Report

Teanaway Solar Reserve Transportation Road Plan Kittitas County, Washington

Prepared for

Teanaway Solar Reserve, LLC

February 2010

Prepared by

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Printed on Recycled and Recyclable Paper

Contents

1.0 Existing Conditions

1.1 Roadway Network

Transporter routes are assumed to carry the majority of construction-related vehicles, including solar component delivery vehicles, water trucks, and the majority of workforce traffic. Figure 1, Vicinity Map (provided in Appendix A) shows the major state highways serving the project. Figure 2, Site Access Map, shows the proposed access route from the major highway to the project site via local and county roadways.

Site access for construction-related vehicles will access the project site primarily from Interstate 90 (I-90) eastbound to Highway 970 northbound at Exit 85. From Highway 970 northbound, the access route would continue to Red Bridge Road (also known as Masterson Road), which is a local County roadway. From Red Bridge Road, project traffic will likely take Wiehl Road northbound for approximately 0.2 mile to Loping Lane, where traffic would turn left and continue westbound on Loping Lane to the project site as shown in Figure 2. Wiehl Road is a county road that is privately maintained. Loping Lane is a private road.

From Loping Lane, project traffic may use existing private roads to access the actual project site, or they may use new proposed maintenance roads constructed as part of this project. These project site roadways are shown in Figure 3, Proposed Site Layout.

Use of these roads would depend on weather conditions and load and size restrictions. Table 1 describes the roads that would directly access the project corridor or provide a critical regional transportation link to the project corridor.

TABLE 1
Key Roads Providing Access to the Project Site

Facility	Description
I-90	I-90 within the vicinity of the project is classified as a rural interstate roadway with rolling terrain, according to the Washington State Department of Transportation (WSDOT) road classification system. This roadway has two lanes in each direction, and has a posted speed limit of 70 miles per hour (mph) outside city limits. I-90 is anticipated to be the major haul route from Seattle, Washington.
Highway 970	Highway 970 begins in Cle Elum, Washington, where the speed limit is posted at 55 mph inside city limits. It continues eastbound and then northbound as a two-lane road with a posted speed limit of 60 mph. This facility is classified as a rural principal arterial with level terrain, according to the WSDOT road classification system. This rural principal arterial would provide the main access between the Interstate and local county roadways serving the project area.
Red Bridge Road	Red Bridge Road (also known as Masterson Road) is a paved two-lane road with a posted speed limit of 25 mph. It is classified by Kittitas County as a rural local-access road. This roadway, south of the intersection with Wiehl Road, will serve as the main connection between the state highway facility and private access roads. Construction-related traffic, especially truck traffic, will not be permitted to access the site by using Red Bridge Road north of the intersection with Wiehl Road.
Wiehl Road	Wiehl Road is an unpaved two-lane privately maintained roadway without a posted speed limit. It is within the public right-of-way, but is not maintained by Kittitas County. This rural privately maintained roadway likely experiences very little daily traffic, and likely will be able to provide access to the project site without impacting existing traffic operations.

TABLE 1
Key Roads Providing Access to the Project Site

Facility	Description
Loping Lane	Loping Lane is an unpaved two-lane private road without a posted speed limit. It is a private roadway, and is not maintained by Kittitas County. This rural private roadway likely experiences very little daily traffic, and likely will be able to provide access to the project site without impacting existing traffic operations.

1.2 Traffic Volumes

To evaluate the possible impacts resulting from traffic associated with the construction and operation of the proposed solar facility, the analysts obtained traffic volumes for state highways that are part of the expected construction transportation route. The study team consulted WSDOT and Kittitas County for traffic volumes and roadway characteristics.

Table 2 shows the average daily traffic (ADT) volumes between 2005 and 2008, the roadway functional classifications, the jurisdiction, and estimated truck percentages on state-maintained roadways in the study area. These volumes are based on available traffic data in an Annual Traffic Report published by the WSDOT. The 2008 WSDOT *Annual Traffic Report* provides annual traffic volumes for at least the last 4 years.

Traffic data along Red Bridge Road was provided by Kittitas County. No traffic data are available for Wiehl Road or Loping Lane because they are privately maintained, and are not monitored or maintained by the County.

All other applicable roadways within the project area are also likely to be privately owned local facilities serving rural traffic only. These roads typically do not have posted speed limits, and ADT volumes are likely not available for these locations.

TABLE 2
Average Daily Traffic (ADT) Volumes, Roadway Functional Classifications, and Estimated Percentage of Trucks

Roadway	State/ Jurisdiction	Functional Classification	2005 ADT	2006 ADT	2007 ADT	2008 ADT	Estimated Truck %
I-90 (MP 82.70)[a]	WSDOT	Rural Interstate	27,000	27,000	28,000	27,000	23
I-90 (MP 84.61)[a]	WSDOT	Rural Interstate	24,000	25,000	27,000	25,000	N/A
I-90 (MP 86.18)[a]	WSDOT	Rural Interstate	24,000	25,000	26,000	24,000	N/A
Highway 970 (MP 2.69 west of SR 10)	WSDOT	Rural Principal Arterial	5,600	5,800	5,800	5,400	N/A
Highway 970 (MP 2.69 east of SR 10)	WSDOT	Rural Principal Arterial	4,700	4,900	4,800	4,500	N/A
Red Bridge Road (MP 0.25)[b]	Kittitas County	Rural Local Access	260	230	250	200	N/A
Wiehl Road	Private	N/A	N/A	N/A	N/A	N/A	N/A
Loping Lane	Private	N/A	N/A	N/A	N/A	N/A	N/A

