use. See attached project description. CDOT Level 2 Auxiliary Turn Lane Analysis & Access Permit				
Existing / Proposed Land Uses	ITE Code	#units or Size	Existing / Proposed Land Uses	ITE Code	#units or Size
Campground	416	24 sites			
Please attach Trip Generation Summary table for large or mixed use projects					

Assumptions			
Study Horizons	Current Year: 2017	Build-out : 2020	Long Term : 2040
Study Area Boundaries *(Attach map if needed)*	North: State Highway 135	South: State Highway 135	
	East:	West: Site Access	
Intersections and Road Segments to be Evaluated *(Attach map if needed)*	1. All Site entrances	5.	
	2.	6.	
	3.	7.	
	4.	8.	
Trip Distribution	*See Attached Sketch* 60% North (Crested Butte), 40% South. Will include a sensitivity analysis.		

Assumptions (continued)					
Trip Reductions *(include in Trip Generation table if provided)* (See below also.)	Internal Capture	Use: N/A 0 %	Pass By	Use: ____ ____%	
		Use: ____ ____%		Use: ____ ____%	
Anticipated Future Traffic Growth Rates (*Describe methodology)*	per CDOT OTIS for SH 135 MM 27.176 +/- = 20 Year Factor of 1.44		Study Time Periods *(circle all that apply)*	AM (7-9) PM (4-6) SAT (noon) Other	
Other Factors proposed/assumed transp. improvements, other studies, nearby proposed developments, etc.	Peak hours are anticipated to be 5-7pm on Friday and 11am-1pm at the site access. Refer to the trip generation calcs. Site Access sight distance will be evaluated at existing Gunnison County Shop location.				
Analysis Methods & Issues *(check all that apply)*	☐ Synchro ☐ HCS ☐ aaSidra or Rodel ☒ Intersections ☐ Roadway Sections ☐ Signal Warrants ☒ Safety/Sight Distance ☐ Queuing & Storage ☒ CDOT (Access Permit, other) ☐ Identify Bicycle, Pedestrian & Transit Accommodations ☐ TDM ☐ Neighborhood Impacts ☐ Other _____				

ATTACHMENTS, NOTES, & other ASSUMPTIONS:

SIGNED: Kari McDowell Schroeder
Applicant or Consultant

PRINT NAME: Kari McDowell Schroeder, PE, PTOE
Applicant or Consultant

DATE: 7/05/2016

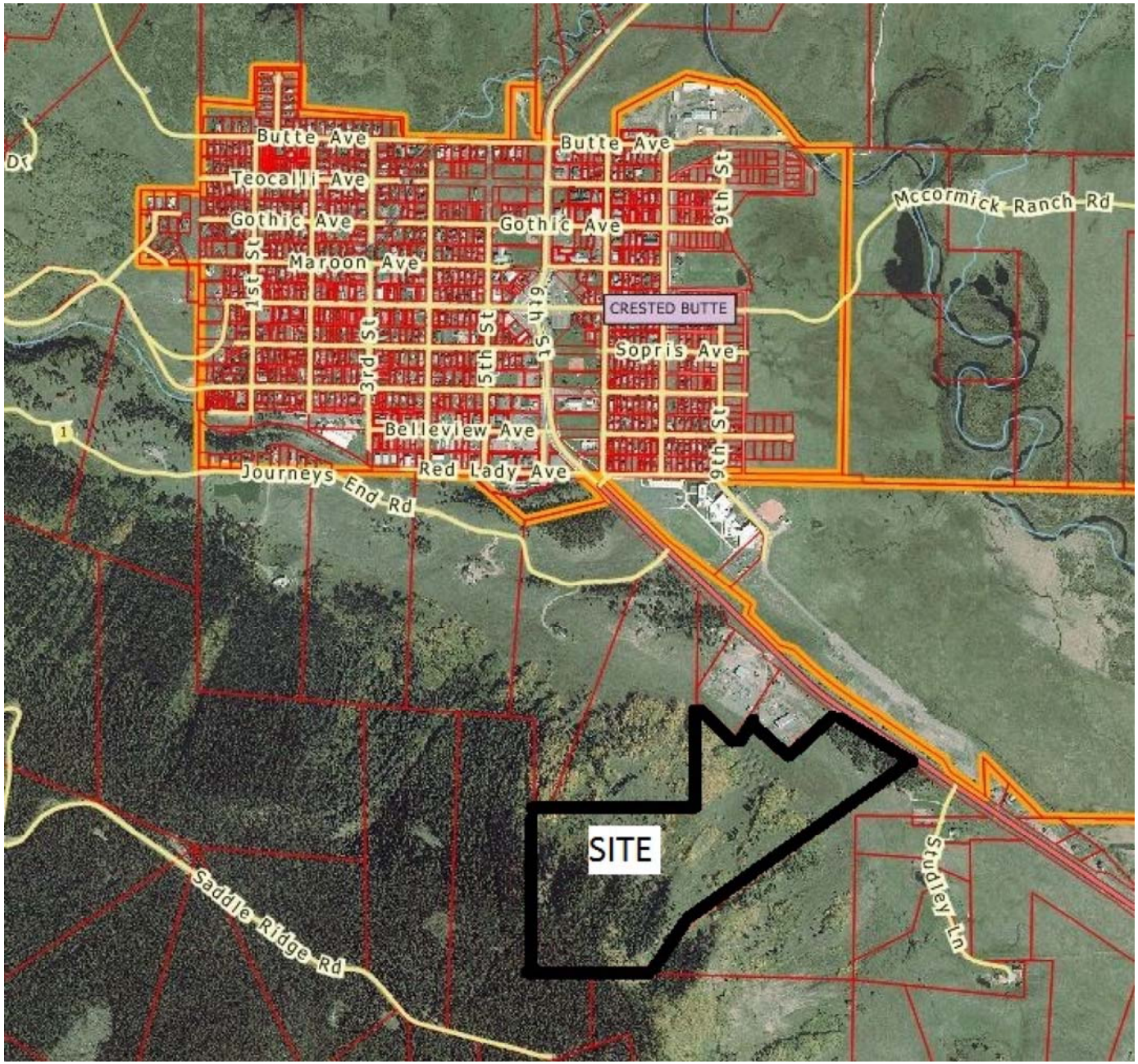
REVIEW AGENCY: _____

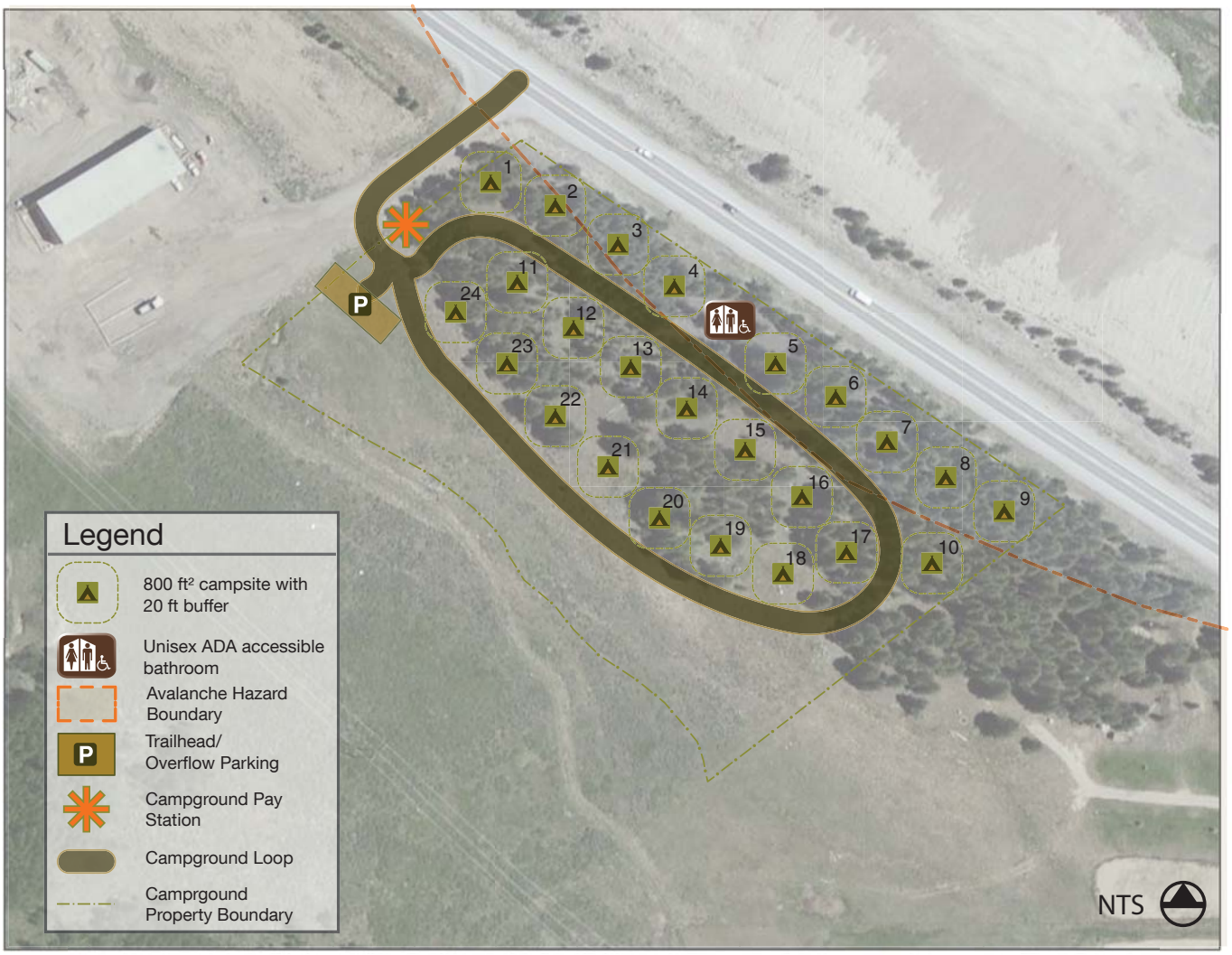
DEPARTMENT:

SIGNED:

PRINT NAME: _____

DATE:


Butte Ave
Butte Ave
Teocalli Ave
Gothic Ave
Gothic Ave
Maroon Ave
1st St
3rd St
5th St
6th St
9th St
9th St
Mccormick Ranch Rd
CRESTED BUTTE
Sopris Ave
Belleview Ave
Red Lady Ave
Journeys End Rd
SITE
Saddle Ridge Rd
Studley Ln



Potential Campground Layout 1

Parking

Each campsite should have one parking stall located immediately off of the ring road through the campground. Parking stalls may be constructed of road base or gravel on compacted soil at a 1.5% grade for drainage. The parking stall should be situated to accommodate head-in or back in parking and provide side clearance for the opening of doors, as well as the use of auto-mounted camping equipment such as awnings and stoves. In order to provide ADA access to sites, as well as easy access to parked autos from individual campsites, parking stalls should be a minimum of 9’ x 18’.

Additional site amenities include: Site number; Picnic Table; Fire Ring and Grill.

Project Number: M1231
Prepared By: KJS
Date: 6/2/2016
Revised:

Table 3 - Total Project Trip Generation
Avalanche Campground
Crested Butte, Colorado
Estimated Project-Generated Traffic[1]

					Average Weekday	Morning Peak Hour Inbound		Morning Peak Hour Outbound		Evening Peak Hour Inbound		Evening Peak Hour Outbound	
ITE Code	Units	AM Peak Hour	PM Peak Hour	Avg. Weekday	Trips (vpd)	% Trips	Trips	% Trips	Trips	% Trips	Trips	% Trips	Trips
Exising Land Use													
Gunnison County Public Works[2]		*driveway counts*					2		0		0		2
in PCE's							6		0		0		6
Proposed Land Use													
#416 Campground/Recreational Vehicle Park	24 Sites	0.25	0.41	N/A	N/A 3	36%	3	64%	4	62%	7	38%	4
in PCEs							9		12		21		12
Total Project-Generated Traffic							**15**		**12**		**21**		**18**

[1] Values obtained from *Trip Generation, 9th Edition,* Institute of Transportation Engineers, 2012.
[2] Existing Land Use trip generation based on driveway counts taken during peak hour on 6/9/2016

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- Structures (#structures-tab)

(/otis/TrafficData#ui/1/0/0/criteria/135A/26/27.484/true/true) (/otis/Flex/MapView?hwy=135A&begrefpt=26&endrefpt=27.484)

Search by highway segment (#)

Select a route and begin and end ref points. You can select a route from the drop down list or click the pencil icon then click the map. You can enter the ref points into the text boxes or click the pencil icon then click the map.

Zoom to County (optional): select a county

CDOT Route Number: 135A Find by Name

Begin Reference: 26

End Reference: 27.484

Search by traffic station (#)

Search by structure (#)

Section between intersections (#)

Click the headings below to view results.

Highway 135A between 26 and 27.484 **Create Straight Line Diagram (/otis/Sld?route=135A&begRef=26&endRef=27.484&keys=126,127,40,46,43,42,39,45,37,38,44,20,23,13,24,18)**

Description

Export to Excel (/otis/API/TRANSYS/DescOn/135A/26/27.484.csv)

Route	Begin Ref	End Ref	Length	Description
135A	25.96	26	0.099	RD N (CO RD R) (RIVERBEND DR) (CO RD 930)
135A	26	27	1.005	MILEPOST 26
135A	27	27.159	0.163	RD SW (JOURNEYS END RD) - MILEPOST 27
135A	27.159	27.176	0.017	FUNCTIONAL LOCATION CHANGE
135A	27.176	27.2	0.029	RD N (7TH ST)
135A	27.2	27.279	0.08	RD W (RED LADY AVE)
135A	27.279	27.346	0.063	RD W (BELLEVIEW AVE)
135A	27.346	27.405	0.061	RD W (WHITEROCK AVE)
135A	27.405	27.484	0.065	RD W (SPORIS AVE)
135A	27.484	27.484	0	RD N (6TH ST) - RD E AND W (ELK AVE) – END SH 135A

Pavement Primary Direction

Export to Excel (/otis/API/TRANSYS/PavementPrimaryDirection/135A/26/27.484.csv)

Route Begin Ref End Ref Length Pri DL Class Pri Remaining DL Pri IRI

Pavement Secondary Direction

Export to Excel (/otis/API/TRANSYS/PavementSecondaryDirection/135A/26/27.484.csv)

Route Begin Ref End Ref Length Sec DL Class Sec Remaining DL Sec IRI

Speed Limit

Export to Excel (/otis/API/TRANSYS/SpeedLimit/135A/26/27.484.csv)

Route	Begin Ref	End Ref	Length	Pri Speed Limit	Sec Speed Limit
135A	25.96	26.5	0.604	55	55
135A	26.5	27.1	0.603	45	45
135A	27.1	27.159	0.06	35	45
135A	27.159	27.176	0.017	35	35
135A	27.176	27.2	0.029	35	25
135A	27.2	27.484	0.269	25	25

Toll / HOV

Export to Excel (/otis/API/TRANSYS/Toll/135A/26/27.484.csv)

Route Begin Ref End Ref Length Toll HOV

System Classification

Export to Excel (/otis/API/TRANSYS/SystemClassification/135A/26/27.484.csv)

Route	Begin Ref	End Ref	Length	Access Control	Admin Class	Functional Class	NHS Designation	Special System
135A	1.365	27.176	25.617	R-A: Regional Highway	CDOT Highway	4 Minor Arterial	0 Not on NHS	NON-STRAHNET
135A	27.176	27.484	0.298	NR-B: Non Rural Arterial	CDOT Highway	4 Minor Arterial	0 Not on NHS	NON-STRAHNET

