

Volume 4: Surveys

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4.1 Specifications

The Contractor shall submit all survey staking requests to the Survey section through the RE with a minimum notice of 48 hours (excluding Mondays, holidays and weekends). If the staking is to be done by a private surveyor, it is the responsibility of the Contractor to ensure that all of the requirements of the Land Surveyors Act are met.

4.2 Cut Sheets & Staking

All construction staking shall be done under the direction of the surveyor. If the staking is done by a private surveyor, it shall be the responsibility of the Contractor to ensure that all of the requirements of the Land Surveyors Act are met. All construction staking notes or cut sheets shall be done on the format approved by the Survey section. The private surveyor shall give a copy of all cut sheets, and any other notes taken as part of the current project, to the Survey office on a weekly basis. Cut sheets are filed in the Survey office indexed by Work Order number. The surveyor shall be responsible for supplying copies of all cut sheets to the RE on a daily basis. The RE will distribute such copies prepared by the Survey section to the Contractor.

4.3 Street & Property Monuments

Prior to construction, the surveyor shall locate all survey monuments existing in the construction area which could be disturbed by the construction activities. The surveyor shall set reference monumentation for each point found as a means of preserving it. The reference monumentation shall be set in such a manner so as to be safe from destruction. A sketch shall be prepared by, or under the direction of, the surveyor which shows the precise location, character and identification markings of each point found. The sketch shall also show the specific surveying method used to reference each point found and any known reference documents. A copy of the sketch will be retained at the Survey section.

If any existing survey monument is destroyed during construction, the surveyor shall set another point of suitable character in the same location using the reference points set prior to destruction of the original point. Such replacement shall take place prior to the Notice of Completion. The surveyor shall then file with the County of San Diego either a Corner Record or a Record of Survey, as appropriate, which shall document the survey procedure used to replace the point and shall perpetuate the point for the record.

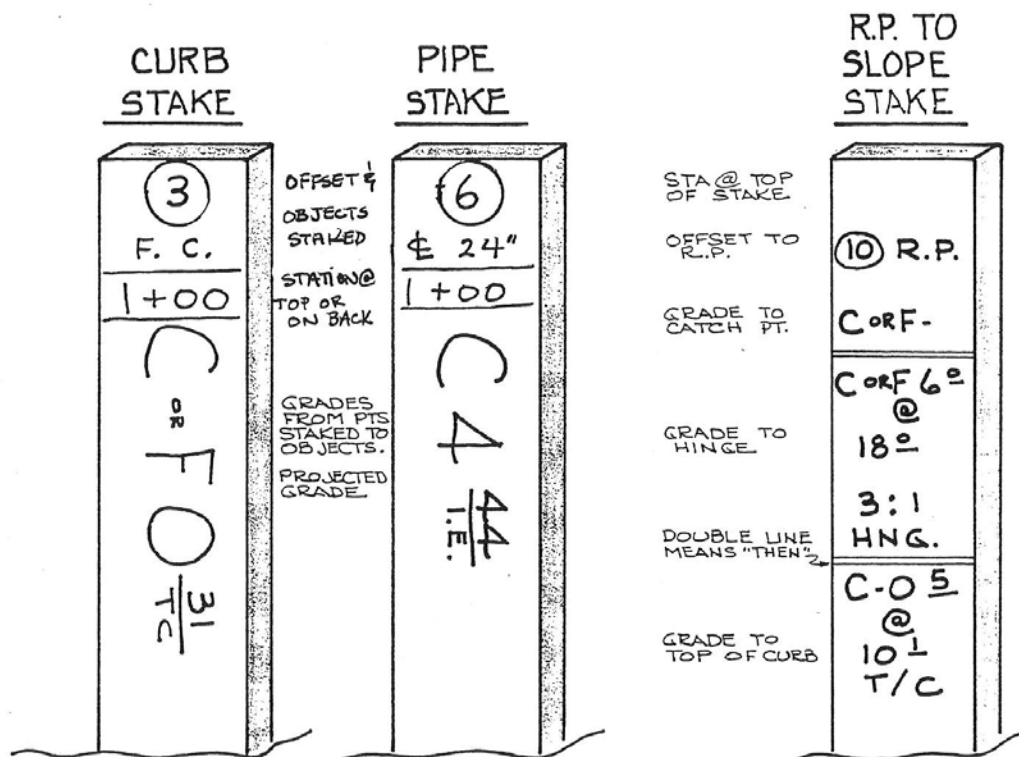
On private contracts, the same procedure shall be followed by the private surveyor. The private surveyor will be responsible to reset or replace any monumentation that was destroyed by the construction project, but not referenced prior to destruction. The surveyor shall likewise file with the County of San Diego either a Corner Record or a Record of Survey, as appropriate, which shall document the survey procedure used to replace the point and shall perpetuate the point for the record.