[a] WSDOT, *Annual Traffic Report*, 2008.
[b] Personal communication with Christina Wollman, Kittitas County, 2009.
N/A = Information not available

1.3 Roadway Restrictions and Limitations

The state highway system (I-90, Highway 970) is constructed to safely accommodate trucks with the designed load-bearing standards. These roadways are able to accommodate vehicles at the legal load limit, thereby reducing the potential for significant traffic safety and maintenance impacts.

There is, however, one permanent load restriction on I-90 between Seattle and the project site. This restriction prohibits loads taller than 16 feet-2 inches from entering the snow shed near Hyak (MP 54-62 on westbound I-90). This restriction is not anticipated to affect truck- and construction-related-traffic since any project related trucks would be empty (no loads) heading westbound. Construction vehicles are expected to be legal size and legal weight for Washington highways, therefore, no special permitting for transport of materials and equipment should be necessary. There are no permanent restrictions on Highway 970 in the vicinity of the project site.

Kittitas County Code 10.28 "Seasonal Weight Restrictions" specifies load and weight restrictions on Kittitas County roads during load sensitive periods. These include any weather conditions that could affect traffic on county roads, such as ice, snow, fog, etc. It also authorizes the director of public works to issue emergency permits for the operation of vehicles exceeding the allowable gross load.

It is not anticipated that seasonal traffic will have any effect on public use of the roadways utilized during construction because of the rural location of the project site. However, if seasonal traffic or other special events possibly may affect traffic, the issue will be addressed as necessary.

1.4 Existing Roadway Level of Service

To analyze traffic conditions, average daily traffic data from WSDOT were used to determine a level of service (LOS) for each of the state roadway segments on the proposed transporter route. LOS is a qualitative measure describing operational conditions in a traffic stream, and motorists' or passengers' perceptions of those conditions. There are six LOS classifications, each given a letter designation from A to F. LOS A represents the best operating conditions and LOS F represents the worst. An estimate of 10 percent of the ADT volume is used to determine the peak hour volumes for state highways.

Table 3 presents the existing LOS for the proposed transporter roads. LOS is based on the methodology in the most current Highway Capacity Manual (HCM) (Transportation Research Board, 2000). The ADT represents the estimated 2008 daily volumes in both directions of travel.

TABLE 3
Existing Level of Service on Proposed Transporter Roads

Roadway	Functional Classification	Number of Lanes	2008 ADT	2008 Peak Hour Volume	2008 Peak Hour LOS
I-90 (MP 84.61)	Rural Interstate	Rural Interstate	25,000	2,500	B
I-90 (MP 86.18)	Rural Interstate	Rural Interstate	24,000	2,400	B
Highway 970 (MP 2.69 west of SR 10)	Rural Principal Arterial	Rural Principal Arterial	5,400	540	C
Highway 970 (MP 2.69 east of SR 10)	Rural Principal Arterial	Rural Principal Arterial	4,500	450	C

Source: WSDOT, *Annual Traffic Report*, 2008.

The LOS ratings for the current state roadways surrounding the proposed project site are LOS C or better. This LOS represents generally smooth traffic operating conditions with occasional delays. With LOS C, individual users feel generally unrestricted by the presence of others in the traffic stream.

1.5 Safety

At the intersection of Highway 970 and Red Bridge Road, eastbound traffic is in a vertical curve. Approaching this intersection, vehicles may have difficulties seeing oncoming or turning traffic from Red Bridge Road due to a slight crest in the road. The posted speed limit is 60 mph, but vehicles often travel at higher speeds. There is no significant crash history at this existing location, but WSDOT has indicated that an eastbound left turn lane could be beneficial. This separate turn lane would allow vehicles to slow down while waiting for a gap in westbound traffic without impeding through traffic. (Source: Personal communication with Rick Holmstrom/WSDOT, January 21, 2010)

1.6 Public Transportation

The project site is not currently served by public transit. The nearest public transportation system is in Ellensburg, Washington. Central Transit is a general public transportation system that operates a fixed route serving mainly Central Washington University. It

includes bus stops, operates on a schedule, and does not require advance reservations. It is operated by HopeSource. (Source: *Kittitas County Long Range Transportation Plan*, 2008)

1.7 Air, Rail, Waterborne Traffic

There are no regional or municipal airports in the vicinity of the project site. The nearest airport is Kittitas County Airport (Bowers Field), approximately 1.5 miles north of the City of Ellensburg. The Kittitas County Airport (Bowers Field) does not have scheduled air service, and none of the equipment or materials necessary for project operations or construction will be transported by air.

Burlington Northern operates an active rail main line between Auburn and the Tri-Cities over Stampede Pass, passing through Ellensburg. Approximately 4 to 10 trains traverse the route daily. No project related equipment or materials will be transported by rail to the project site.

