APPENDIX 3.16B

Dry Utilities Study

CapitolUtility Specialists

AMORUSO RANCH

TECHNICAL DRY UTILITIES STUDY

September 3, 2015

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Exhibits

SECTION 1 – OVERVIEW

Background Information

The Amoruso Ranch Specific Plan (ARSP) encompasses 674.4 acres in unincorporated Placer County and is proposed for annexation to the City of Roseville. It's located north of Blue Oaks Boulevard -- north of the Creekview Specific Plan (CSP) -- and west of the Placer Ranch Specific Plan (PRSP). At buildout, the project will have low, medium and high density residential units, an elementary school, a fire station, parks, open space and commercial uses. This study has been updated to reflect the 5/4/2015 land use plan.

Electric will feed from the new substation in the CSP. Natural gas, telephone and cable television/broadband services exist south of the site on Blue Oaks Boulevard and will extend west on Blue Oaks Boulevard then north through the CSP on Westbrook Boulevard to serve the site.

Joint trenches will be placed in franchise or public utility easements (PUEs) parallel and adjacent to the road rights of way. PUEs will be designed to accommodate the joint trench, boxes, transformers, switches and other pedestals. All new distribution facilities will be underground, with the exception of transformers, switches, telephone cabinets and other pedestals and pad-mounted equipment. Roseville Electric's 60 kV transmission and fiber facilities will be overhead.

Roseville Electric (RE), Pacific Gas & Electric Company (PG&E), AT&T and Comcast Communications (Comcast) will serve the project. All four utilities received preliminary land use plans and other pertinent information for their long range planning.

Project Phasing

The ARSP area is designed to allow the backbone infrastructure to be phased. Initial plans call for phasing to be generally south to north along Westbrook Boulevard, though phases may be developed in any sequence provided 1) Public safety, health and welfare issues are addressed, 2) The City of Roseville approves and 3) Utility infrastructure has been extended to feed the proposed phase.

Parcel specific improvements will be determined with small lot tentative maps.

SECTION 2 – ELECTRIC SERVICE

ELECTRIC

In accordance with its ordinances and specifications, RE will supply electric service to ARSP. We estimate peak electric demand at buildout at approximately 19 megavolt amperes (MVA).

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

Land Use	Residential LDR& MDR (1845 Units)	Residential HDR (982 Units)	Community Commercial/Retail (442,000 SF)	Community Office (34,000 SF)	Schools Public Fac. (80,000 SF)	Peak Demand (MVA)
Peak Demand (MVA)	10.1	3.9	3.1	.2	1.3	18.7

Existing Facilities

RE has no distribution facilities immediately adjacent to the site. The closest substation is a 92 MVA facility (Figure 1) located on Blue Oaks Boulevard in the Westplan. It provides distribution voltages at 12 thousand volts (12 kV), and is equipped with fourteen mainline 12 kV breakers/ feeder circuits. RE confirms that all excess capacity from this substation has been committed to other projects -- CSP, Fiddyment Farms, et al.

Figure 1 - Roseville Electric's Westplan Substation

ARSP will be served from the Creekview Substation (Appendix A, Offsite Dry Utility Exhibit) once it's constructed.

System Design

RE's underground distribution systems can be divided into two parts: 1) The large capacity main line backbone feeder circuits that extend down the major roads, and 2) The smaller capacity local circuits that loop through the neighborhoods.

Each three phase 12 kV main line circuit has a design capacity of about 8.0 MWs. RE employs a strategy known as "N minus 1." It intentionally underloads its circuits to about 75% capacity to provide reliability in emergency conditions (as well as allow for future growth). If a circuit is lost, load from the damaged circuit is shed to other nearby circuits, thereby maintaining integrity of the overall distribution system and keeping most customers in service. Once repairs are made, load is shifted back to the original

Figure 2 – Capacitor Bank

circuits so the additional capacity is available for future emergencies. Main line circuits from one substation often interconnect with those of neighboring substations. The circuits from one substation to a degree back up the circuits from neighboring substations. It's a very reliable system.

Pad mounted capacitor banks (Figure 2) will be installed throughout the project to help with voltage and capacitance issues on hot days. Street lighting will be provided along all public streets as part of the roadway frontage improvements. All electric and streetlight facilities will be designed and constructed to the City's current standards.

Project Design

Four electric main line circuits will extend north to ARSP along Westbrook Boulevard (2 circuits on each side of the road) from the new substation to be built in the CSP area. The circuits (Appendix B – Roseville Electric Backbone Exhibit) will branch and extend along all the major roads to and through pad mounted main line switches (Figure 3).

Figure 3 – Main Line Switch

Local 12 kV circuits extend off main line circuits via pad mounted fused switches and distribute service to the commercial and residential neighborhoods.

