APPENDIX 4 : DRY UTILITIES MASTER PLANNING CRITERIA

Prepard by Moffatt & Nichol
March 2008

Moffatt & Nichol
MEMORANDUM

DATE: 03/13/08

TO: Visalia Project Team

FROM: Ari Konyalian / Tyler Sparks

SUBJECT: Dry Utilities Master Planning Criteria – Dry Utilities

1.0 Natural Gas

Natural gas in the city of Visalia is provided by Socal Natural Gas / Sempra Energy. Existing records show that transmission lines around the project vicinity deliver natural gas to the surrounding properties. There are no known records of natural gas lines within the project limits. Land development for the East Visalia Master Plan will include land for mixed and commercial uses. New construction, mainline tie ins, and any possible abandonment of the natural gas distribution system will be coordinated with a Socal Natural Gas / Sempra construction representative.

1.1 Design and Sizing Criteria - This subsurface dry utility master plan is governed by need for service, environmental constraints, project specific design constraints, route selection, horizontal and vertical alignment, economic feasibility and non-interference among substructures. The concept utility plan integrates elements learned from field investigation, existing subsurface utility investigation, and Socal Gas specific design standards applied to the project area.

The natural gas delivery system detailed design will base utility size, material, design and construction designations on development type, utility demand, hydraulic calculations, and service main capacity in an effort to deliver 2 psig natural gas to each end user. Natural gas service line trenches will contain only dry utilities, be of such size as to provide a minimum vertical clearance of twelve inches from power conductors of any size and a minimum separation of six inches from all other substructures. All gas main and service piping will have a minimum thirty inches cover below finished grade. All trenches will be level and free of debris at the time gas lines are to be installed. The ultimate line sizing (pipe diameters) will be based on the hydraulic capabilities of the existing system. Diameters for typical transmission systems are on the order of 3" to 4", with service laterals between 1" and 2".

Service laterals will be extended for all commercial or restaurant land uses. Typically restrooms and public comfort areas will not require a natural gas service lateral. The ultimate detailed design will either be completed in accordance California Public Utilities Commission Standards, as well as Socal Gas (A Sempra Utility) design specifications and coordinated as part of their work.

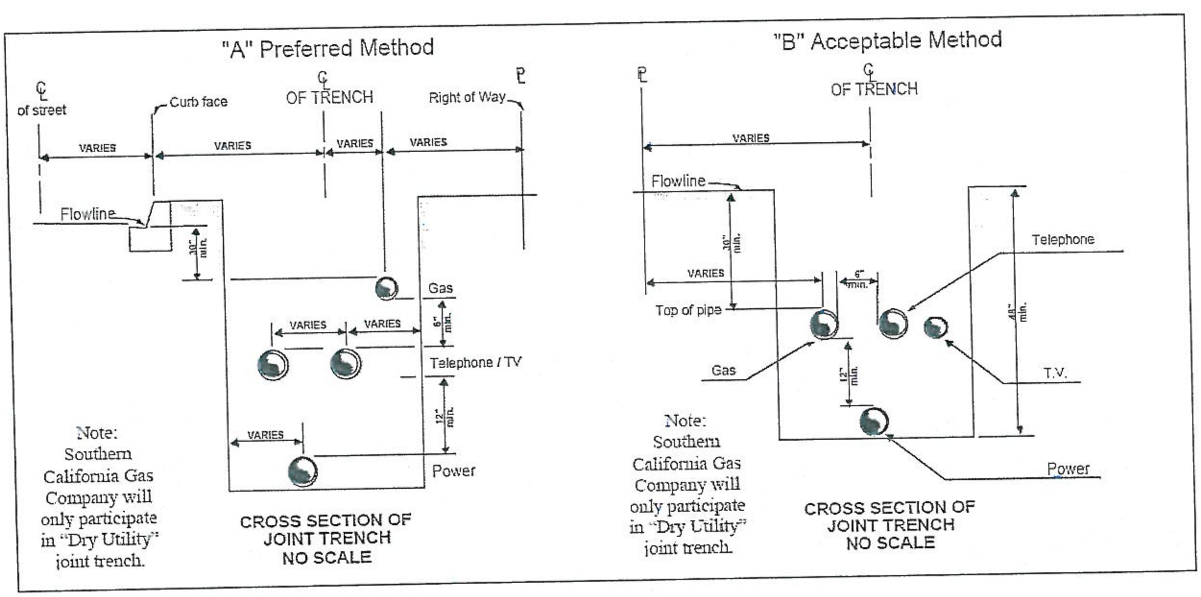
1.2 **Route Selection** - Route selection and design criteria shall be in accordance with SocalGas / Sempra Utilities specifications (as the authority having jurisdiction). This section addresses general, typical concept plan design used to develop the utility layout with respect to natural gas systems, in accordance with the aforementioned authority having jurisdiction.