The Ports of Pasco, Benton, and Kennewick operate on the Columbia River over 100 miles southeast of the project site. Grain is the major commodity using barge transportation on this stretch of the river. It is not anticipated that any of the equipment or materials necessary for operations or construction will be transported by barge or ship.

2.0 Impacts during Construction

2.1 Truck Traffic Volumes

Transport of major equipment and materials to the site for construction would likely span seven to nine months for each of two or three construction seasons (over 3 consecutive years). During construction, a number of trucks will be accessing the site on the proposed transporter route. Trucks will be carrying equipment and components for the construction and operation of the proposed solar facility that cannot be produced onsite. Trucks will also be needed to provide operation services such as delivering water to the site for fugitive dust control during road construction or for grading improvements. Trucks are not expected to exceed the legal load limits for the roads along the transporter route. If a load in excess of load limits is expected, the appropriate permits will be obtained and fees paid.

All solar panels necessary for the reserve will be trucked to the site. It is estimated that the project will require up to 450 trucks to bring in the solar panels. An estimated 800 trucks would be necessary to deliver structural supports and other materials for the solar module foundations. Concrete will be necessary for up to 80 inverter stations. Concrete will also be necessary for control buildings and maintenance building onsite, as well as support structure foundations. Assuming transport trucks have a capacity of 10 cubic yards of concrete, approximately 175 truckloads of concrete could be expected through the construction period.

Gravel and water for the project will be sourced in the Cle Elum area to the extent possible. Gravel will be used mainly for surfacing of the maintenance roads and access roads. Assuming Wiehl Road and Loping Lane will be improved with gravel, approximately 3,600 cubic yards of the material (360 trucks) would be necessary. Approximately

18,650 cubic yards (1,865 trucks) would be necessary for new or improved maintenance roads onsite. A total of approximately 2,225 trucks could be necessary for import of gravel.

Water will be used for fugitive dust control. Quantities for water required for onsite activities are being determined.

Prior to the transport of solar materials and equipment, the site will require clearing to address the potential for damage from blown down trees. To clear the site for installing the project, trees will be harvested within the project area on an as-needed basis. Construction equipment such as tractors, backhoes, loaders, dozers, and graders will also be needed to clear brush and vegetation from the site as needed, and to grade roads and foundation locations. Assuming cleared or excavated material will be hauled off-site, approximately 950 trucks could be necessary for removal of this material.

TABLE 4
Approximate Construction Truck Quantities

Item	Quantity	Unit	Number of Trucks [a]
Solar Panels	450	Shipping Container	450
Solar Panel Structural Supports/Mounting	N/A	N/A	800
Concrete	1,750	Cubic Yard	175
Gravel	22,250	Cubic Yard	2,225
Water	TBD	TBD	TBD
Clearing/Grading	9,500	Cubic Yard	950

[a] Number of trucks expected over the course of construction (two or three seasons)
Note: Quantities for water, and clearing and grading are still being determined.

Approximately 7- to 9-month construction seasons are expected for 2 or 3 consecutive years. A total of approximately 4,600 trucks would be expected over the course of construction. This estimate does not include trucks for water.

To conservatively estimate truck traffic impacts, these trips could be assumed to arrive during two construction seasons of 7 months each. Assuming 20 workdays per construction month, and truck deliveries occur between 7 a.m. and 7 p.m. on weekdays only, this would produce approximately 17 daily trucks. This will equate to a maximum of 34 trips per day (17 trucks with one inbound trip and one outbound trip) added to background traffic patterns during the peak of construction.

However, this estimate is conservative because actual truck deliveries would likely be spread over three construction seasons, and not all types of construction activities could occur at the same time. A more reasonable estimate of average daily truck traffic to the site is calculated by spreading the total truck traffic out over three construction seasons of approximately 9 months each. Using the same assumptions as above (20 workdays per construction month), the project is expected to generate approximately 9 trucks per day, or 18 truck trips per day.

2.2 Workforce Traffic Volumes

Construction worker traffic would also be expected during the construction seasons. The expected workforce could peak at 450 workers, while the average workforce would be approximately 225 workers. Carpooling will be encouraged, and high-occupancy bus trips to the project site will be emphasized. Vanpools or busses from local hotels will likely be provided to workers to minimize vehicular traffic on Red Bridge Road, Wiehl Road, and Loping Lane. Approximately 50 workers can be transported by each bus.

Local workers will most likely originate in the nearby City of Ellensburg to the east, which is approximately 30 miles from the proposed project site. Workers could also originate from the west in Cle Elum (approximately 7 miles from the site). Workers needed for specialized construction (e.g., electrical, solar testing) may originate from areas outside Kittitas County.

Under peak workforce conditions, assuming 30 percent of construction workers carpool to the site each day with one other person and the remaining 70 percent use project-provided bus transportation, approximately 75 construction worker vehicles could be expected to enter the project site in the morning and leave the site during the evening peak hour. These 75 construction worker vehicles would consist of 68 personal vehicles and seven busses. If the entire peak workforce is transported to the project site via bus, nine total workforce vehicles would be expected.

