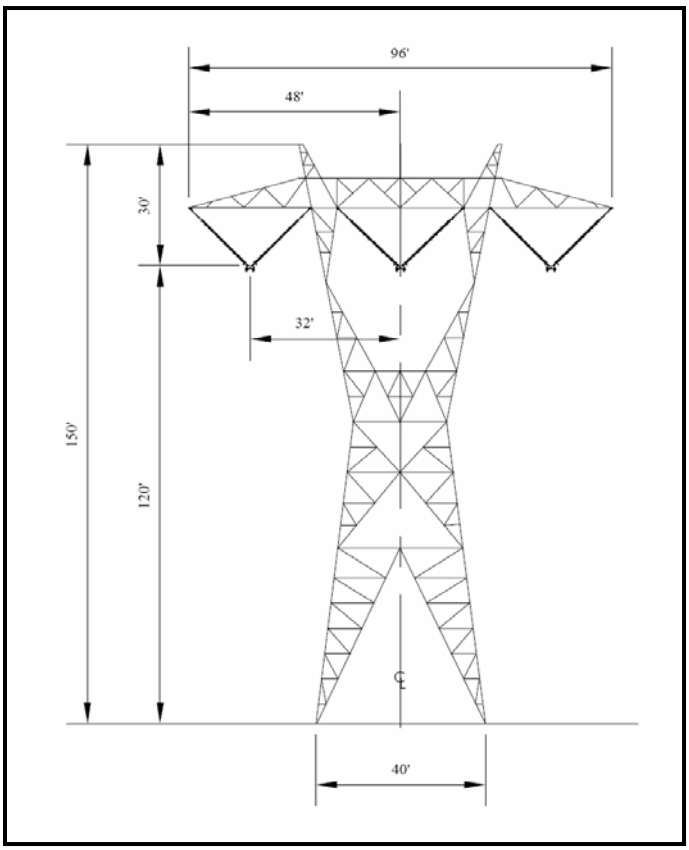
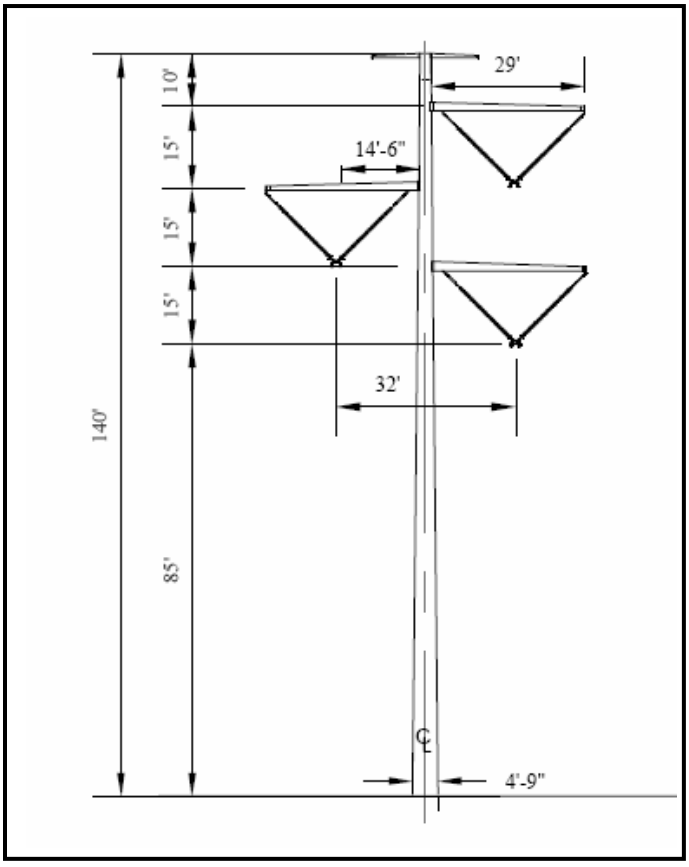


Illustrated tower height and footings for level ground span. Actual height and footings depends on span length and terrain.

Figure 3-7
TYPICAL SINGLE-CIRCUIT 500-KV STEEL LATTICE TOWER
Source: Southern California Edison Company



Illustrated tower height and footings for level ground span. Actual height and footings depends on span length and terrain.

Figure 3-8
TYPICAL SINGLE-CIRCUIT 500-KV MONOPOLE TOWER
Source: Southern California Edison Company

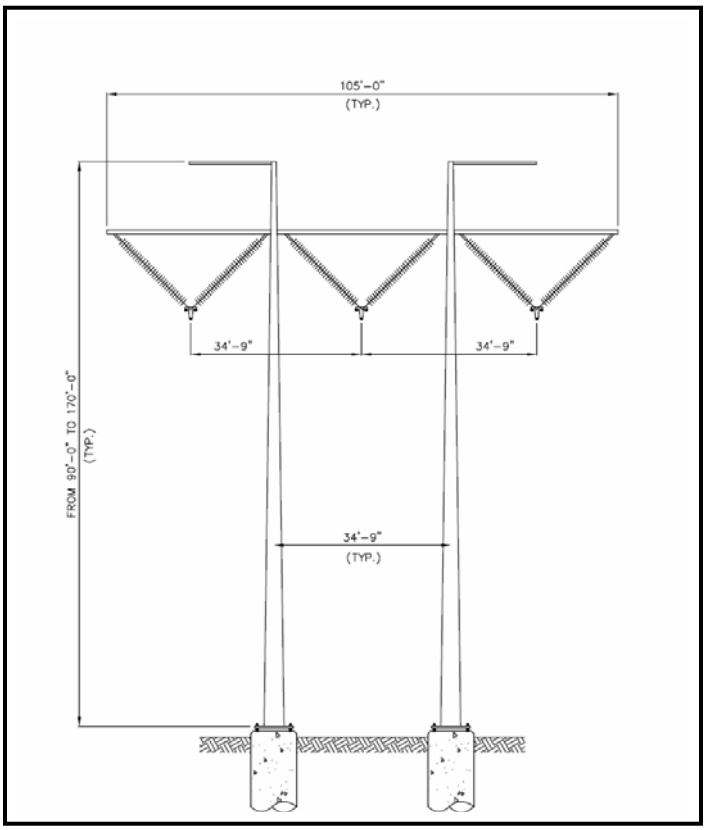
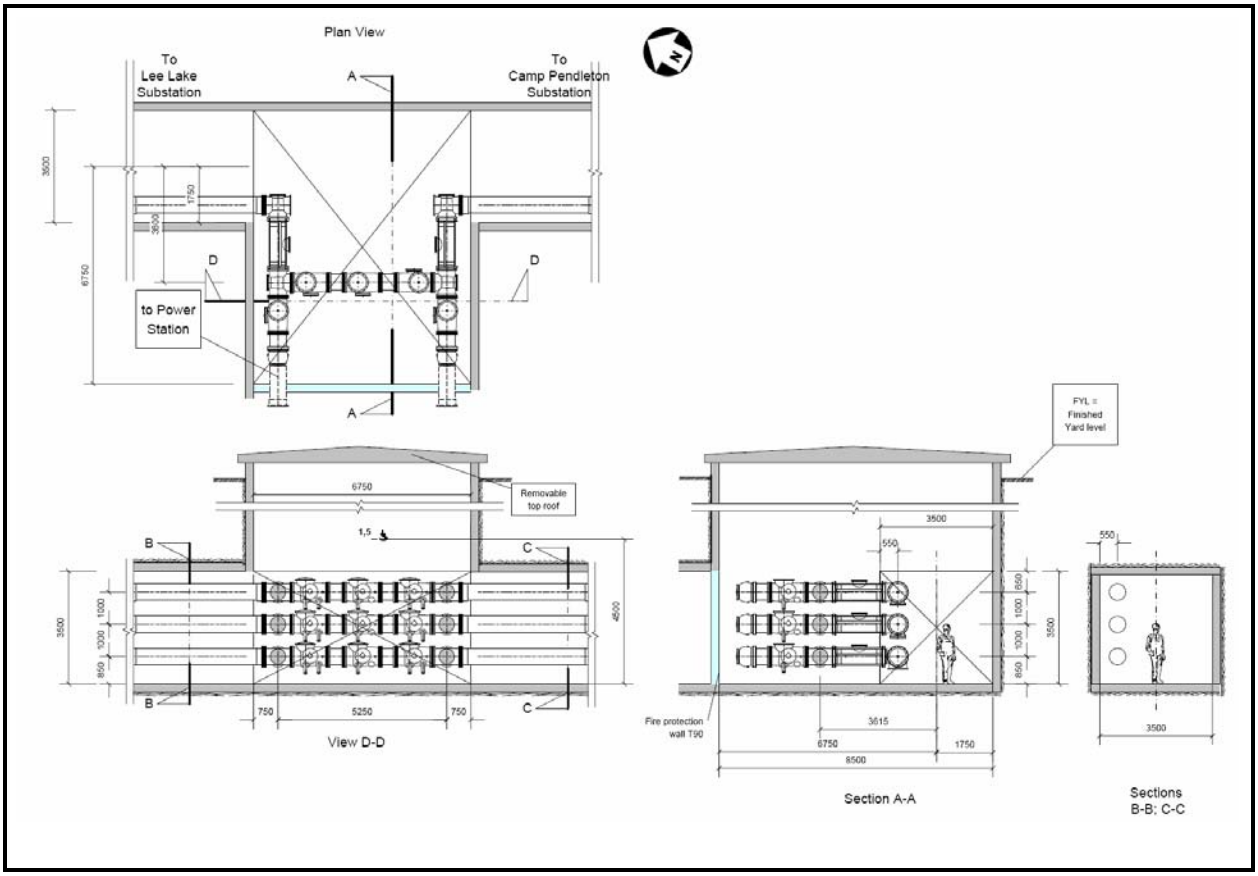


Figure 3-9
TYPICAL SINGLE-CIRCUIT 500-KV H-FRAME TOWER
Source: San Diego Gas & Electric Company

Illustrated tower height and footings for level ground span. Actual height and footings depends on span length and terrain.

Figure 3-10
GAS-INSULATED VAULT TRANSITION TO PUMPHOUSE SECTION DRAWING
Source: Siemens Power Transmission & Distribution



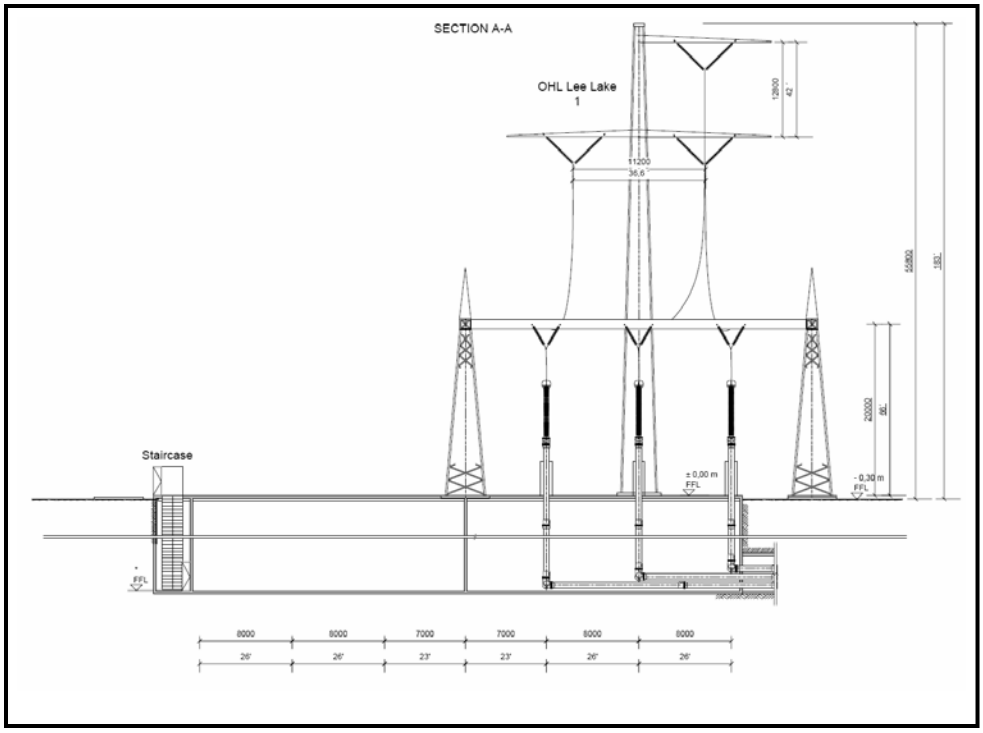


Figure 3-11 (1 of 4)
GIL-OHL TRANSITION STATION NORTH ELEVATION DRAWING
Source: Siemens Power Transmission & Distribution