The RE shall coordinate with the Contractor when dealing with the removal/replacement of curb or sidewalks to ensure that no survey markers are lost. Prior to sawcutting, the RE will survey the area to be removed to verify if any property markers or offset disks will be impacted. If any such property markers or offset disks are found, contact the Survey section so they can be tied out before concrete is removed. On private contracts, the same procedure should be required of the private surveyor or Engineer.

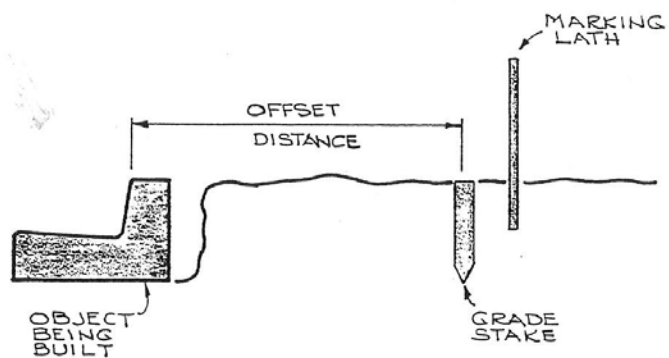
When a “well monument” is found, referenced and replaced in the same location and is of the same character, it shall be properly punched and stamped with the registration number of the surveyor, and a Corner Record filed in accordance with the Land Surveyors Act. When a newly established “well monument” is set on a private contract, the surveyor shall locate it per the contract. The surveyor shall then notify the Survey Office of the newly set monument; and shall provide them with a copy of the sketch or cut sheet showing the new monument. A Corner Record or a Record of Survey, as appropriate, shall be filed with the County of San Diego.

4.4 Cut Sheets, Staking and Misc. Examples

See attached samples.



CONSTRUCTION MARKING LATH



CHIEF: D. Luther	INSPECTOR: L JENTZEN	WORK #: S-00870.06.02	SHEET C- 11	Page 2 of 3
CREW: Jose E. Lara	PLAN SHEETS: 37517 - 11 - D	MIN INDEX:	MAX INDEX:	Date: 02-08-2019

Line Stakeout: S00870 CL OMR

Point Name	Description	Line Name	Station	Offset	Design Z	Staked Z	Cut/Fill
11653	3' FC	S00870 CL OMR	11+15.000	-23.280	315.080	314.849	F+0.231
11654	3' FC	S00870 CL OMR	11+33.690	-23.280	316.320	315.963	F+0.357
11655	3' FC	S00870 CL OMR	10+90.000	-23.300	313.280	312.922	F+0.359
11656	3' FC	S00870 CL OMR	10+60.400	-23.100	311.500	311.142	F+0.358

Line Stakeout: Hawken ramp

Point Name	Description	Line Name	Station	Offset	Design Z	Staked Z	Cut/Fill
11660	3' FC	Hawken ramp	0+43.850	-3.000	311.070	310.890	F+0.180
11659	3' FC	Hawken ramp	0+28.580	-3.000	309.560	309.619	C-0.059
11658	3' FC	Hawken ramp	0+24.580	-3.000	309.500	309.367	F+0.133
11657	3' FC	Hawken ramp	0+20.080	-3.000	309.570	309.056	F+0.514
11661	30' RAD.PT	Hawken ramp	0+00.000	-30.000	-	309.008	-

Line Stakeout: S00870 CL OMR

Point Name	Description	Line Name	Station	Offset	Design Z	Staked Z	Cut/Fill
11662	3' FC	S00870 CL OMR	10+50.000	23.060	311.110	310.211	F+0.899
11663	3' FC	S00870 CL OMR	10+75.000	23.140	312.670	311.682	F+0.988
11664	3' FC	S00870 CL OMR	11+00.000	23.220	314.230	313.398	F+0.832
11665	3' FC	S00870 CL OMR	11+38.750	23.360	316.660	316.333	F+0.327
11666	3' FC	S00870 CL OMR	11+19.370	23.290	315.440	314.682	F+0.758

