

October 4, 2019

Mr. Curtis B. Miller
Transmission Siting and Environmental Planner
Tri-State Generation and Transmission Association, Inc.
1100 W. 116th Ave.
Westminster, CO 80234

Re: **Traffic Memorandum**
Vollmer Transmission Line and Substation Project, El Paso County, Colorado

Dear Mr. Miller,

The purpose of this Traffic Memorandum is to analyze and document the traffic impacts of the proposed Vollmer Transmission Line and Substation Project (Project). Tri-State Generation and Transmission Association Inc. (Tri-State), in cooperation with member distribution cooperative Mountain View Electric Association (MVEA), is proposing to construct a new 115-kilovolt (kV) transmission line and a new 115/12.5kV substation (Vollmer Substation) near Falcon in El Paso County, Colorado. Collectively, the new transmission line and substation comprise the proposed Project. The Vollmer Substation will be located about 1 mile north of East Woodmen Road and about 0.7 mile east of the northern terminus of Mohawk Road (attached as Figure 1). The Project transmission line (Vollmer to Vollmer Tap 115kV transmission line) will tap Tri-State's existing Black Squirrel to Fuller 115kV transmission line, which is located a short distance east of the terminus of Falcon Meadows Boulevard, travels approximately 1.35 miles west within a 100-foot-wide right-of-way before terminating at the Vollmer Substation. No access currently exists to the Project area, but a new 0.7-mile temporary private access drive will be constructed within a 50-foot-wide easement beginning at the northern terminus of Mohawk Road and extending east to the Vollmer Substation site as part of Project construction. Tetra Tech prepared this Traffic Memorandum to analyze the peak construction traffic for the Project.

Project Construction Traffic Trip Generation

Construction Schedule and Activities

Tri-State and MVEA are currently working on Project permitting activities and final design of the proposed Project facilities. Construction is scheduled to begin approximately 12 to 15 months after an approval has been received through El Paso County's Areas and Activities of State Interest (1041) review process. Construction of Vollmer Substation is estimated to take 4 to 6 months to complete from contractor mobilization to energization, and construction of the transmission line is estimated to take 3 to 4 months. For this analysis, it was assumed that construction of the substation and transmission line will occur at the same time. The typical construction workday will see most workers arriving and departing during a common peak hour. The standard construction hours are anticipated to be 7:00 am to 7:00 pm. Most workers will arrive between 6:00 am and 7:00 am and depart between 6:00 pm and 7:00 pm at the construction sites. Construction will be limited to daylight hours.

Project construction will generally include the following activities. Activities may vary based on construction phasing.

Substation Construction	Transmission Line Construction
<ul style="list-style-type: none"> • Mobilization • Site preparation—clearing, grading, and staging area setup • Construction <ul style="list-style-type: none"> ○ Access drive ○ Fencing ○ Equipment and material delivery ○ Foundations ○ Structures ○ Electrical equipment delivery and installation ○ Final grading and surfacing ○ Testing and commissioning of electrical equipment • Landscaping • Energization • Cleanup and demobilization 	<ul style="list-style-type: none"> • Mobilization • Site preparation—staging area setup • Construction <ul style="list-style-type: none"> ○ Foundations ○ Transmission line structure delivery, erection, and installation ○ Stringing of conductor and static wire • Testing and commissioning • Energization • Cleanup and demobilization

Haul Routes

Project traffic will include a combination of construction equipment, material delivery vehicles, construction workers, and job site personnel. Construction traffic will access the Vollmer Substation primarily from North Powers Boulevard and U.S. Highway 24 to Mohawk Road by way of East Woodmen Road. Similarly, primary access for traffic during construction of the transmission line will be from North Powers Boulevard and U.S. Highway 24 by way of East Woodmen Road. Direct access to the transmission line will be via Golden Sage Road to Woodman Frontage Road and then left onto Falcon Meadows Boulevard. The Project traffic distribution between North Powers Boulevard and U.S. Highway 24 was assumed to be about equal. A map illustrating the location of the Project and construction vehicle haul routes is attached as Figure 2.