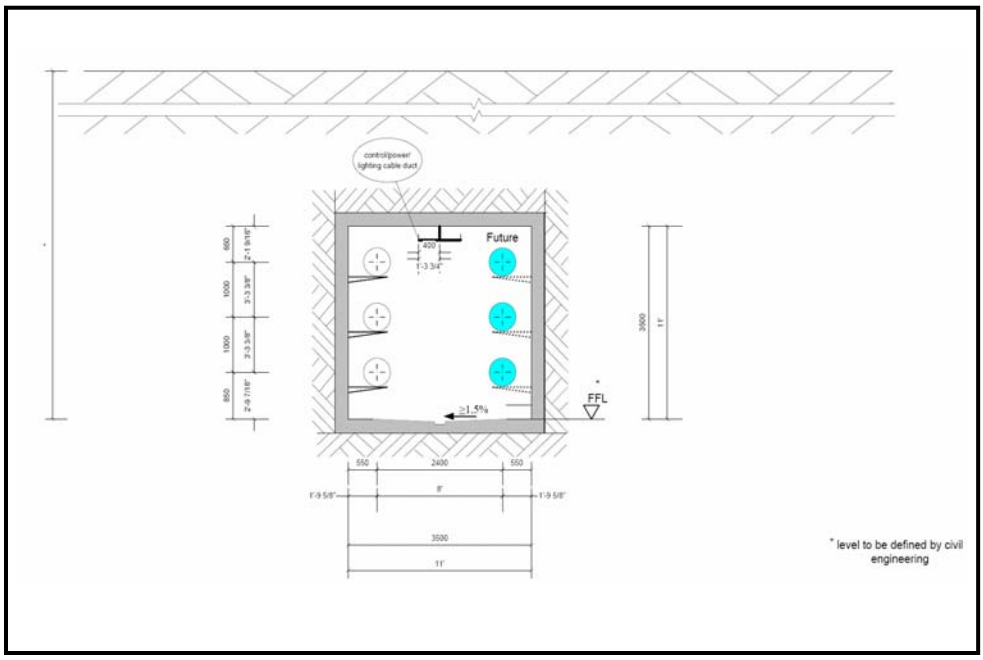


Figure 3-11 (2 of 4)
GIL-OHL TRANSITION STATION NORTH SECTION DRAWING
Source: Siemens Power Transmission & Distribution

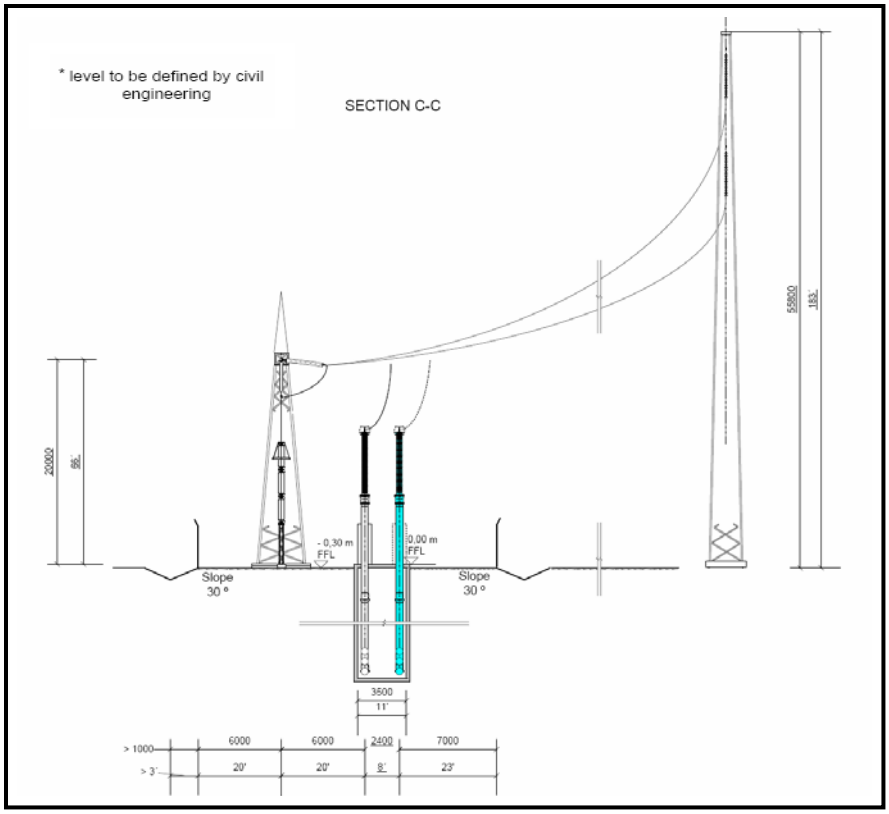


Figure 3-11 (3 of 4)
GIL-OHL TRANSITION STATION NORTH SECTION DRAWING
Source: Siemens Power Transmission & Distribution

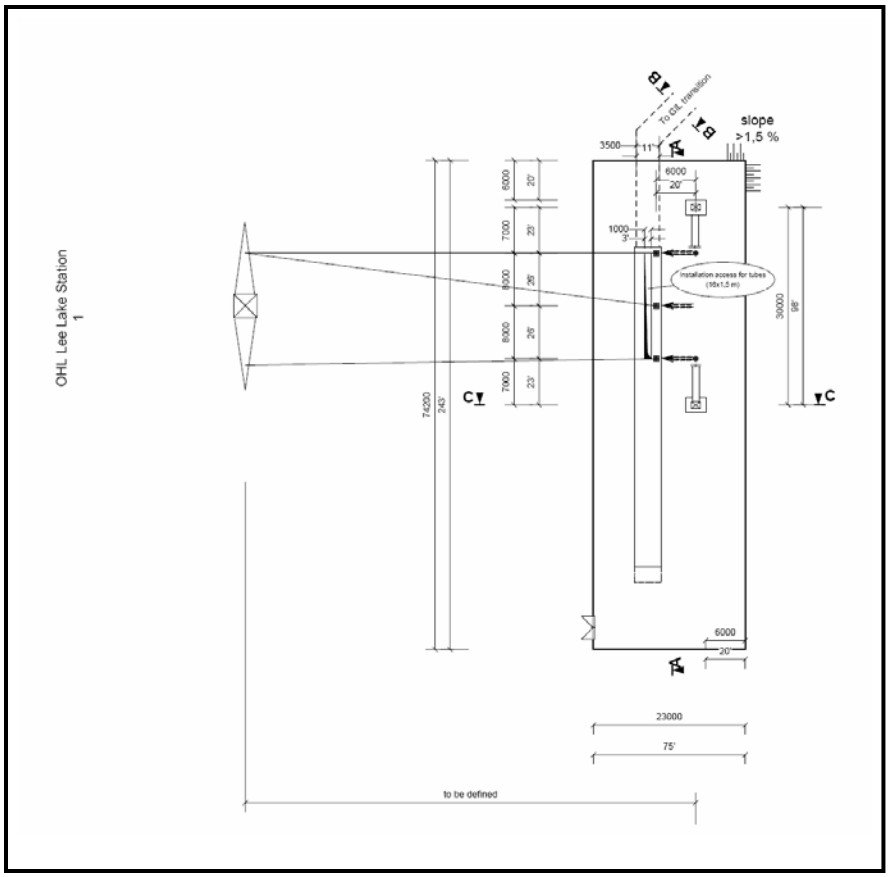


Figure 3-11 (4 of 4)
GIL-OHL TRANSITION STATION NORTH SITE PLAN
Source: Siemens Power Transmission & Distribution

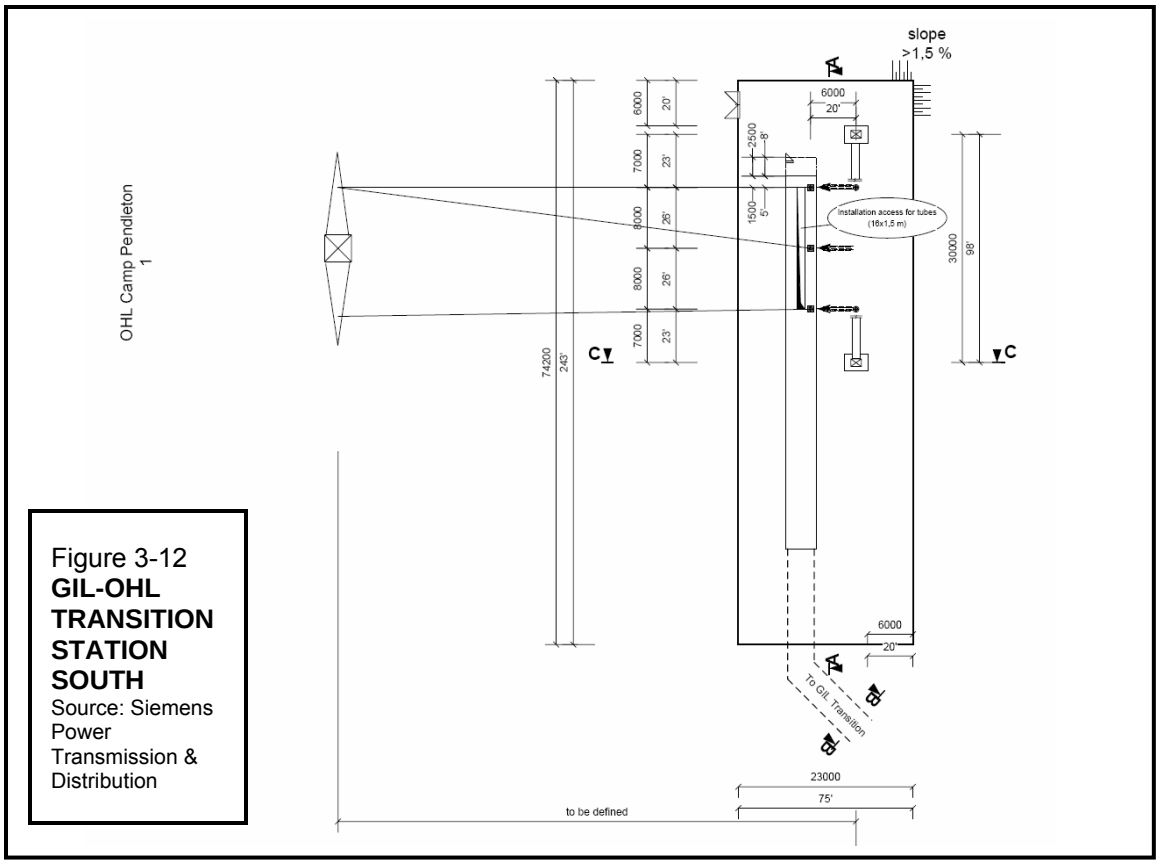


Figure 3-12
GIL-OHL TRANSITION STATION SOUTH
Source: Siemens Power Transmission & Distribution

◊ National Electric Safety Code® (NESC), 1977[21];
◊ Occupational Safety and Health Administration Standard (29 CFR 1910.269);
◊ Uniform Fire Code™ (UFC), 2003 Edition[22]; and
◊ Urban-Wildland Interface Code (UIC), 2003 International Edition.

Maintenance activities will conformance to the Forest Service's and California Department of Forestry and Fire Protection's (CDF or CALFIRE) "Power Line Fire Prevention Field Guide."[23]

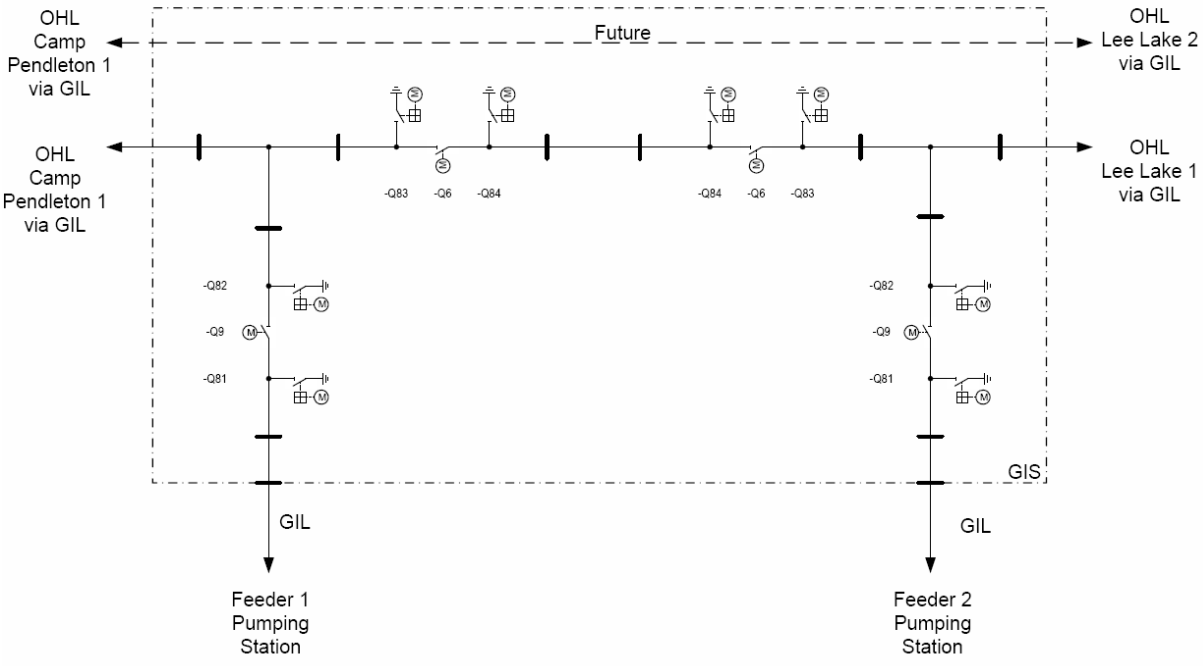
- **Substations and switchyards**. New substations/switchyards, identified as the Northern (Lake) substation and Southern (Pendleton or Case Springs) substation, will be constructed where the new transmission line will interconnect with SCE's existing 500-kV transmission system on the north and SDG&E's existing 230-kV transmission system on the south. Each of the proposed substations/switchyards is described below.

  ◊ **Northern (Lake) substation**. As illustrated in Figure 3-15 (Northern [Lake] Substation Site), the proposed northern connection to SCE's existing Valley-Serrano 500-kV transmission line and new 500-kV/115-kV substation will be located near Lee (Corona) Lake, in unincorporated (Alberhill) Riverside County.