Transformers (Figures 4 & 5) are typically placed in series through residential and commercial neighborhoods. Residential circuits typically serve 120 to 160 homes, with a maximum of 178 homes per circuit.

Figure 4 – Three Phase Transformer

Figure 5 – Single Phase Transformer

60 kV Transmission Line

A 60 kV overhead transmission line (double circuit) will extend from the Westplan substation west on Blue Oaks Blvd, northwest along the south side of Pleasant Grove Creek, then north up the east side of Westbrook Boulevard to the substation site where

it dead ends. Long range plans anticipate the line continuing north then east through the PRSP where it will tie to existing RE 60 kV facilities and complete a loop. RE requires a 35' PUE – or as otherwise approved – be placed along all roadways or locations that require a 60 kV line.

Figure 6 – 60 kV Double Circuit Transmission Line

Creekview Substation

Though the Creekview Substation is not the responsibility of ARSP, the following is being provided for informational purposes only due to its impact on this project.

The Creekview Substation is planned for a .98 acre site (Parcel C-81) on the northwest corner of Westbrook Boulevard and Benchmark Drive in the CSP area, adjacent to the open space. Substations typically take 26 to 30 months to plan, design, fabricate and construct. The substation will be served from the 60 kV overhead transmission line that will extend north into the project. A block wall will be constructed by RE around the substation site.

Requirements for the site are as follows:

- Deed a level pad at rough grade with no mitigation issues to RE
- Provide an access road capable of transporting a 200,000 pound distribution transformer and transportation trailer. The road must accommodate the truck and trailer minimum turning radii, shall have a minimum width of 12 feet (12') plus two foot (2') aggregate base shoulders on each side of the road, and shall have a structural section consisting of lime treated sub-grade with two inch (2") asphalt concrete over four inch (4") aggregate base.

On-Site PG&E Electric Facilities

An overhead PG&E 12kV three phase electric mainline runs east - west along the north side of Sunset Boulevard West adjacent to the site. Two PG&E overhead lines extend south onto or adjacent to the property. The first is a 12kV radial three phase tap that runs south just west of Amoruso's western property line and serves a pump on the adjacent property. It will remain. The second is a 12kV radial three phase tap that runs south and serves two old farm houses and a pump. Since electric service will be supplied by RE, the line serving the farm houses and pump has no practical long term value to the development and will be removed as the project develops.

SECTION 3 – NATURAL GAS SERVICE

PG&E

Pacific Gas & Electric Company (PG&E) will supply natural gas service to the Plan Area -- upon request and in accordance with the tariffs on file with the California Public Utilities Commission (CPUC). We estimate peak gas demand at buildout at approximately 164 thousand cubic feet per hour (MCFH).

Table 3 -- Estimated Natural Gas Peak Demand at Buildout

Land Use	Residential LDR & MDR (1,845 Units)	Residential HDR (982 Units)	Community Commercial/Retail (442,000 SF)	Community Office (34,000 SF)	Schools Public Fac. (80,000 SF)	Peak Demand (MCFH)
Peak Demand (MCFH)	92.3	44.2	22.1	1.7	4.0	164.2

Existing Facilities

PG&E has no existing natural gas facilities adjacent to the site. It maintains an 8-inch plastic (Pl) distribution gas main with a maximum operating pressure (MOP) of 60 pounds per square inch gauge (psig) at the Blue Oaks Boulevard and Hayden Parkway intersection (Appendix A, Offsite Dry Utility Exhibit), approximately 0.8 miles east of the future Westbrook Boulevard. The system is fed from two natural gas regulator stations: One located at Blue Oaks Boulevard and Industrial Avenue, the other at Country Club Drive and Badovinac Drive (Figure 7).

Offsite Bring-Up

The 8-inch gas main will extend west from Hayden Parkway along Blue Oaks Boulevard to Westbrook Boulevard in the PUE in a joint trench with RE, Comcast and AT&T. It will continue north up Westbrook Boulevard through the CSP area to ARSP.

Figure 7 – PG&E Gas Regulator Station, Country Club Drive & Badovinac Drive

System Design

An 8-inch Pl distribution main will continue north on Westbrook Boulevard from Blue Oaks Boulevard to and through the site. 4-inch and 6-inch ribs will branch and serve the various neighborhoods (Appendix C – PG&E Natural Gas Backbone Exhibit). Distribution lines and services will extend off the main and will be sized based on anticipated gas loads to the various parcels. Residential neighborhoods will have 2-inch Pl mains and 1-inch services.

SECTION 4 – TELEPHONE

AT&T

AT&T is the incumbent local exchange carrier (ILEC) and will be the primary provider of telephone service per the tariffs on file with the CPUC.