Haul Route Road Classification

East Woodmen Road is classified as an expressway with four east-west through lanes. According to Map 6: Existing Capacity Analysis of the *El Paso County 2016 Major Transportation Corridors Plan Update*,¹ East Woodmen Road is considered “congesting” with about 22,000 vehicles per day (vpd), Map 5: Existing Traffic Volumes. At the intersection of East Woodmen

¹ <https://publicworks.elpasoco.com/wp-content/uploads/Documents/MTCP-Adopted-Report-12-6-2016.pdf>

Road with Mohawk Road, there are single dedicated turn lanes in each direction. Mohawk Road has a left turn lane and a combined right turn and through lane dedicated to traffic accessing East Woodman Road. On the south leg of the intersection, all three movements share one lane. The intersection is signalized with a simple two-phase traffic signal. A two-phase traffic signal has one green phase for the major street and one green phase for the minor street, and left turn movements are not given a protected phase. The Golden Sage Road and East Woodmen Road intersection that will provide access for transmission line construction traffic is a signalized intersection with dedicated left and right turn lanes. The Woodmen Frontage Road can serve as a secondary access between Mohawk Road and Falcon Meadows Boulevard for local traffic. Mohawk Road and Falcon Meadows Boulevard terminate about 0.9 mile north of their intersection with the Woodman Frontage Road; however, there is no connection between these roads at their terminus. Presently, Mohawk Road and Falcon Meadows Boulevard serve as primary access for small large-lot residential communities north of East Woodmen Road.

Construction Traffic Estimates

The Institute of Transportation Engineers (ITE) *Trip Generation Manual, 10th Edition* does not address values for the construction of a substation or high voltage electric transmission line. The estimates for Project duration, number of workers and vehicles, quantity of materials and equipment, and number of deliveries required to construct the proposed Project was provided by Tri-State and is based on their prior experience constructing substations and transmission lines (see Figure 3 - Project Construction Vehicle Table). Utilizing the estimates, it is anticipated that peak construction traffic (one-month duration) will be less than 80 vehicle round trips per day. Only 26 to 32 vehicles are expected during peak hours.

A commonly used measure of the performance of a roadway or intersection is level of service (LOS). Roadway LOS is measured on a scale from A to F, where "A" represents the best operations with no congestion. LOS "F" represents poor LOS with severe congestion. LOS is reported for the peak hour of a roadway, the "peak hour" representing a morning or afternoon commuting rush hour. According to the *2016 Major Transportation Corridors Plan Update*, El Paso County's goal is to maintain LOS D or better on each roadway segment. Since East Woodmen Road experiences about 22,000 vpd, the *Highway Capacity Manual, 6th Edition* guidelines estimate that 2,200 of those vehicles will be peak-hour vehicles, or around 550 vehicles per lane per hour. Project construction traffic will be considerably less than the confidence interval of the estimated traffic values. There is an uncertainty of at least +/- 50 peak-hour vehicles on East Woodmen Road.

Mohawk Road provides access to about 23 single-family homes situated on large lots along Mohawk Road. To address the number of daily trips associated with single-family homes, the analysis made use of data from the ITE *Trip Generation Manual*. 9.44 trips per day is a generally accepted estimate per single-family home. This amounts to an estimated 217 one-way trips per day on Mohawk Road. The intersection with East Woodmen Road will see around double that number because of additional traffic from the Woodmen Frontage Road, an estimated 435 one-way trips per day, or approximately 44 trips during peak hour. The number of vehicles that

could utilize the minor leg of the intersection in an hour on a green light from Mohawk Road was estimated to be about 450. A similar number could make the turn onto Mohawk Road. Thus, Mohawk Road and the intersection turning movements entering and exiting East Woodmen Road are underutilized. The intersection is at roughly 10% capacity and is capable of accommodating Project vehicles. Based on the analysis conducted, Project construction traffic will be an insignificant and negligible addition to existing traffic and will have no substantive influence on the East Woodmen Road LOS. The LOS at the intersection with Mohawk Road was estimated to be "C", which will be better than the acceptable LOS D for urban signalized intersections. Project vehicle traffic will not change the LOS for this intersection.