Under average workforce conditions approximately 38 construction worker vehicles could be expected to enter and exit the project site each day.

2.2.1 Construction Traffic Summary

Assuming construction occurs during a two year construction window, approximately 17 trucks (34 daily trips) and 75 worker vehicles (150 daily trips) could be added to background traffic patterns if 70 percent of the workforce is bussed to the site. If 100 percent of the workforce is bussed to the site, worker vehicles could be reduced to 9 busses (18 daily trips).

During construction with an average workforce, 17 trucks (34 daily trips) and 38 worker vehicles (76 daily trips) could be expected (if 70 percent of the workforce is bussed to the site). If the entire average workforce is bussed to the site, worker vehicles could be reduced to 5 daily busses (or 10 daily trips).

If construction occurs under a more reasonable three year construction window, truck traffic would likely be reduced from 17 trucks to approximately 9 trucks entering and exiting the project site per day (18 daily trips).

2.3 Total Traffic Volumes

As previously established, I-90 carried an ADT volume of approximately 25,000 vehicles in 2008 within the project travel area. Assuming similar volumes during the year of construction, the project would likely cause an increase in traffic of approximately 34 daily truck trips (17 vehicles expected to enter the site and leave the site at the end of the day) and up to 150 daily worker trips (up to 75 vehicles entering the site in the morning and leaving the site at the end of the day). This increase represents an increase of approximately

1 percent on I-90, and is expected to be inconsequential. Construction of the facility is not expected to cause any traffic congestion or delay impacts to the state roadway system.

Average daily traffic volumes on Highway 970 would likely increase by approximately 5 percent with construction trips. This is not expected to affect driving conditions or cause backups and delays because there would still be ample capacity on Highway 970, and an additional daily 184 construction-related trips are not expected to affect driving conditions or cause backups and delays.

On the county and private roadways (on Red Bridge Road, Wiehl Road, and Loping Lane), the daily traffic volumes will likely triple. Although these roads would experience a temporary increase in traffic volumes during construction, because of the rural nature of the area, construction will not result in traffic volumes that exceed the capacity of the roadway facilities. The roadway facilities currently support few trips and have ample capacity. Therefore, even with traffic increases, construction is not anticipated to cause adverse impacts to current levels of service.

2.4 Proposed Roadway Improvements

Existing public and private roads will be used as much as possible, except that construction-related traffic will not be permitted to use Red Bridge Road north of the intersection of Wiehl Road. Because project-generated and local traffic volumes are fairly low, improvements to existing paved roads or streets accessing the project are not anticipated. Highway 970 and Red Bridge Road (between Highway 970 and Wiehl Road) are not expected to require improvements prior to construction.

Unimproved, unpaved roadways to the project site will also be used. These roadways include Wiehl Road (public road, privately maintained) and Loping Lane (private road). These roads will require improvements prior to construction. Improvements such as gravel resurfacing, grading, or widening could be necessary to accommodate transport of large or heavy equipment and/or materials to the site during construction. These private roadways would be improved to Kittitas County Road Standards, and likely be at least 24 feet wide at completion per the Local Access Rural Design Standards for low-volume, low-speed roads.

A portion of Wiehl Road between Red Bridge Road and Loping Lane is very steep, and would likely need to be improved to allow for acceptable roadway grades. This road would be constructed to County standards with drainage ditches and shoulder widths prior to project construction. The County road standards suggest asphalt concrete pavement for roads with grades exceeding 10 percent. Because this portion of Wiehl Road is fairly steep, paving would likely be recommended.

Culverts or drainage ditches could be constructed along the roadway to drain any potential runoff into a detention pond or catchment area away from the roadway, where it would be slowly released back into the ground. The design of these culverts or catchment areas would be developed during the engineering stage of the project and would follow requirements as specified in the Washington State Ecology Manual for Eastern Washington (see Attachment F, *Hydrology Plan*, for more information).

An alternative to paving is using layers of crushed stone or gravel to level and stabilize the roadway. The gravel layer would likely need to be between 8 and 21 inches deep,

depending on the topography of the existing road. The size of the gravel and the density of the layers would need to be determined during the engineering stage of the project. Although gravel roads would allow some drainage to occur from the roadway surface, drainage ditches or culverts would likely still be necessary to prevent water from collecting on the shoulders.

Any improvements to privately maintained County roadways will be coordinated with the Kittitas County Public Works Department to ensure compliance with County requirements.

From Loping Lane, new or existing maintenance roads would be used to access the solar arrays as shown in Figure 3, Proposed Site Layout. These private roads would have gravel surfaces and be at least 20 feet wide to allow for traffic in both directions.

Vehicle turnouts on Loping Lane will be constructed at various intersections with access and maintenance roads to help facilitate turning movements to and from the project site. These vehicle turnouts would provide adequate space for large construction vehicles to make safe turning movements into and out of maintenance roads.

The total number of new maintenance roads will be kept to a minimum to avoid disrupting existing land use. Haul routes and roadway improvements will be constructed with the smallest possible footprint.