Existing Facilities

Two AT&T wire centers serve the plan area, with an exchange boundary running east-west through the very southernmost portion. The Stanford/Rocklin central office (CO) is a mega-wire center that includes the Stanford and Lincoln exchanges. The Pleasant Grove wire center is a much smaller and more rural exchange, with limited telecom capabilities.

The majority of the project is located within the Pleasant Grove wire center, but that is changing. The exchange boundary will be relocated so that ARSP is located in and served from the Stanford exchange.

Figure 8 – AT&T Primary Flex Point

System Design

AT&T's Stanford/Rocklin CO is located east of ARSP on Cincinnati Avenue, just north of Sunset Boulevard West. It serves much of northwest Roseville (Crocker Ranch, portions of Fiddyment Farms, Westpark & Westbrook), as well as Rocklin and Lincoln. The primary feed will be a large count fiber trunk extended west & north in the conduit system that runs up Hayden Parkway to Blue Oaks Boulevard. Fiber will continue west along Blue Oaks Boulevard then north up Westbrook Boulevard in a joint trench.

Two types of fiber optic cable connections are used in residential projects: 1) Fiber to the premises (FTTP) and, 2) Fiber to the node (FTTN).

ARSP will be served FTTP, AT&T's most advanced pure fiber connection medium, where fiber runs from the CO directly to each residence.

In FTTP, large count fiber cables run from the CO to Primary Flex Points (PFPs, Figure 8) located in residential areas. Each PFP contains multiple splitters (optical prisms) and can serve from 100 to 500 homes. We anticipate 8 to 9 PFPs serving the residential neighborhoods in ARSP. Fiber cables (the

Figure 9 – ONT & Electric Meter Panel

distribution fibers, 432 – 216 – 144 – 72 – 48 - 24 strand) extend from each PFP to the Fiber Serving Terminals (FSTs) strategically placed throughout the neighborhoods. Each FST can serve up to 8 homes, but typically serve 5 to 6. A single fiber runs from the FST to an optical network terminal (ONT, Figure 9) mounted on the outside wall of each residence, so each home is fed by its own fiber.

Two main equipment components are placed at the home: 1) The ONT, which sits in a flush mount telco cabinet on the side of the house and, 2) An external back-up battery located either in the garage or the house. The ONT converts the digital light signal (data encoded in a pulse of light) from the CO to an analog electrical signal which provides the desired services – dial tone, video and internet (i.e., a triple play of services).

AT&T's next most advanced residential fiber optic cable connection is FTTN, where fiber from the CO overlays an existing copper network to a fiber cabinet placed adjacent to an existing service area interface (SAI) box (Figure 10). Copper pairs run from the fiber cabinet to the SAI, with the existing copper pairs remaining as the final legs to the residences. AT&T offers its triple play via FTTN, and large portions of Fiddyment Farms and Westpark are served in this manner.

Figure 10 – SAI Box & Fiber Cabinet

A backbone conduit and manhole (Figure 11) system capable of supporting both copper and fiber systems will run along Westbrook Boulevard and the other major roads (Appendix E – AT&T Telecom Backbone Exhibit).

Service to commercial and retail customers will be based on their requirements -- either copper or fiber fed. AT&T still runs copper pairs for traditional business telephone service unless a customer specifically requests fiber service.

We anticipate several remote terminal (RT) cabinets (Figure 12) placed in PUEs to serve the schools and commercial sites.

Figure 11 – PTS-65 Manhole

Figure 12 - Electronic Cabinet w-SAI & Pedestal

SECTION 5 – CABLE TELEVISION/ BROADBAND

COMCAST COMMUNICATIONS

Comcast is the cable television provider for this area and will serve ARSP with cable, telephone and broadband. It has no facilities in the immediate area.

Offsite Bring-Up

Conduit structure exists on Blue Oaks Boulevard and Hayden Parkway (Appendix A, Offsite Dry Utility Exhibit). Comcast plans to push fiber to the site in the joint trench that will extend west on Blue Oaks from Hayden Parkway, then north up Westbrook Boulevard.

Figure 13 – Comcast HDPE Reel

System Design

Comcast will offer a "triple play" of services (dial tone, video and internet). It currently installs a fiber/coax hybrid system inside poly (high density polyethylene - HDPE) pipe (Appendix E – Comcast Cable TV Backbone Exhibit). The HDPE (Figure 13) comes on reels, is typically black or terra cotta colored, and looks very similar to gas pipe. Developers provide the trench. Comcast will provide its own system -- conduit, boxes, pedestals, fiber, coax, nodes, amplifiers, splitters, power supplies, etc. Fiber nodes, nodes, amplifiers, splitters and power supplies are often placed in dog houses (Figure 14). Each fiber node (Figure 15) serves 300 to 400 customers (Comcast is working to reduce that to ~200 customers) and is fed with 6 fibers. We anticipate 11 to 15 fiber nodes in the ARSP.