Transmission line construction traffic will utilize both Mohawk Road and Falcon Meadows Boulevard (see Figure 2). Construction traffic will access Falcon Meadows Boulevard by exiting East Woodmen Road onto Golden Sage Road, turn right (east) onto the Woodmen Frontage Road, and then travel less than 1,000 feet to Falcon Meadows Boulevard. Traffic volume on Falcon Meadows Boulevard provides access to about 68 single-family homes situated on large lots along and west of Falcon Meadows Boulevard. Using the estimate of 9.44 trips per day per single-family home equals about 642 one-way trips per day. There are also about 50 homes a little over 0.5 mile east of Falcon Meadows that will also use the Golden Sage Road and East Woodmen Road intersection by way of the Woodmen Frontage Road. The addition of trips associated with these homes will increase the number of trips to 1,114 one-way trips per day, which will be about 110 trips during peak hour. The intersection minor leg can service roughly the same number of vehicles as Mohawk Road (450 per hour). The Golden Sage Road and East Woodmen Road intersection will have less construction traffic than the East Woodman Road and Mohawk Road intersection since it will only be utilized for transmission line construction vehicles. Delays for vehicles turning left from East Woodman Road onto Golden Sage Road may occur due to the amount of through traffic on East Woodmen Road, but no more than three construction vehicles are anticipated to use this movement during peak hours.

Operational Traffic Trip Generation

After the Project has been constructed and placed in service, traffic impacts from operations are not expected because the substation and electric transmission line are passive uses and will not generate trips in excess of those occasionally needed for maintenance or emergencies. The substation will not be staffed, and the only vehicles entering and exiting the site on a monthly basis will be related to maintenance.

Based on the analysis conducted, Tetra Tech believes the Project construction traffic will be incorporated into the existing roadway network without noticeable impact. The results of our analysis are as follows:

- The added Project construction traffic will be less than typical daily fluctuations in traffic volume and represents no measurable impact to streets and intersections.
- It is anticipated that construction activities will neither block roadways nor impede daily traffic volume due to the location of the Project and the proposed type of construction.

- Vehicles associated with maintaining the substation and the transmission line are generally pickup trucks or an occasional bucket truck and will have a negligible impact to transportation infrastructure. Such vehicles will likely only access the Project site on a monthly basis.

In conclusion, Tetra Tech does not recommend any changes to the roadway configurations. Tetra Tech further concludes that short-term construction impacts to local infrastructure will be minimal, and long-term operations impacts will be negligible. If you have any questions or require any additional information, please do not hesitate to contact me at (303) 980-3549.