[21]/ Clapp, Allen L., NESC Handbook: Development and Application of the American National Standard, National Electrical Safety Code Grounding Rules, General Rules, and Parts 1, 2, and 3, Institute of Electrical and Electronics Engineers, 1984 Edition.
[22]/ National Fire Protection Association, NFPA 1, Uniform Fire Code (UFC)™, 2003 Edition.
[23]/ California Department of Forestry and Fire Protection, Power Line Fire Prevention Field Guide, March 27, 2001.

Rated voltage	550 kV
Rated frequency	60 Hz
Rated lightning impulse withstand voltage	1550 kV
Rated power frequency withstand voltage (1 min)	740 kV
Rated current busbar	4000 A
Rated current feeder	4000 A
Rated short - time withstand current	63 kA / 1s
Rated short - circuit breaking current	63 kA
Indoor ambient temperature	-5°C / +40°C
Outdoor ambient temperature	-5°C / +49°C

Figure 3-13
GIL-VAULT SINGLE-LINE DIAGRAM TRANSITION TO PUMPHOUSE
Source: Siemens Power Transmission & Distribution



The new substation (500-kV, 115-kV tie option, and 13.8-kV station power) will be located north of the Interstate 15 (I-15) Freeway near SCE's existing 500-kV Valley-Serrano line. The property is presently privately owned and would need to be acquired. This new transmission and distribution substation will occupy about six acres on one pad and consist of a new breaker and a half configuration. The loop in/out will be approximately half-way between SCE's existing Serrano substation (East Carver Lane, Orange, Orange County) and Valley substation (Menifee Road and Highway 74, Romoland, Riverside County). A conceptual site plan of the new Northern (Lake) 500-kV/115-kV substation is presented Figure 3-16 (Northern [Lake] 500-kV/115-kV Substation - Conceptual Site Plan). Conceptual elevation drawings for that substation are presented in Figure 3-17 (Northern [Lake] 500-kV Substation – Conceptual Elevation Drawing). The substation is electrically depicted in Figure 3-18 (Northern [Lake] 500-kV Substation - Single-Line Diagram).

The substation will be split into the following three parts: (1) 500-kV connection to the Valley-Serrano line; (2) 500-kV/115-kV SCE reinforcement project[24]; and (3) 500-kV connection to the LEAPS and/or TE/VS Interconnect projects' new OHL. The SCE 500-kV/115-KV reinforcement project is illustrated in Figure 3-19 (SCE 500-kV/115-kV Reinforcement Project - Line and Bus Arrangement) and has been included as a component of the TE/VS Interconnect project. The connection to the SCE reinforcement project will be done using the second breaker and a half scheme. SCE's distribution system upgrades include two 560-MVA transformer banks from 500 kV to 115 kV. A total of seven bays of 115-kV GIS equipment will be provided to reinforce the following distribution loads: (1) 115-kV Loop 1-Skylark; (2) 115-kV Loop 2-Ivyglen 1; (3) 115-kV Loop 3-future 115-kV/12-kV; (4) 115-kV Loop-Ivyglen 2; (5) 115-kV Loop 5-future; (6) 115-kV Loop 6-Fogarty; (7) No. 1 Capacitor Bank 46.8 MVAR; and (8) No. 2 Capacitor Bank 46.8 MVAR. In addition, SCE will require additional expansion area for an ultimate plan build-out of nine bays at 115 kV with bussing at 5,000 amps and space for two additional 560-MVA transformers.

The extension of the Valley-Serrano line involves two single circuits starting between existing structures 16/1 and 15/3 on the existing right-of-way and the northern "A" frame dead end in the Northern (Lake) substation. The distance from the substation to the existing right-of-way is about 2.2 miles, for an estimated total of 4.4 miles of new transmission line. SCE requires that the line extension be constructed on two separate single-circuit structures with about 150-foot separation on the same right-of-way. The 500-kV transmission system will be built to SCE standards.

To be able to keep jurisdictions clear, a line of demarcation will be made between the SCE and the Applicant's portions of the substation using walls gates and fences, where appropriate. As proposed, the building will be reinforced concrete block. The seismic requirements for the equipment and building will be to IEC 693 high-seismic level. Air conditioning and auxiliary service requirements will be defined by the gas-insulated switchgear (GIS) equipment itself. Each section of the substation (SCE and Applicant) will have its own dedicated control room.

[24]/ In prior discussions between SCE and the CPUC, this facility has been identified as the Alberhill substation. For the purpose of this PEA, that nomenclature is not further utilized herein and the proposed reinforcement project is described as a component of the Northern (Lake) substation.

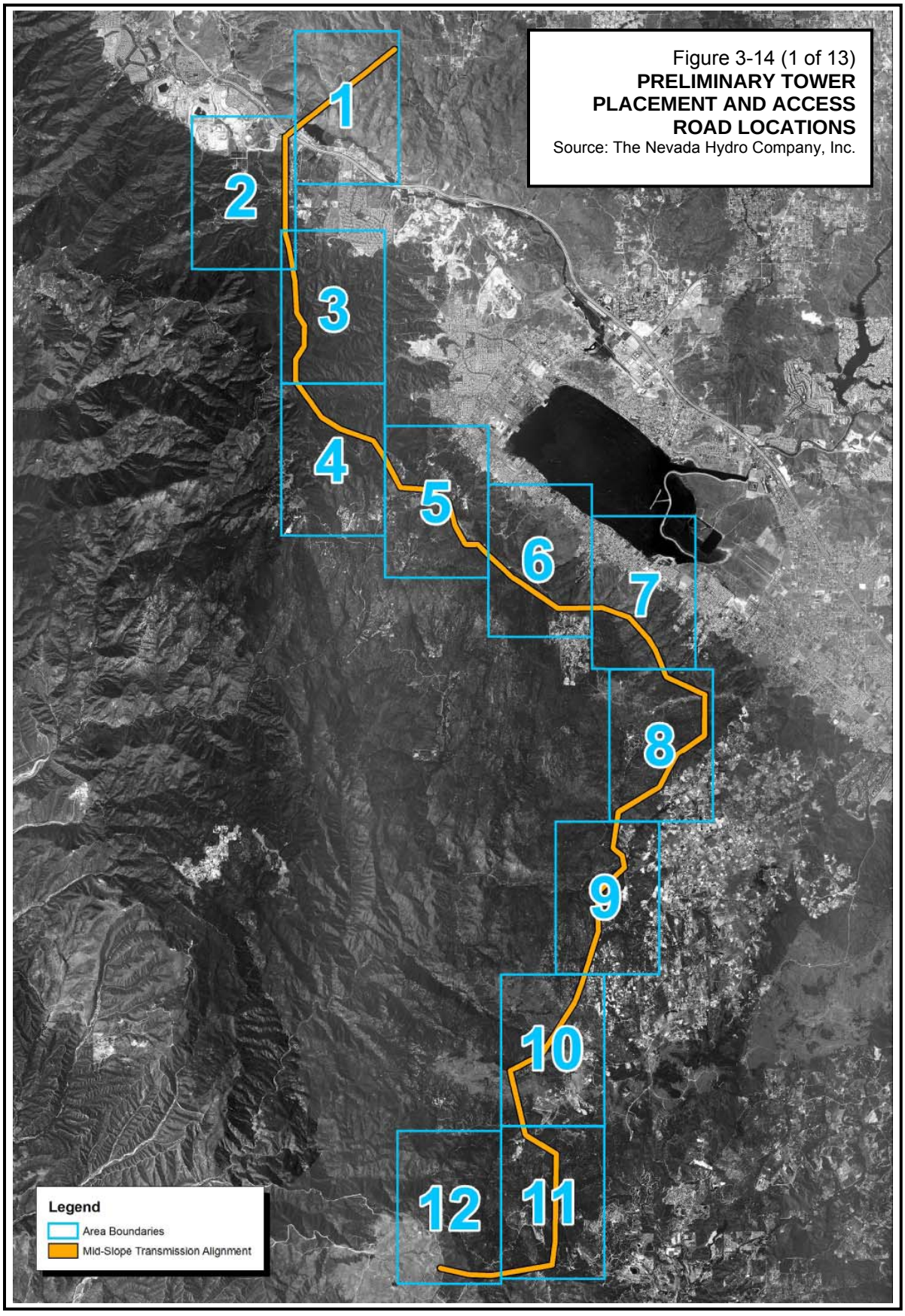


Figure 3-14 (1 of 13)
PRELIMINARY TOWER PLACEMENT AND ACCESS ROAD LOCATIONS
Source: The Nevada Hydro Company, Inc.

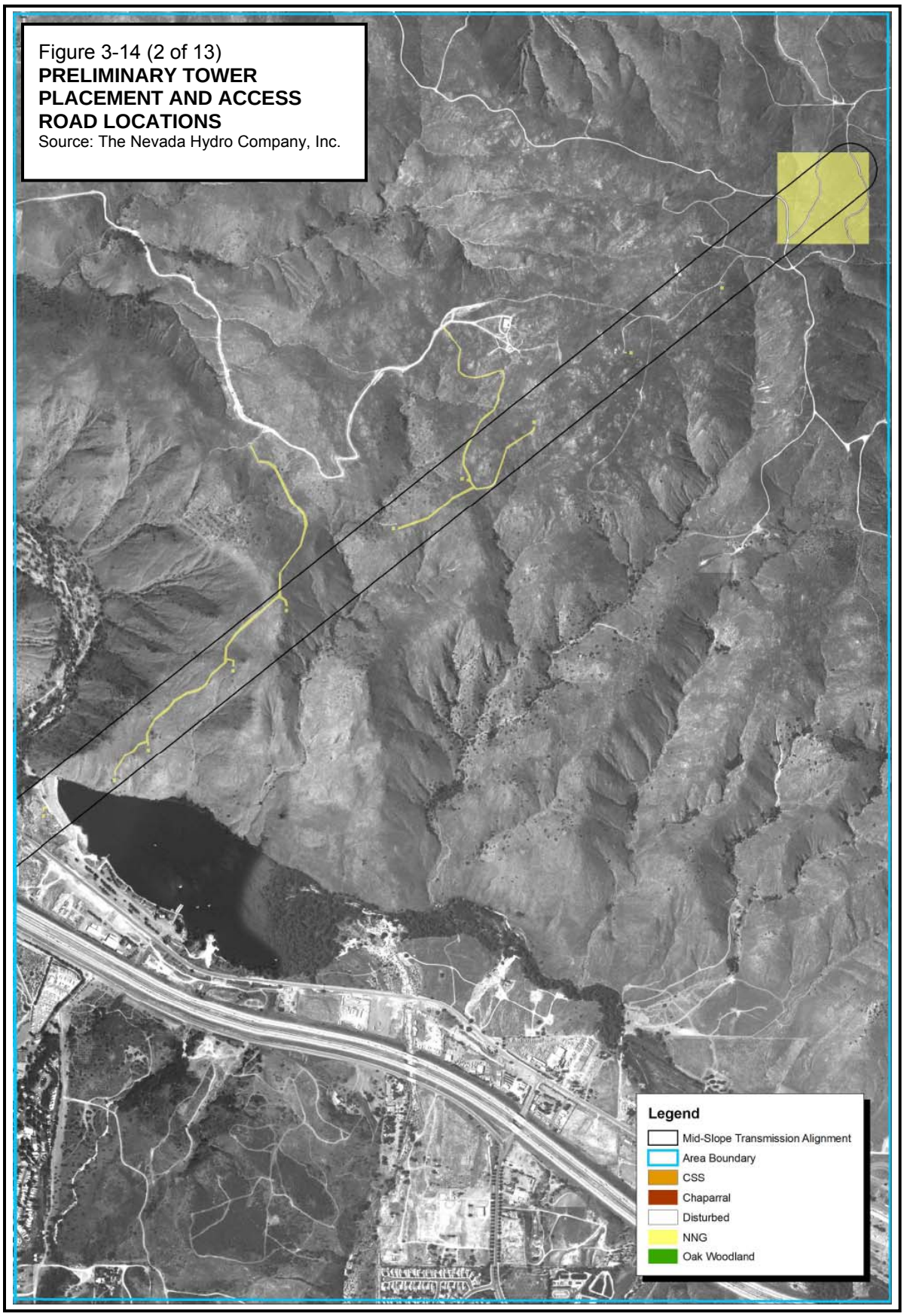


Figure 3-14 (2 of 13)
PRELIMINARY TOWER PLACEMENT AND ACCESS ROAD LOCATIONS
Source: The Nevada Hydro Company, Inc.