Comcast expects to launch its own version of a FTTP system in the near future. If so, ARSP will almost certainly be served under that newest technology.

Figure 14 – Cable TV Doghouse

Figure 15 – Comcast Fiber Node and Power Supply

SECTION 6 – OTHER CONSIDERATIONS

Wireless Internet

Wireless internet service is available via a line-of- sight connection (through a dish antenna) from Zeta Broadband facilities on the Consolidated Communications Tower in Roseville, about 4.2 miles east of the project (www.zetabroadband.com). It may be useful for service to construction trailers in the early stages of development.

Environmental Documents

We recommend environmental documents include evaluation of the cumulative impacts of existing and proposed utility facilities, particularly:

- New electric transmission-related facilities such as 60 kV lines
- Any potential environmental issues associated with offsite bring-up of the dry utilities (60 kV overhead, and 12 kV electric, natural gas, telephone and cable television/broadband) to and within the ARSP.

Evaluating and including these issues in any ongoing or proposed studies now will assure the project's compliance with CEQA, and reduce potential delays and added costs.

SECTION 7 – SUMMARY & CONCLUSIONS

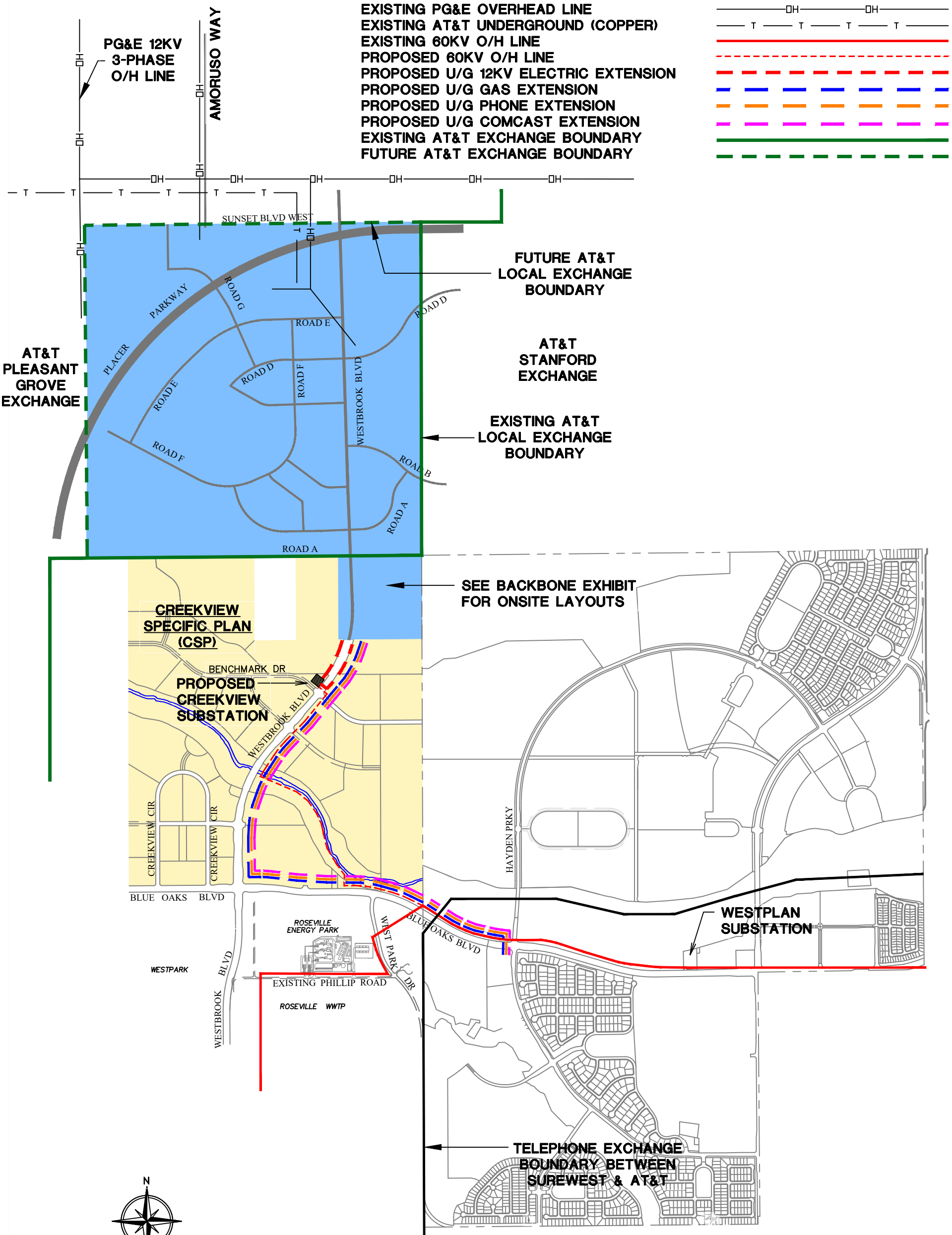
From a dry utility perspective, we do not anticipate any insurmountable or cost prohibitive challenges in serving ARSP. All major dry utilities -- natural gas, electric, telephone and cable television -- are available, though there will be significant offsite bring-ups required with the tie-in points for telephone, gas and cable almost a mile away (1500' east of future Westbrook Boulevard at Hayden Parkway).