The gas line routes, interconnections and physical flows shall be such that integrity of the natural gas utilities system and its service to its customers shall not be jeopardized or interfered with. The proposed routes consider minimizing these interferences with the natural gas line and any of its appurtenances, including valves, meters, quality measurement, etc. This concept substructure plan identifies the shortest, most practical and available route (clear of obstructions) as necessary to connect the service delivery point to the distribution main. There will be one service lateral for any one building or group of buildings requiring service, including associated facilities. The proposed routes will provide safe and ready access for utility personnel, free from obstructions for utility vehicles and equipment to install, remove, repair or maintain its facilities.

The concept plan routes will consider placing natural gas lines in areas that do not limit access with construction of the natural gas system along public streets, alleys, roads, highways, and other publicly dedicated ways and places. This dry utility master plan does not address the furnishing, installing and maintaining of any necessary protective structures that a specific route or delivery may require. The natural gas utility will individually meter gas service at each tenant in a nonresidential building or group of buildings.

Socal gas also considers joint trench installation methods with other dry utilities. For the purposes of this master planning effort, it is likely that a joint trench for all dry utilities be installed. Joint trenching is cost effective for grassroots development utility installations. The following figures depict acceptable methods of joint trenching between natural gas and other dry utilities.

Figure 1: Preferred Methods of Joint Trench Installation



1.3 Construction Phasing – A phasing plan should consider installing the natural gas line prior to the extension of School Avenue. Because the development site is surrounded by existing dry utility infrastructure, School Avenue can serve as a transmission corridor extending the existing dry utilities serving elements both north and south of School Avenue. Extending the transmission mains prior to any road extensions or improvements would ease installation and limit cost.

2.0 Telecommunications and Cable

There are multiple telecommunication providers in the city of Visalia. This section of the document identifies conceptual planning and routing methods that should be adhered to with respect to communications cabling and routing standards.

2.1 Design and Sizing Criteria – The telecommunications master concept plan is governed by need for service, environmental constraints, project specific design constraints, route selection, horizontal and vertical alignment, economic feasibility and non-interference among substructures.

2.2 Route Selection – The proposed conduit and cable distribution method is an underground cable system consisting of cables placed in buried conduits, using manholes and/or pull boxes for splices in large runs. Splice boxes and manholes are needed where maximum cable reel lengths are exceeded, at the intersection of main and branch conduit runs, and at other locations where splices are needed in a conduit system. The conduit will run from each service to a pole, pedestal, or manhole at each building entrance. Manholes must be sized to meet the maximum conduit requirements and be located to optimize the use of the associated conduit routes. All conduits must be sealed in a manhole to prevent water entry.

The minimum depth of a trench must allow 24 inches of cover from the top of the conduit to final grade. Warning tape containing metallic tracings will be placed a minimum of 18 inches above the buried cable to minimize any chance of an accidental dig-up. The American Public Works Association has adopted the color orange for the telecommunications cables. The placement of underground cables is governed by the California Public Utilities Commission.

The following table presents minimum clearances and separations from existing substructures.

Table 1

Adjacent Structure	Minimum Separation
Power or other Foreign Conduit	3 inches of Concrete 4 inches of masonry 12 inches of well-tamped earth
Pipes (gas,oil,water, etc.)	6 inches when crossing 12 inches when parallel
Railroad Crossings	5 feet below top of rail 12 feet from the nearest rail if terminating on a pole 7 feet from the nearest rail if terminating on a pole at a siding
Street Railways	3 feet below top of rail

The following figures depict typical trenching section for paved and unpaved areas, for trenches where joint installation will not be used.

Figure 2: Typical Trench for Unpaved Areas

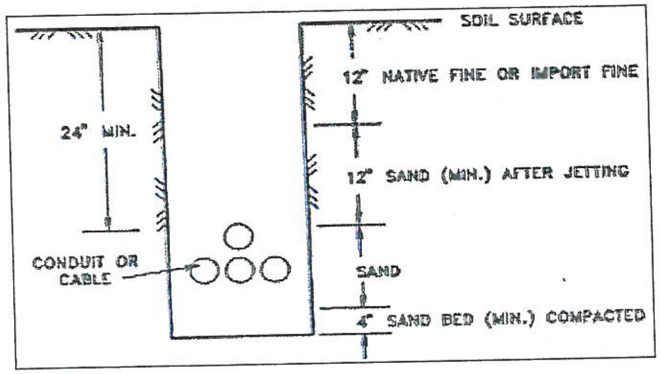
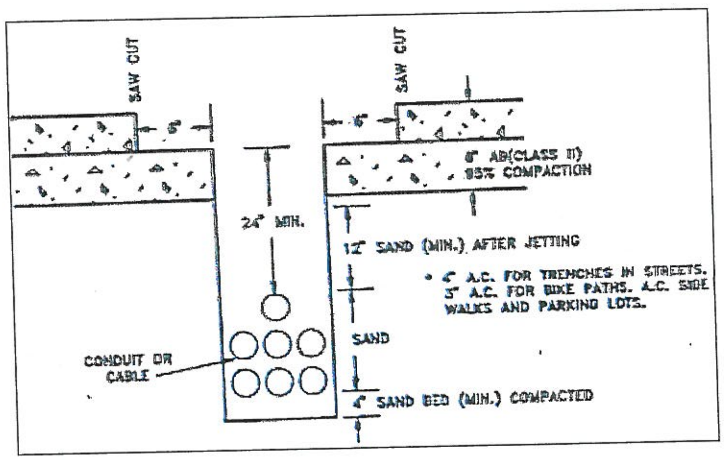