Route Classification

Export to Excel (/otis/API/TRANSYS/RouteClassification/135A/26/27.484.csv)

Route Begin Ref End Ref Length Highway Designation Forest Route Scenic Route Truck Restriction Terrain

Jurisdiction Classification

Export to Excel (/otis/API/TRANSYS/JurisdictionClassification/135A/26/27.484.csv)

Route Begin Ref End Ref Length FIPS City FIPS County Urban Area

CDOT Classification

Export to Excel (/otis/API/TRANSYS/CdotClassification/135A/26/27.484.csv)

Route	Begin Ref	End Ref	Length	Commission District	CDOT Engineering Region	Transportation Planning Region

Geometrics 1

Export to Excel (/otis/API/TRANSYS/GeometricsGeneral/135A/26/27.484.csv)

Route Begin Ref End Ref Length Thr Ln Qty Thr Ln Wd Is Divided Operation Surface Width

Geometrics 2

Export to Excel (/otis/API/TRANSYS/GeometricsPrimary/135A/26/27.484.csv)

Route	Begin Ref	End Ref	Length	Pri TL Qty	Pri TL Wid	Pri Surf	Pri Out Shld	Pri Out Shld Wid	Pri Out Safety	Pri Out Curb	Pri Snd Wall

Geometrics 3

Export to Excel (/otis/API/TRANSYS/GeometricsPrimary2/135A/26/27.484.csv)

Route	Begin	End	Length	Pri In	Pri In	Pri In	Pri Aux	Pri Aux Ln	Pri Aux	Pri LT Ln	Pri LT Ln

Ref	Ref	Shld	Shld Wid	Curb	Ln Qty	Type	Ln Wid	Qty	Wid

Geometrics 4

Export to Excel (/otis/API/TRANSYS/GeometricsSecondary/135A/26/27.484.csv)

Route	Begin Ref	End Ref	Length	Med Type	Med Wid	Med Safety Type	Man Acc Lns	Man Acc Lns Aln	Lt Rail Aln

Mile Markers

Export to Excel (/otis/API/TRANSYS/MILEGROUPSON/135A/26/27.484.csv)

Route	Mile Marker	Length	UTM X	UTM Y	Longitude	Latitude

Click the headings below to view results.
Highway 135A between 26 and 27.484

AADT

Export to Excel (/otis/API/TRANSYS/AADT/135A/26/27.484.csv)

Route	Begin Ref	End Ref	Length	AADT	% Trucks	Vehicle Miles Travelled
135A	20.704	27.176	6.418	7300	3.7	46851.4
135A	27.176	27.484	0.298	6700	3.5	1996.6

Traffic Capacity

Export to Excel (/otis/API/TRANSYS/TrafficCapacity/135A/26/27.484.csv)

Route	Begin Ref	End Ref	Length	Route Capacity	V/C Ratio	V/C Ratio 20
135A	20.704	27.176	6.418	2000	0.68	0.98
135A	27.176	27.484	0.298	1840	0.68	0.84

Count Locations

Export to Excel (/otis/API/TRANSYS/TRAFFStation/135A/26/27.484.csv)

Route	Ref	Station	LOCATION	Count Type
135A	20.704	104574 (/otis/trafficdata#ui/2/0/0/station/104574/criteria/104574)	ON SH 135 SE/O RED LADY AVE & 7TH ST, CRESTED BUTTE	Short Duration
135A	27.176	104575 (/otis/trafficdata#ui/2/0/0/station/104575/criteria/104575)	ON SH 135, 6TH ST N/O WHITEROCK AVE, CRESTED BUTTE	Short Duration

Click the headings below to view results.
Highway 135A between 26 and 27.484
Camera: Front Right Direction: Increasing Decreasing Full-Size
View in Windshield App (/otis/windshield#2015/135A/26/1/1) Google Street View

Route Ref

Photo year: 2015

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Click the headings below to view results.

Highway 135A between 26 and 27.484

ROW Plans

Route Begin Ref End Ref ROW Plan

Click the headings below to view results.

Highway 135A between 26 and 27.484

Structures

Export to Excel (/otis/API/TRANSYS/Structures/135A/26/27.484.csv)

Route Ref	StrId	Dir	ClrminNE	ClrmaxNE	ClrminSW	ClrmaxSW	On / Under	Type	Sufficiency Rating	GFP	Location	Photo

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(/otis/TrafficData#ui/1/0/0/criteria/135A/26/27.484/true/true) (/otis/Flex/MapView?hwy=135A&begrefpt=26&endrefpt=27.484)

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Select a route and begin and end ref points. You can select a route from the drop down list or click the pencil icon then click the map. You can enter the ref points into the text boxes or click the pencil icon then click the map.

Zoom to County (optional): select a county

CDOT Route Number: 135A Find by Name

Begin Reference: 26

End Reference: 27.484

Search by traffic station (#)

Search by structure (#)

Section between intersections (#)

Click the headings below to view results.

Highway 135A between 26 and 27.484 **Create Straight Line Diagram (/otis/Sld?route=135A&begRef=26&endRef=27.484&keys=126,127,20,23,13,24,18)**

Description

Export to Excel (/otis/API/TRANSYS/DescOn/135A/26/27.484.csv)

Route	Begin Ref	End Ref	Length	Description
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135A	27.159	27.176	0.017	FUNCTIONAL LOCATION CHANGE
135A	27.176	27.2	0.029	RD N (7TH ST)
135A	27.2	27.279	0.08	RD W (RED LADY AVE)
135A	27.279	27.346	0.063	RD W (BELLEVIEW AVE)
135A	27.346	27.405	0.061	RD W (WHITEROCK AVE)
135A	27.405	27.484	0.065	RD W (SPORIS AVE)
135A	27.484	27.484	0	RD N (6TH ST) - RD E AND W (ELK AVE) – END SH 135A

Pavement Primary Direction

Export to Excel (/otis/API/TRANSYS/PavementPrimaryDirection/135A/26/27.484.csv)

Route Begin Ref End Ref Length Pri DL Class Pri Remaining DL Pri IRI

Pavement Secondary Direction

Export to Excel (/otis/API/TRANSYS/PavementSecondaryDirection/135A/26/27.484.csv)

Route Begin Ref End Ref Length Sec DL Class Sec Remaining DL Sec IRI

Speed Limit

Export to Excel (/otis/API/TRANSYS/SpeedLimit/135A/26/27.484.csv)

Route	Begin Ref	End Ref	Length	Pri Speed Limit	Sec Speed Limit
135A	25.96	26.5	0.604	55	55
135A	26.5	27.1	0.603	45	45
135A	27.1	27.159	0.06	35	45
135A	27.159	27.176	0.017	35	35
135A	27.176	27.2	0.029	35	25
135A	27.2	27.484	0.269	25	25

Toll / HOV

Export to Excel (/otis/API/TRANSYS/Toll/135A/26/27.484.csv)

Route Begin Ref End Ref Length Toll HOV

System Classification

Export to Excel (/otis/API/TRANSYS/SystemClassification/135A/26/27.484.csv)

Route	Begin Ref	End Ref	Length	Access Control	Admin Class	Functional Class	NHS Designation	Special System
135A	1.365	27.176	25.617	R-A: Regional Highway	CDOT Highway	4 Minor Arterial	0 Not on NHS	NON-STRAHNET
135A	27.176	27.484	0.298	NR-B: Non Rural Arterial	CDOT Highway	4 Minor Arterial	0 Not on NHS	NON-STRAHNET

Route Classification

Export to Excel (/otis/API/TRANSYS/RouteClassification/135A/26/27.484.csv)

Route Begin Ref End Ref Length Highway Designation Forest Route Scenic Route Truck Restriction Terrain

Jurisdiction Classification

Export to Excel (/otis/API/TRANSYS/JurisdictionClassification/135A/26/27.484.csv)

Route Begin Ref End Ref Length FIPS City FIPS County Urban Area

CDOT Classification

Export to Excel (/otis/API/TRANSYS/CdotClassification/135A/26/27.484.csv)

Route	Begin Ref	End Ref	Length	Commission District	CDOT Engineering Region	Transportation Planning Region

Geometrics 1

Export to Excel (/otis/API/TRANSYS/GeometricsGeneral/135A/26/27.484.csv)

Route Begin Ref End Ref Length Thr Ln Qty Thr Ln Wd Is Divided Operation Surface Width

Geometrics 2

Export to Excel (/otis/API/TRANSYS/GeometricsPrimary/135A/26/27.484.csv)

Route	Begin Ref	End Ref	Length	Pri TL Qty	Pri TL Wid	Pri Surf	Pri Out Shld	Pri Out Shld Wid	Pri Out Safety	Pri Out Curb	Pri Snd Wall

Geometrics 3

Export to Excel (/otis/API/TRANSYS/GeometricsPrimary2/135A/26/27.484.csv)

Route	Begin	End	Length	Pri In	Pri In	Pri In	Pri Aux	Pri Aux Ln	Pri Aux	Pri LT Ln	Pri LT Ln

Ref	Ref	Shld	Shld Wid	Curb	Ln Qty	Type	Ln Wid	Qty	Wid

Geometrics 4

Export to Excel (/otis/API/TRANSYS/GeometricsSecondary/135A/26/27.484.csv)

Route	Begin Ref	End Ref	Length	Med Type	Med Wid	Med Safety Type	Man Acc Lns	Man Acc Lns Aln	Lt Rail Aln

Mile Markers

Export to Excel (/otis/API/TRANSYS/MILEGROUPSON/135A/26/27.484.csv)

Route Mile Marker Length UTM X UTM Y Longitude Latitude

Click the headings below to view results.

Highway 135A between 26 and 27.484

AADT

Export to Excel (/otis/API/TRANSYS/AADT/135A/26/27.484.csv)

Route Begin Ref End Ref Length AADT % Trucks Vehicle Miles Travelled

Traffic Capacity

Export to Excel (/otis/API/TRANSYS/TrafficCapacity/135A/26/27.484.csv)

Route Begin Ref End Ref Length Route Capacity V/C Ratio V/C Ratio 20

Count Locations

Export to Excel (/otis/API/TRANSYS/TRAFFStation/135A/26/27.484.csv)

Route Ref Station LOCATION Count Type

Click the headings below to view results.

Highway 135A between 26 and 27.484

Camera: Front Right Direction: Increasing Decreasing Full-Size

View in Windshield App (/otis/windshield#2015/135A/26/1/1) Google Street View

Route Ref

Photo year: 2015

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Click the headings below to view results.

Highway 135A between 26 and 27.484

ROW Plans

Route	Begin Ref	End Ref	ROW Plan

Click the headings below to view results.
Highway 135A between 26 and 27.484

Structures

Export to Excel (/otis/API/TRANSYS/Structures/135A/26/27.484.csv)

Route	Ref	StrId	Dir	ClrminNE	ClrmaxNE	ClrminSW	ClrmaxSW	On / Under	Type	Sufficiency Rating	GFP	Location	Photo

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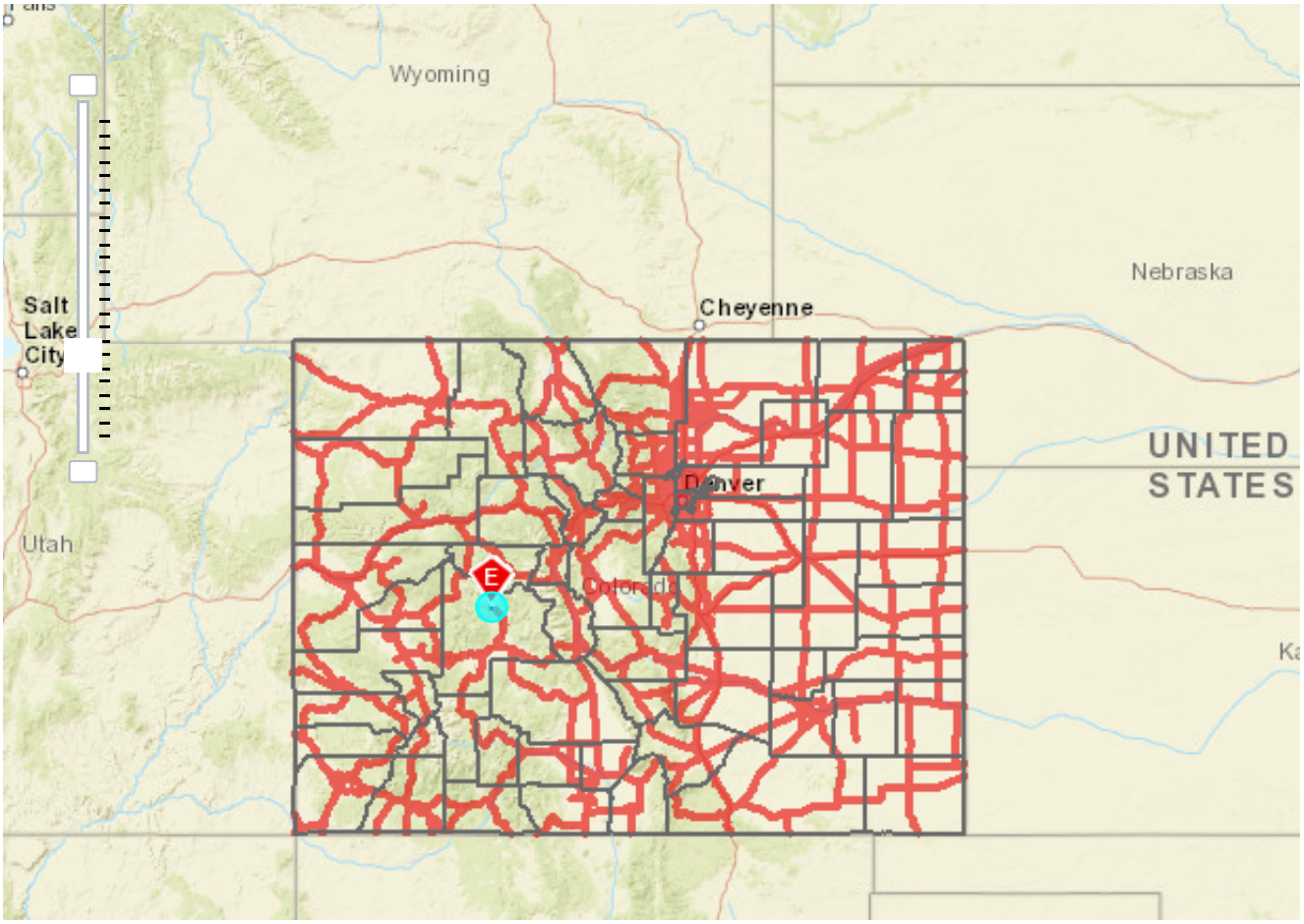
(/otis/HighwayData#/ui/0/0/criteria/135A/26/27.484) (/otis/Flex/MapView?hwy=135A&begrefpt=26&endrefpt=27.484)



Search by city / county (#)

Search by highway segment (#)

Select a route and begin and end ref points. You can select a route from the drop down list or click the pencil icon then click the map. You can enter the ref points into the text boxes or click the pencil icon then click the map.

Zoom to County (optional): select a county

CDOT Route Number: 135A Find by Name

Begin Reference: 26

End Reference: 27.484

Count type: All Short Duration Continuous Count

Found 2 traffic stations.