3.0 Impacts during Operation

3.1 Traffic Volumes

Traffic impacts associated with the completed project are not anticipated. Once the project has been completed, there will be virtually no daily traffic for operations and maintenance. Staff technicians will perform system monitoring. Once onsite, staff will make frequent trips between the facility and the operations and maintenance building by way of passenger pickup truck or off-road vehicle.

Larger delivery trucks occasionally may be required if major equipment is in need of replacement such as structural elements, inverters, or large quantities of solar panels.

On typical days, fewer than five vehicles could be expected to access the site. Given the low traffic volumes within the project area, these minor added trips would not cause traffic impacts during project operations. TSR has committed to maintenance and operation of Wiehl Road and Loping Lane during all seasons, which includes winter plowing of these roads.

3.2 Emergency Vehicle Access

The gate system controlling access to the project site will be coordinated with applicable private property owners so they can maintain access. Access gate control will also be coordinated with local agencies, such as fire, medical, and emergency services. These services will be able to gain access to the project site via these gates. Access roads at these gates will be at least 16 feet wide to accommodate emergency or rescue vehicles.

TSR will also provide local emergency agencies with detailed maps of the access road to the site and the maintenance roads within the site.

3.3 Traffic Management

In general, adverse construction and operational impacts to traffic safety or travel times from the project are not anticipated. While construction-related traffic may cause short-term traffic delays (delivery vehicles turning onto or off of Highway 970), the delays will be temporary and could be managed with the following general measures:

- Providing proper road signage and warnings of "Equipment on Road," "Truck Access," or "Road Crossings".
- Provide road signs directing traffic to the project-site.
- Provide drivers with maps to the project site and instructions not to use Red Bridge Road north of Wiehl Road.
- Construction workers will be bused to reduce traffic volume.
- Employing flagpersons as necessary to direct traffic if equipment is exiting or entering public roads to minimize risk of accidents.

The construction workforce will most likely travel during the morning and afternoon peaks of a typical workday. Although local traffic volumes on Kittitas County roadways near the project site are estimated to be very low, by bussing workers fewer vehicles can be anticipated on the roadway during this time, thus reducing the effect of construction on typical commuters.

Because project transportation impacts are limited and temporary in nature, specific measures to reduce traffic impacts to local residents at specific locations during the construction process, such as signaling are not warranted.