As a further challenge, those dry utilities must run through CSP, which has yet to be developed and may lag behind ARSP.

We anticipate the usual types of challenges, but in general, costs and challenges should fall within the normal ranges for a project of this magnitude.

LEGEND

EXISTING PG&E OVERHEAD LINE
EXISTING AT&T UNDERGROUND (COPPER)
EXISTING 60KV O/H LINE
PROPOSED 60KV O/H LINE
PROPOSED U/G 12KV ELECTRIC EXTENSION
PROPOSED U/G GAS EXTENSION
PROPOSED U/G PHONE EXTENSION
PROPOSED U/G COMCAST EXTENSION
EXISTING AT&T EXCHANGE BOUNDARY
FUTURE AT&T EXCHANGE BOUNDARY



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LAND USE PLAN PROVIDED BY KIMLEY-HORN.

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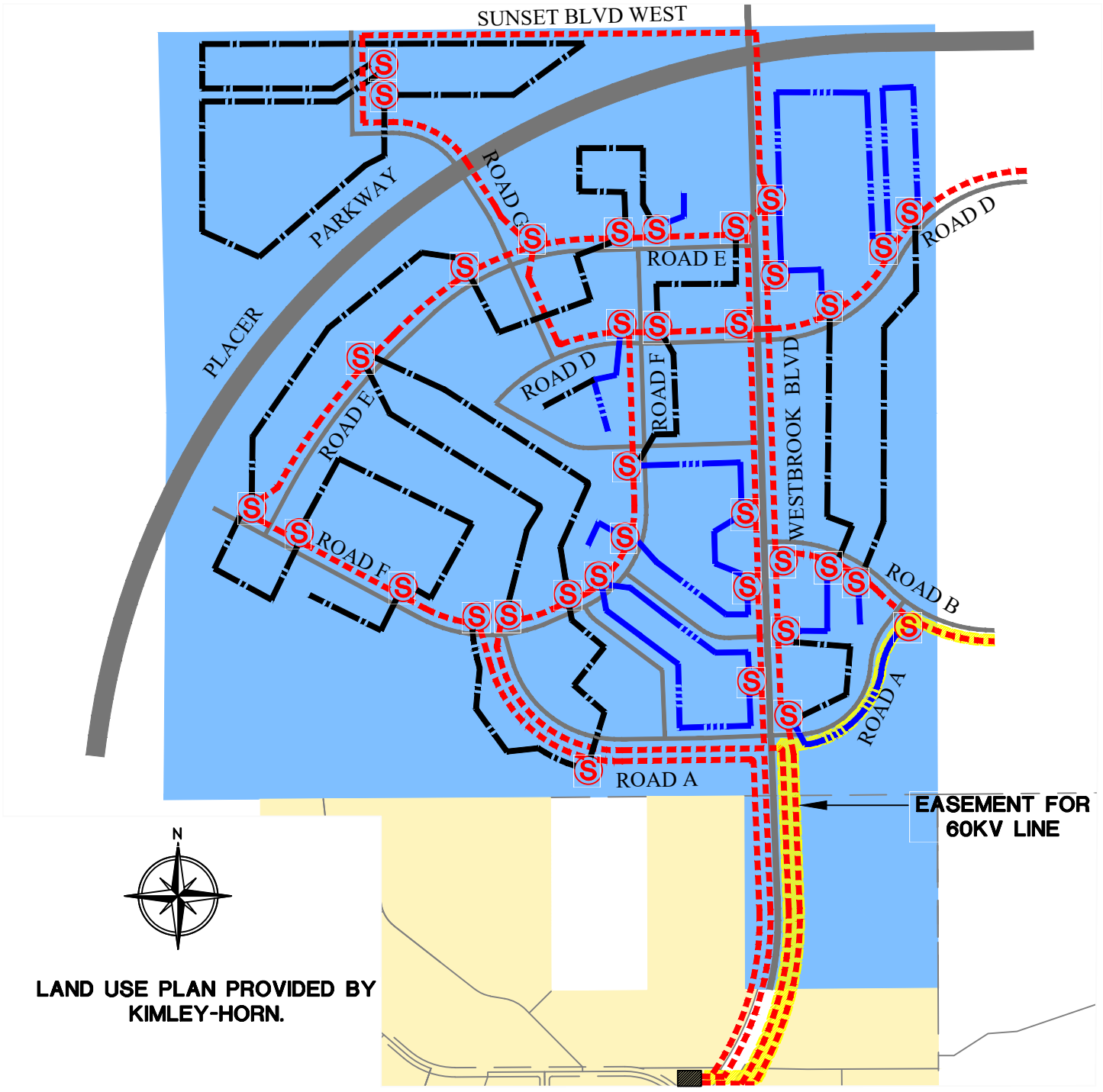
OFFSITE DRY UTILITY EXHIBIT

