

Appendix E

**Sunset Area Electric, Natural Gas,
Telecommunications Technical
Dry Utilities Analysis**

SUNSET AREA

ELECTRIC, NATURAL GAS, TELECOMMUNICATIONS

TECHNICAL DRY UTILITIES ANALYSIS

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I. Introduction

Purpose and Objectives

This Technical Analysis provides a broad overview of the dry utility (electricity, natural gas, telephone/broadband, and cable television/broadband) infrastructure needed to serve the Sunset Area.

Background Information on Study Area

The Sunset Area is in Placer County and lies north of Roseville, south of Lincoln and west of Rocklin. Placer Ranch covers approximately 2,200 acres of the southern portion, but its load is excluded from this report and covered in a separate study (Placer Ranch Technical Dry Utilities Study dated July 18, 2017). The Sunset Area will include retail, commercial, entertainment mixed use, business parks, an innovation center, eco-industrial, light industrial, public facilities, a preserve /mitigation reserve and an urban reserve, as described in the July 2017 Sunset Plan Area Administrative Draft.

Proposed Dry Utility Requirements

New extensions of natural gas, electric, telephone and cable television/broadband will be required to serve the new facilities and will be extended in joint trenches wherever possible. Utility trenches will be placed in franchise areas and on private property in multi-purpose easements (MPEs). To accommodate the joint trench, vaults, transformers, switches and other pedestals, MPEs will be created as needed within the private roads and properties. All new distribution facilities will be underground with the exception of transformers, switches, interrupters, pedestals and pad-mounted equipment.

Pacific Gas & Electric Company (PG&E) – electric, PG&E – natural gas, AT&T – telecom and Wave Broadband – telecom, will provide service to the area. Consolidated Communications (CCI) and Comcast Communications have also indicated a strong interest in serving the Sunset Area.

II. Existing Conditions

This section discusses the existing conditions of the various dry utility systems in the project area.

PG&E Electric

The Sunset Industrial Infill District (Industrial Avenue, Cincinnati Avenue, West Sunset Blvd and the surrounding areas) is well developed with multiple overhead lines [21,000 and 115,000 volt lines (21 kV & 115 kV)]. Athens Avenue adjacent to the Thunder Valley Casino has both 115 kV (transmission) and 21 kV three-phase distribution lines, though the 115 kV line turns north just west of the casino and continues north. (Thunder Valley is primary metered: It takes service from two PG&E 21 kV circuits). The 21 kV line on Athens Avenue continues west where it connects to a 21 to 12 kV auto-bank which converts it to 12 kV, then continues west towards Fiddymont Road at 12 kV.

Another PG&E 12 kV three-phase overhead distribution line runs north to south along the east side of Fiddymont Road. Another 12 kV line runs west from Fiddymont Road along the north side of Sunset Boulevard West.

PG&E's Rio Oso-Atlantic double-circuit 230 kV electric transmission tower line runs in a northwest/southeast direction through the project.

PG&E's Pleasant Grove Substation is located on Industrial Avenue north of Sunset Boulevard West.

PG&E Natural Gas

PG&E has a 12-inch steel gas transmission main (Line 123) traversing roughly southwest to northeast through the far southeastern portion of Placer Ranch. It angles and runs north roughly paralleling Industrial Avenue to Twelve Bridges Drive, where it turns east. The nearest regulator station is on Sunset Boulevard West near Cincinnati Avenue (the Industrial Park Regulator Station). A second regulator station is on Twelve Bridges Drive just west of East Joiner Parkway. A third regulator station is located on Westbrook Boulevard just north of Pleasant Grove Boulevard.

The Sunset Industrial Infill District is developed with gas mains serving the immediate area. A 6-inch plastic gas main extends south on Industrial Avenue towards Roseville and north to just north of Cyber Court. An 8-inch main is stubbed on Sunset Boulevard east towards Placer Ranch.