Search by traffic station (#)

- Stations (#stations-tab)
- AADT (#aadt-tab)
- Future Traffic (#futuretraffic-tab)
- ESAL (#esal-tab)

Found 2 stations. Click the magnifying glass icon in front of a station to see count data below.

Export to Excel (/otis/API/TRANSYS/GetTrafficStationsByRouteRefs/135A/26/27.484/true/true.csv)

Station ID	Route	Start	End	County	City	Description
104574	135A	20.704	27.176	Gunnison	Crested Butte	ON SH 135 SE/O RED LADY AVE & 7TH ST, CRESTED BUTTE
104575	135A	27.176	27.484	Gunnison	Crested Butte	ON SH 135, 6TH ST N/O WHITEROCK AVE, CRESTED BUTTE

Found 2 stations. Click the magnifying glass icon in front of a station to see count data below.

Export to Excel (/otis/API/TRANSYS/GetAadtsByRouteRefs/135A/26/27.484/true/true.csv)

Route	Start	End	Description	AADT	Year	Single Unit	Comb Trucks	% Trucks	20 Year Factor	DHV	DVMT	DD
135A	20.704	27.176	ON SH 135 SE/O RED LADY AVE & 7TH ST, CRESTED BUTTE	7,300	2014	70	200	3.7	1.44	16	46,851	58
135A	27.176	27.484	ON SH 135, 6TH ST N/O WHITEROCK AVE, CRESTED BUTTE	6,700	2014	70	170	3.5	1.24	16	1,997	58

Projection Year: 2036 **Export to Excel (/otis/API/TRANSYS/GetFutureTrafficByRouteRefs/2036/135A/26/27.484/true/true.csv)**

Route	Start	End	AADT	Year	Single Trucks	Combined Trucks	% Trucks	DHV	Projected AADT	Projected Single Trucks	Projected Combined Trucks

Build Year: Design Life (yrs): Lanes: 1 Rigid pavement: **Export to Excel (/otis/API/TRANSYS/GetEsalsByRouteRefs///1/false/135A/26/27.484/true/true.csv)**

Route	Start	End	Length	AADT	Year	20 Year Factor	Single Trucks	Combined Trucks	Projected AADT	Projected Single Trucks	Projected Combined Trucks	18 Kip ESALs

- **Daily (#daily-tab)**
- **Monthly Summaries (#monthly-tab)**
- **Annual (#annual-tab)**

View Entire Month

Export to Excel

Dir 0h 1h 2h 3h 4h 5h 6h 7h 8h 9h 10h 11h 12h 13h 14h 15h 16h 17h 18h 19h 20h 21h 22h 23h

P = Primary direction S = Secondary direction C = Combined traffic counts

Export to Excel

Yr Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec

Export to Excel

Annual data are only avaible for continuous sites.

Download CDOT's traffic database

Excel format (http://dtdapps.coloradodot.info/staticdata/Downloads/TrafficDataBase/cdot_traffic.xlsx)

Access format (http://dtdapps.coloradodot.info/staticdata/Downloads/TrafficDataBase/cdot_traffic.zip)

- Connect (https://www.facebook.com/coloradodot)
- Watch (http://www.youtube.com/user/cdotmedia)
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- Home (/otis/)
- Highway Data (/otis/HighwayData)
- Traffic Data (/otis/TrafficData)
- Data Catalog (/otis/catalog)
- Reports (/otis/Statistics)
- Map View (/otis/Flex/MapView)
- Help (/otis/TrafficData/Help?actionName=Index)
-
- Sign In (/otis/Account/LogOn)

OTIS Online Transportation Information System

Contact Us (/otis/Home/ContactUs)

Served from Ext4

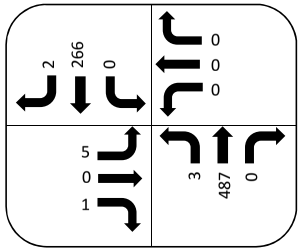
CDOT Home Page (http://www.coloradodot.info/)

SH 135 & Site Access
Crested Butte, CO
Data Collection Date: Thursday, June 02, 2016
Weather: Clear

Weekday Traffic Counts

Start Time	County Yard												N/A												SH 135												SH 135											
	Eastbound												Westbound												Northbound												Southbound											
	Left				Thru				Right				Left				Thru				Right				Left				Thru				Right				Left				Thru				Right			
	Car	Trk	Ped	Bik	Car	Trk	Ped	Bik	Car	Trk	Ped	Bik	Car	Trk	Ped	Bik	Car	Trk	Ped	Bik	Car	Trk	Ped	Bik	Car	Trk	Ped	Bik	Car	Trk	Ped	Bik	Car	Trk	Ped	Bik	Car	Trk	Ped	Bik	Car	Trk	Ped	Bik	Car	Trk	Ped	Bik
7:00 AM	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	53	1	0	0	0	0	0	0	0	0	0	0	20	0	0	0	0	0	0	0
7:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	51	5	0	0	0	0	0	0	0	0	0	0	35	0	0	0	0	0	0	0
7:30 AM	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	75	3	0	0	0	0	0	0	0	0	0	0	42	4	0	0	0	0	0	0
7:45 AM	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	117	2	0	0	0	0	0	0	0	0	0	0	49	5	0	1	1	0	0	0
8:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	111	12	0	0	0	0	0	0	0	0	0	0	52	1	0	0	1	0	0	0
8:15 AM	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	152	5	0	0	0	0	0	0	0	0	0	0	71	2	0	0	0	0	0	0
8:30 AM	1	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	82	6	0	0	0	0	0	0	0	0	0	0	85	1	0	0	0	0	0	0
8:45 AM	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	85	3	0	0	0	0	0	0	0	0	0	0	43	4	0	0	0	0	0	0
Total	5	2	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	1	0	0	726	37	0	0	0	0	0	0	0	0	0	0	397	17	0	1	2	0	0	0
Peak Hour Total	3	2	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	1	0	0	462	25	0	0	0	0	0	0	0	0	0	0	257	9	0	1	2	0	0	0
Peak Hour Total	5 vph		0 pph		0 vph		0 pph		1 vph		0 pph		0 vph		0 pph		0 vph		0 pph		0 vph		0 pph		3 vph		0 pph		487 vph		0 pph		0 vph		0 pph		0 vph		0 pph		266 vph		1 pph		2 vph		0 pph	

Total Peak Hour Vehicle Traffic at Intersection	764	vph
Total Peak Hour Peds/Bikes at Intersection	1	pph
Total Peak Hour Traffic (All Modes) at Intersection	765	pph
Percentage Peak Hour Trucks at Intersection	4.84	%
Peak Hour Factor	0.82	



Peak Hour Data (Vehicular)

SH 135 & Site Access
Crested Butte, CO
Data Collection Date: Thursday, June 09, 2016
Weather: Clear

Weekday Traffic Counts

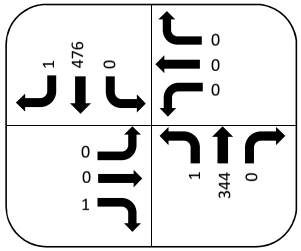
Start Time	County Yard – Eastbound – Left				Thru				Right			
	Car	Trk	Ped	Bik	Car	Trk	Ped	Bik	Car	Trk	Ped	Bik
4:00 PM	0	0	0	0	0	0	0	0	0	0	0	0
4:15 PM	0	0	0	0	0	0	0	0	0	0	0	0
4:30 PM	0	0	0	0	0	0	0	0	0	0	0	0
4:45 PM	0	0	0	0	0	0	0	0	0	1	0	0
5:00 PM	0	0	0	0	0	0	0	0	0	0	0	0
5:15 PM	0	0	0	0	0	0	0	0	0	0	0	0
5:30 PM	0	0	0	0	0	0	0	0	0	0	0	0
5:45 PM	0	0	0	0	0	0	0	0	1	0	0	0
Total	0	0	0	0	0	0	0	0	1	1	0	0
Peak Hour Total	0	0	0	0	0	0	0	0	0	1	0	0
Peak Hour Total	0 vph		0 pph		0 vph		0 pph		1 vph		0 pph	

Start Time	N/A – Westbound – Left				Thru				Right			
	Car	Trk	Ped	Bik	Car	Trk	Ped	Bik	Car	Trk	Ped	Bik
4:00 PM	0	0	0	0	0	0	0	0	0	0	0	0
4:15 PM	0	0	0	0	0	0	0	0	0	0	0	0
4:30 PM	0	0	0	0	0	0	0	0	0	0	0	0
4:45 PM	0	0	0	0	0	0	0	0	0	0	0	0
5:00 PM	0	0	0	0	0	0	0	0	0	0	0	0
5:15 PM	0	0	0	0	0	0	0	0	0	0	0	0
5:30 PM	0	0	0	0	0	0	0	0	0	0	0	0
5:45 PM	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0
Peak Hour Total	0	0	0	0	0	0	0	0	0	0	0	0
Peak Hour Total	0 vph		0 pph		0 vph		0 pph		0 vph		0 pph	

Start Time	SH 135 – Northbound – Left				Thru				Right			
	Car	Trk	Ped	Bik	Car	Trk	Ped	Bik	Car	Trk	Ped	Bik
4:00 PM	0	0	0	0	63	5	0	1	0	0	0	0
4:15 PM	0	0	0	1	83	3	0	1	0	0	0	0
4:30 PM	0	0	0	0	68	5	0	1	0	0	0	0
4:45 PM	0	1	0	0	83	2	0	0	0	0	0	0
5:00 PM	0	0	0	0	80	6	0	0	0	0	0	0
5:15 PM	0	0	0	0	90	2	0	0	0	0	0	0
5:30 PM	0	0	0	0	81	0	0	0	0	0	0	0
5:45 PM	0	0	0	0	86	4	0	0	0	0	0	0
Total	0	1	0	1	634	27	0	3	0	0	0	0
Peak Hour Total	0	1	0	0	334	10	0	0	0	0	0	0
Peak Hour Total	1 vph		0 pph		344 vph		0 pph		0 vph		0 pph	

Start Time	SH 135 – Southbound – Left				Thru				Right			
	Car	Trk	Ped	Bik	Car	Trk	Ped	Bik	Car	Trk	Ped	Bik
4:00 PM	0	0	0	0	90	9	0	0	0	0	0	0
4:15 PM	0	0	0	0	94	7	0	1	1	0	0	0
4:30 PM	0	0	0	0	89	2	0	0	0	0	0	0
4:45 PM	0	0	0	0	102	7	0	2	0	0	0	0
5:00 PM	0	0	0	0	138	6	0	0	0	0	0	0
5:15 PM	0	0	0	0	112	2	0	0	0	0	0	0
5:30 PM	0	0	0	0	104	5	0	0	0	1	0	0
5:45 PM	0	0	0	0	85	3	0	0	0	0	0	0
Total	0	0	0	0	814	41	0	3	1	1	0	0
Peak Hour Total	0	0	0	0	456	20	0	2	0	1	0	0
Peak Hour Total	0 vph		0 pph		476 vph		2 pph		1 vph		0 pph	

Total Peak Hour Vehicle Traffic at Intersection	823	vph
Total Peak Hour Peds/Bikes at Intersection	2	pph
Total Peak Hour Traffic (All Modes) at Intersection	825	pph
Percentage Peak Hour Trucks at Intersection	4.00	%
Peak Hour Factor	0.90	



Peak Hour Data (Vehicular)

Saturday Factor Calculation

7/9/15 - Thursday

Dir	0h	1h	2h	3h	4h	5h	6h	7h	8h	9h	10h	11h	12h	13h	14h	15h	16h	17h	18h	19h	20h	21h	22h	23h	
P	7	5	4	3	6	19	110	284	235	213	210	197	219	252	253	283	298	272	169	134	107	134	71	27	
S	10	5	3	1	9	21	103	136	162	244	237	230	227	243	228	269	335	393	249	122	88	57	40	16	
	17	10	7	4	15	40	213	420	397	457	447	427	446	495	481	552	633	665	418	256	195	191	111	43	6940

7/11/2015 - Saturday

P	17	15	4	5	4	19	53	141	180	181	221	259	240	281	232	280	235	248	191	119	141	169	91	46	
S	15	2	4	9	11	28	74	107	155	231	247	246	252	239	217	252	298	265	249	152	90	82	59	28	
	32	17	8	14	15	47	127	248	335	412	468	505	492	520	449	532	533	513	440	271	231	251	150	74	6684

7/12/2015 - Sunday

P	16	9	4	5	6	20	35	118	162	185	191	225	275	228	241	260	258	218	176	127	87	69	31	9	
S	7	5	5	7	7	22	63	73	158	218	254	265	249	248	262	293	257	222	189	122	90	86	28	16	
	23	14	9	12	13	42	98	191	320	403	445	490	524	476	503	553	515	440	365	249	177	155	59	25	6101

Saturday Adjustment Factor	0.963
Sunday Adjustment Factor	0.879

7/16/2015. - Thursday

P	7	5	2	6	8	32	128	283	280	230	226	244	222	282	239	306	333	295	236	162	123	135	52	23	
S	14	5	3	3	4	22	90	135	189	241	286	202	238	238	249	322	351	402	237	139	103	80	52	31	
	21	10	5	9	12	54	218	418	469	471	512	446	460	520	488	628	684	697	473	301	226	215	104	54	7495

7/18/2015 - Saturday

P	21	5	6	1	3	32	78	140	196	227	234	297	301	312	309	289	283	237	150	120	110	81	44	12	
S	18	3	2	6	13	37	73	111	185	214	244	242	254	285	301	303	251	243	174	147	132	76	73	23	
	39	8	8	7	16	69	151	251	381	441	478	539	555	597	610	592	534	480	324	267	242	157	117	35	6898

7/19/2016 - Sunday

P	9	3	3	4	5	16	36	122	138	186	204	224	221	250	225	292	260	192	154	108	90	61	32	9	
S	17	4	3	3	10	29	54	103	145	255	314	384	336	299	273	266	275	196	170	128	73	49	36	17	
	26	7	6	7	15	45	90	225	283	441	518	608	557	549	498	558	535	388	324	236	163	110	68	26	6283

Saturday Adjustment Factor	0.920
Sunday Adjustment Factor	0.838

7/23/15 - Thursday

P	9	4	5	5	9	23	105	277	228	249	261	268	252	261	268	278	305	309	236	145	104	79	62	18	
S	12	3	4	8	12	31	95	130	192	229	255	267	236	231	258	268	327	366	217	139	107	80	59	31	
	21	7	9	13	21	54	200	407	420	478	516	535	488	492	526	546	632	675	453	284	211	159	121	49	7317

7/25/15 - Saturday

P	26	6	4	1	8	25	84	147	175	221	282	273	247	287	303	297	277	260	172	127	107	92	51	22	
S	17	9	2	6	13	23	81	85	174	227	261	267	240	179	210	268	301	263	194	151	113	121	87	37	
	43	15	6	7	21	48	165	232	349	448	543	540	487	466	513	565	578	523	366	278	220	213	138	59	6823

7/26/2015 - Sunday

P	12	13	7	6	5	18	37	131	150	175	188	234	261	228	294	242	257	215	160	114	92	62	40	9	
S	25	3	5	13	4	27	50	96	164	231	312	357	352	288	251	273	253	192	153	119	85	69	52	17	
	37	16	12	19	9	45	87	227	314	406	500	591	613	516	545	515	510	407	313	233	177	131	92	26	6341

Saturday Adjustment Factor	0.932
Sunday Adjustment Factor	0.867

Average Saturday Adjustment Factor	0.939
Average Sunday Adjustment Factor	0.861

Thought on events at the Crested Butte Horse Park

Acceleration / Deceleration Test performed for Crested Butte Horse Park Project

Acceleration/Deceleration Test—	Length	Weight
Truck 2004 Chevy 2500 Duramax Diesel	19’	7700 lbs
Trailer Trails West Adventure 3 Horse	17’	3000 lbs with tack and equipment
Horses 3@1200lbs		3600 lbs
	36’	14,300 lbs

Acceleration leaving Lost Miner U.S. Highway 50	23.38 Seconds
Deceleration Entering Tomichi Tire U.S. Highway 50	22.07 Seconds
Acceleration leaving Tomichi Tire U.S. Highway 50	23.28 Seconds
Deceleration entering Lost Miner U.S. Highway 50	21.77 Seconds

McDowell Engineering LLC
Transportation Engineering Consultants

Project Number: M1231
Prepared By: KJS
Date: 7/20/2016
Revised:

Table 1 - Comparable Campground Trip Generation Calculations
KOA Campground
Silt, Colorado
Observed Site-Generated Traffic[1]

			Trip Generation Rates					Average Weekday	Average Saturday	Morning Peak Hour				Evening Peak Hour				Saturday Peak Hour			
										Inbound		Outbound		Inbound		Outbound		Inbound		Outbound	
ITE Code	Units		AM Peak Hour	PM Peak Hour	SAT Peak Hour	Average Weekday	Average Saturday	Trips (vpd)	Trips (vpd)	% Trips	Trips	% Trips	Trips	% Trips	Trips	% Trips	Trips	% Trips	Trips	% Trips	Trips
Exising Land Use																					
Campground[2]	73	Units	0.15	0.15	0.37	1.51	2.36	110	172	55%	6	45%	5	64%	7	36%	4	48%	13	52%	14
# Cars/Pickups											2		1		4		0		6		2
# Large Vehicles (Campers or RVs)											4		4		3		4		7		12
Trucks in PCEs[2]											8		8		6		8		14		24
Total PCEs[2] at driveway			0.26	0.25	0.63						10		9		10		8		20		26

[1] Values obtained from *KOA Campground in Silt, CO.*
[2] Passenger Car Equivalents are based upon Section 2.3(4)(e) of the State of Colorado's State Highway Access Code.