Figure 3: Typical Trench for Paved Areas



2.3 **Construction Phasing** – A phasing plan should consider installing telecommunications and cable prior to the extension of School Avenue. Because the development site is surrounded by existing dry utility infrastructure, School Avenue can serve as a transmission corridor extending the existing dry utilities serving elements both north and south of School Avenue. Extending the transmission mains prior to any road extensions or improvements would ease installation and limit cost.

3.0 Electrical Service

Electrical service in the city of Visalia is provided by Southern California Edison. SCE is governed by requirements of the Public Utilities Commission, and per the PUC, SCE must provide electrical service to this Visalia development if service is requested. At some time prior to the final design of the development, and preferably much earlier, SCE should be contacted and informed of the upcoming request for electrical service which SCE will be receiving. At that time, a discussion will be entered into with the SCE Service Planner, electrical loads will be discussed and site development plans will be reviewed by SCE and the site electrical designer..

Based on the electrical loads required, the location and capacity of their surrounding existing facilities, and the layout of the development, SCE will determine the alignments of their electrical lines which will serve the site. SCE's engineering department will complete the design plans and specs for their power distribution system.

The alignment shown on the M&N exhibit drawing is one possible layout of the SCE distribution network, but SCE will have to approve these alignments.

SCE will likely serve the site with a 12KV distribution system, constructed of insulated conductors in underground concrete encased conduits, known as an underground ductbank. These ductbank are typically installed about 3 feet below the surface. The SCE ductbanks will supply pad-mounted transformers installed on concrete pads, at grade. The transformers will be owned by SCE and will supply either 480/277V, 208/120V or 120/240V, depending on the size of each electrical load. Each customer will have a separate electrical service at one of the above voltages, and each will have an SCE meter for billing.

The ductbanks, concrete pads, and electric service and meter equipment, will have to be installed in accordance with SCE's Electrical Service Requirements. The Electrical Service Requirements manual is available free online at the SCE website.

3.1 **Construction Phasing** – A phasing plan should consider installing electrical conduit prior to the extension of School Avenue. Because the development site is surrounded by existing dry utility infrastructure, School Avenue can serve as a transmission corridor extending the existing dry utilities serving elements both north and south of School Avenue. Extending the transmission mains prior to any road extensions or improvements would ease installation and limit cost.