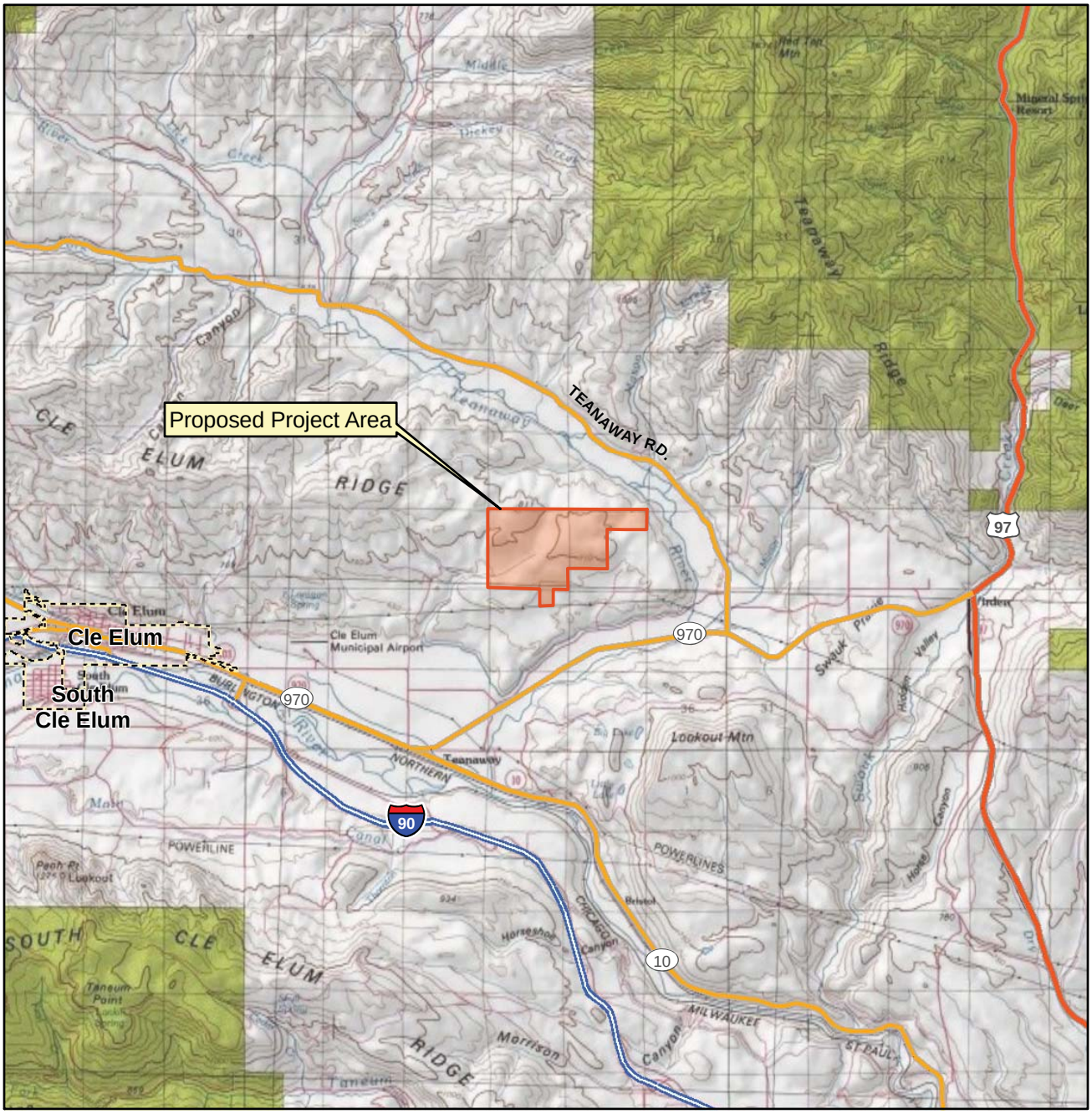
3.4 Decommissioning

Traffic impacts during decommissioning are expected to be similar to those described for construction. If some of the access roads constructed or improved as part of the project remain in place, there would be fewer trips associated with workforce, materials, and equipment during decommissioning, and there would likely be fewer traffic impacts than expected during construction. Truck trips are anticipated to occur between 7 a.m. and 7 p.m. on weekdays. Workforce trips during decommissioning are expected to increase compared to workforce trips during project operation, but no significant unavoidable adverse impacts from decommissioning or restoration of the proposed project are expected.

Mitigation at the time of decommissioning would be implemented and would likely be similar to that recommended for construction.

APPENDIX A

Figures



LEGEND

- Proposed Project Area
- City Boundary
- Interstate
- Highway
- Major Road

Note:
1. USGS 100K Quadrangle: Wenatchee.

0 1 2
Miles

N

VICINITY MAP

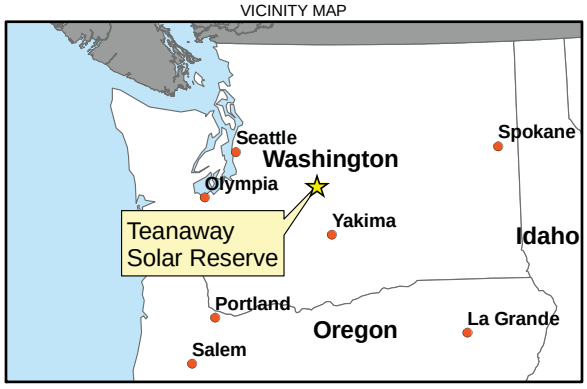
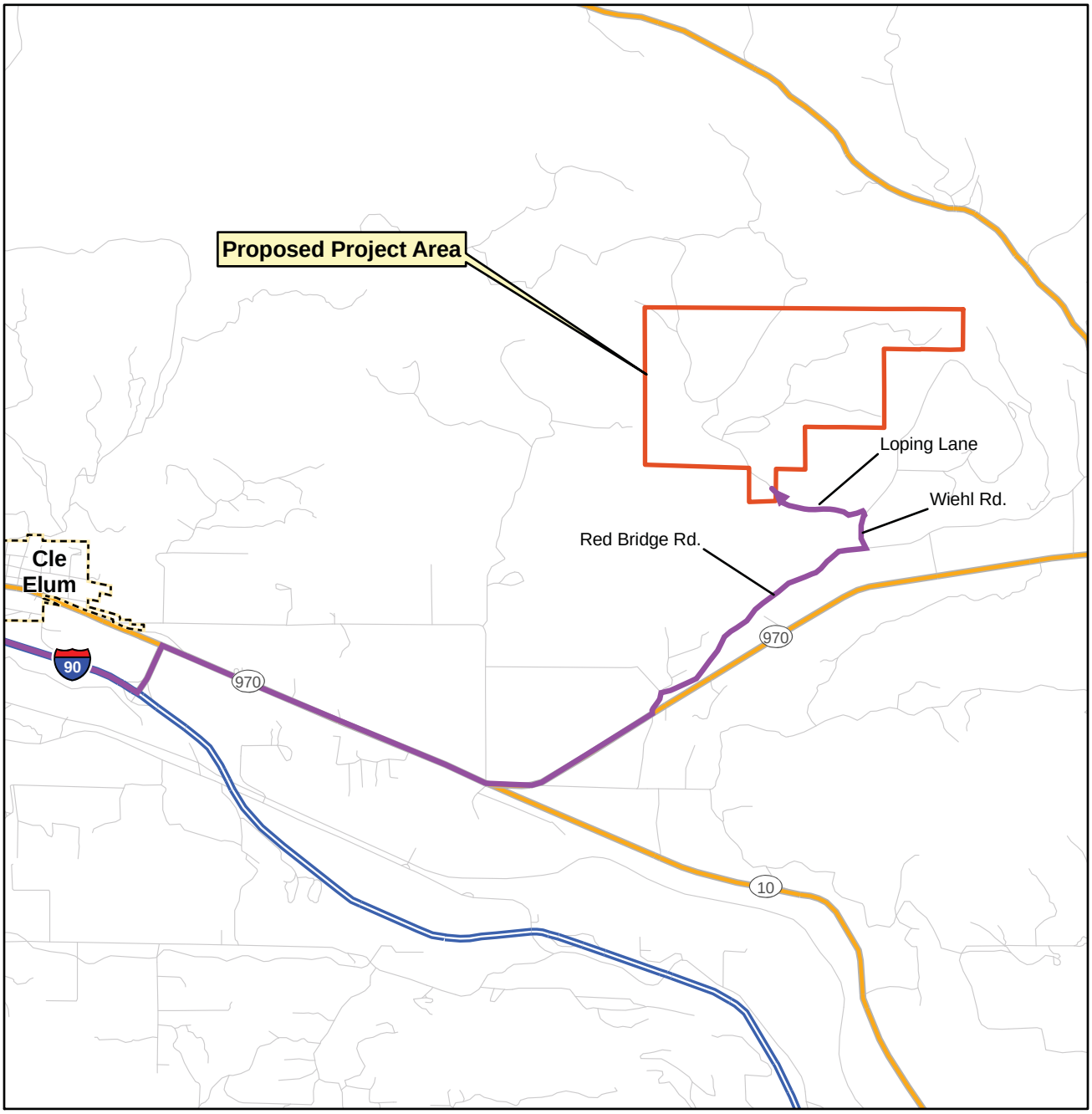