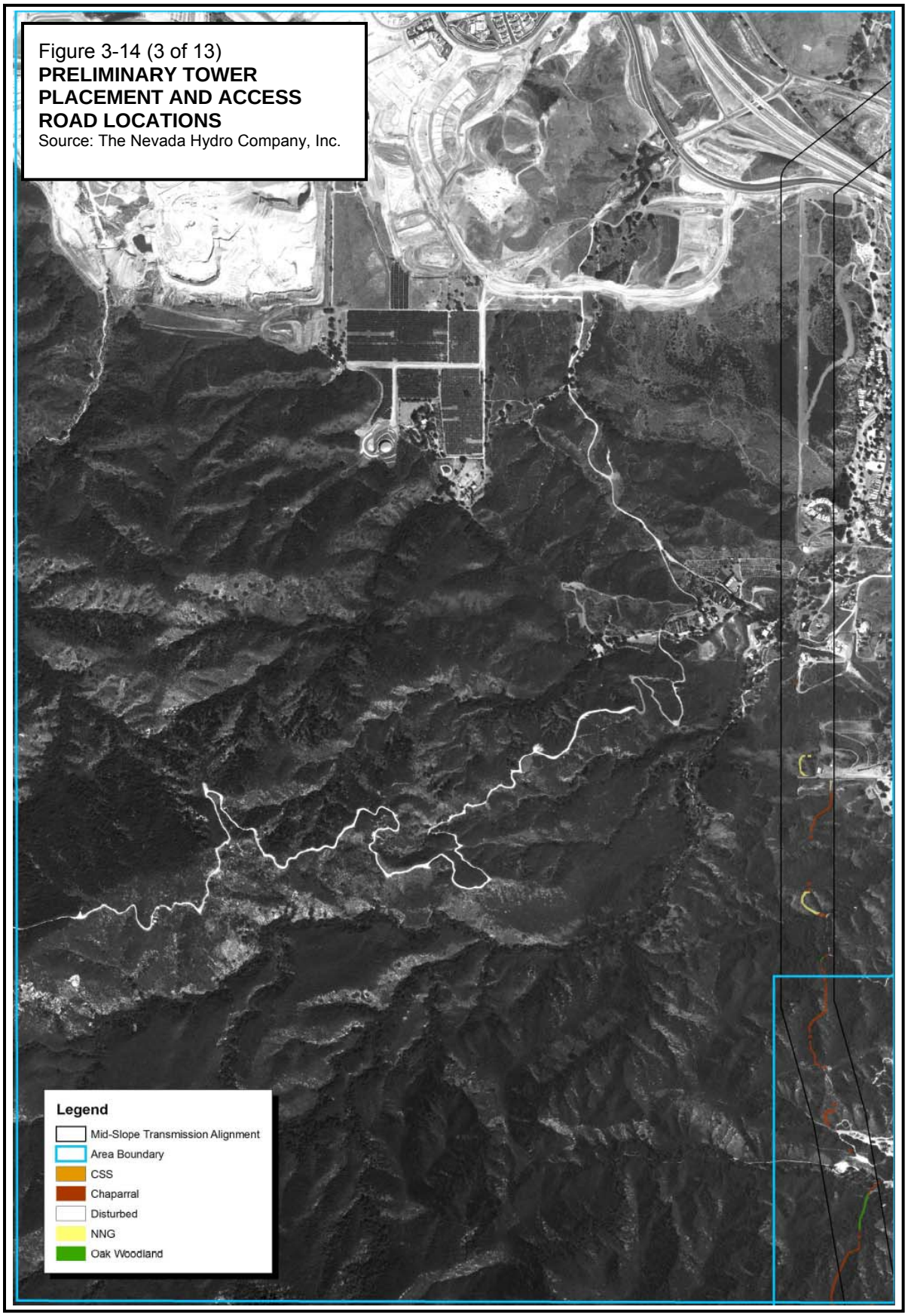


Figure 3-14 (3 of 13)
PRELIMINARY TOWER PLACEMENT AND ACCESS ROAD LOCATIONS
Source: The Nevada Hydro Company, Inc.

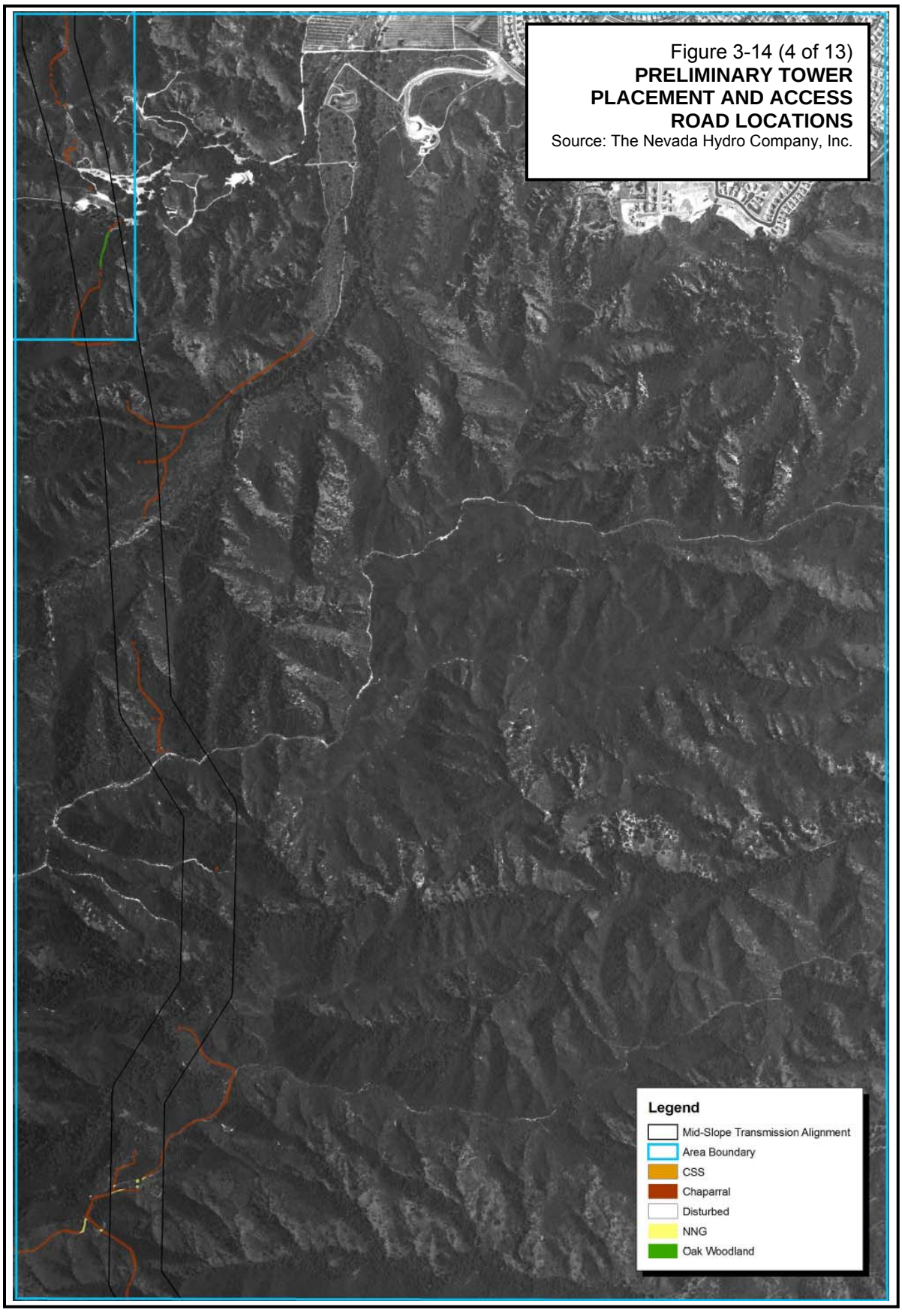


Figure 3-14 (4 of 13)
PRELIMINARY TOWER PLACEMENT AND ACCESS ROAD LOCATIONS
Source: The Nevada Hydro Company, Inc.

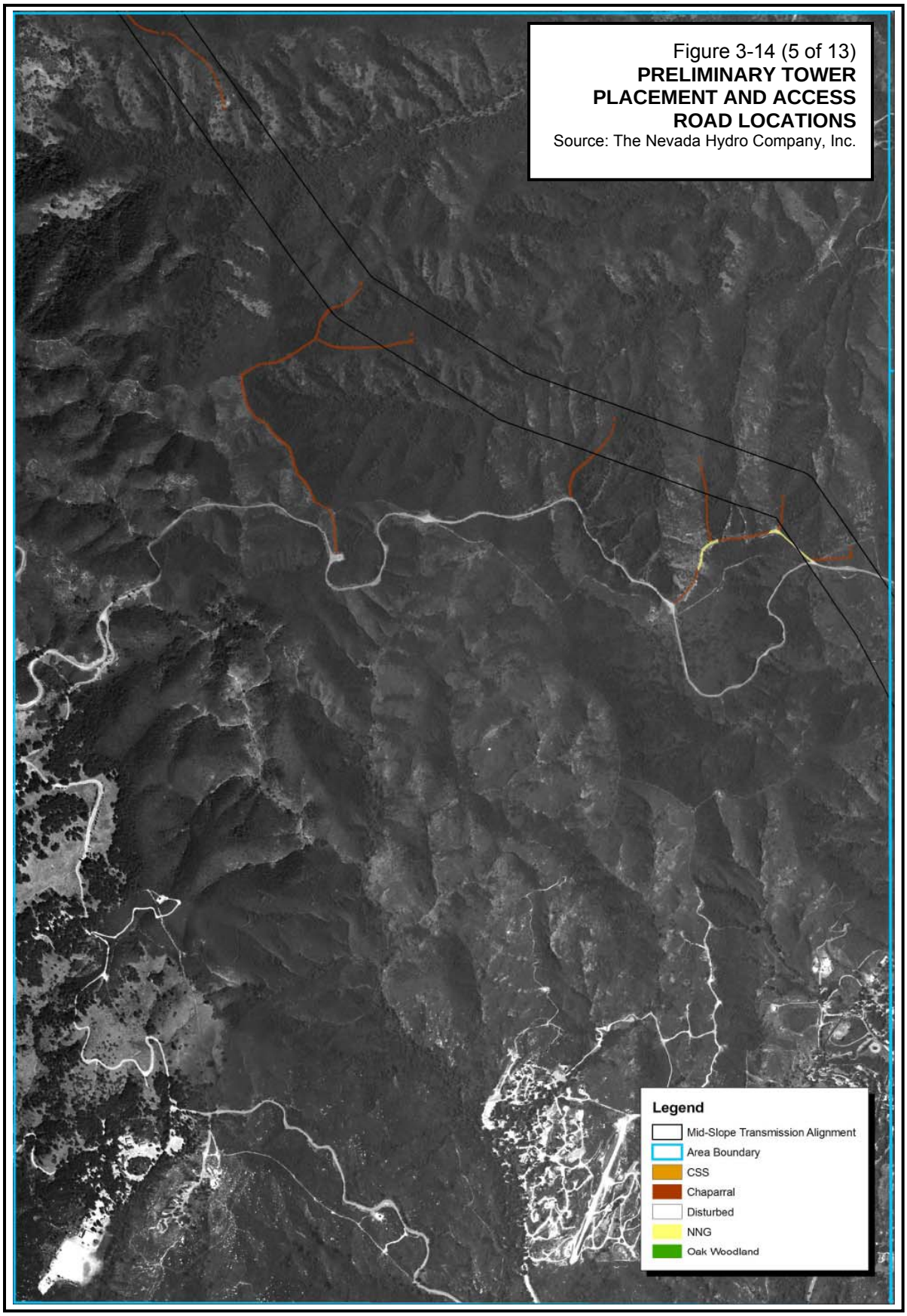


Figure 3-14 (5 of 13)
PRELIMINARY TOWER PLACEMENT AND ACCESS ROAD LOCATIONS
Source: The Nevada Hydro Company, Inc.
Legend
Mid-Slope Transmission Alignment
Area Boundary
CSS
Chaparral
Disturbed
NNG
Oak Woodland

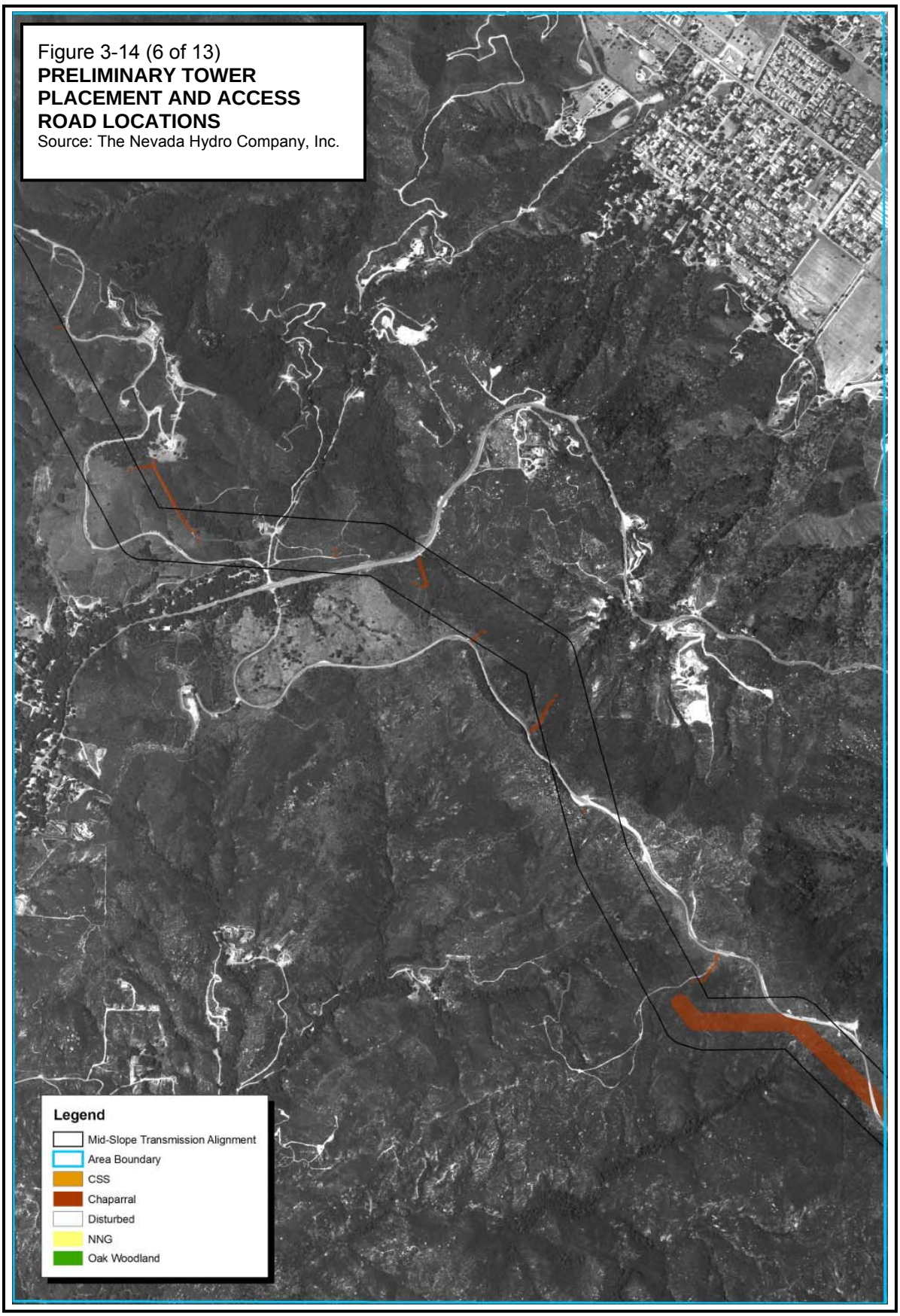


Figure 3-14 (6 of 13)
PRELIMINARY TOWER PLACEMENT AND ACCESS ROAD LOCATIONS
Source: The Nevada Hydro Company, Inc.