PG&E has an 8-inch, 6-inch and 4-inch plastic (pl) gas distribution mains stubbed along the south and southeast boundaries of Placer Ranch.

AT&T

The Stanford/Rocklin central office (CO) is located north of Sunset Boulevard on Industrial Avenue. Underground fiber trunks run north on Industrial Avenue, along Cincinnati Avenue and west along Sunset Avenue West. A fiber line runs west on Athens Avenue past the Thunder Valley Casino then north on Fiddymment.

AT&T's Pleasant Grove Wire center is located on Pleasant Grove Boulevard just north of Howsley Road. An old buried copper cable runs west from it on Sunset Boulevard West.

Wave Broadband

Wave Broadband has conduit structure with fiber stubbed along the south boundary of Placer Ranch.

Comcast

Comcast has conduit structure with fiber and coaxial cable stubbed along the south and southeast boundaries of Placer Ranch.

Consolidated Communications

Consolidated Communications' (CCI) Placer Corporate CO is located on Placer Corporate Drive in the Sunset Industrial Infill District. It has fiber and copper infrastructure in the surrounding areas and stubbed along the south and southeast boundaries of Placer Ranch. An overhead fiber line (an underbuild to PG&E's 12 kV line) that is believed to belong to CCI runs west on Athens, south on Fiddymment and then west on Sunset Boulevard through the Sunset Area.

Sprint

A Sprint fiber line extends north-south through the Sunset Area along the east side of Fiddymont Road as an underbuild to the PG&E overhead 12 kV line.

III. Developed Conditions

This section discusses the developed conditions of the various dry utility systems in the project area.

A. PG&E Electric

Pacific Gas & Electric (PG&E) will supply electric service to the Sunset Area in accordance with its rules and regulations. Peak electric demand at buildout (Table 1) is estimated at 168 MVA.

Table 1 – Estimated Electric Peak Demand at Buildout (MVA)

Land Use	Residential MDR & HDR	Commercial, Business/Retail	Hospitals Medical & Nursing	Industrial Light & Heavy	Office Business Park	Peak Demand (MVA)
Peak Demand Phase 1	1.4	13.5	2.0	9.3	14.5	40.7
Peak Demand Phase 2	5.5	2.1	0.3	63.1	56.2	127.2
Peak Demand at Buildout	6.9	15.6	2.4	72.4	70.7	168.0

Substations

Four substations will either serve or back up service to the Sunset Area -- two will be located onsite, and two offsite:

Pleasant Grove Substation: PG&E’s Pleasant Grove Substation is located just west of the site on Industrial Avenue (just north of Sunset Boulevard West) and will serve the initial phases of the Placer Ranch portion of the Sunset Area. It’s a 115 to 21 kV, 135 MVA substation consisting of three 45 MVA banks and six main-line 21 kV breakers/ get-away circuits (two per bank). At peak demand Pleasant Grove is running at approximately 110 to 115 MVA, close to 80% of capacity. There are no plans for expansion; PG&E considers 135 MVA to be the ultimate buildout.

Athens Substation: A new substation has long been planned on the east side of Industrial Avenue, just north of 12 Bridges Drive and south of the new Hwy 65 bypass that curves west over Industrial. PG&E owns the 10 acre site and projects construction to begin in 2020 to 2022. Once built the utility will off-load some of the existing Pleasant Grove demand to Athens so the Pleasant Grove substation can pick up new load as the Sunset Area (including Placer Ranch) develops. Athens will be a 115 to 21 kV, 3 bank, 135 MVA substation.

Placer Ranch Substation: A third substation is planned for the Placer Ranch portion of the Sunset Area, immediately adjacent to PG&E’s 230 kV transmission line and Roseville Electric’s Peaking Plant #2. The Placer Ranch substation will be a 230 to 21 kV, 3 bank, 135 MVA substation, and have a footprint of roughly 450 feet by 400 feet (approximately four acres) with access capabilities

for large utility trucks, cranes and equipment. PG&E projects construction to begin in 2030 to 2040, with actual timing driven by demand.