Sincerely,

TETRA TECH, INCORPORATED



Perry Patton, P.E.
Project Civil Engineer



Eric Mathers, E.I.
Civil Engineer I

Attachments

Figure 1—Vicinity Map

Figure 2—Haul Route

Figure 3—Project Construction Vehicle Table
Site Plan

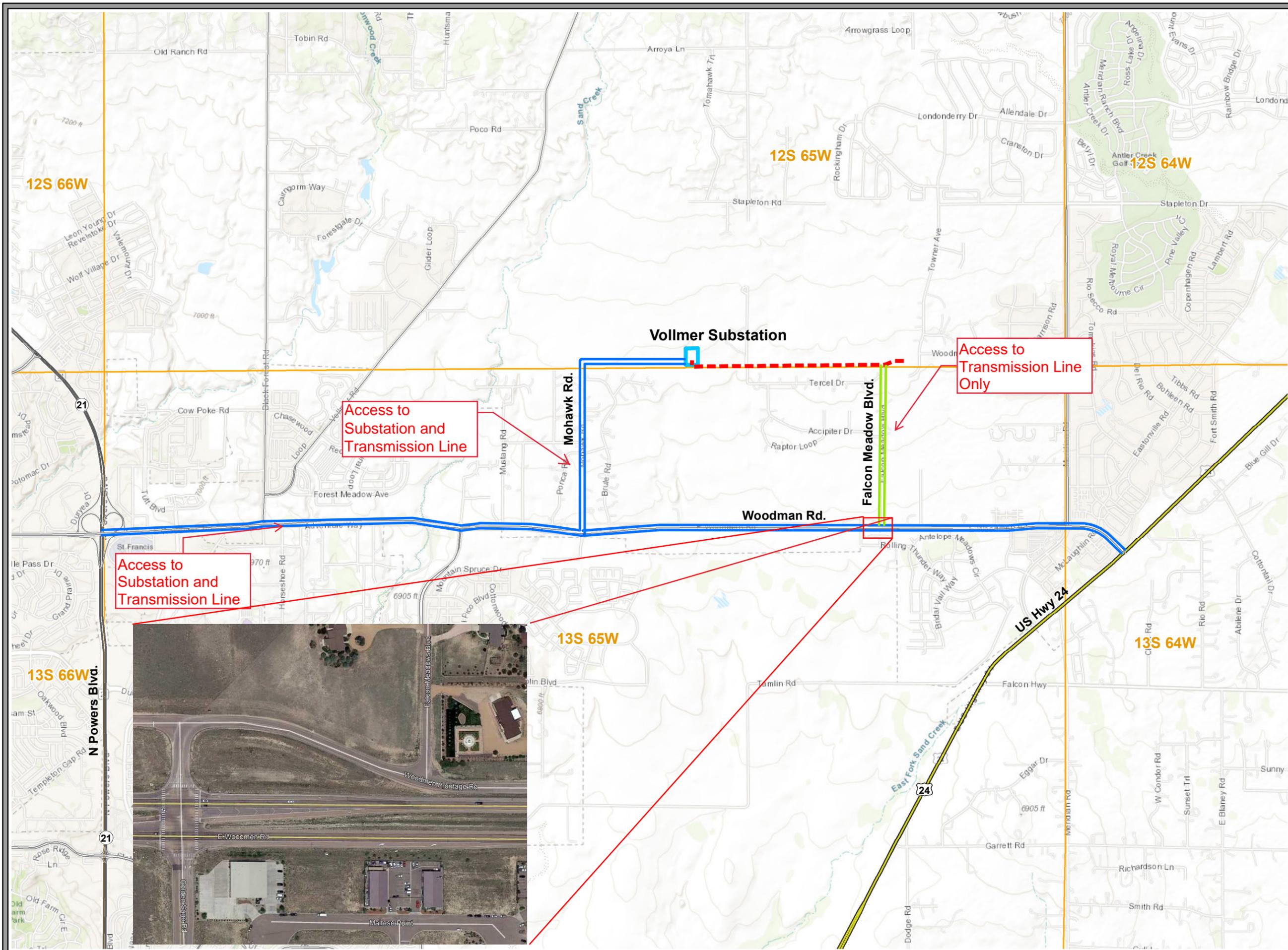
Haul Route Map

Vollmer Substation and Transmission Line

Haul Routes

- Substation & Transmission Line
- Transmission Line

- Proposed Transmission Line
- Vollmer Substation Property
- Township/Range



Access to Substation and Transmission Line

Access to Transmission Line Only

Access to Substation and Transmission Line

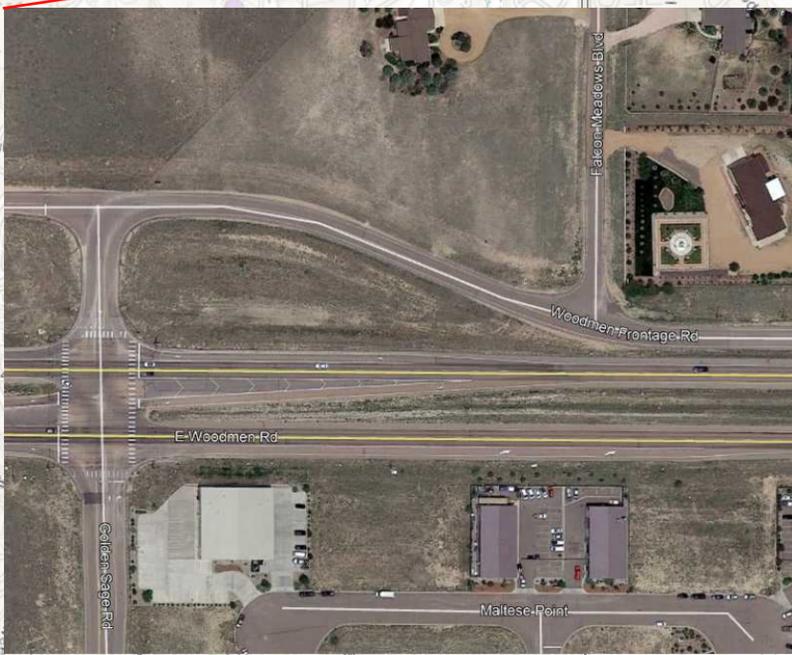
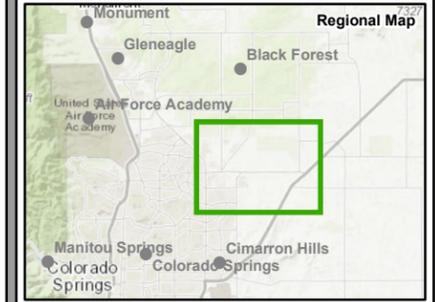


Figure 2



This map includes confidential information of Tri-State and third parties. The GIS data and maps may not be disclosed to any third party. The user agrees to keep this information confidential and not disclose it to third parties. If you have any questions regarding this, please contact the Tri-State legal department. GIS data and maps available to Tri-State Generation and Transmission Association employees are provided as general information to aid Tri-State transmission maintenance. No user of Tri-State's GIS data and maps may sell any portion of the information provided therein. Tri-State makes no warranty regarding accuracy or completeness of the data and maps. Users shall rely only upon proper



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Figure 3 - Project Construction Vehicle Table

Substation Construction