To: Mayor Michel and Town Council

From: Michael Yerman, Director of Planning

Subject: **SH 135/Red Lady Avenue Roundabout- Work Session**

Date: September 19, 2016

Background:
On February 1st JVA Engineers and McDowell Engineering presented the Council with two design alternatives for the SH 135/Red Lady intersection. After this presentation, the Town Council instructed the Town staff to pursue funding from the Colorado Department of Transportation ("CDOT") for the creation of a roundabout at this intersection. The presentation is attached to this memo.

The cost of improving this intersection will have significant ramifications on the Town's Street and Alley fund and property tax mill. This project is also considered an on-system improvement for CDOT which requires their approval and would potentially allow funding for the implementation of the project from the State.

At this time, staff will be presenting a modest mill increase over the next 5 years to raise sufficient funds to provide a 25% match for this project. The total project cost is anticipated to be $2.5 million with the Town providing a $750,000 match. Town staff is hoping to raise an additional $100,000-$250,000 in matching funds from regional partnerships. The 15 year Street and Alley Fund budget prepared last year shows how the Town's property tax mill would be raised to create sufficient funding for this match. This is also attached.

To receive funding for this project from CDOT, the Gunnison Valley Transportation Planning Region ("TPR") will need to prioritize this project in the Statewide Transportation Improvement Program ("STIP"). CDOT has announced that the TPR and Regional Director David Eller will be visiting Gunnison County on October 25, 2016 to request projects for the next 4 year STIP budget planning cycle which occurs from 2021-2024. The TRP will be considering requests for funding on December 1, 2016.

The Town will need to get on this round of STIP funding if the project will proceed in the next five years. Town staff has already presented the project to the School District, Gunnison County, and Mt. Crested Butte over the past few months. At this time, the Town needs to make formal requests for letters of support to gain traction with the TPR to have our project included in the STIP planning cycle.

Direction needed at this time:
Staff needs direction from the Town Council to request letter of support and possible funding from the School District, Gunnison County, City of Gunnison, and Mt. Crested Butte in preparation of the October 25, 2016 CDOT visit. The Council also needs to appoint one additional Council person to attend and request funding from CDOT on October 25, 2016 and December 1, 2106. If more than 2 Council persons are interested in attending the Town Clerk should be directed to post the meeting.

TOWN OF CRESTED BUTTE
Street Fund 15 Year Plan
Utilizing External Funding

Revenue	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026
TAX FROM MILL LEVY	644,216	655,060	656,250	675,938	721,000	742,630	742,800	812,902	813,025	862,046	886,725	913,327
INTEREST & PENALTIES	2,000	2,000	1,300	1,300	1,300	1,300	1,300	1,400	1,400	1,400	1,400	1,500
INTEREST INCOME	1,000	1,200	8,000	5,000	5,000	10,000	10,000	5,000	5,000	10,000	12,000	15,000
HIGHWAY USERS TAX	47,050	47,829	48,329	48,829	49,329	49,829	50,329	50,829	51,329	51,829	52,329	52,829
OTHER REV/CONTRIBUTIONS	4,000	3,000	4,000	4,000	4,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000
Total Revenue	698,266	709,089	717,879	735,067	780,629	808,759	809,429	875,131	875,754	930,275	957,454	987,656
PAYROLL OBLIGATIONS	80,039	67,697	71,082	82,636	86,768	91,106	95,661	100,445	105,467	110,740	116,277	122,091
REPAIR & MAINT STREETS	109,668	95,766	99,597	117,581	122,284	127,175	132,262	137,553	143,055	148,777	154,728	160,917
SNOW REMOVAL	106,085	148,982	154,941	175,139	182,144	189,430	197,007	204,888	213,083	221,607	230,471	239,690
FUEL	20,850	40,000	41,200	42,436	43,709	45,020	46,371	47,762	49,195	50,671	52,191	53,757
R&M VEHICLE	17,382	20,000	16,000	18,000	18,000	18,000	18,000	20,000	20,000	20,000	20,000	20,000
PAVING PROJECT	85,000	100,000	700,000	85,000	85,000	85,000		1,000,000		85,000	85,000	
ENGINEERING	5,000	10,000	15,000	5,000	5,000	5,000	50,000	20,000	7,500	7,500	7,500	60,000
SIDEWALK REPAIR & MAINT	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	25,000	25,000	25,000	25,000
STORM WATER PROJECT	25,000		30,000		30,000		30,000		35,000		35,000	
TREASURERS FEES	23,588	24,456	22,969	23,658	25,235	25,992	25,998	28,452	28,456	30,172	31,035	31,966
STREET SIGNS/OTHER EXP	14,482	17,300	18,000	18,000	18,000	18,000	18,000	18,000	18,000	18,000	18,000	18,000
BLOWER/SWEEPER/PLOW BLADE	25,000	22,000	150,000						225,000	220,000		
Total Expenditures	532,094	566,201	1,338,789	587,449	636,140	624,724	633,300	1,597,098	869,756	937,466	775,202	731,421
AVAILABLE FUND BALANCE	1,715,878	1,860,766	1,239,857	1,387,474	1,531,963	1,715,998	1,892,127	1,170,160	1,176,158	1,168,967	1,351,219	1,607,453
ASSESSED VALUE FOR TAXES	87,341,320	87,500,000	90,125,000	90,125,000	92,828,750	92,850,000	95,635,500	95,650,000	98,519,500	98,525,000	101,480,750	101,500,000
MILL LEVY	8.059	7.500	7.500	7.500	8.000	8.000	8.000	8.500	8.500	8.750	9.000	9.000
Transportation Needs Mill	0.441	0.500	0.750	1.000	1.000	0.750	0.750	0.500	0.500	0.500	0.500	0.500
Transportation Revenue	34,966	43,671	65,625	90,125	90,125	69,622	69,638	47,818	47,825	49,260	49,263	50,740
Fund Balance - Trans.	234,966	278,637	344,262	434,387	524,512	344,133	413,771	(38,411)	9,414	58,673	107,936	158,676
Red Lady/135/7th						250,000		500,000				
3% growth reassessment years												

Computer File Information		
Creation Date: 11\16\15		Initials: CEC
Last Modification Date: 11\16\15		Initials: CEC
Full Path: \\2387.2c\DWG		
Drawing File Name: Option1.dwg		
Acad Ver. R16	Scale: 1:40	Units: FEET

	Index of Revisions		
R-X	.	.	.
R-X	.	.	.
R-X	.	.	.
R-X	.	.	.
R-X	.	.	.

Colorado Department of Transportation

COLORADO DEPARTMENT OF TRANSPORTATION
222 SOUTH 6TH STREET, #317
GRAND JUNCTION, CO 81501
Phone: 970-683-6284 FAX: 970-683-6290

Region Number 3

As Constructed	
No Revisions:	.
Revised:	.
Void:	.

OVAL ROUNDABOUT

Designer: .		
Detailer: .		
Sheet Subset: .	Subset Sheet::	.

Project No./Code
Number
Code
Sheet Number .

CONSULTING ENGINEERS

Presentation

McDowell Engineering LLC

February 1, 2016

Crested Butte Highway 135 Red Lady Intersection Improvements

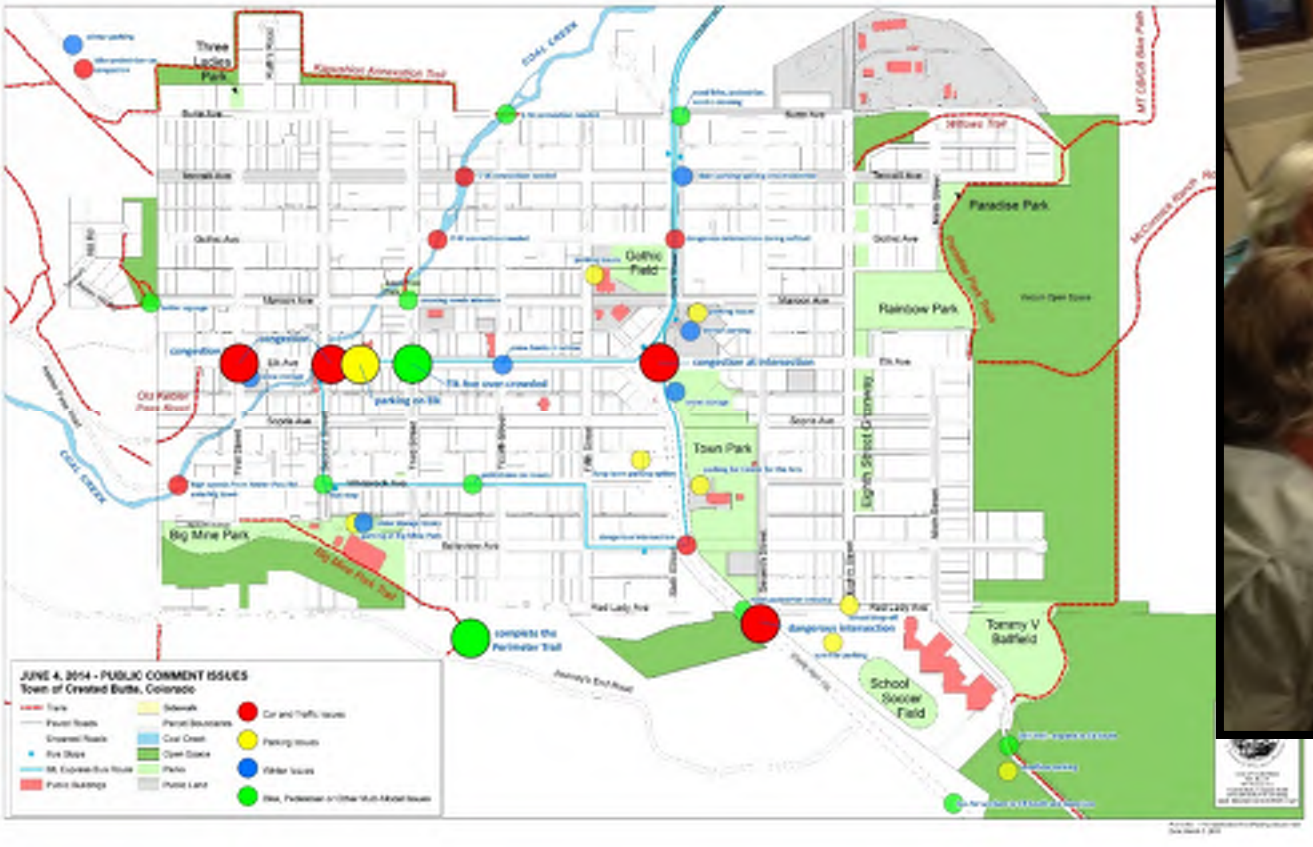
Today's Presenters:

Michael Yerman - Town Planner

Joel Price, PE, LEED AP – Civil Engineer

Kari McDowell Schroeder, PE, PTOE – Traffic Engineer

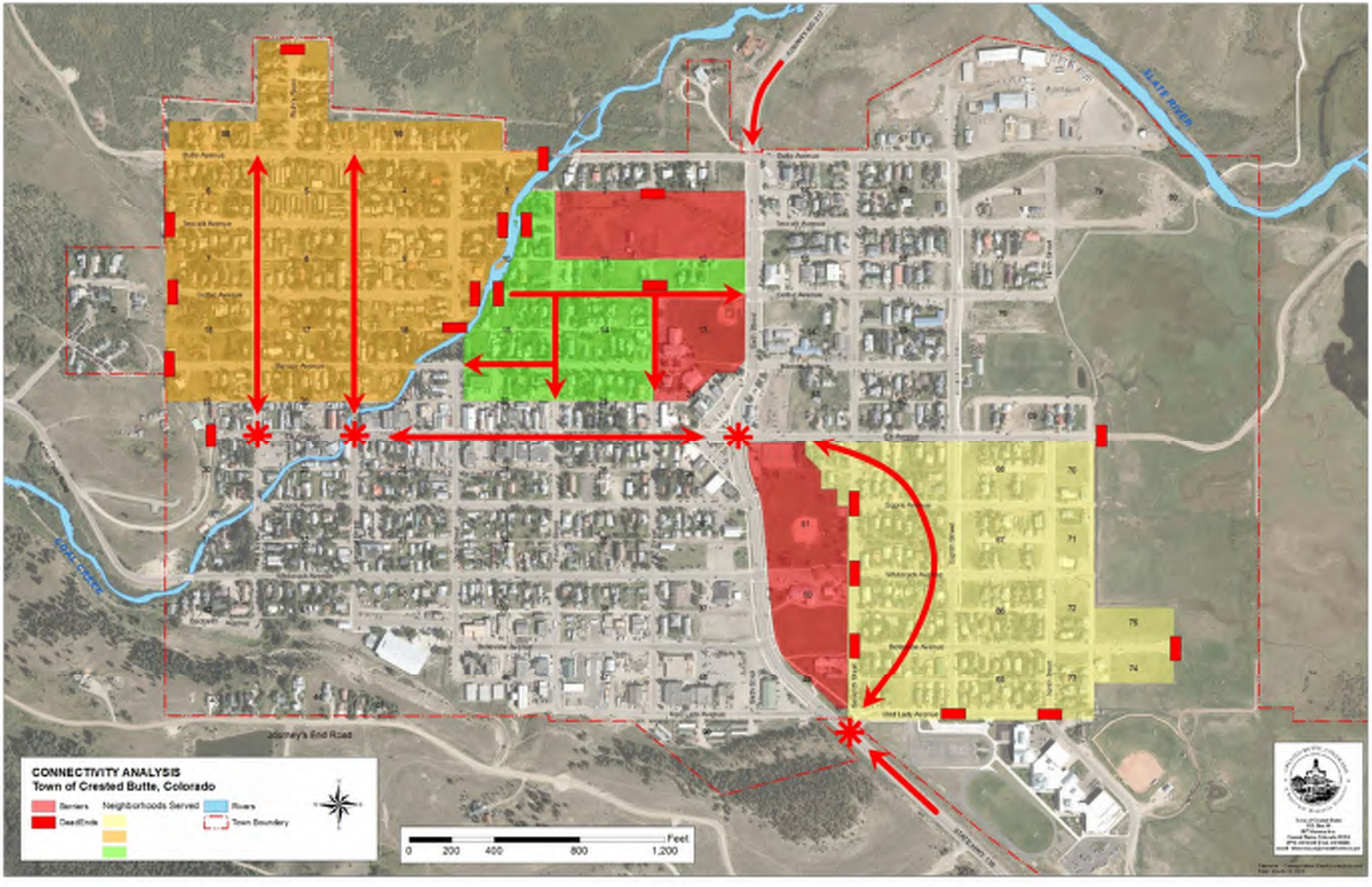
How did we prioritize this intersection?