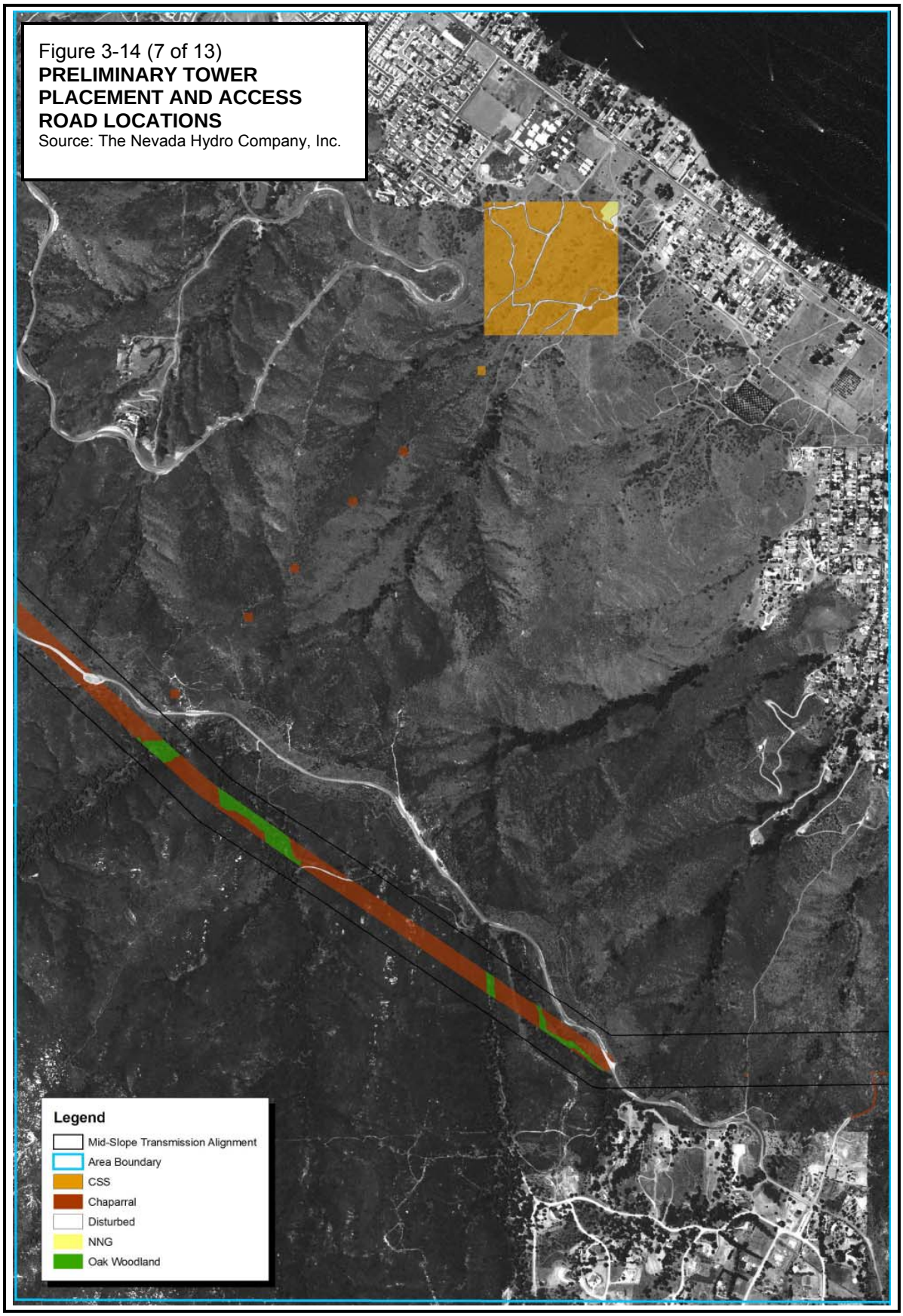


Figure 3-14 (7 of 13)
PRELIMINARY TOWER PLACEMENT AND ACCESS ROAD LOCATIONS
Source: The Nevada Hydro Company, Inc.
Legend
Mid-Slope Transmission Alignment
Area Boundary
CSS
Chaparral
Disturbed
NNG
Oak Woodland

Figure 3-14 (8 of 13)
PRELIMINARY TOWER PLACEMENT AND ACCESS ROAD LOCATIONS
Source: The Nevada Hydro Company, Inc.

Figure 3-14 (9 of 13)
PRELIMINARY TOWER PLACEMENT AND ACCESS ROAD LOCATIONS
Source: The Nevada Hydro Company, Inc.

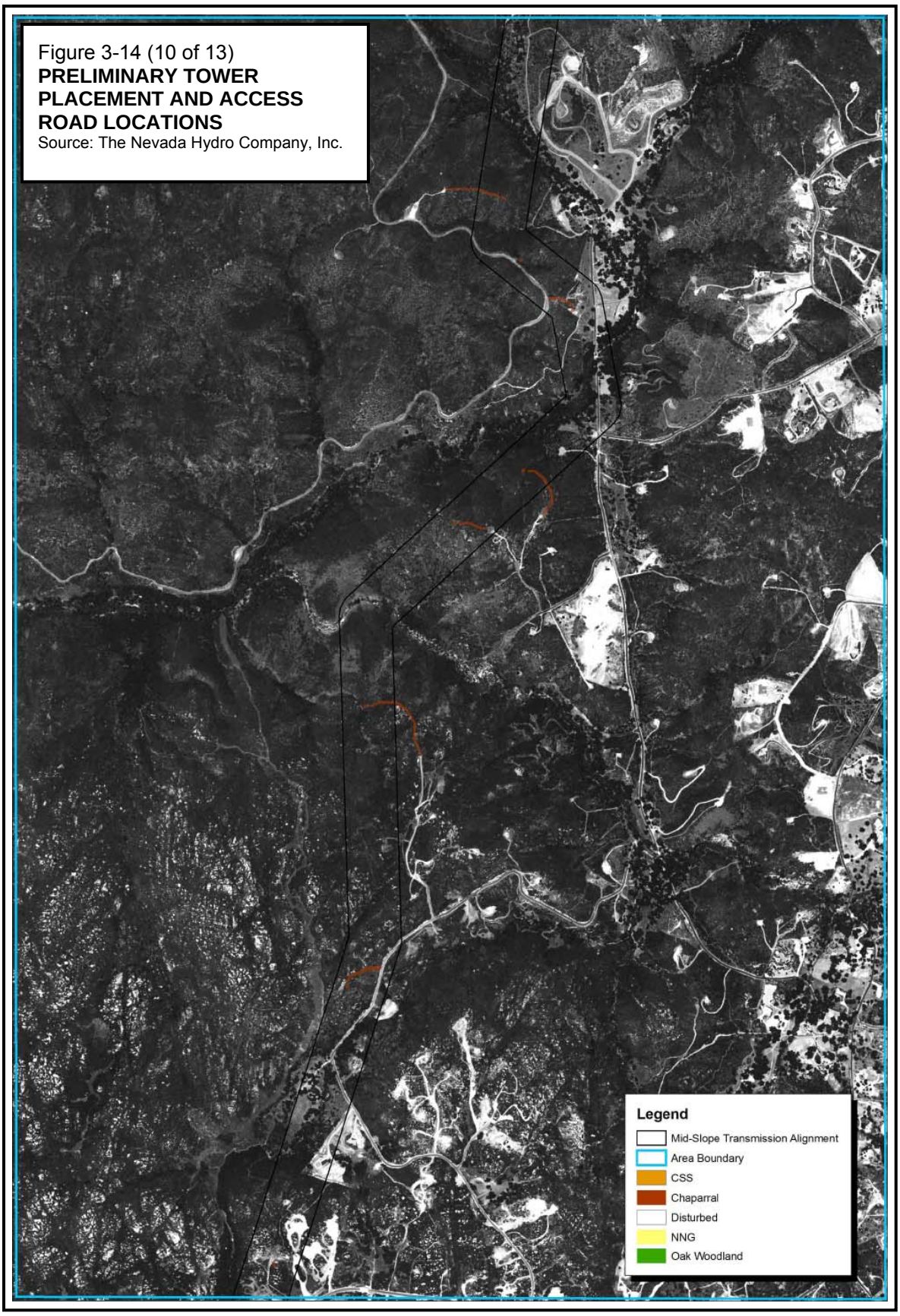


Figure 3-14 (10 of 13)
PRELIMINARY TOWER PLACEMENT AND ACCESS ROAD LOCATIONS
Source: The Nevada Hydro Company, Inc.

Figure 3-14 (11 of 13)
PRELIMINARY TOWER PLACEMENT AND ACCESS ROAD LOCATIONS
Source: The Nevada Hydro Company, Inc.

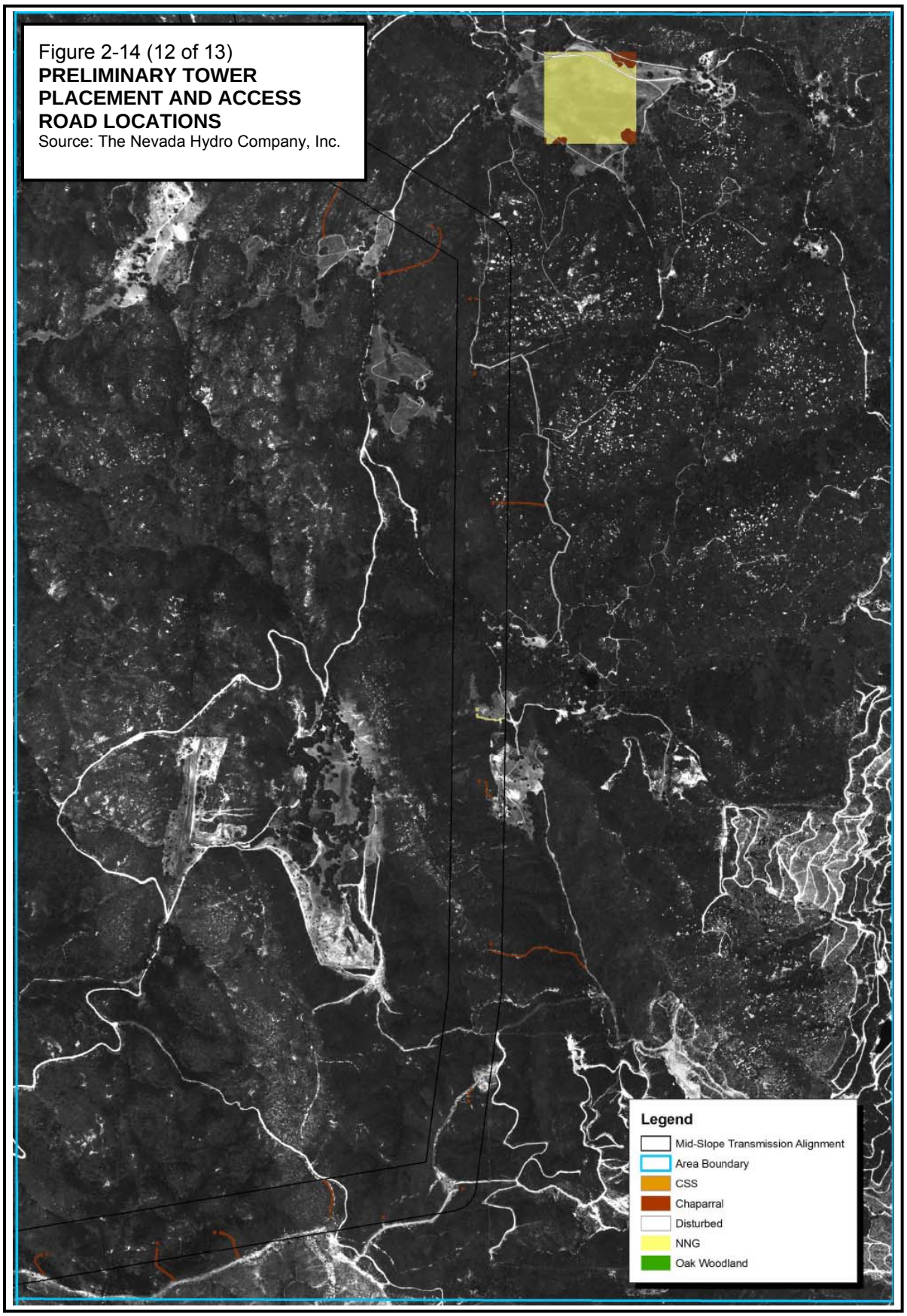


Figure 2-14 (12 of 13)
PRELIMINARY TOWER PLACEMENT AND ACCESS ROAD LOCATIONS
Source: The Nevada Hydro Company, Inc.