FIGURE 1
Vicinity Map
Transporation Road Plan
Teanaway Solar Reserve
Kittitas County, Washington



LEGEND

- Proposed Project Area
- Site Access Route
- City Boundary
- Interstate
- Highway
- Major Road
- Minor Road

Note:
1. Street Data: 2002 ESRI StreetMap USA.

N

0 0.5 1
Miles

VICINITY MAP

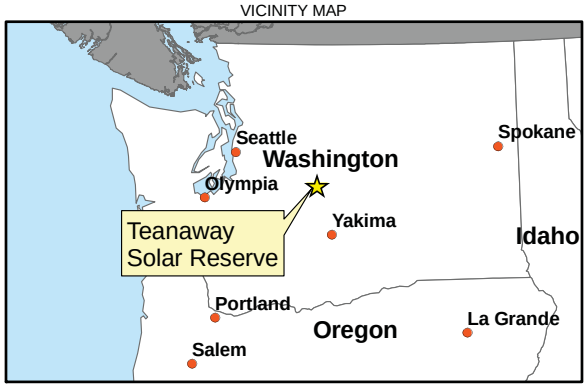
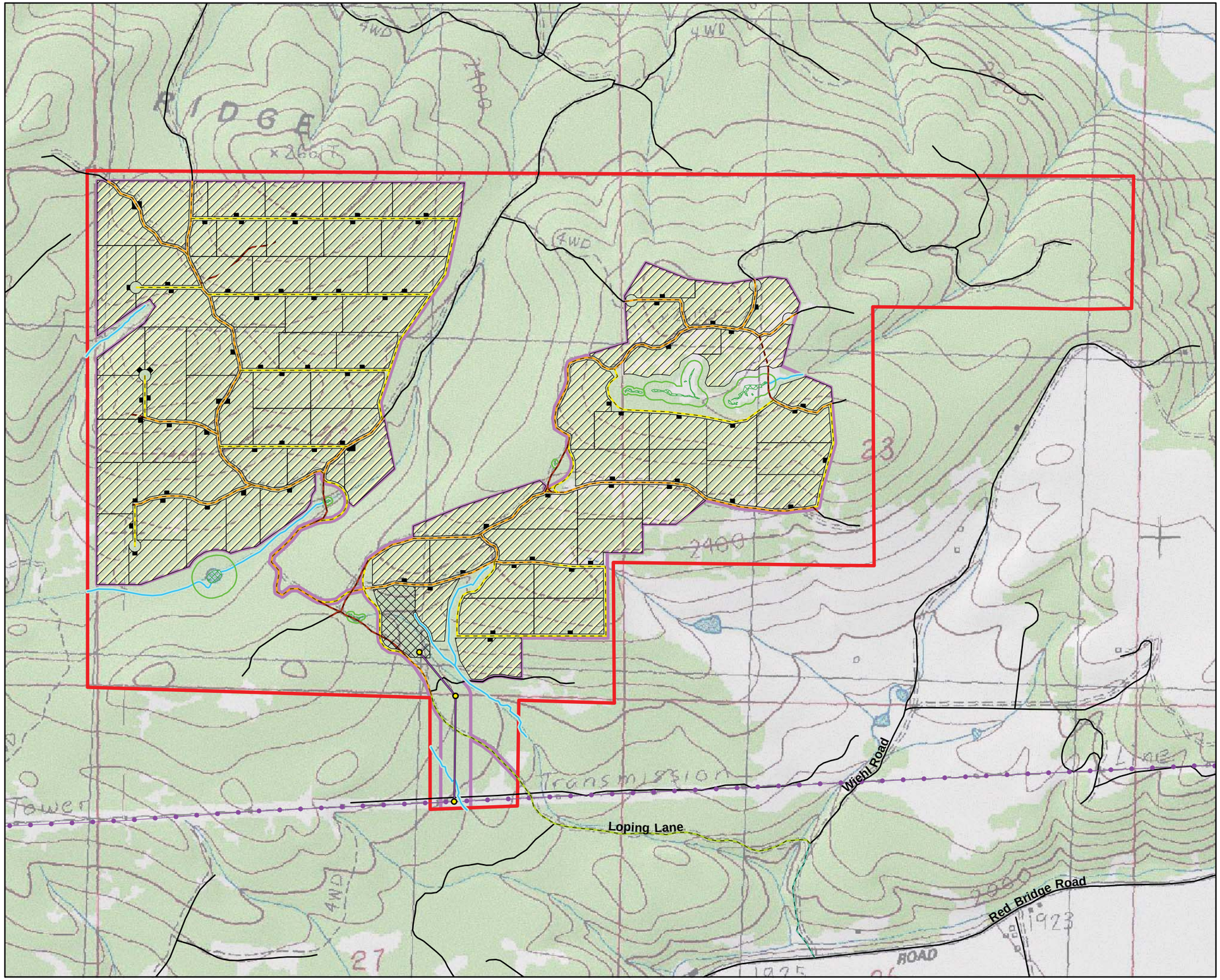
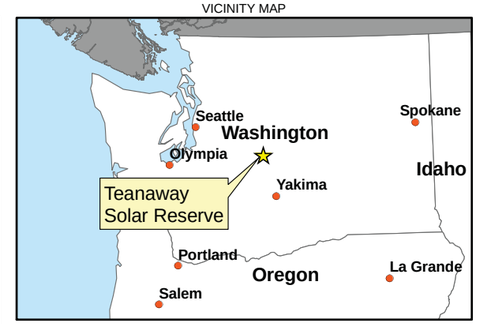