Primary Issues Identified June 6, 2014

- Maintaining a Pedestrian and Bike Oriented Community
- Congestion on Elk Avenue
- Parking
- Completion of Perimeter Trail
- Snow Storage
- Traffic/Connectivity/Major Intersections
  - Red Lady/ SR 135
  - Elk Ave./ 6th Street
  - Elk Ave./1st & 2nd Street
  - Gothic Ave./6th Street

Lack of Connectivity has Cause Intersection Issues



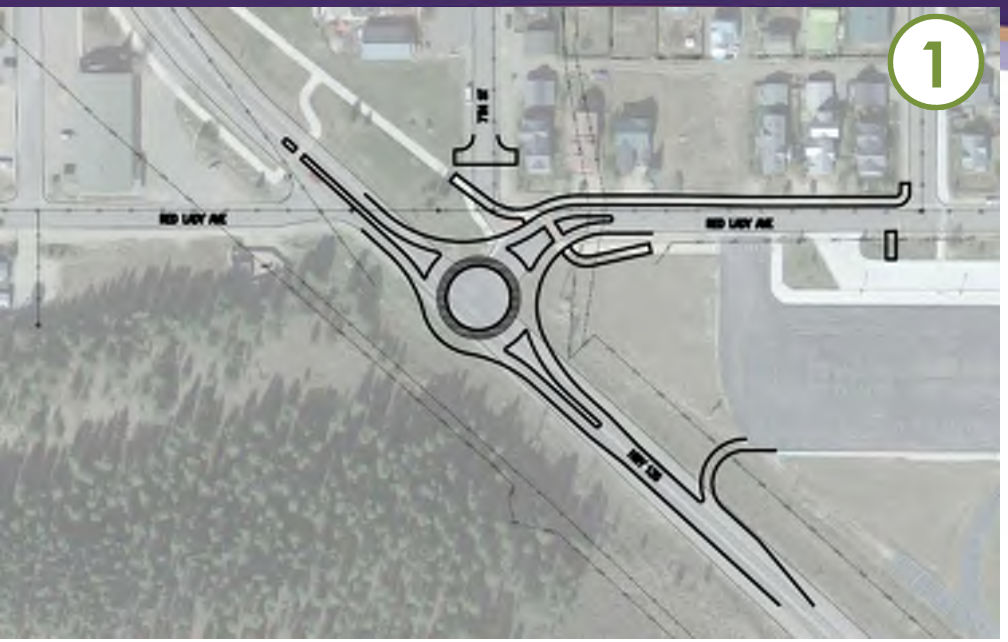
Why Plan for Red Lady?

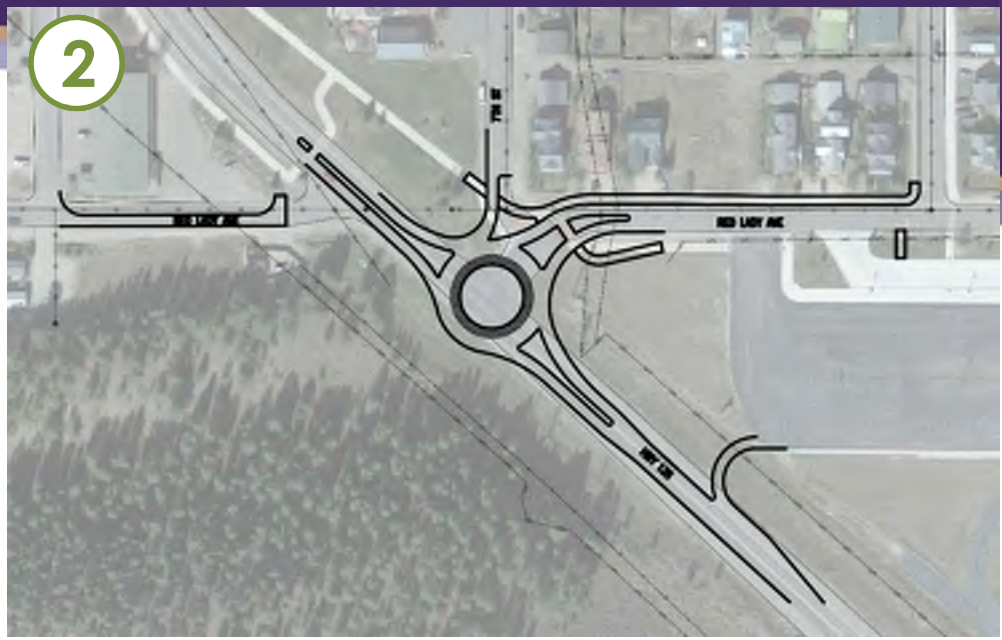
- Entrance to Town
- Located next to School
- Pedestrian safety needs improved
- Intersection Located along CDOT ROW
- Requires CDOT Approval
- Costs associated with project will use a majority of Town Transportation funds
- Town needs a CDOT Approved Concept Plan and Budget to receive external funding

