

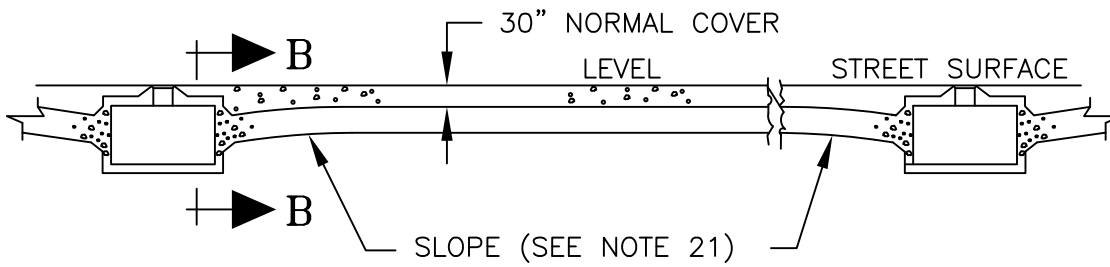
10	7/16	CORRECTED NOTATIONS	TT
4	6/13	ADDED JOINT TRENCH & NOTES	TT
3	10/09	REVISED MIN PRIMARY COVER	TT
2	8/08	COMBINED DT-SS-U-1003 DT-PR-U-1004	TT
1	6/06	REVISED NOTES	JT
REV	DATE	DESCRIPTION	APPR
NTS	DT-SS-U-1003	1 OF 4	
SCALE	STANDARD NO.	SHEET NO.	

APPROVED \_\_\_\_\_ 20  
ENGR. MANAGER  
DRAWN  
CHECKED PV

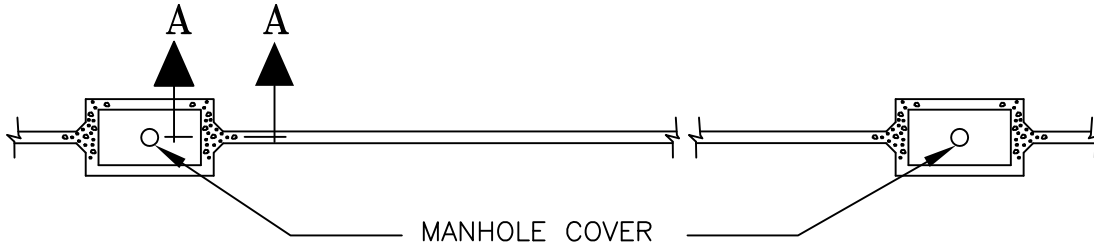
*Original Signed and Approved by Engineering Manager*