Sunset Substation: Due to the projected demands of the Sunset Area at buildout (168 MVA), a fourth substation is anticipated to be required within the Sunset Area. A site hasn't been determined, but it should be located in the northwest end of the development directly adjacent to PG&E's 230 kV transmission line. We anticipate the Sunset Substation to be 230 to 21 kV, 3 bank, 135 MVA, on a four acre site. No extensions of transmission lines will be required. Timing of construction will be driven by demand.

Electric System Design

PG&E's underground distribution systems can be divided into two parts: The large capacity 600 amp main-line backbone feeder circuits that extend down the major roads, and the smaller capacity 200 amp local loops and radial circuits that extend from it and run through the neighborhoods.

The backbone circuits will have main-line interrupters (primarily pad mounted 600 amp I-9s, or a subsurface 3-way, 3-way switch with a 200 amp interrupter) near all the major intersections as well as at every 1500 kVA of main-line load. Capacitor banks will be installed on main line circuits throughout the project to help with voltage and capacitance issues on hot days.

The smaller capacity three phase and single phase 200 amp circuits may be looped or extended as radials off main-line circuits and will distribute electric service to the industrial/commercial and residential neighborhoods. Transformers will be located in residential neighborhoods and at industrial/commercial sites to serve individual users.

Street lighting will be designed and constructed to Placer County standards along all public streets as part of the roadway frontage improvements.

Distribution Voltage

PG&E has a three phase 12 kV overhead line running north-south through the development on Fiddymont Road that will be relocated and converted to underground as the project develops. Its Pleasant Grove substation (located just east of the project) provides distribution voltage at 21 kV. PG&E could serve the Sunset Area at 21 & 12 kV or just 21 kV, but a 21 kV system offers financial benefits (to PG&E and developer) in large communities such as Sunset Area that make it especially attractive. PG&E intends to serve all of Placer Ranch at 21 kV, though no decisions have been made on the balance of the Sunset Area.

PG&E's Rio Oso-Atlantic 230 kV Double Circuit Tower Line

A PG&E 230 kV tower line runs in a northwest/southeast direction through the Sunset Area and Placer Ranch in a 120-foot wide easement. The line isn't centered in the easement, leaving PG&E the space and land rights to construct a parallel 230 kV tower line. We wouldn't rule out PG&E constructing a parallel 230 kV line through the Sunset Area at some future point, but it isn't a high priority and will not happen in the near future.

B. PG&E Natural Gas

Pacific Gas & Electric (PG&E) will supply natural gas service to the Sunset Area in accordance with its rules and regulations. Peak gas demand at buildout (Table 2) is estimated at 1,507,000 cubic feet per hour (1,507 MCFH).

Table 2 - Estimated Natural Gas Peak Demand at Buildout (MCFH)

Land Use	Residential MDR & HDR	Commercial, Business/Retail	Hospitals Medical & Nursing	Industrial Light & Heavy	Office Business Park	Peak Demand (MCFH)
Peak Demand Phase 1	16.0	109.0	15.7	132.2	119.0	391.9
Peak Demand Phase 2	96.5	16.7	2.7	545.8	453.3	1115.0
Peak Demand at Buildout	112.5	125.8	18.4	678.0	572.3	1506.9

PG&E’s Line 123 Gas Transmission Main

Transmission mains bring natural gas to a locality at high pressures. As discussed previously, PG&E owns and operates Line 123, a 12- and 8-inch steel natural gas transmission pipeline that runs somewhat diagonally (southwest to northeast) through the far southeastern portion of Placer Ranch and the Sunset Area in a 10-foot wide transmission pipeline easement.

Transmission mains are typically engineered to a maximum allowable operating pressure (MAOP) of 900 psig, but the portion of Line 123 that runs through and north of Placer Ranch and into the Sunset Area, was constructed in 1943 and is due to be upgraded. It is most likely running at only 400 to 500 psig.