Exhibit 1: Dry Utilities Existing and Proposed Routing

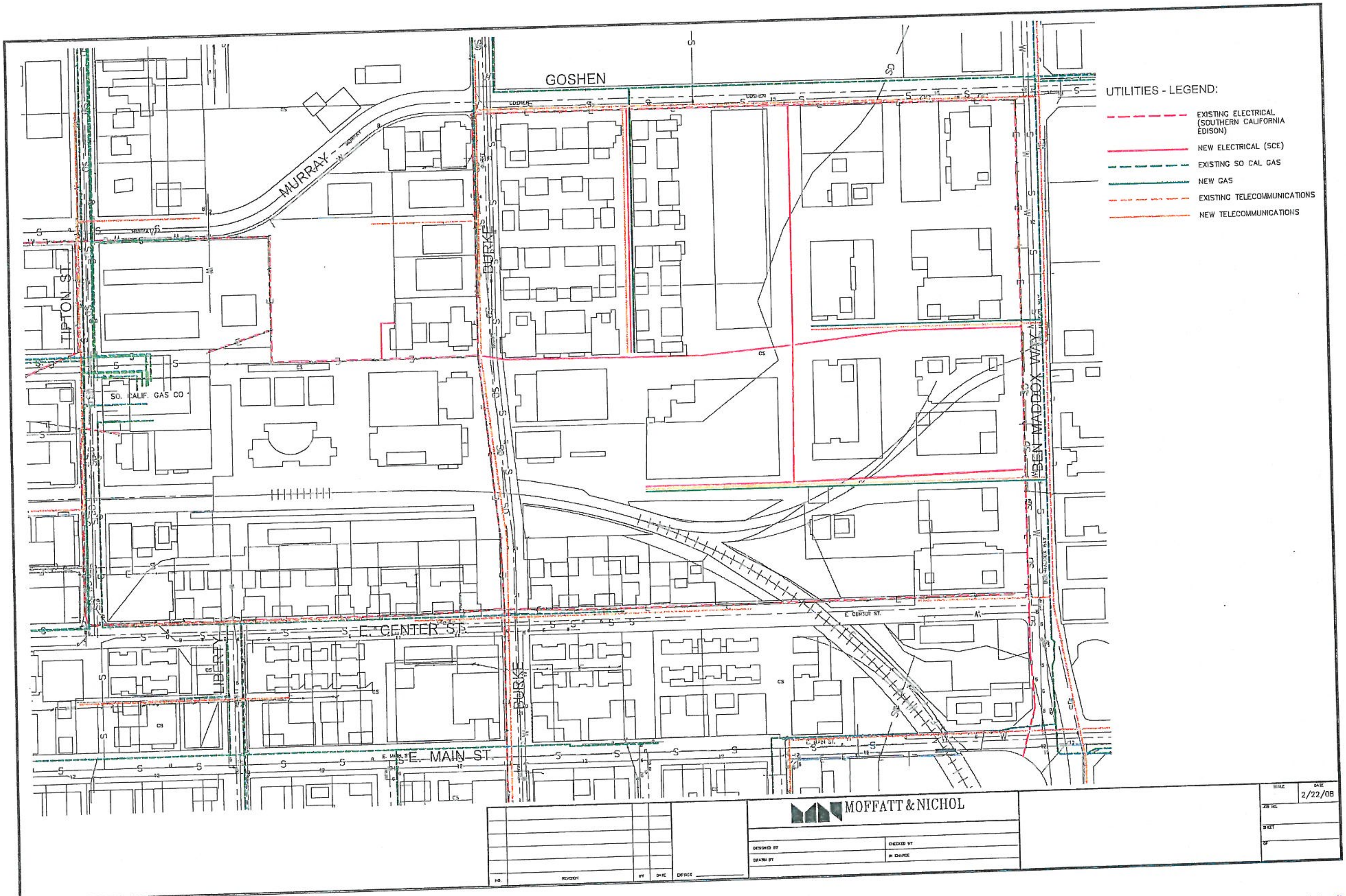


Table 2: Order of Magnitude Estimate for Dry Utilities

ACTIVITY: Order of Magnitude Estimate

PROJECT TITLE: Visalia

SPECIFICATION NO.:

A-E FIRM NAME: MOFFATT & NICHOL

SHEET 1 OF 1

ESTIMATED BY: FIRM: M & N; EST. NAME: T. Sparks

CHECKED BY:

DATE: 13-Mar-08

STATUS OF DESIGN: CONCEPTUAL ■ ☐ 50% ☐ 100% ☐ FINAL

Electrical and Telephone Utility Service	QUANTITY		MATERIAL COST		LABOR COST		ENGINEERING ESTIMATE	
	NUMBER	UNIT	UNIT COST	TOTAL	UNIT COST	TOTAL	UNIT COST	TOTAL
ELECTRICAL								
SCE Concrete Ductbank (4-5" conduits encased in concrete)	2,500	LF	$ 100	$ 250,000	$ 100	$ 250,000	$ 200	$ 500,000
SCE Concrete Transformer Pads	10	EA	$ 5,000	$ 50,000	$ 5,000	$ 50,000	$ 10,000	$ 100,000
SCE Manholes	10	EA	$ 4,000	$ 40,000	$ 5,000	$ 50,000	$ 9,000	$ 90,000
SCE 12KV Cables	7,500	LF	$ 16	$ 120,000	$ 10	$ 75,000	$ 26	$ 195,000
SCE Grounding	2,500	LF	$ 2	$ 5,000	$ 2	$ 5,000	$ 4	$ 10,000
Subtotal								$ 895,000
TELEPHONE								
Telephone Concrete Ductbank (2-4" conduits encased in concrete)	2,500	LF	$ 70	$ 175,000	$ 70	$ 175,000	$ 140	$ 350,000
Telephone Pullboxes	10	EA	$ 2,400	$ 24,000	$ 2,500	$ 25,000	$ 4,900	$ 49,000
Telephone Cables (Fiber and/or copper)	2,500	LF	$ 8	$ 20,000	$ 6	$ 15,000	$ 14	$ 35,000
Subtotal								$ 434,000
NATURAL GAS								
Natural Gas Transmission Line Extensions	2,500	LF	$ 5	$ 12,500	$ 45	$ 112,500	$ 50	$ 125,000
Subtotal								$ 125,000
Total								$ 1,454,000