Figure 3-14 (13 of 13)
PRELIMINARY TOWER PLACEMENT AND ACCESS ROAD LOCATIONS
Source: The Nevada Hydro Company, Inc.

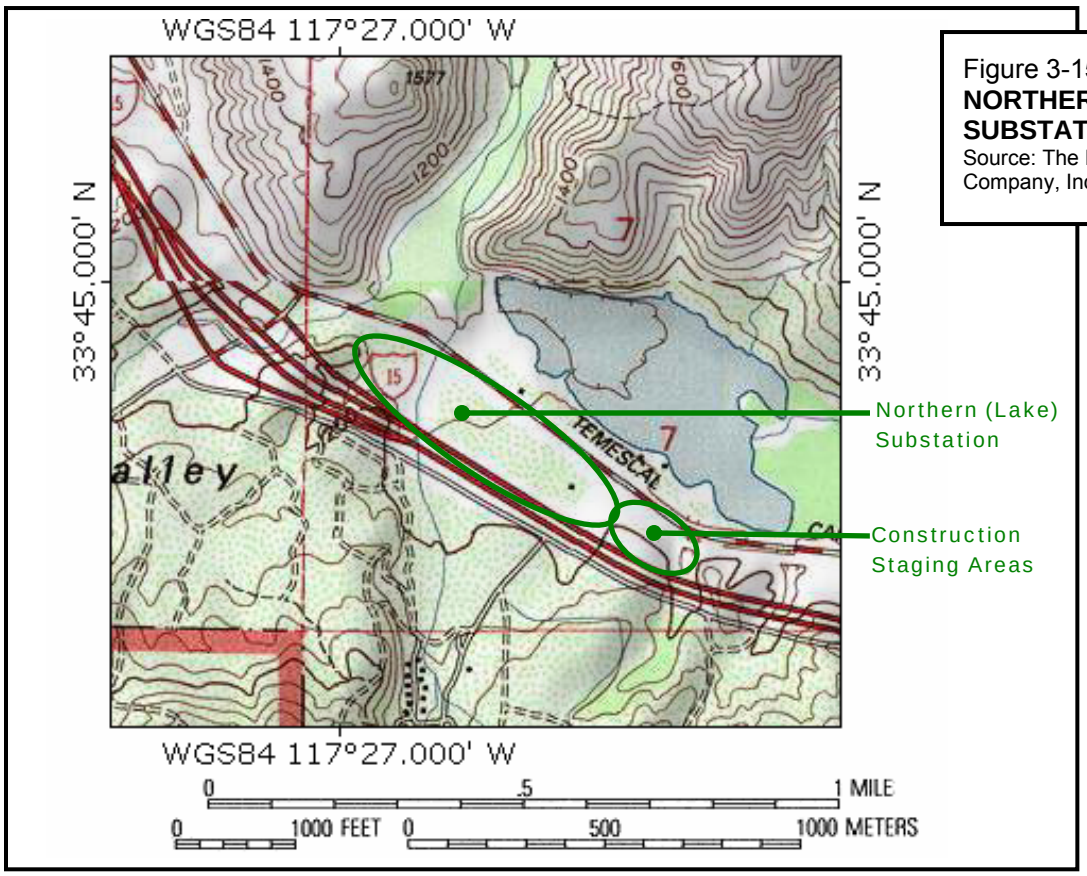
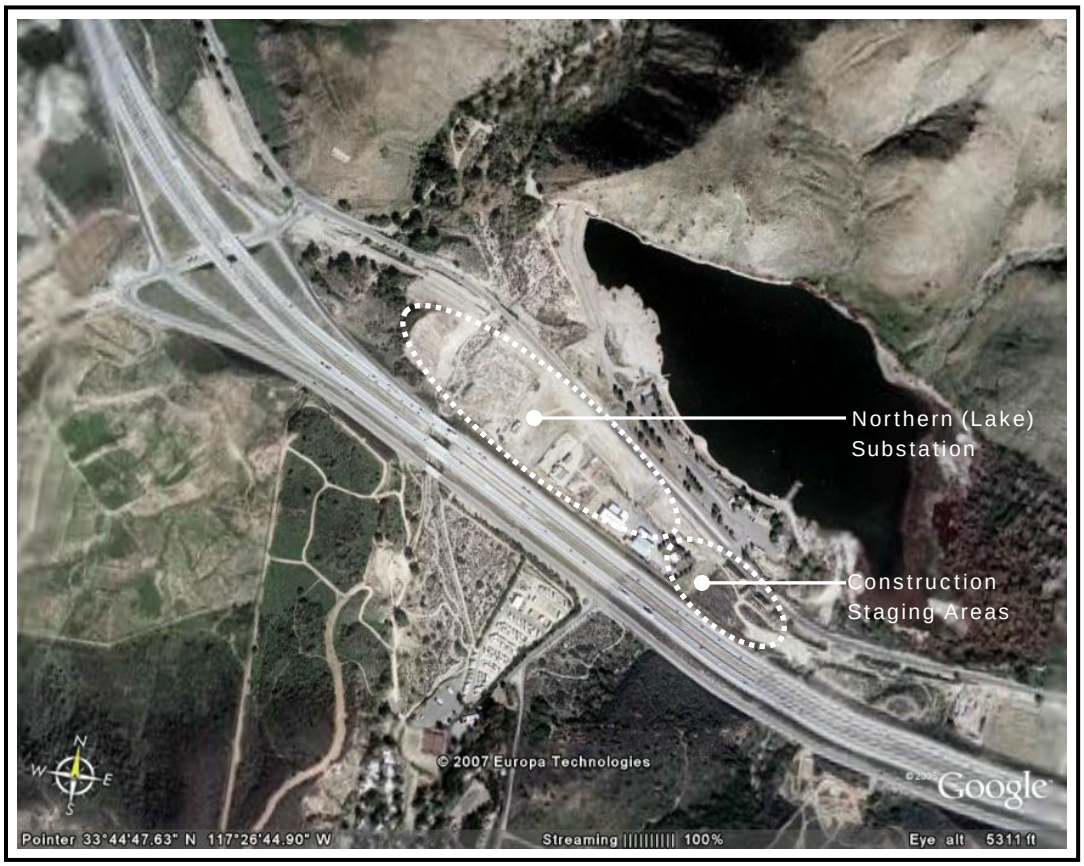


Figure 3-15
NORTHERN (LAKE) SUBSTATION SITE
Source: The Nevada Hydro Company, Inc.



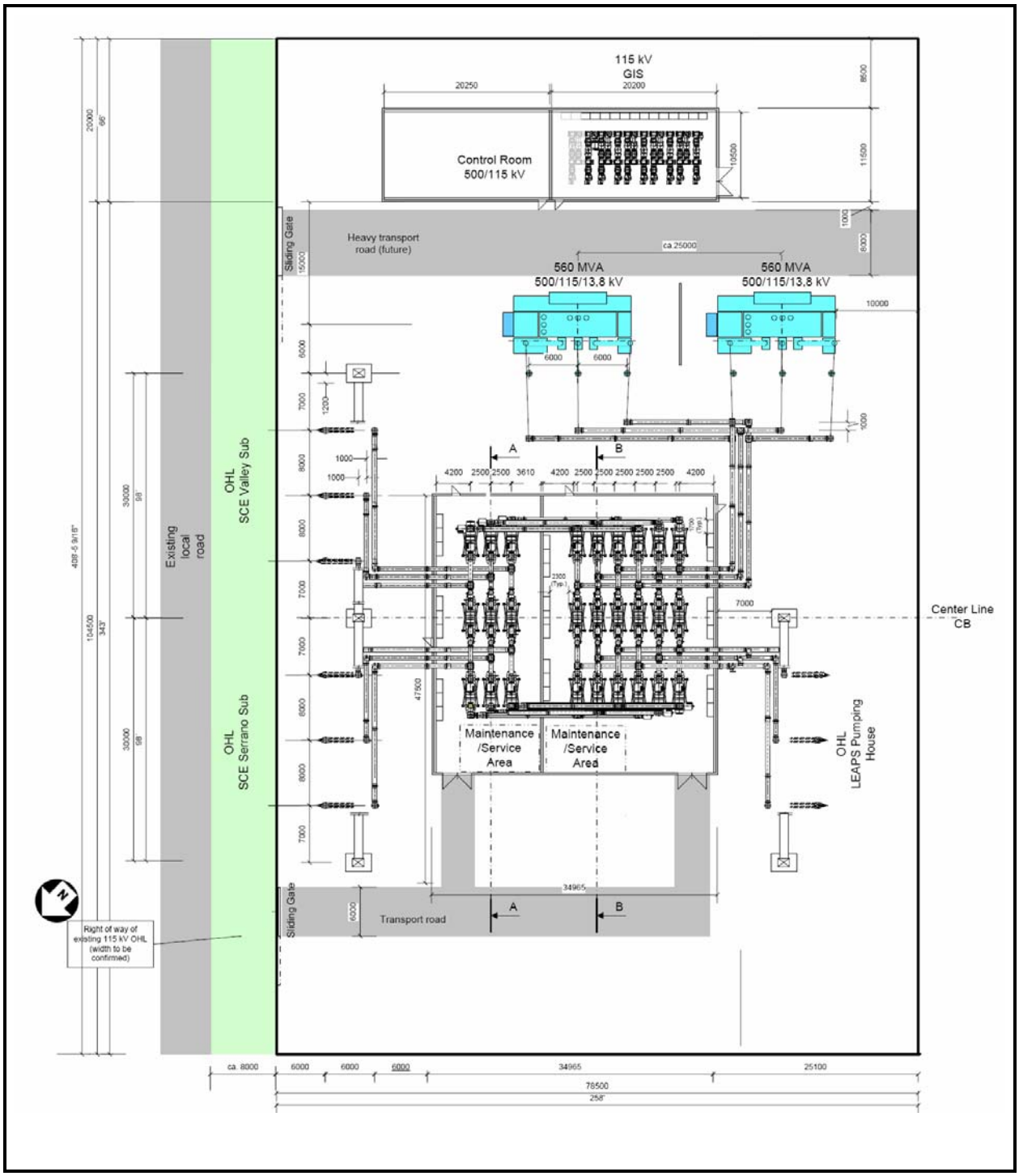


Figure 3-16
NORTHERN (LAKE)
500-KV/115-KV SUBSTATION
CONCEPTUAL SITE PLAN
Source: Siemens Power Transmission & Distribution

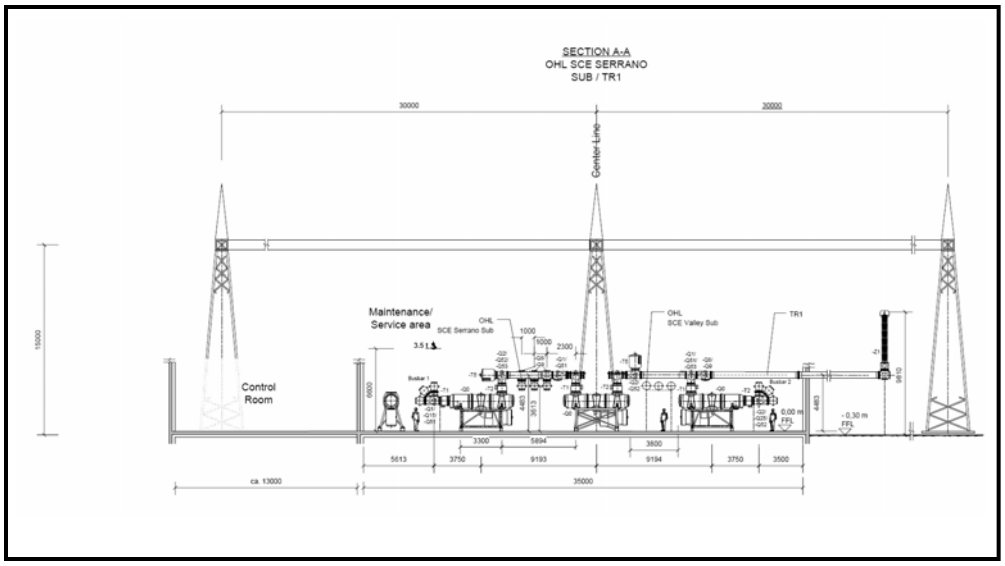


Figure 3-17
(1 of 3)
NORTHERN (LAKE) 500-KV SUBSTATION CONCEPTUAL ELEVATION (SECTION A-A')
Source: Siemens Power Transmission & Distribution

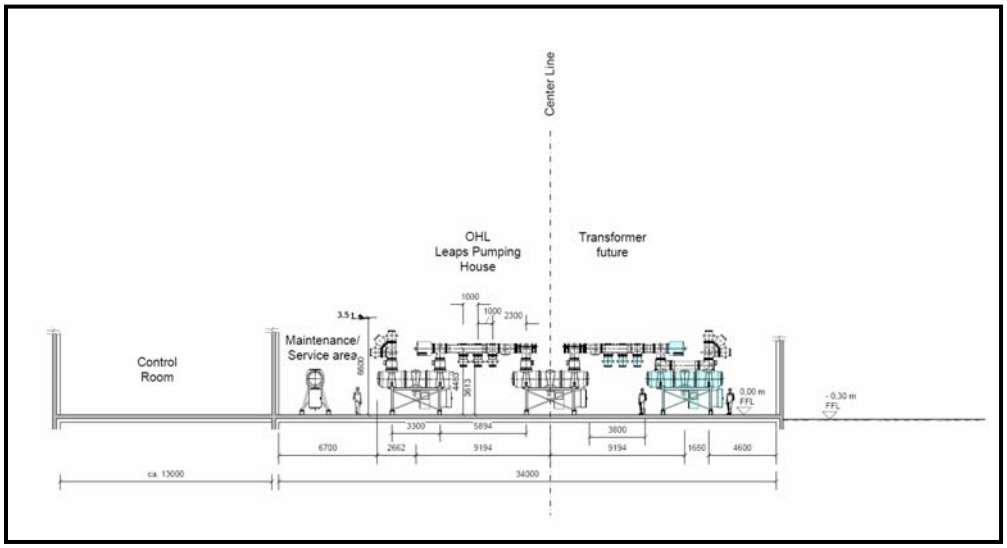


Figure 3-17
(2 of 3)
NORTHERN (LAKE) 500-KV SUBSTATION CONCEPTUAL ELEVATION (SECTION B-B')
Source: Siemens Power Transmission & Distribution