Gas Regulator Stations

Regulator stations reduce transmission pressures to typical distribution pressures (MAOP 60 psig) and serve the adjacent communities. PG&E has gas regulator stations on Sunset Boulevard West, Twelve Bridges Drive and Westbrook Boulevard, so it has capacity to serve a portion of the Sunset Area. But with an estimated peak gas demand of 1,507 MCFH, the need for one to two additional regulator stations is anticipated at buildout.

In order to serve the entire Sunset Area with natural gas, the utility will place one or perhaps two gas regulator stations along its existing transmission line. The timing, size and location of those future facilities have not been determined, but once identified the owners should plan to grant PG&E an easement (with all-weather access for maintenance and operations) of approximately 20 feet by 80 feet for each regulator station.

Gas System Design

Distribution mains and services will extend off the mains and will be sized based on anticipated gas loads to the various parcels. 8-inch, 6-inch and 4-inch plastic gas mains will be extended into

and loop through the development as the project progresses. 2-inch distribution mains will loop through the remaining roads and through subdivisions, commercial areas and business parks. Residential neighborhoods will have 2-inch plastic mains and 1-inch services.

C. AT&T

AT&T is the incumbent local exchange carrier (ILEC) and will provide telecom services to the Sunset Area in accordance with its rules and regulations.

System Design

AT&T's Stanford/Rocklin central office (CO, also known as an exchange or a wire center) is located east of Placer Ranch on Industrial Avenue, just north of Cyber Court. It's a "mega" wire center equipped with the latest in fiber telecom technology and serves much of northwest Roseville, as well as Rocklin and Lincoln through its Stanford and Lincoln exchanges. It also serves the industrial areas in the vicinity of Cincinnati and Industrial Avenue.

The Stanford Wire Center will provide telecommunications service to the Sunset Area. Underground fiber trunks run along Industrial Avenue, Cincinnati Avenue and west along Sunset Avenue West from the CO.

AT&T's Pleasant Grove Wire center will serve the western portion of the Sunset Area.

Residential: Two types of fiber systems are employed for residential projects: 1) Fiber to the premises (FTTP) and, 2) Fiber to the node (FTTN).

AT&T's most advanced pure fiber connection medium is FTTP, where fiber runs from the CO directly to each residence. AT&T's intention is to serve the residential portion of Placer Ranch and most of the Sunset Area with FTTP.

The Pleasant Grove Wire center is an older facility and does not offer FTTP or FTTN. As development proceeds the developer may want to petition AT&T to relocate its exchange boundary and transfer all of the Sunset Area into the Stanford Wire Center. That would assure it the most advanced telecom service.

Industrial/Commercial: Service to business, commercial and retail customers will be based on their requirements -- either copper or fiber fed. AT&T still runs copper for traditional business telephone service unless a customer specifically requests and contracts for fiber service. Large businesses, office buildings, strip malls, schools, hospitals, libraries etc. will be served via fiber fed Digital Loop Carrier (DLC), which uses an optical fiber trunk cable from the CO to a remote terminal (RT), and copper pairs for the final leg from the RT cabinet to the end user. Multiple dwelling units (MDUs) will be served via fiber or fiber-fed DLC, depending on conditions. It is anticipated that several RT cabinets placed in MPEs will serve the business parks, commercial and industrial sites. A backbone conduit and manhole system capable of supporting both copper and fiber systems will run along all the major roads.

D. Wave Broadband

Wave Broadband is the cable television provider for this portion of Placer County and will serve the Sunset Area with cable TV and broadband/internet from its Headend in Rocklin. Wave has

conduit structure with fiber stubbed west at Sunset Boulevard and Cincinnati Avenue, and at Nichols Drive and Duluth Avenue.

System Design

Wave offers a “triple play” of services (dial tone, video and internet). It installs a hybrid fiber-coaxial (HFC) system that combines fiber and coaxial cable in DB 120 conduit. In an HFC system, the information (TV channels, data, voice, et al) is sent from the company’s head end to optical nodes in the local neighborhoods via optical fiber trunk cables. The optical node (i.e., the fiber node) converts the digital light signal (data encoded in a pulse of light) to an electrical signal for the final leg via coaxial cable to the end users.