Activity	Equipment	Round Trip Counts	Duration on Site	VPD	Peak Hr. Trips
Site Preparations	Bulldozers /Excavators	1	8 weeks	3.5	2
	Grader	1			
	Water truck	1/day for 8 weeks			
	Backhoe	1			
	Pick-up trucks	2/day for 8 weeks (80)			
	Bobcat	1			
Foundations/ Materials delivery	Tractor trailers	4/day for 3 weeks then 2/day for 5 weeks (110 trips)	12 weeks	8	3
	Pressure digger	1			
	Pick-up trucks	2/day for 12 weeks (120)			
	Concrete truck	4/day for 3 weeks (60)			
Structure Assembly and Wiring	Bucket trucks	1	12 weeks	4	3
	Boom truck	1			
	Man lift	1			
	Crane	1			
	Pick-up trucks	3/day for 12 weeks (180)			
	Transformers Via tractor trailer	1			

Transmission Line Construction

Activity	Equipment	Round Trip Counts	Duration on Site	ADT	Peak Hr. Trips
Material delivery	foreman pickup	1-3 per day	1 week	7	4
	line crew trucks	2-6 per day			
	dump truck	1			
	tractor/trailer	1- per day			
	skidsteer	1			
Structure Assembly and Erection	bucket trucks	1	1 week	6	4
	digger trucks	1			
	skidsteers	1			
	foreman pickups	1-3 per day			
	backhoe	1			
	line crew trucks	2-6 per day			
	tractor/trailers	1			
Wire Installation	puller	1	1 week	4	3
	line crew trucks	2-6 per day			
	tensioner	1			
Cleanup	skidsteer	1	1 week	5	3
	tractor trailer	1			
	foreman pickup	1-3 per day			
	line crew trucks	2-6 per day			

NOTE: Transmission line construction is assumed to occur at the same time as the substation construction.

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Road Condition Assessment

(Under Development—Forthcoming)

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