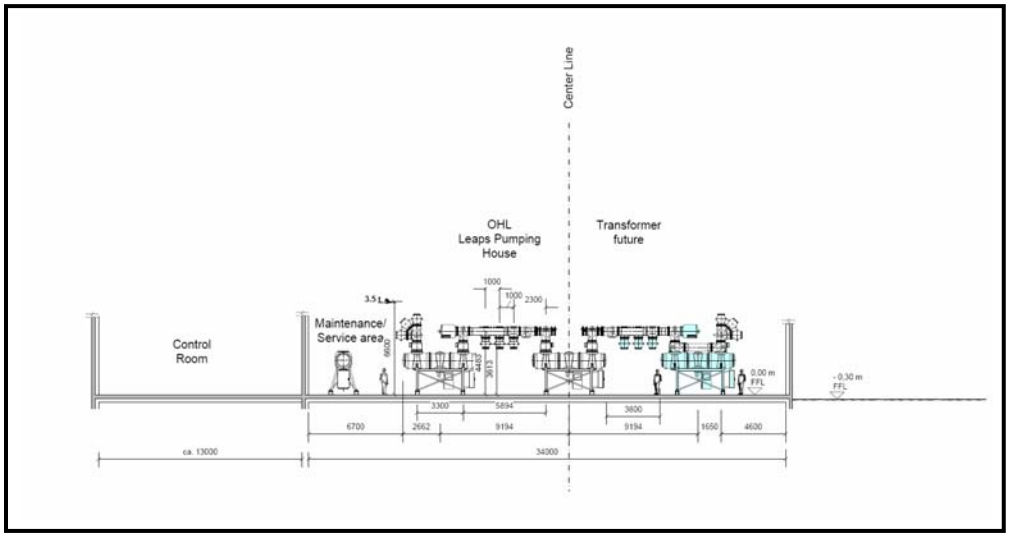


Figure 3-17
(3 of 3)
NORTHERN (LAKE) 500-KV SUBSTATION CONCEPTUAL ELEVATION (SECTION C-C')
Source: Siemens Power Transmission & Distribution

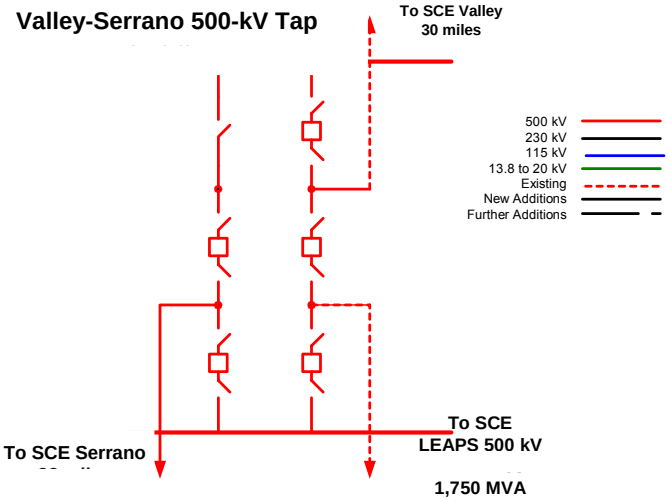
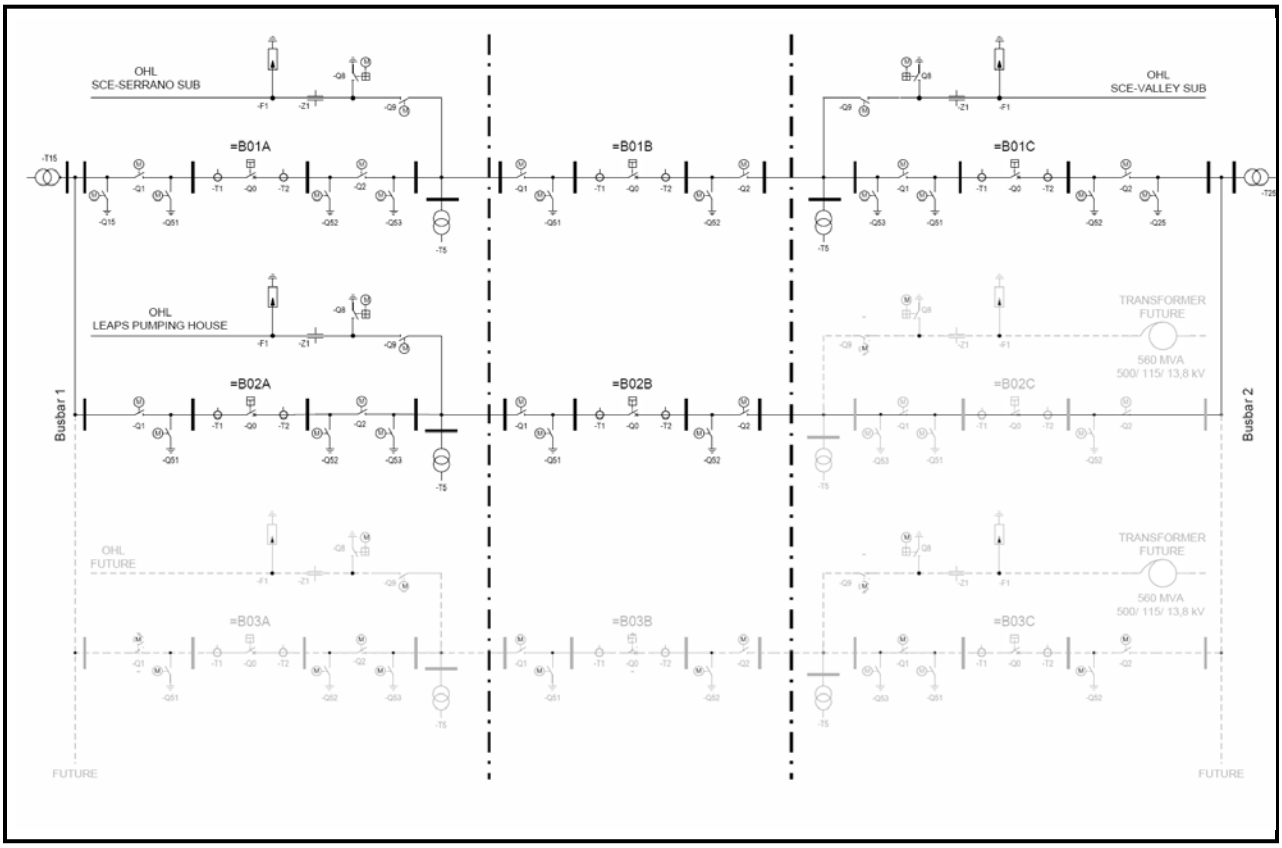


Figure 3-18
NORTHERN (LAKE) 500-KV SUBSTATION SINGLE-LINE DIAGRAM
Source: Siemens Power Transmission & Distribution

Rated voltage	550 kV
Rated frequency	60 Hz
Rated lightning impulse withstand voltage	1550
Rated power frequency withstand voltage	740 kV
Rated current busbar	4000 A
Rated current feeder	4000 A
Rated short - time withstand current	63 kA/ 1s
Rated short - circuit breaking current	63 kA
Indoor ambient temperature	-5 °C ... +40 °C
Outdoor ambient temperature	-5 °C ... +49 °C



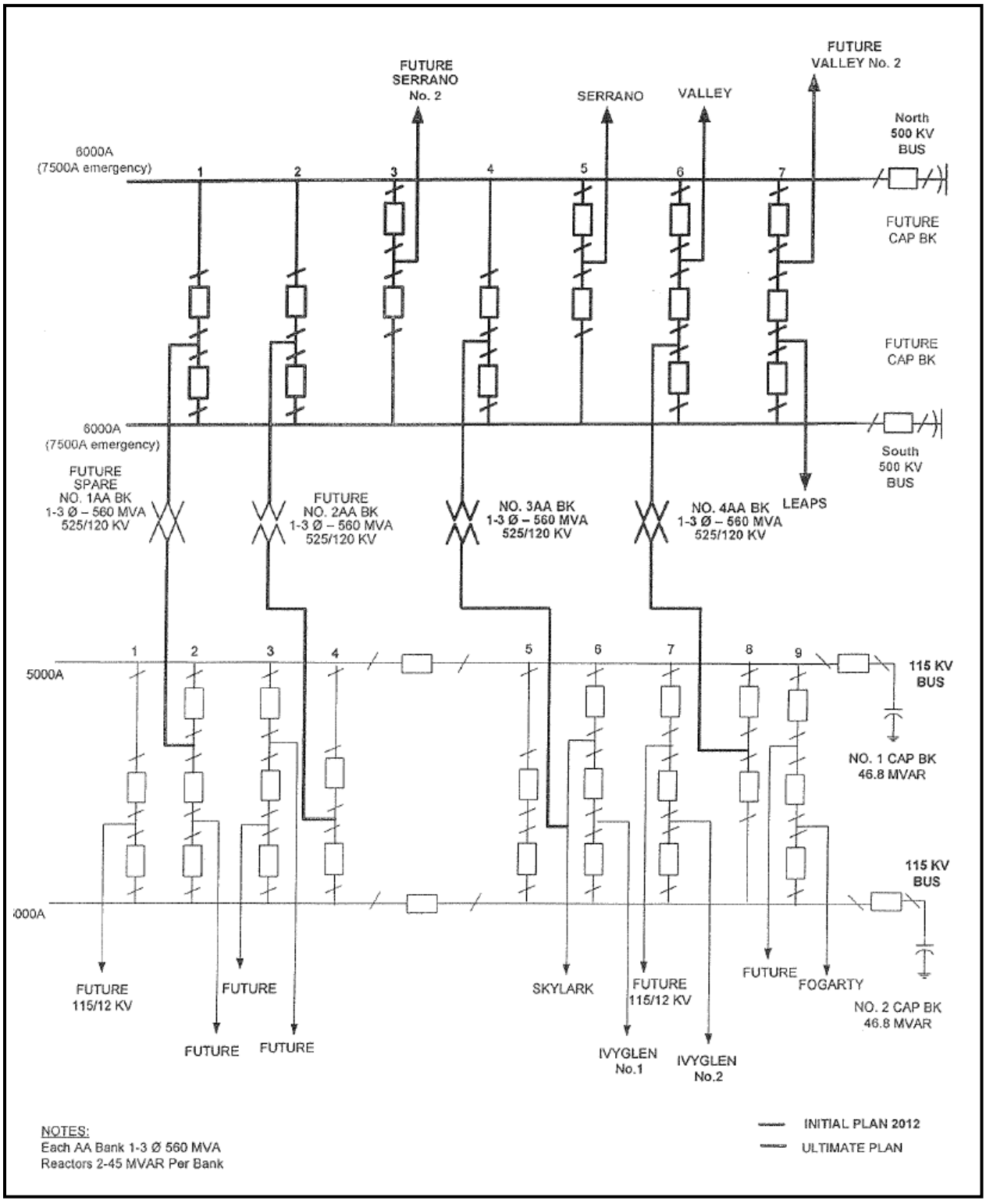


Figure 3-19
SCE 500-KV/115-KV REINFORCEMENT PROJECT - LINE AND BUS ARRANGEMENT
Source: Southern California Edison