SCALE: 1"=1,500'

Appendix A

RE ELECTRIC BACKBONE EXHIBIT

EASEMENT FOR FUTURE 60KV LINE
3-PHASE MAINLINE (1-6" FEEDER CONDUIT)
3-PHASE LOCAL CIRCUIT (1-4" CONDUIT)
1-PHASE LOCAL CIRCUIT (4" CONDUIT)
MAINLINE SWITCH



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AMORUSO

SCALE: 1"=1,000'

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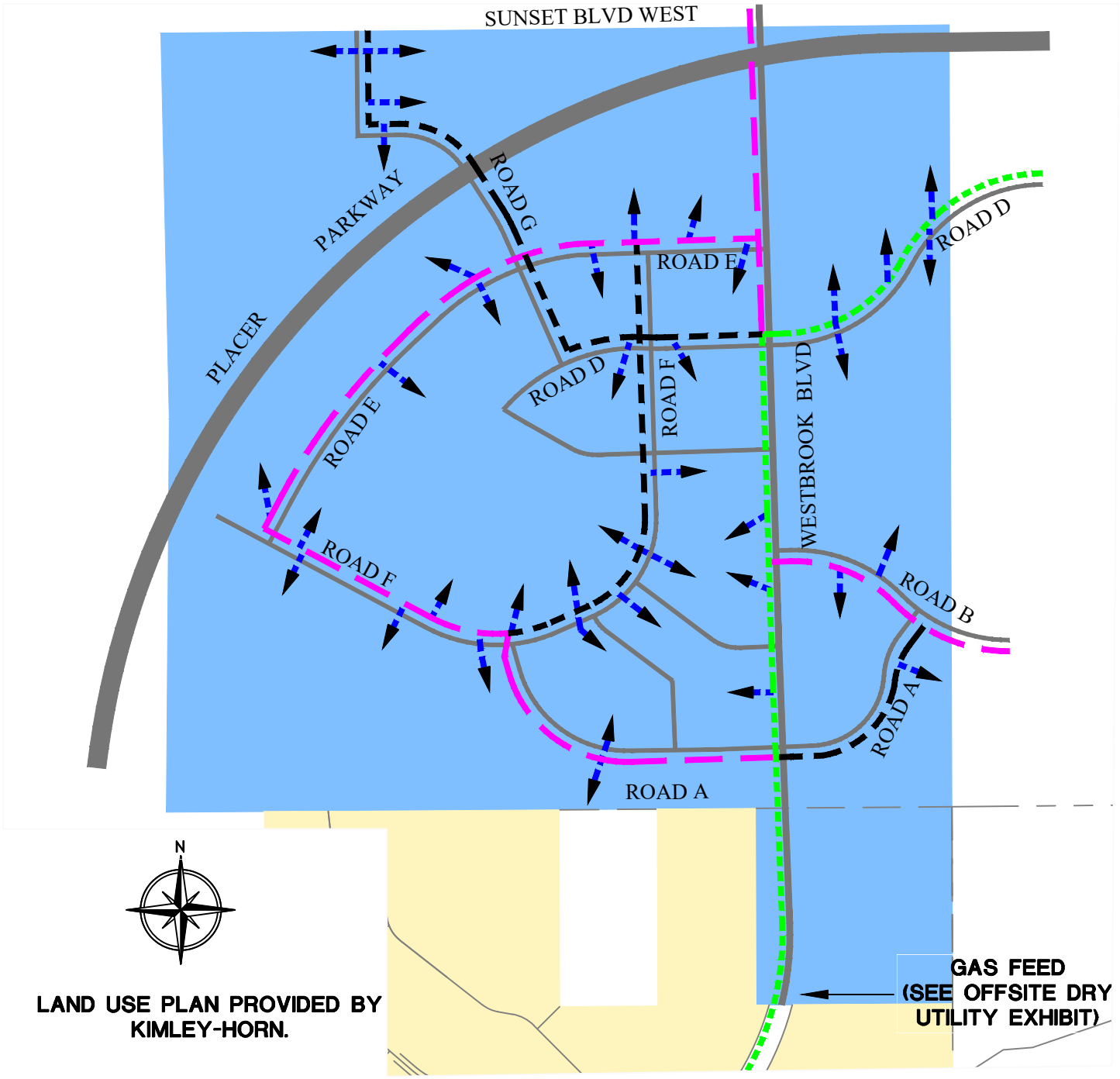
PG&E GAS BACKBONE EXHIBIT