ENGINEERING STANDARD  
**UNDERGROUND DUCT LINES**  
TYPICAL TRENCH SECTION DETAILS

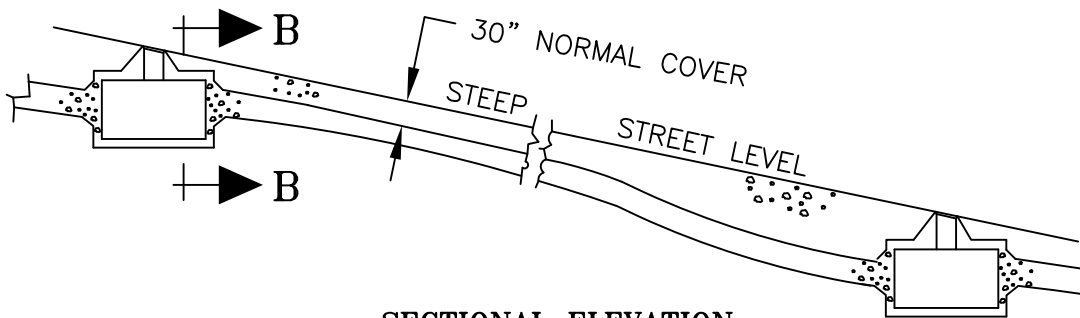
**CITY OF PALO ALTO**  
CALIFORNIA



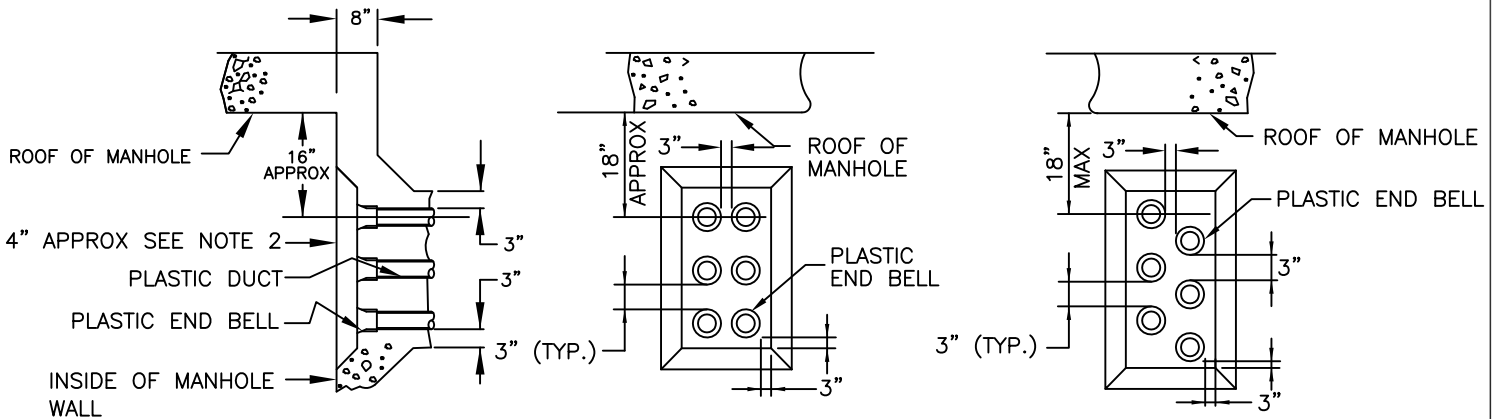
**SECTIONAL ELEVATION**



**PLAN VIEW**



**SECTIONAL ELEVATION**



**SECTION A-A**

**ALT. SECTION B-B  
DUCT WINDOW**

**SECTION B-B  
DUCT WINDOW**

APPROVED \_\_\_\_\_ 20

ENGR. MANAGER

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ENGINEERING STANDARD

**UNDERGROUND DUCT LINES  
TYPICAL TRENCH SECTION DETAILS**

**CITY OF PALO ALTO  
CALIFORNIA**

5	1-12	CORRECTED COVER DIMENSION	TT
4	8-08	COMBINED DT-SS-U-1003 DT-PR-U-1004	TT
3	7-99	REVISED NOTES 1, 2, 5	FINCH
2	6-90	CHANGED NOTE 2	
REV	DATE	DESCRIPTION	APPR
NTS		<b>DT-SS-U-1003</b>	2 OF 4
SCALE		STANDARD NO.	SHEET NO.

*Original Signed  
and Approved  
by Engineering  
Manager*

**NOTES:**

1. DIRECT BURIED PRIMARY CONDUIT IS NOT AN APPROVED CONSTRUCTION METHOD. PRIMARY CONDUITS SHALL BE CONCRETE ENCASED, UNLESS OTHERWISE APPROVED BY UTILITIES ENGINEER.
2. JOINT TRENCH WITH NATURAL GAS OR PRIVATE STREETLIGHT SYSTEMS IS NOT ALLOWED UNLESS APPROVED BY CITY OF PALO ALTO UTILITIES ELECTRIC AND WATER, GAS, WASTEWATER ENGINEERING DEPARTMENTS.
3. APPROVED CONDUIT MATERIALS:
  - a. SCHEDULE 40 PVC
  - b. TYPE "DB 60" (SECONDARY) OR "DB 120" (PRIMARY) PLASTIC CONDUIT
  - c. HOT DIPPED GALVANIZED RIGID STEEL CONDUIT.
4. EVERY EFFORT MUST BE MADE TO OBTAIN A STRAIGHT WATER-TIGHT CONDUIT LINE TRUE TO THE CENTER LINE OF THE TRENCH.
5. SHARP TURNS MUST BE AVOIDED. UNLESS APPROVED BY THE CITY OF PALO ALTO UTILITIES ELECTRICAL ENGINEER, FACTORY OFFSETS SHALL NOT BE USE. ALLOWABLE BEND RADIUS:

CONDUIT SIZE	MINIMUM BEND RADIUS
2 inch	24 inches
3 inch	36 inches
4 inch	36 inches
5 inch	60 inches
All risers	36 inches

6. NO MORE THAN 2-90° BENDS (180°) IN PRIMARY OR 3-90° (270°) IN SECONDARY CONDUIT RUNS. ALL BENDS AND SWEEPS (90°) MUST BE ENCASED IN CONCRETE (MINIMUM 3") ALONG THE INSIDE RADIUS.
7. IF THE ELECTRIC UNDERGROUND INSPECTOR DETERMINES THAT THE BOTTOM OF THE TRENCH IS ROCKY, A 2" SAND BEDDING MUST BE INSTALLED BEFORE THE CONDUIT.
8. BACKFILL IN UNIMPROVED AREAS. 12" OF CLEAN NATURAL SAND PER CALTRANS STD SPECS SEC 19-3.025B ON TOP OF THE UPPERMOST CONDUIT, 90% COMPACTION; TOPPED WITH EXCAVATED NATIVE SOIL, 85% COMPACTION.
9. BACKFILL IN IMPROVED AREAS (STREETS, SIDEWALKS, DRIVEWAYS, ETC. OF ASPHALT OR CONCRETE) THE BACKFILL MATERIAL SHALL BE IN ACCORDANCE WITH THE CITY OF PALO ALTO PUBLIC WORKS DEPARTMENT STANDARD DRAWING NO. 401, TRENCHES - TYPICAL CROSS-SECTIONS.
10. ALL CONDUITS MUST BE MANDRELLED (STD. DWG DT-SS-U-1025). THIS TEST MUST BE WITNESSED BY THE ELECTRIC UNDERGROUND INSPECTOR.
11. A 3/8" POLYPROPYLENE PULL LINE (MIN. 150 LBS. TEST) MUST BE INSTALLED IN EACH CONDUIT.
12. CONDUIT SPACING SHALL BE MAINTAINED BY SPACERS, APPROVED BY THE CITY OF PALO ALTO, INSTALLED NO MORE THAN 7 FEET APART. CONDUITS MUST BE SECURELY BOUND TO THE SPACERS.
13. MINIMUM COVER FOR DIRECT BURIED CONDUIT:
 

a. SECONDARY (NON TRAFFIC)	24"
b. COMMUNICATION (NON TRAFFIC)	24"
c. SECONDARY (TRAFFIC)	30"
d. COMMUNICATION (TRAFFIC)	30"
14. MINIMUM CLEARANCE OF ELECTRIC LINES FROM OTHER UTILITY LINES:
 

a. VERTICAL CLEARANCE FROM CROSSING UTILITY LINES	12"
b. HORIZONTAL CLEARANCE FROM NATURAL GAS LINES	24"
c. HORIZONTAL CLEARANCE FROM WATER/WASTEWATER LINES	48"

10	7/16	REVISED NOTE 5, ADD 3"	TT
9	1/12	REVISED NOTES 8,9	TT
8	5-09	REVISED NOTES 6 & 15	TT
7	10/09	ADDED NOTE 14	TT
6	5-09	COMBINED DT-SS-U-1003 DT-PR-U-1004	TT
5	6-99	MODIFIED NOTES	JT
REV	DATE	DESCRIPTION	APPR
NTS	DT-SS-U-1003	3 OF 4	
SCALE	STANDARD NO.	SHEET NO.	

APPROVED _____ 20
ENGR. MANAGER
CHECKED BY _____
CHECKED BY _____ PV

ENGINEERING STANDARD  
**UNDERGROUND DUCT LINES**  
**TYPICAL OPEN CUT TRENCH SECTION DETAILS**  
**CITY OF PALO ALTO**  
**CALIFORNIA**