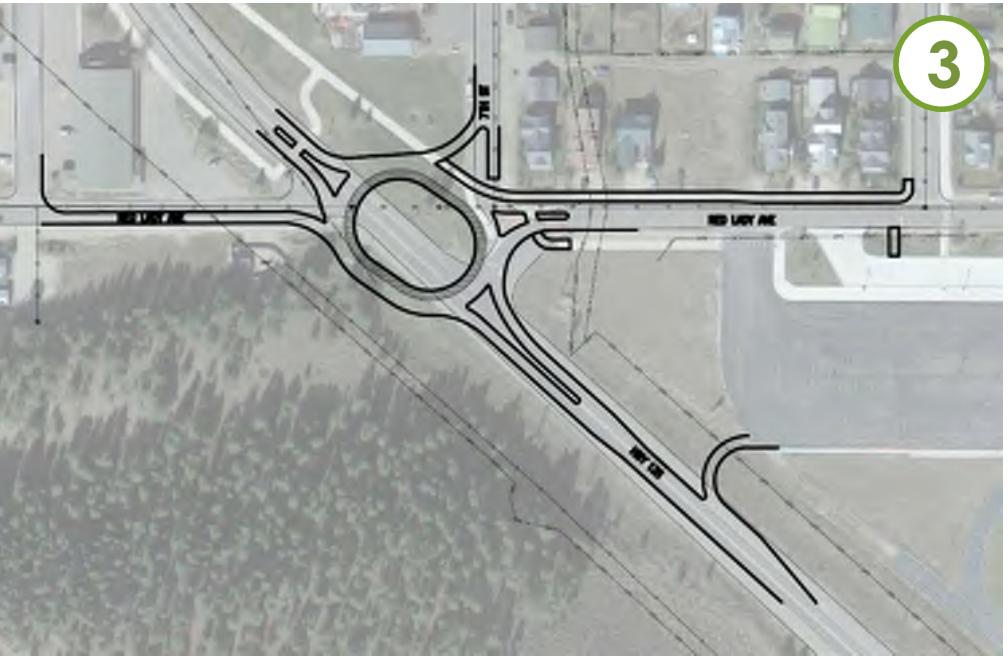
Existing Conditions

Initial Concepts – Red Lady Avenue

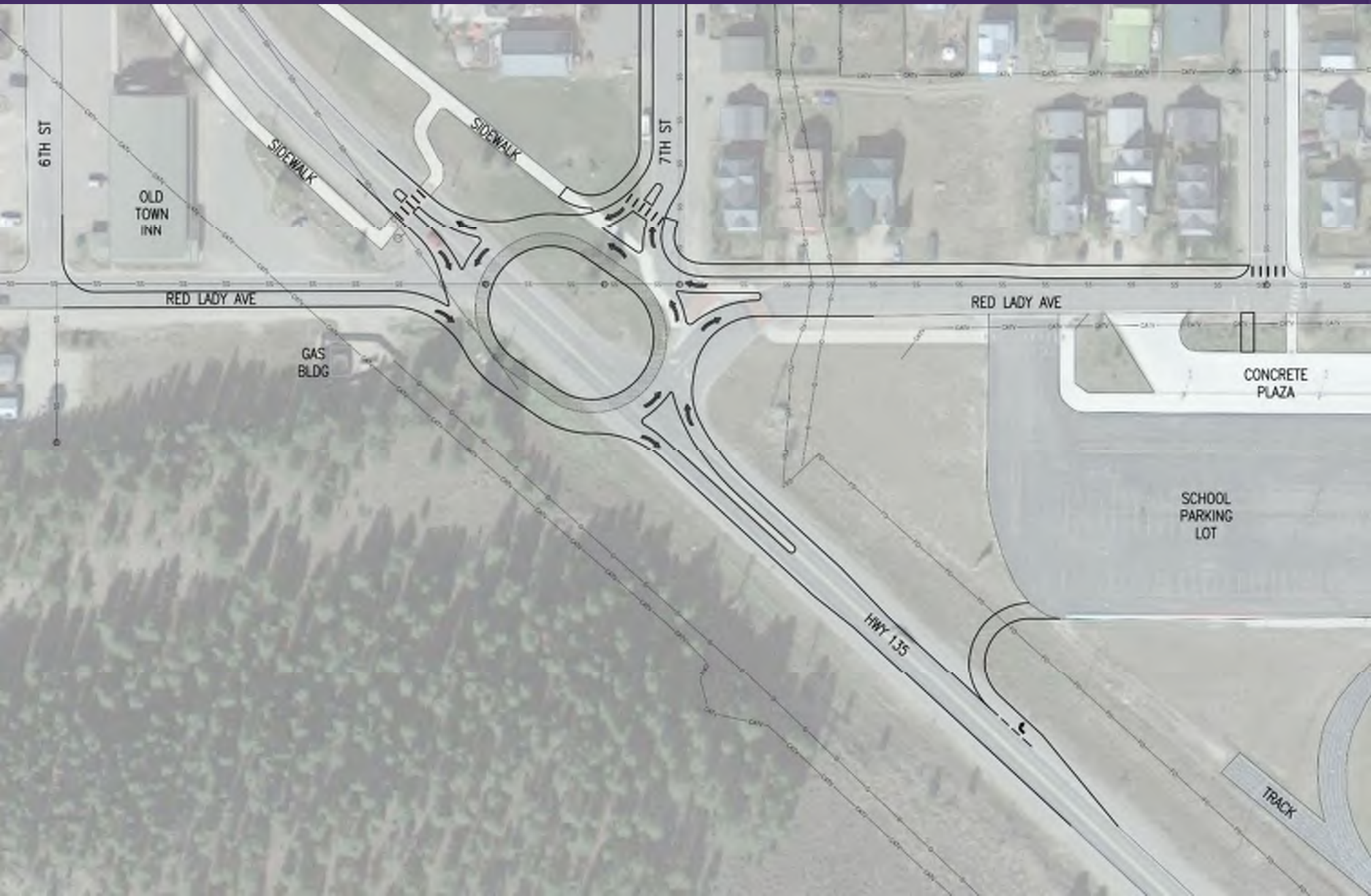
Intermediate Concepts – Roundabout



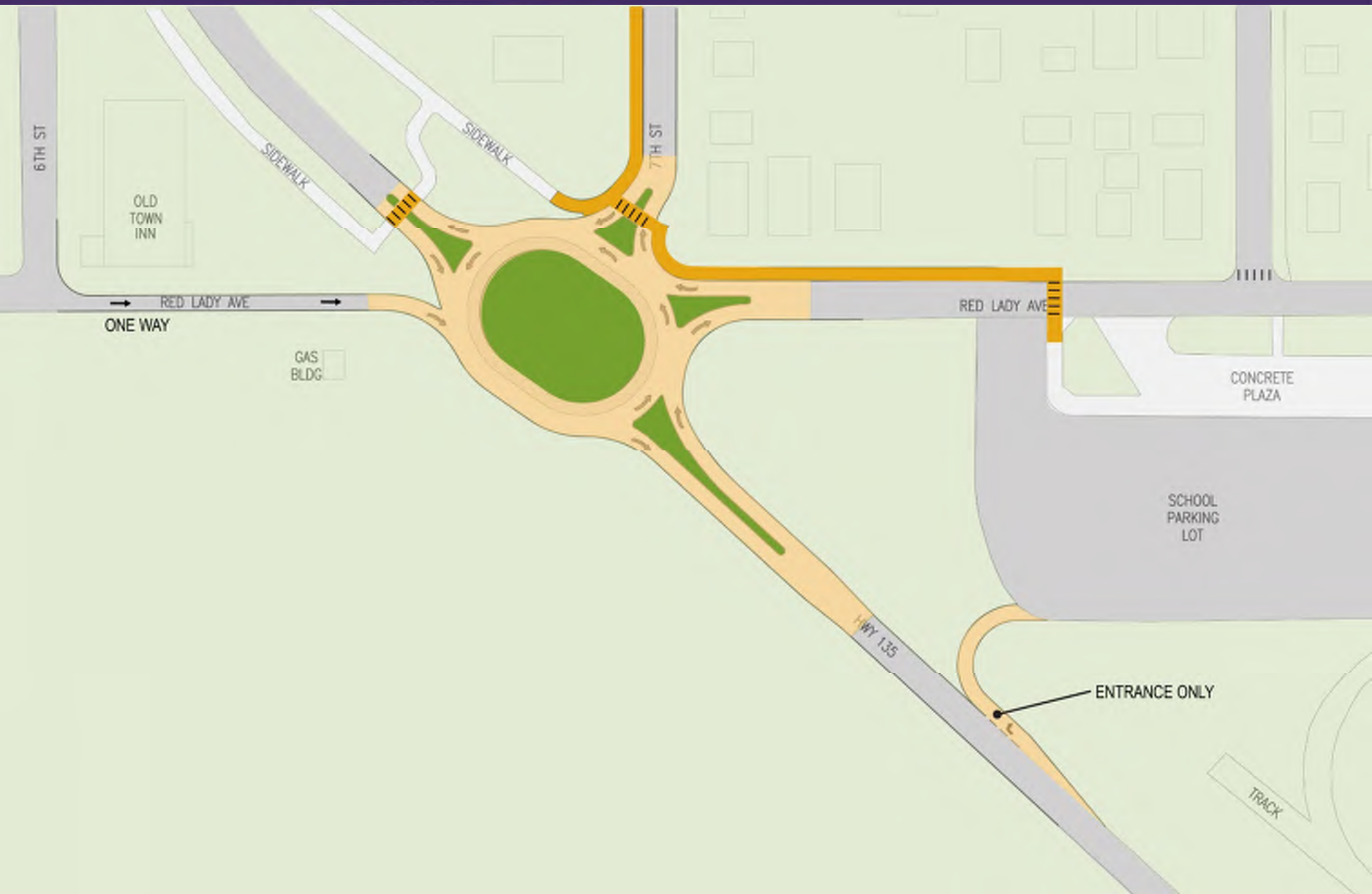




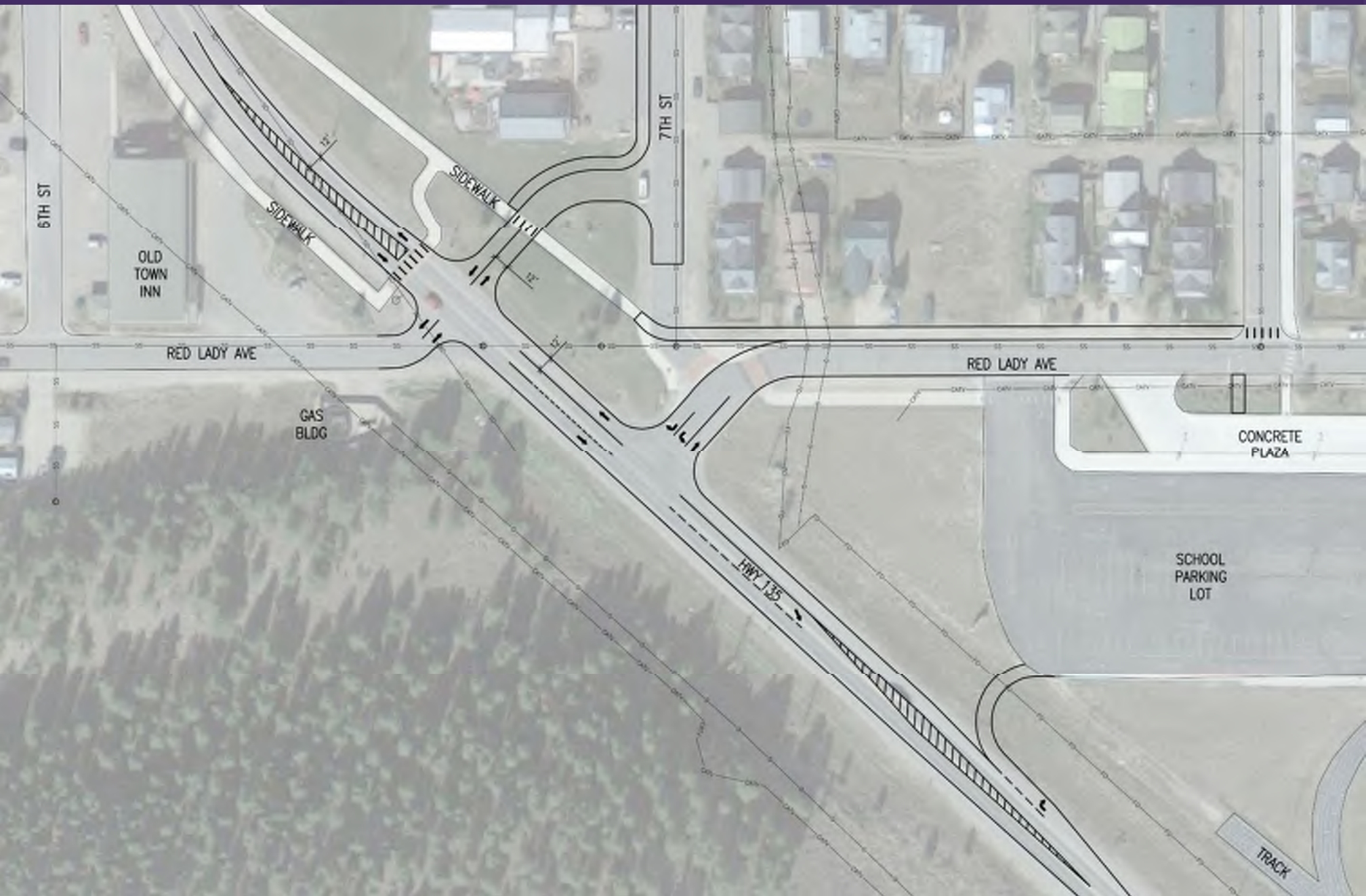
Preferred Option



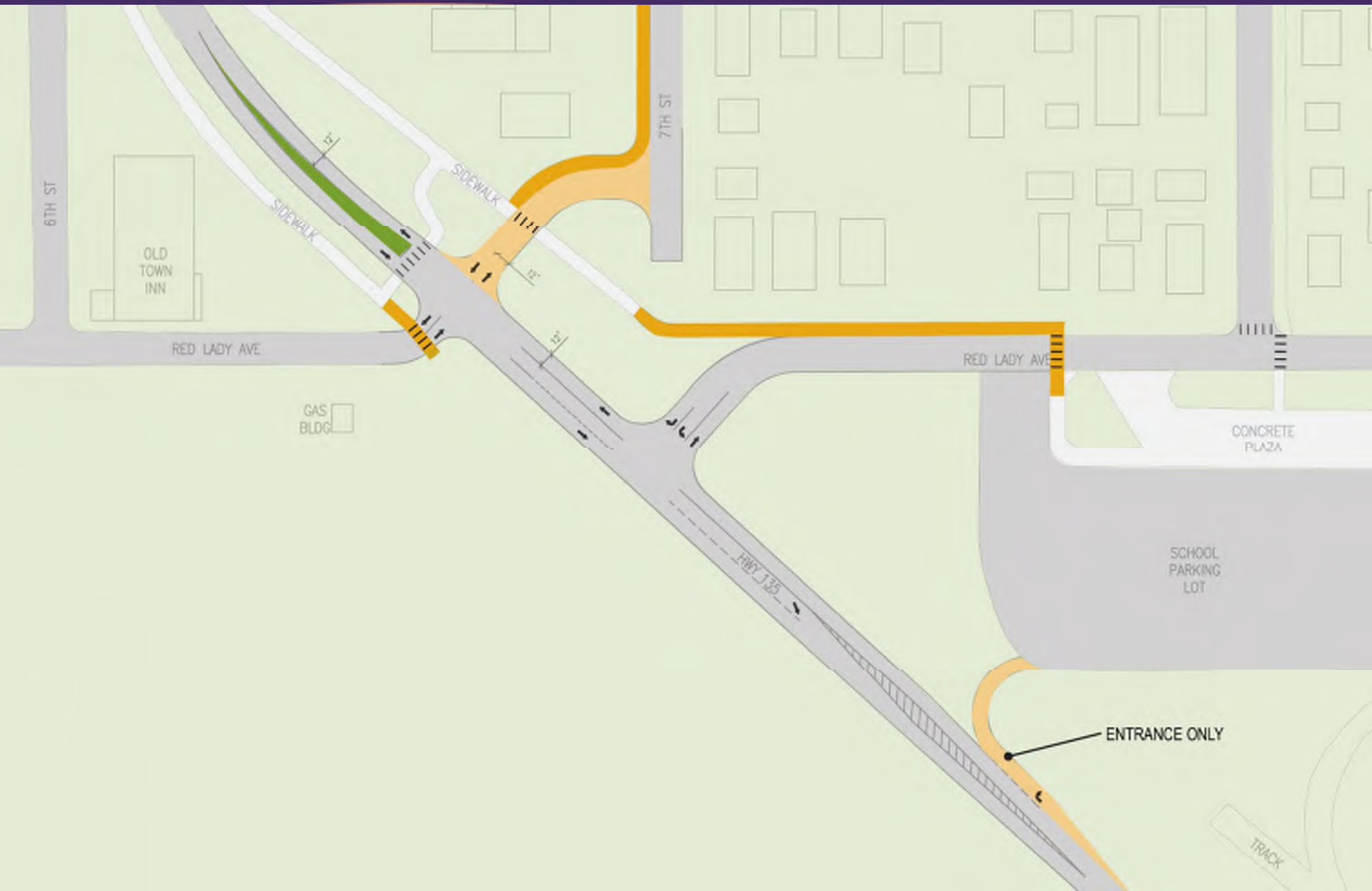
Preferred Option – Roundabout



Full Movement



Full Movement



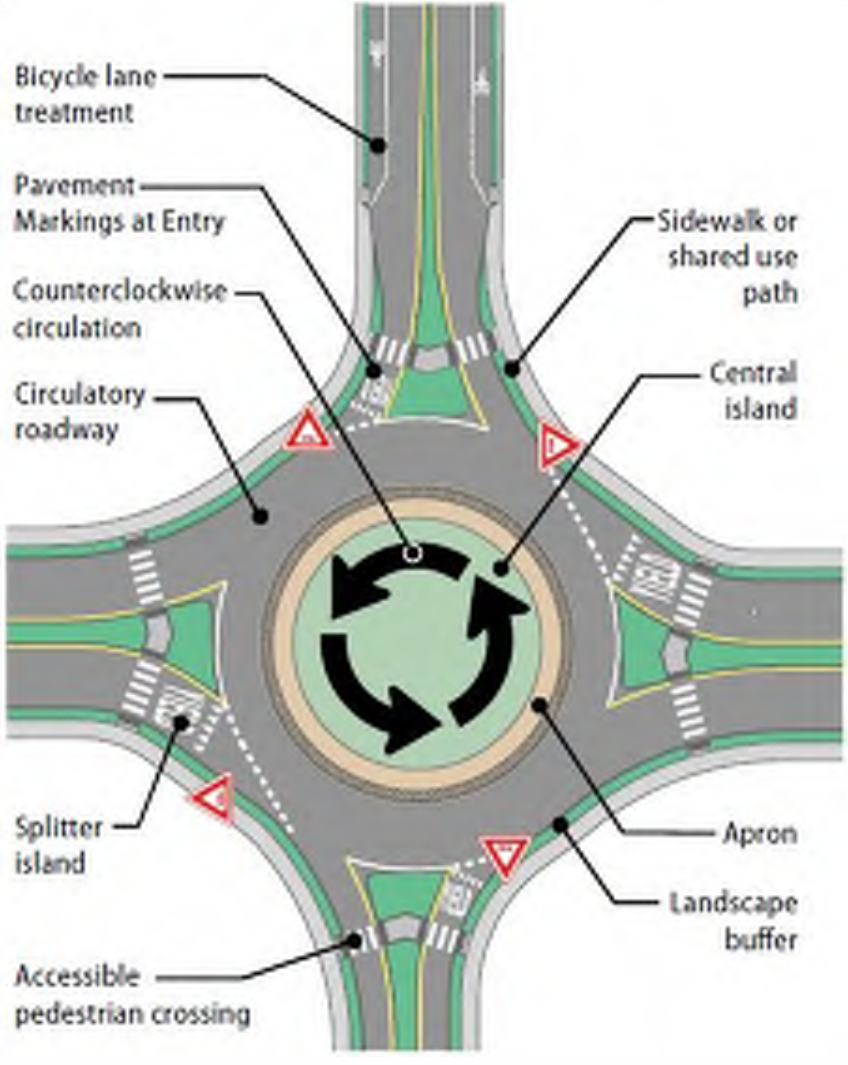
Results of Preferred Option

Benefits of Roundabouts

- Roundabout Operation

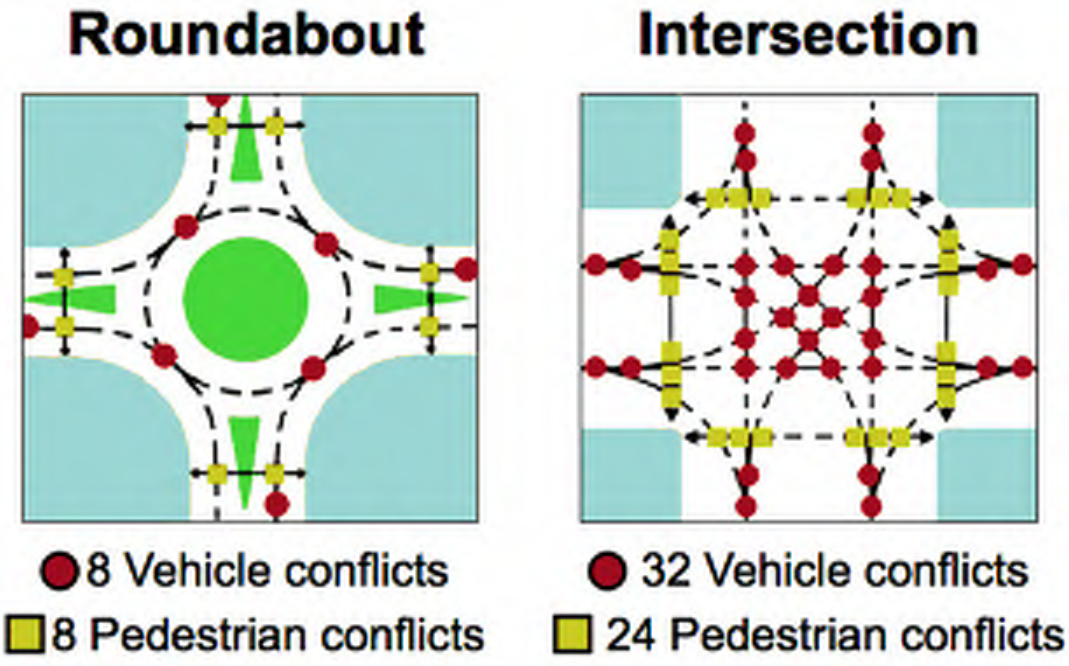
Benefits of Roundabouts

- How a roundabout operates
  - CCW
  - Traffic Moves Freely
  - Incoming Yield
  - Splitter Islands
  - Pedestrians
  - Bicycles



Benefits of Roundabouts

- Increased Safety
  - Reduction in Crashes
  - Lower Travel Speeds
  - Reduced Conflict Points
  - Increased Fuel Efficiency
  - Simplified 5-legged Intersection