Wave pipes the main roads with one 3-inch and two 2-inch ducts as its backbone system, and typically runs two 2-inch ducts in subdivisions. It provides and installs its own system -- conduit, boxes, pedestals, fiber, coaxial cable, nodes, amplifiers, splitters, power supplies, etc. The fiber nodes, nodes, amplifiers, splitters and power supplies are often placed in pedestals or dog houses. Each fiber node is fed with 6 fibers and serves 300 to 400 customers.

Wave recently launched its own version of a FTTP system, and the Sunset Area will almost certainly be served via that latest technology.

E. Comcast

Comcast has indicated a strong interest in serving the Sunset Area and has facilities stubbed to the south and southeast portions of the Placer Ranch.

System Design

Comcast offers a “triple play” of services (dial tone, video and internet). It installs an HFC system similar to the one described above for Wave Broadband in a high density polyethylene (HDPE) pipe as opposed to conduit. The HDPE comes on reels, is typically black or terra cotta colored, and looks very similar to gas pipe.

Comcast recently launched its own version of an FTTP system and the Sunset Area should receive that latest technology.

F. Consolidated Communications

CCI is interested in serving the Sunset Area. It is the incumbent local exchange carrier (ILEC) for most of Roseville, but would compete with AT&T as a competitive local exchange carrier (CLEC) in the Sunset Area. It is exceptionally well situated to serve: Consolidated Communications’ Placer Corporate CO is located on Placer Corporate Drive and has conduit stubbed west on Sunset Boulevard towards the Sunset Area. It has conduit from its Del Webb CO stubbed to the Placer Ranch southern boundary on Fiddymont Road, and conduit from its Blue Oaks CO stubbed north to the project’s boundary on Woodcreek Oaks Boulevard. Conduits from CCI’s Industrial CO are stubbed to the north end of Foothills Boulevard.

CCI will offer services (dial tone, video and internet access) via fiber-optic cable from any of the four CO’s listed above. System design is much like that described above for AT&T.

G. Sprint

The Sprint fiber line traversing the project on Fiddymment Road (an underbuild on the PG&E 12 kV line) is a long haul trunk & toll line that runs from Mexico to Canada. As such, it will not provide telecom service to either Placer Ranch or the Sunset Area.

The fiber line will be relocated and converted to underground as the project develops, but that presents challenges. The architecture of this aerial line is unusual and obsolete – no spare fiber is coiled anywhere along it to deal with the relocations, underground conversions or car pole accidents that invariably occur. Any changes whatsoever require complete reconstruction from splice point to splice point, which could be a half a mile away in each direction. The splices themselves are in buried boxes (not flush-mount boxes with lids, truly buried boxes) making them inaccessible without a backhoe. It's a challenging and expensive system to work with.

IV. Environmental Documents

It is recommended the environmental documents include evaluation of the cumulative impacts of existing, relocated and proposed dry utility facilities.

V. Summary & Conclusions

From a dry utility perspective, no insurmountable obstacles are anticipated in serving the Sunset Area. The usual challenges are anticipated – undergrounding and relocating existing overhead lines, siting of telephone remote terminals, tapping the 230 kV line for PG&E's new substations, determining acceptable locations for gas regulator stations, working around, over and under PG&E's 230 kV high voltage electric transmission tower line and its Line 123 gas transmission line.

PG&E electric and natural gas, AT&T, Wave, and CCI all have distribution facilities within the Industrial Infill area -- ready to be extended and activated to serve Phase 1 of the Sunset Area. Comcast is not well positioned to serve Phase 1 of the Sunset Area as their existing facilities are stubbed south of Placer Ranch. However, if they are extended through Placer Ranch in a timely manner they could then be extended into the Sunset Area to provide service.