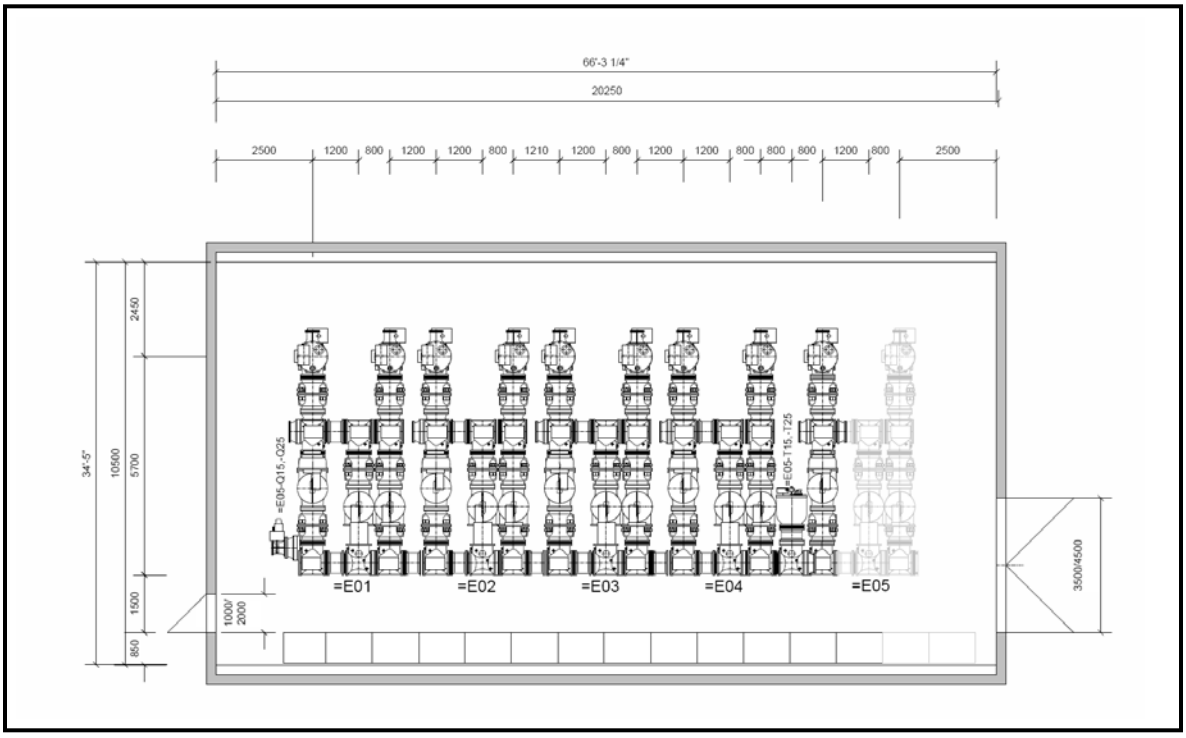
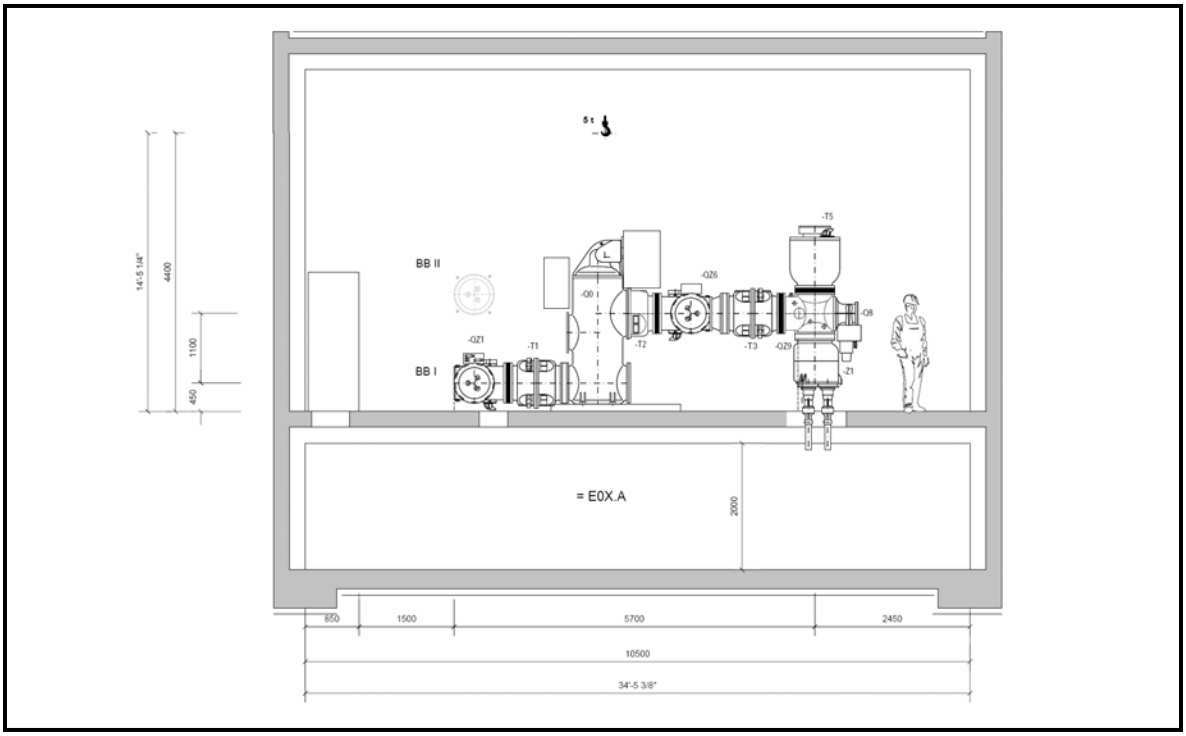


Figure 3-20 (1 of 4)
NORTHERN (LAKE) 115-KV SUBSTATION CONCEPTUAL ELEVATIONS
Source: Siemens Power Transmission & Distribution

Figure 3-20 (2 of 4)
NORTHERN (LAKE) 115-KV SUBSTATION CONCEPTUAL ELEVATIONS
Source: Siemens Power Transmission & Distribution



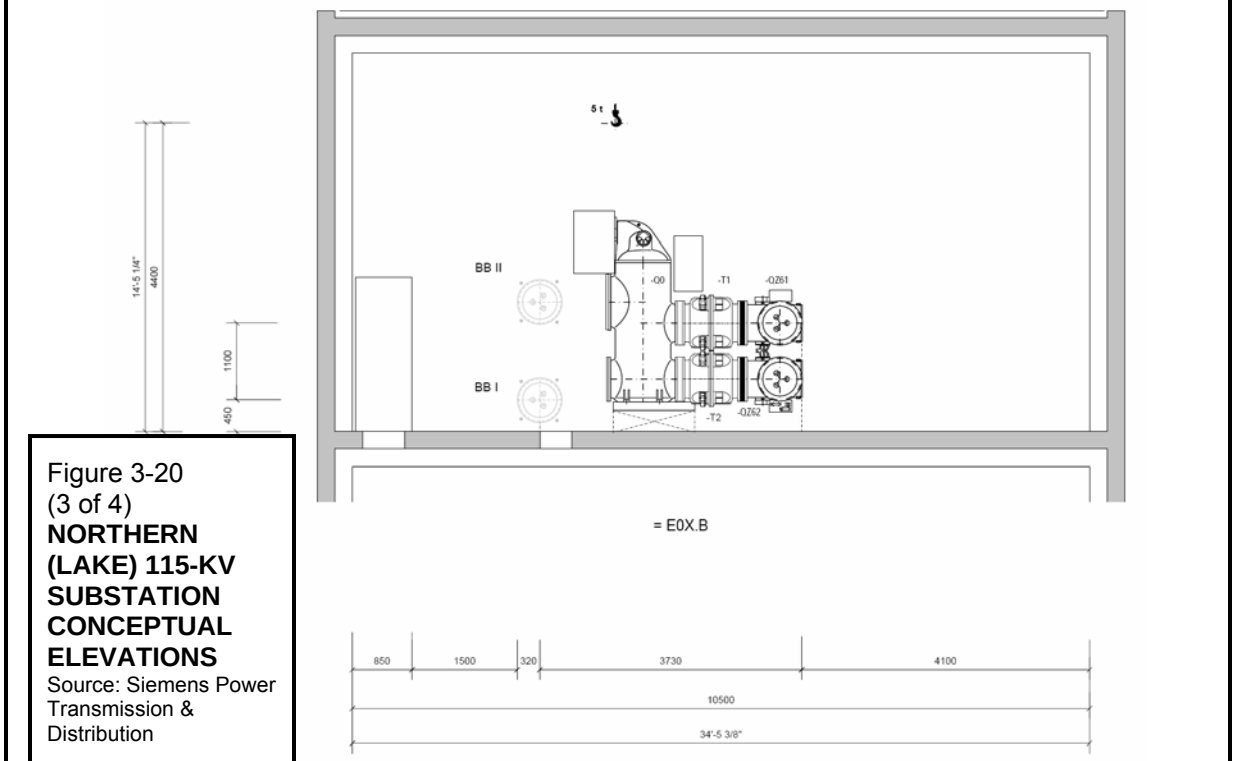


Figure 3-20
(3 of 4)
NORTHERN (LAKE) 115-KV SUBSTATION CONCEPTUAL ELEVATIONS
Source: Siemens Power Transmission & Distribution

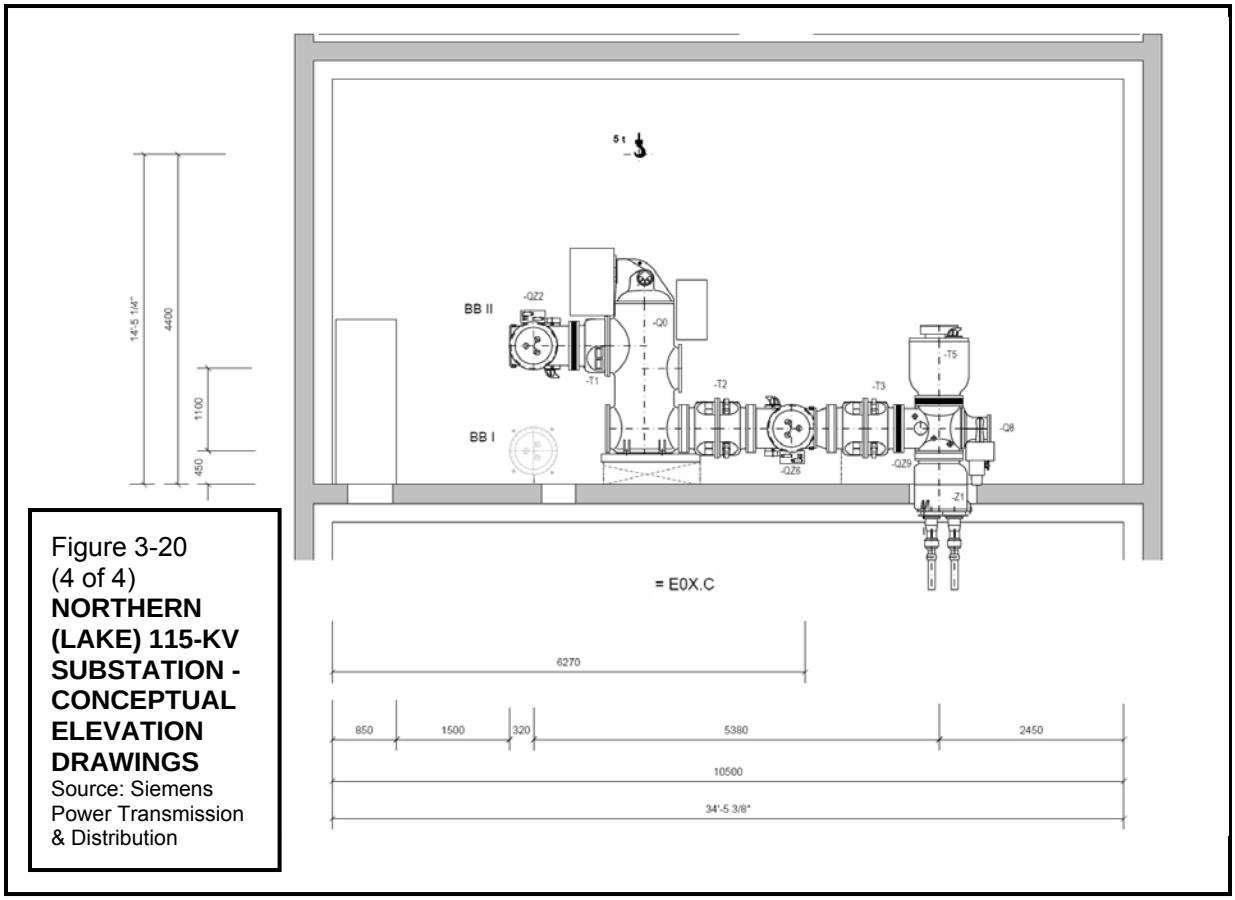


Figure 3-20
(4 of 4)
NORTHERN (LAKE) 115-KV SUBSTATION - CONCEPTUAL ELEVATION DRAWINGS
Source: Siemens Power Transmission & Distribution

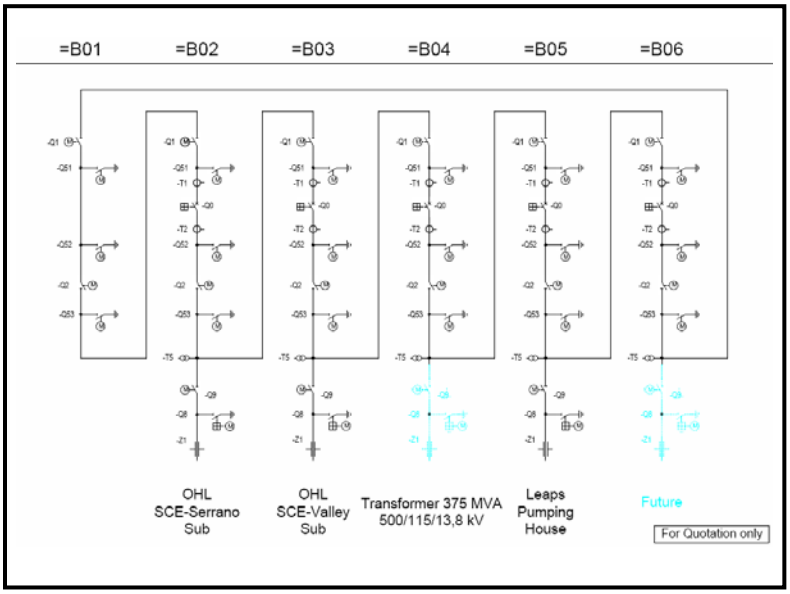


Figure 3-21
NORTHERN (LAKE) 115-KV SUBSTATION SINGLE-LINE DIAGRAM
Source: Siemens Power Transmission & Distribution

Rated voltage	145 kV
Rated frequency	50 Hz
Rated lightning impulse withstand voltage	650 kV
Rated power frequency withstand voltage	275 kV
Rated current busbar	1250 A
Rated current feeder	1250 A
Rated short - time withstand current	31,5 kA / 1s
Rated short - circuit breaking current	31,5 kA
Indoor ambient temperature	__°C
Closing (Insertion) Resistor	yes / no
Rated switching impulse withstand voltage	___ kV