Benefits of Roundabouts

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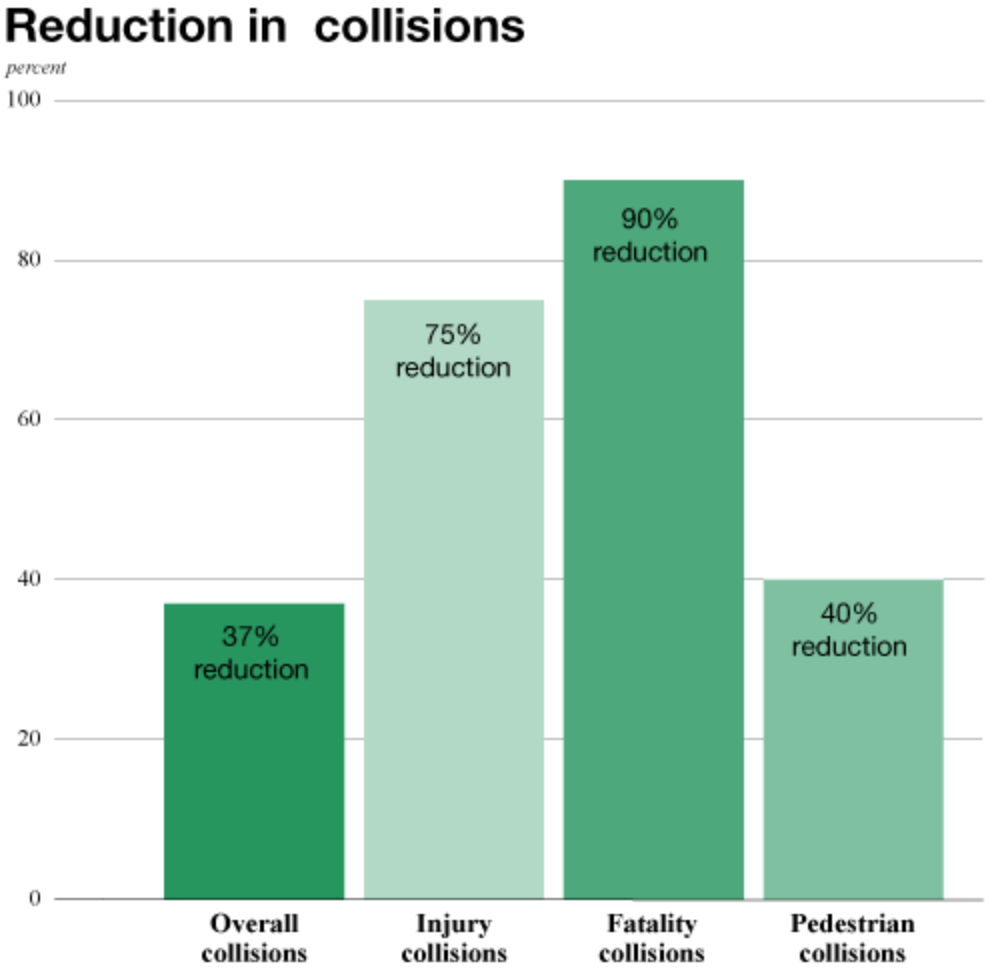
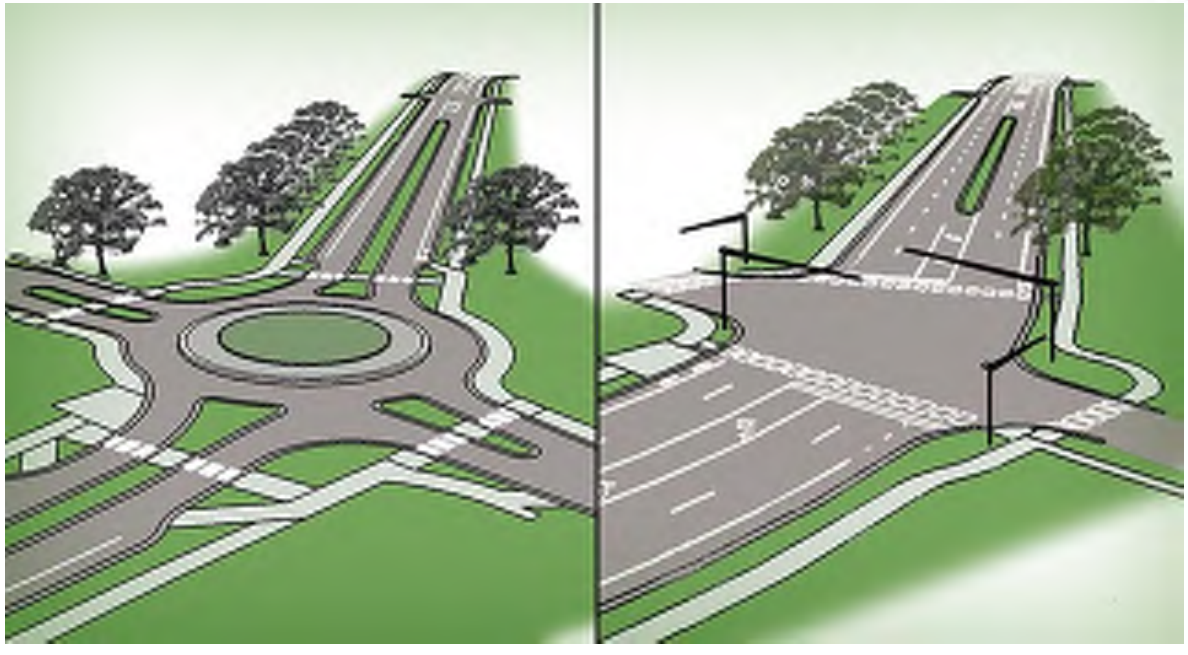


Source: Federal Highway Administration and Insurance Institute for Highway Safety (FHWA and IHS)

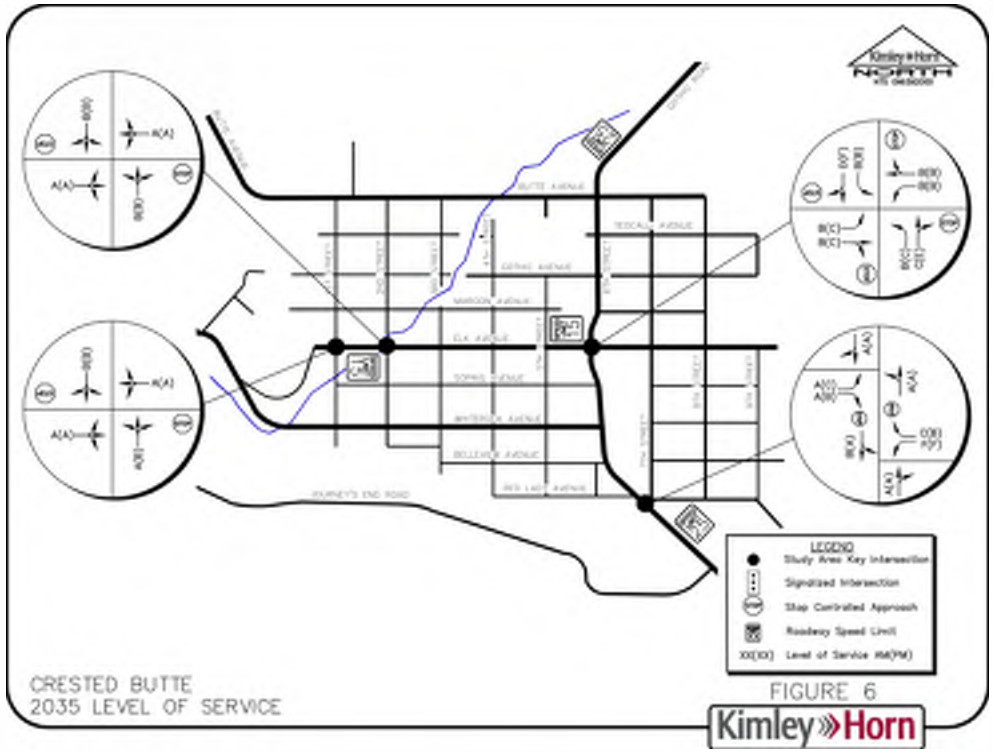
Benefits of Roundabouts

- Increased Safety
  - Pedestrian Safety
    - Crossing Width
    - Ped Refuge
    - Vehicle Speeds
  - Vehicular Safety
    - Yield Condition
    - Low Travel Speeds
    - One-Way Travel
  - Simplifying Intersections



Benefits of Roundabouts

- Operational Benefits
  - Efficient Traffic Flow
    - Level of Service (A-F)
      - LOS A < 10 seconds
      - LOS F > 50 seconds
    - Reduce Delay
    - More efficient than stop of signal-controlled intersections
    - Operate with higher capacity
  - Reduced Emissions
    - Increased fuel efficiency

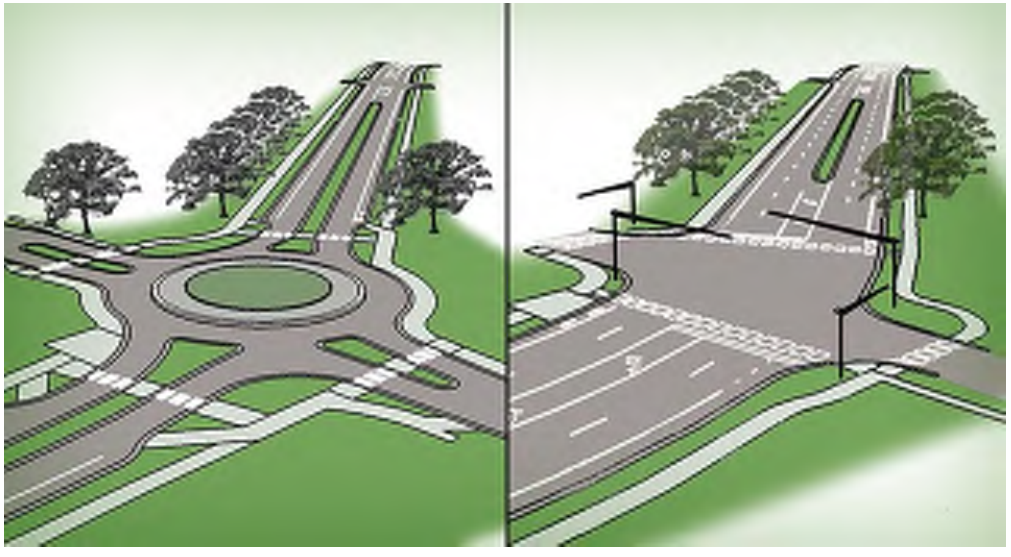


Benefits of Roundabouts

- Operational Benefits
  - Community Livability
    - Traffic Calming
    - Aesthetic Landscaping
    - Reduces Congestion
  - Lower Costs
    - Smaller <u>overall</u> footprint
    - Lower life cycle cost that traffic signal

Full Movement Option

- Operations
  - Higher Speed Traffic
  - Wider Roadways
  - Longer Delays
- Safety
  - Increased Points of Conflict
  - Increased Accident Rate
  - More Pollution
- Benefits
  - Lower Construction Costs
  - Familiar



Public Opinion

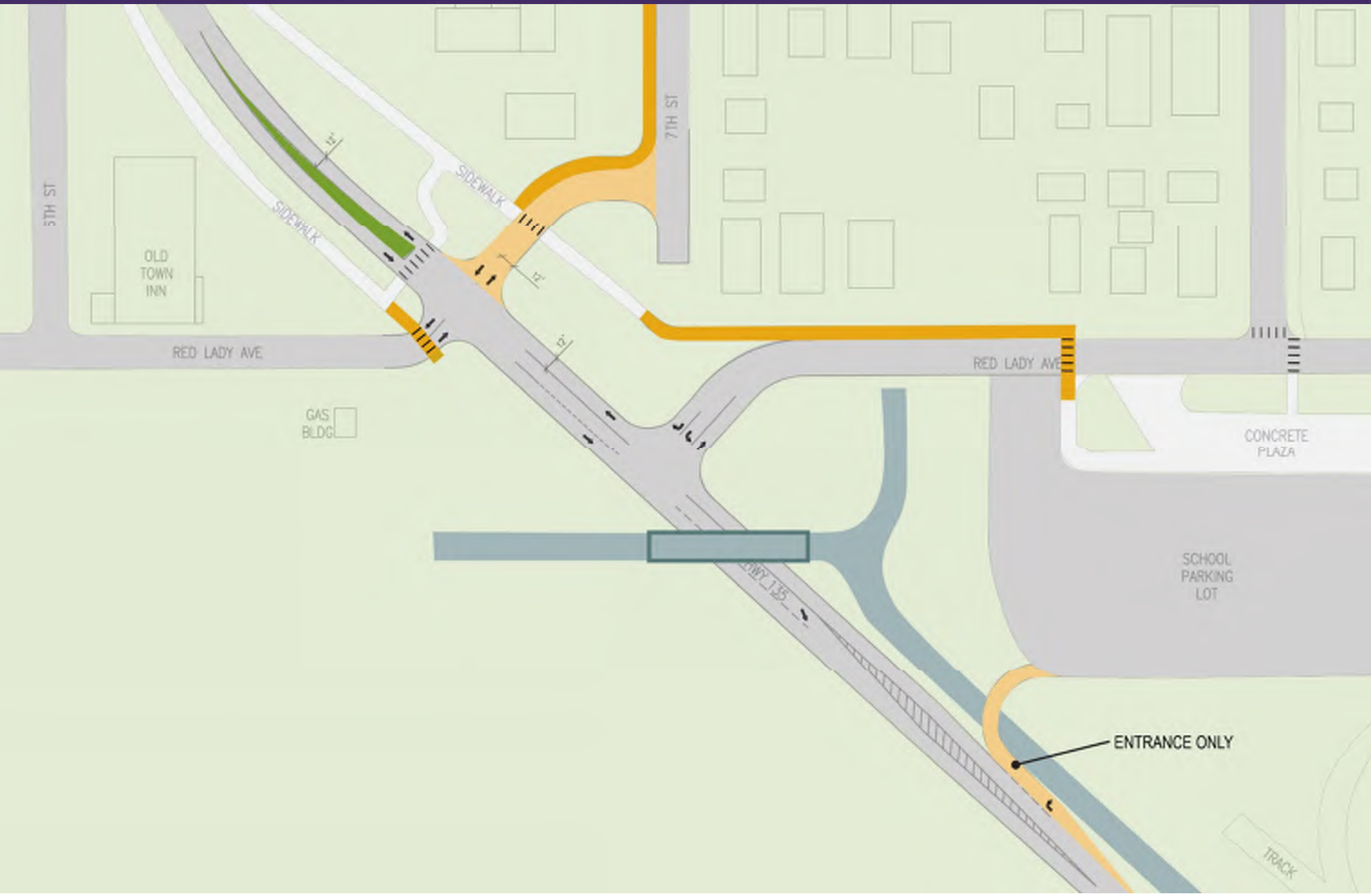
- Public Support of Roundabouts Before and After Construction

Full Movement Option

- Higher speeds
- Greater points of conflict
- Lack of an entrance to Town
- Wider pedestrian crossings
- Traffic light is the next upgrade to intersection
- Brings intersection dangerously close Pre-School