PG&E 8" POLY GAS MAIN
PG&E 6" POLY GAS MAIN
PG&E 4" POLY GAS MAIN
PG&E 2" POLY GAS MAIN



LAND USE PLAN PROVIDED BY KIMLEY-HORN.

GAS FEED (SEE OFFSITE DRY UTILITY EXHIBIT)

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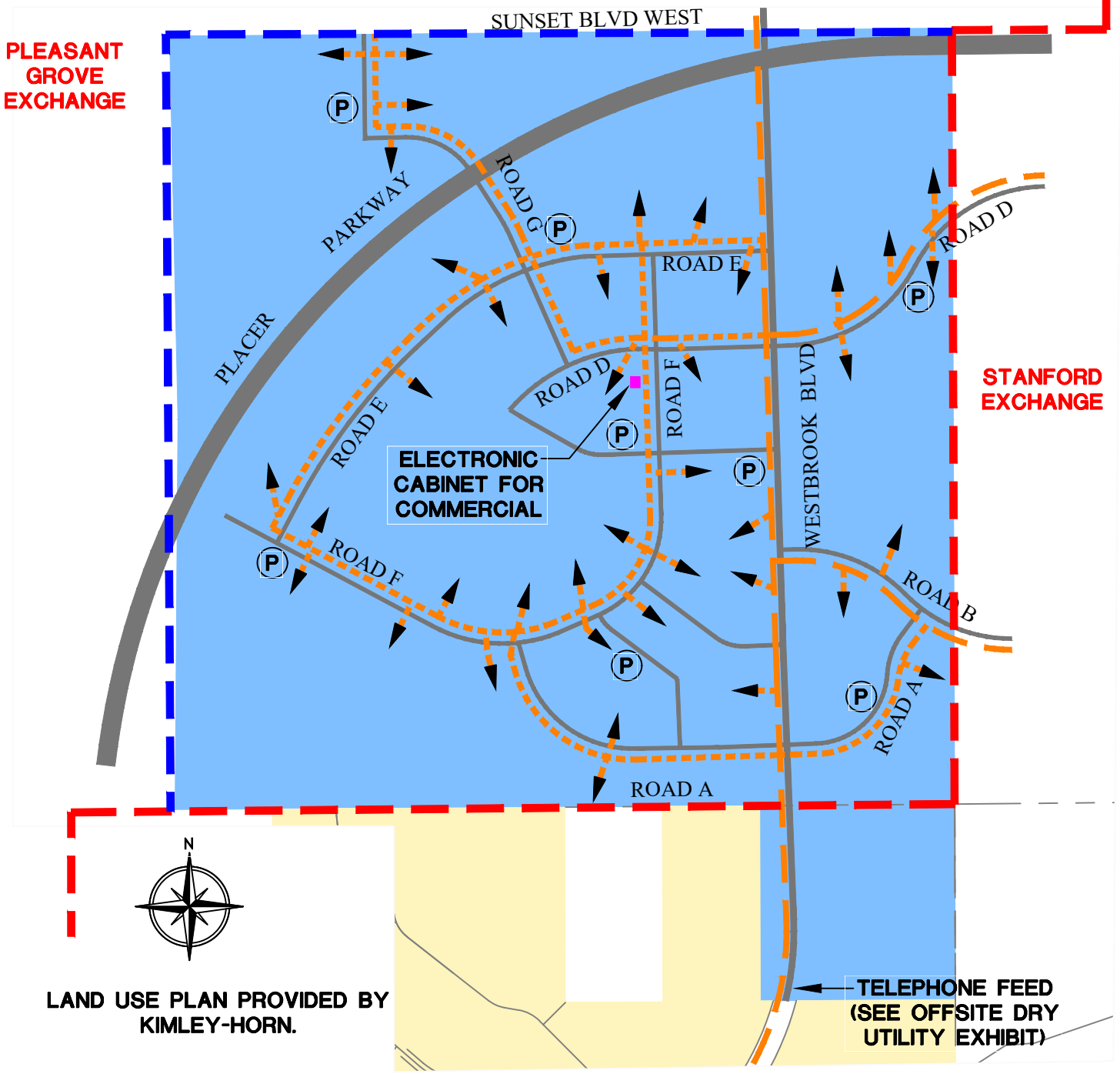
AMORUSO