FIGURE 2
Site Access Map
Transportation Road Plan
Teanaway Solar Reserve
Kittitas County, Washington



VICINITY MAP



LEGEND

Proposed Project Features

- Proposed Project Area (982 Acres)
- Proposed Project Site (477 acres)
- Proposed PV Array Block
- Proposed Field Inverter and Field Transformer
- Proposed Substation/O&M Facility
- Proposed Transmission Line
- Proposed Transmission Structure
- Proposed Maintenance Road
- Proposed Improved Maintenance Road
- Existing Maintenance Road (Planned Decommissioning)
- Proposed Improved County Access Road
- Proposed Improved Private Access Road

Existing Features

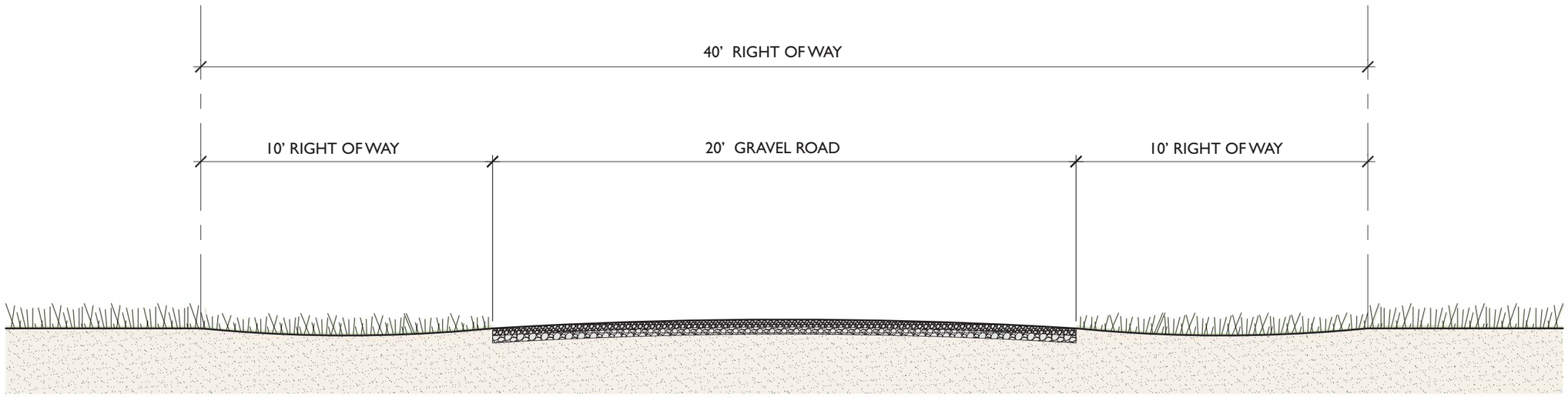
- Existing BPA Transmission Line and ROW
- Existing Road
- Stream
- Stream Buffer
- Wetland
- Wetland Buffer

N

0 1,000
Feet

1 inch = 1,000 feet

FIGURE 3
Proposed Site Layout
Transportation Road Plan
Teanaway Solar Reserve
Kittitas County, Washington



TYPICAL ROAD SECTION

scale: 1/4” = 1’-0”

FIGURE 4
Preliminary Road Section
Teanaway Solar Reserve
Kittitas County, Washington

Teanaway
solar reserve