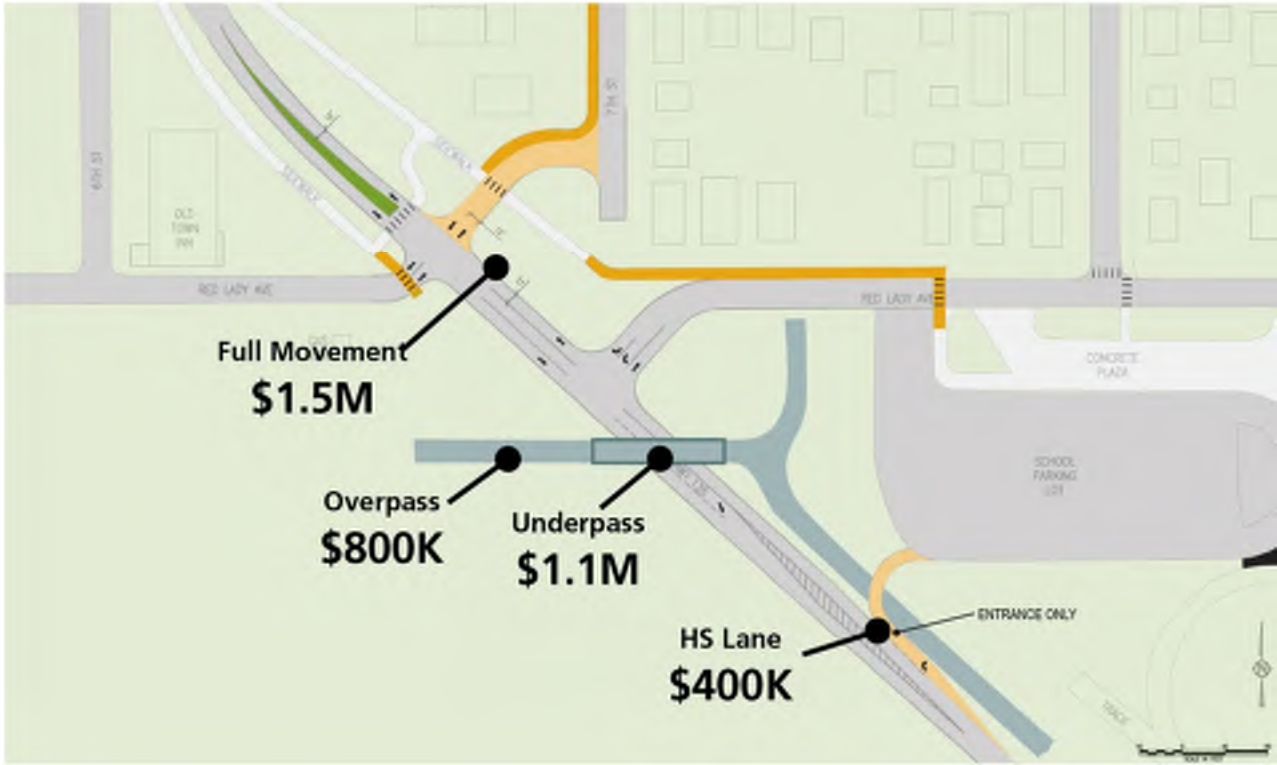
Overpass/Underpass for Roundabout

Overpass/Underpass for Full Movement



Cost

Roundabout
$2.1M
Overpass
$800K
Underpass
$1.1M
HS Lane
$400K
ENTRANCE ONLY
ONE WAY
RED LADY AVE
CONCRETE PLAZA
SCHOOL PARKING LOT


Full Movement
$1.5M
Overpass
$800K
Underpass
$1.1M
HS Lane
$400K
ENTRANCE ONLY
RED LADY AVE
CONCRETE PLAZA
SCHOOL PARKING LOT

Mill Levy Property Tax

- Funds pay for paving, maintenance, sidewalks, storm water, snow removal, equipment, projects and street signage
- Voter approved for up to 16 Mills
- Currently set at 8.00 which generates $698,000 per year
- Subject to Gallagher Amendment

Plans for the Mill Levy

- Every 5 years major street maintenance project paid for in Cash
- Next Major Street Maintenance Project 2017
- 1.2 Million needed to maintain what exists today
- 2015 and 2016 budgets provided an additional $78,000 to be put into reserves for major projects
- Next major project anticipated in 2019-2022
- Town could Bond major projects- requires voter approval and interest is paid on Bond
- Raising the mill could help provide future funding for larger projects

Funding (Town)

Mill Levy - Streets	7.50	7.50	7.50	7.50
Mill Levy - Transportation Plan Projects	1.00	1.50	2.50	3.00
Total Mill Levy	8.50	9.00	10.00	10.50
Revenue Generated for new transportation projects through 2020	$440,000	$620,000	$980,000	$1,160,000
Property Tax for full mill per $100,000 assessed valuation	$850.00	$900.00	$1,000.00	$1,500.00
Amount attributable to mill increase for new transportation projects per $100,000 assessed valuation	$100.00	$150.00	$250.00	$300.00
Gallagher Amendment dictates that commercial property be taxed at more than 3 times the residential rate				
Tax Example: $800,000 market value property				
Total Street & Transportation Mill Levy	8.50	9.00	10.00	10.50
Residential Tax	$541	$573	$636	$669
Commercial Tax	$1,972	$2,088	$2,320	$2,436
Amount attributable to mill increase for new transportation projects				
Residential Tax	$64	$96	$159	$191
Commercial Tax	232	$348	$580	$696
Tranportation Mill per $100,00 of Market Value				
Residential Tax	$8	$12	$20	$24
Commercial Tax	$29	$44	$73	$87

Outside Funding

- Project Located in CDOT Region 3
- In the Gunnison Valley Transportation Planning Region (“TPR”)
- State Transportation Improvement Program (“STIP”)
- Budget set every 4 years as projects are prioritized by the TPR
- Next available Budget 2020-2024
- Hope to Design in 2020 and Construct in 2022

JVA, Incorporated
1319 Spruce Street
Boulder, CO 80302
Ph: 303.444.1951
Fax: 303.444.1957

Job Name: Crested Butte Roundabout Alternatives
Job Number: 2387.2c
Date: 01/20/2016
By: JSP
Phase: Conceptual

Opinion of Probable Costs For
Town of Crested Butte - Conceptual Design for Oval Roundabout Option

	Quantity	Units	Unit Cost	Total
General Sitework				
Mobilization	1	LS	$100,000.00	$100,000.00
Demo Existing Asphalt and Concrete/Misc. Structures	32,000	SF	$3.00	$96,000.00
Clear and Grub	0.5	AC	$5,000.00	$2,500.00
Landscaping and Signage for Center of Roundabout	1	LS	$30,000.00	$30,000.00
Pavement Subgrade Prep - 12" Scarify,Recompact	1,700	CY	$2.00	$3,400.00
Cut, Fill and Compact Onsite Material	4,000	CY	$6.00	$24,000.00
Utility Relocate	1	LS	$200,000.00	$200,000.00
General Sitework - Roundabout Subtotal				**$455,900.00**
Roundabout - Pavements, Structures & Utilities				
Asphalt Paving - 10"	1,600	TONS	$130.00	$208,000.00
Concrete - 4" (flatwork, with fiber) at Roundabout & Trail Connection	24,000	SF	$8.50	$204,000.00
Concrete - 8" (Truck Apron)	4,500	SF	$15.00	$67,500.00
Signage and Striping	1	LS	$30,000.00	$30,000.00
Traffic Control Plan for Work in Street	1	LS	$50,000.00	$50,000.00
Roundabout - Pavements, Structures & Utilities Subtotal				**$559,500.00**
HS Access - Pavements, Structures & Utilities				
Asphalt Paving - 10"	225	TONS	$130.00	$29,250.00
Storm Culvert	1	LS	$30,000.00	$30,000.00
MSE Retaining Wall	2	LS	$100,000.00	$200,000.00
Guardrail	300	LF	$45.00	$13,500.00
Clear and Grub	0.3	AC	$5,000.00	$1,250.00
Pavement Subgrade Prep - 12" Scarify,Recompact	300	CY	$2.00	$600.00
Cut, Fill and Compact Onsite Material	600	CY	$6.00	$3,600.00
Signage and Striping	1	LS	$7,500.00	$7,500.00
Traffic Control Plan for Work in Street	1	LS	$20,000.00	$20,000.00
HS Access - Pavements, Structures & UtilitiesSubtotal				**$305,700.00**
Erosion Control				
Erosion Control Logs	1500	LF	$3.00	$4,500.00
Inlet/Culvert Protection	4	EA	$500.00	$2,000.00
Concrete Washout	2	EA	$1,500.00	$3,000.00
Vehicle Tracking Control	2	EA	$1,000.00	$2,000.00
Sedimentation Pond	1	EA	$3,000.00	$3,000.00
Seeding and Mulching	0.5	AC	$3,000.00	$1,500.00
Fuel Containment Area	1	EA	$2,000.00	$2,000.00
Erosion Control Maintenance (months)	6	EA	$1,000.00	$6,000.00
Erosion Control Subtotal				**$24,000.00**
			Subtotal	**$1,345,100.00**
			Contingency (20%)	$269,020.00
			Contractor's OH&P (15%)	$242,120.00
			Design, Engineering, and Surveying Fees (10%)	$185,625.00
			PROJECT TOTAL	**$2,041,865.00**

Engineer's opinions of probable Construction Cost provided for herein are to made on the basis of Engineer's experience and qualifications and represent Engineer's best judgment as an experienced and qualified professional generally familiar with the industry. However, since the Engineer has no control over the cost of labor, equipment, or services furnished by others, or over the Contractor's methods of determining prices, or over competitive bidding or market conditions, Engineer cannot and does not guarantee that proposals, bids, or actual Construction Cost will not vary from opinions of probable Construction Cost prepared by Engineer. Actual required quantities will vary from this estimate. Owner/Contractor to verify all required quantities and other estimate items, permits, fees, etc. not included above that may be specified in the Construction documents. If Owner wishes to greater

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Date: 01/20/2016
By: JSP
Phase: Conceptual

Opinion of Probable Costs For
Town of Crested Butte - Conceptual Design for Oval Roundabout Option w/ Overpass

	Quantity	Units	Unit Cost	Total
General Sitework				
Mobilization	1	LS	$100,000.00	$100,000.00
Demo Existing Asphalt and Concrete/Misc. Structures	32,000	SF	$3.00	$96,000.00
Clear and Grub	0.5	AC	$5,000.00	$2,500.00
Landscaping and Signage for Center of Roundabout	1	LS	$30,000.00	$30,000.00
Pavement Subgrade Prep - 12" Scarify,Recompact	1,700	CY	$2.00	$3,400.00
Cut, Fill and Compact Onsite Material	4,000	CY	$6.00	$24,000.00
Export Excess Cut	3,000	CY	$20.00	$60,000.00
			General Sitework Subtotal	**$315,900.00**
Roundabout - Pavements, Structures & Utilities				
Asphalt Paving - 10"	1,600	TONS	$130.00	$208,000.00
Concrete - 4" (flatwork, with fiber) at Roundabout & Trail Connect	24,000	SF	$8.50	$204,000.00
Concrete - 8" (Truck Apron)	4,500	SF	$15.00	$67,500.00
Signage and Striping	1	LS	$30,000.00	$30,000.00
Traffic Control Plan for Work in Street	1	LS	$50,000.00	$50,000.00
8' wide Pedestrian Bridge, 350' long, 20' high with railing	2,800	SF	$125.00	$350,000.00
4 Bridge Piers 40	4	EA	$50,000.00	$200,000.00
Support and Relocate Existing Utilities	1	LS	$200,000.00	$200,000.00
			Roundabout - Pavements, Structures & Utilities Subtotal	**$1,309,500.00**
HS Access - Pavements, Structures & Utilities				
Asphalt Paving - 10"	225	TONS	$130.00	$29,250.00
Storm Culvert	1	LS	$30,000.00	$30,000.00
MSE Retaining Wall	2	LS	$100,000.00	$200,000.00
Guardrail	300	LF	$45.00	$13,500.00
Clear and Grub	0.3	AC	$5,000.00	$1,250.00
Pavement Subgrade Prep - 12" Scarify,Recompact	300	CY	$2.00	$600.00
Cut, Fill and Compact Onsite Material	600	CY	$6.00	$3,600.00
Signage and Striping	1	LS	$7,500.00	$7,500.00
Traffic Control Plan for Work in Street	1	LS	$20,000.00	$20,000.00
			HS Access - Pavements, Structures & Utilities Subtotal	**$305,700.00**
Erosion Control				
Erosion Control Logs	1500	LF	$3.00	$4,500.00
Inlet/Culvert Protection	4	EA	$500.00	$2,000.00
Concrete Washout	2	EA	$1,500.00	$3,000.00
Vehicle Tracking Control	2	EA	$1,000.00	$2,000.00
Sedimentation Pond	1	EA	$3,000.00	$3,000.00
Seeding and Mulching	0.5	AC	$3,000.00	$1,500.00
Fuel Containment Area	1	EA	$2,000.00	$2,000.00
Erosion Control Maintenance (months)	6	EA	$1,000.00	$6,000.00
			Erosion Control Subtotal	**$24,000.00**
			Subtotal	**$1,955,100.00**
			Contingency (20%)	$391,020.00
			Contractor's OH&P (15%)	$351,920.00
			Design, Engineering, and Surveying Fees (10%)	$269,805.00
			PROJECT TOTAL	**$2,967,845.00**

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Landscaping and Signage for Center of Roundabout	1	LS	$30,000.00	$30,000.00
Pavement Subgrade Prep - 12" Scarify,Recompact	1,700	CY	$2.00	$3,400.00
Cut, Fill and Compact Onsite Material	4,000	CY	$6.00	$24,000.00
Export Excess Cut	3,000	CY	$20.00	$60,000.00
			General Sitework - Roundabout Subtotal	**$315,900.00**
Roundabout - Pavements, Structures & Utilities				
Asphalt Paving - 10"	1,600	TONS	$130.00	$208,000.00
Concrete - 4" (flatwork, with fiber) at Roundabout & Trail Connection	24,000	SF	$8.50	$204,000.00
Concrete - 8" (Truck Apron)	4,500	SF	$15.00	$67,500.00
Signage and Striping	1	LS	$30,000.00	$30,000.00
Traffic Control Plan for Work in Street	1	LS	$50,000.00	$50,000.00
8x8 Pedestrian Underpass	350	LF	$2,000.00	$700,000.00
Support and Relocate Existing Utilities	1	LS	$600,000.00	$600,000.00
			Roundabout - Pavements, Structures & Utilities Subtotal	**$1,859,500.00**
HS Access - Pavements, Structures & Utilities				
Asphalt Paving - 10"	225	TONS	$130.00	$29,250.00
Storm Culvert	1	LS	$30,000.00	$30,000.00
MSE Retaining Wall	2	LS	$100,000.00	$200,000.00
Guardrail	300	LF	$45.00	$13,500.00
Clear and Grub	0.3	AC	$5,000.00	$1,250.00
Pavement Subgrade Prep - 12" Scarify,Recompact	300	CY	$2.00	$600.00
Cut, Fill and Compact Onsite Material	600	CY	$6.00	$3,600.00
Signage and Striping	1	LS	$7,500.00	$7,500.00
Traffic Control Plan for Work in Street	1	LS	$20,000.00	$20,000.00
			HS Access - Pavements, Structures & UtilitiesSubtotal	**$305,700.00**
Erosion Control				
Erosion Control Logs	1500	LF	$3.00	$4,500.00
Inlet/Culvert Protection	4	EA	$500.00	$2,000.00
Concrete Washout	2	EA	$1,500.00	$3,000.00
Vehicle Tracking Control	2	EA	$1,000.00	$2,000.00
Sedimentation Pond	1	EA	$3,000.00	$3,000.00
Seeding and Mulching	0.5	AC	$3,000.00	$1,500.00
Fuel Containment Area	1	EA	$2,000.00	$2,000.00
Erosion Control Maintenance (months)	6	EA	$1,000.00	$6,000.00
			Erosion Control Subtotal	**$24,000.00**
			Subtotal	**$2,505,100.00**
			Contingency (20%)	$501,020.00
			Contractor's OH&P (15%)	$450,920.00
			Design, Engineering, and Surveying Fees (10%)	$345,705.00
			PROJECT TOTAL	**$3,802,745.00**

Engineer's opinions of probable Construction Cost provided for herein are to made on the basis of Engineer's experience and qualifications and represent Engineer's best judgment as an experienced and qualified professional generally familiar with the industry. However, since the Engineer has no control over the cost of labor, equipment, or services furnished by others, or over the Contractor's methods of determining prices, or over competitive bidding or market conditions, Engineer cannot and does not guarantee that proposals, bids, or actual Construction Cost will not vary from opinions of probable Construction Cost prepared by Engineer. Actual required quantities will vary from this estimate. Owner/Contractor to verify all required quantities and other estimate items, permits, fees, etc. not included above that may be specified in the Construction documents. If Owner wishes to greater assurance as to probable Construction Cost, Owner shall employ an independent cost estimator.