SCALE: 1"=1,000'

AT&T TELEPHONE BACKBONE EXHIBIT

4-4" BACKBONE
2-4" BACKBONE
EXISTING EXCHANGE BOUNDARY
FUTURE EXCHANGE BOUNDARY
PRIMARY FLEX POINT (P)



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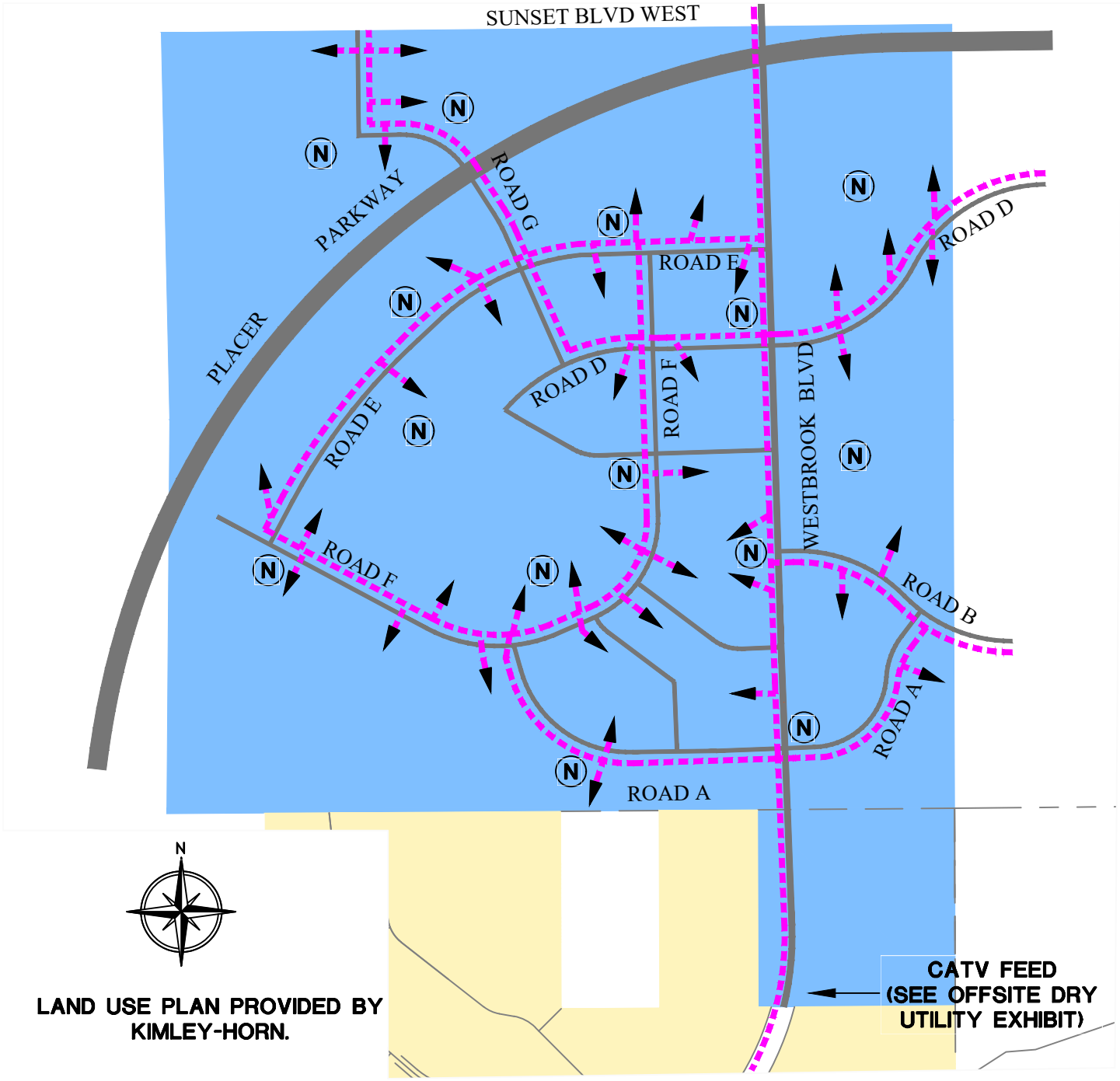
Appendix D

COMCAST CABLE TV BACKBONE EXHIBIT

2-2" FEEDER CONDUITS
FIBER NODE (N)



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SCALE: 1"-1,000'

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