**Original Signed and Approved by Engineering Manager**

**NOTES:**

15. HORIZONTAL SPACING BETWEEN JOINTLY INSTALLED SECONDARY, COMMUNICATION, TELEPHONE, AND STREETLIGHTING CABLES OR CONDUIT MAY BE RANDOM UNLESS OTHERWISE SPECIFIED. THERE SHALL BE A MINIMUM OF 1" CLEARANCE AROUND ALL CONDUITS AT GROUND LEVEL.
16. JOINT TRENCH WITH GAS IS ONLY ALLOWED FOR RESIDENTIAL SERVICES AND WITH THE APPROVAL OF BOTH UTILITIES ELECTRIC AND WGW ENGINEERING. REFER TO CPAU WGW DRAWING NUMBER WGW-02 FOR ADDITIONAL DETAILS.
17. THE CONCRETE SHALL BE READY-MIXED, CLASS B PORTLAND CEMENT CONCRETE, CONTAINING 3 SACKS OF CEMENT PER CUBIC YARD AND 3/4" AGGREGATE. THE CONCRETE SHALL BE COLORED RED BY THE ADDITION OF 5 POUNDS OF RED OXIDE PIGMENT PER CUBIC YARD OF CONCRETE MIX. COLOR WILL BE TO THE SATISFACTION OF THE ELECTRIC UNDERGROUND INSPECTOR.
18. DURING CONCRETING, THE DUCTS SHALL BE HELD SECURELY IN PLACE WITH STAKES, PLASTIC SPACERS, ETC. WOODEN TIE-DOWN STAKES SHALL BE REMOVED IMMEDIATELY AFTER THE CONCRETE IS POURED.
19. BENDS IN DUCT LINES SHALL BE OF MAXIMUM PRACTICAL RADIUS.
20. WHEN A BREAK IS MADE IN THE POURING OF THE DUCT BEAM, A 3-FOOT LONG 5/8" DIA STL RE-BAR SHALL BE INSERTED HORIZONTALLY AT EACH CORNER OF THE DUCT BEAM, LEAVING 18" TO TIE INTO THE SUBSEQUENT POUR.
21. SLOPE TO BE 3" IN 100 FT, IF POSSIBLE OR 1" IN 100 FT MIN. ON LEVEL GROUND, SLOPE DUCT LINE FROM CENTER TO EACH MANHOLE.
22. VERTICAL STAGGERING OF DUCT IN THE VAULT WINDOW, SHOWN IN SECTION B-B, ON SHEET 2, IS PREFERRED.
23. HORIZONTAL DIRECTIONAL BORING IS ALLOWED FOR INSTALLATION OF SECONDARY CONDUITS ONLY WHEN APPROVED BY UTILITY ELECTRIC ENGINEER. IT IS NOT ALLOWED FOR THE INSTALLATION OF PRIMARY CONDUITS.
24. DIRECTIONAL BORING IS NOT ALLOWED IF IN THE OPINION OF UTILITY ENGINEERING OR THE ELECTRIC UNDERGROUND INSPECTOR, THE EXISTING FACILITIES OR OTHER CONFLICTS CREATE NAVIGATIONAL PROBLEMS.
25. ALL UTILITY COVER AND SEPARATION REQUIREMENTS MUST BE MET FOR THE ENTIRE LENGTH OF THE BORE RUN. UTILITY EASEMENTS MUST BE HONORED.
26. POTHOLES SHALL BE DONE AT KEY LOCATIONS, AS PER THE INSTRUCTIONS OF THE ELECTRIC UNDERGROUND INSPECTOR, PRIOR TO COMMENCING HORIZONTAL DIRECTIONAL BORING.
27. A THOROUGH INVESTIGATION SHALL BE PERFORMED TO IDENTIFY KNOWN UTILITY SYSTEMS PARALLELING OR CROSSING THE PROPOSED BORE ROUTE PRIOR TO COMMENCING DIRECTIONAL BORING.

APPROVED _____ 20 ENGR. MANAGER <i>Original Signed and Approved by Engineering Manager</i> DRAWN BY _____ CHECKED BY PV	ENGINEERING STANDARD <b>UNDERGROUND DUCT LINES</b> <b>TYPICAL TRENCH SECTION DETAILS</b>		10	7/16	REVISED NOTE 17	TT
	<b>CITY OF PALO ALTO</b> <b>CALIFORNIA</b>		6	6-08	COMBINED DT-SS-U-1003 DT-PR-U-1004	TT
			5	6-09	MODIFIED NOTES	JT
			4	7-99	MODIFIED NOTES	FINCH
			REV	DATE	DESCRIPTION	APPR
		NTS	<b>DT-SS-U-1003</b>		4 OF 4	
		SCALE	STANDARD NO.		SHEET NO.	