CURB AND STREET STAKING:

- Column 1: Number given to identify stored points in the survey file.
- Column 2: Description of construction reference point.
- Column 3: Alignment name along which stationing runs.
- Column 4: Plan Station of the construction reference point.
- Column 5: Offset Distance of the construction reference point from the alignment.
- Column 6: Design Z or Design El: The design elevation per plan.
- Column 7: Elevation of the top of the construction reference point.
- Column 8: C/F: The cut or fill from the top of the construction reference point, to the design elevation.

CHIEF: D. De La Torre	INSPECTOR: Armin Asadyari	WORK #: B-00403	SHEET: 19,20-D	Page 1 of 4
CREW: G. Castaneda M. Meyer	PLAN SHEETS: 39562	MIN INDEX:	MAX INDEX:	

Line Stakeout: Sheet 19-20_55th St Sewer							
Point Name	Description	Line Name	Station	Offset	Design Z	Staked Z	Cut/Fill
3003	10/SMH 51	Sheet 19-20_55th St Sewer	1+00.000	-10.000	393.770	400.179	-6.409 IE
3004	L/O	Sheet 19-20_55th St Sewer	1+00.000	-15.000	393.770	400.151	-6.381 IE
3005	10/S	Sheet 19-20_55th St Sewer	1+50.000	-10.000	394.270	400.710	-6.440 IE
3007	10/S	Sheet 19-20_55th St Sewer	2+00.000	-10.000	394.771	401.322	-6.551 IE
3008	10/S	Sheet 19-20_55th St Sewer	2+50.000	-10.000	395.271	402.084	-6.813 IE
3009	10/S	Sheet 19-20_55th St Sewer	3+00.000	-10.000	395.772	402.770	-6.998 IE
3006	10/S	Sheet 19-20_55th St Sewer	3+50.000	-10.000	396.272	403.446	-7.175 IE
3010	10/SMH 52	Sheet 19-20_55th St Sewer	3+78.811	-10.000	396.560	403.617	-7.057 IE
3011	L/O	Sheet 19-20_55th St Sewer	3+78.811	-25.000	396.560	403.866	-7.306 IE
3012	10/S	Sheet 19-20_55th St Sewer	4+25.000	-10.000	397.021	404.415	-7.393 IE
3013	10/S	Sheet 19-20_55th St Sewer	4+75.000	-10.000	397.521	405.261	-7.740 IE

SEWER STAKES:

- Column 1: Number given to identify stored points in the survey file.
- Column 2: Description of construction reference point.
- Column 3: Alignment name along which stationing runs.
- Column 4: Plan Station of the construction reference point.
- Column 5: Offset Distance of the construction reference point from the alignment.
- Column 6: Design Z or Design El: The design elevation per plan.
- Column 7: Elevation of the top of the construction reference point.
- Column 8: C/F: The cut or fill from the top of the construction reference point, to the design elevation.

CUT SHEET				CITY OF SAN DIEGO		SHEET No. 1 OF 1	
CHIEF, WENTWORTH				ENGINEERING DEPARTMENT FIELD NOTES		DATE 5/23/90	
INSTA: _____				Job Description and Location CHOLLA PARK LAKE		DRAWING No. 23048	
CHM: _____				SLOPE STAKES COLLEGE GROVE DR		W. O. No. 118622	
STATION	TOE GRADE	RIDGE GRADE	ELEV TOE			SLOPE	
46+01							
47+50	458.9	465.0	458.9	C 0.0 @ 10.0 TOE	F 41.2 @ 20.0	RIDGE	4.9:1
47+00	458.5	465.0	458.5	C 0.0 @ 10.0 TOE	F 65.0 @ 19.5	RIDGE	3:1
46+50	458.1	466.5	458.1	C 0.0 @ 10.0 TOE	F 84.0 @ 25.2	RIDGE	3:1
46+00	457.8	466.5	457.8	C 0.0 @ 10.0 TOE	F 87.0 @ 26.1	RIDGE	3:1
45+50	457.2	465.0	457.2	C 0.0 @ 10.0 TOE	F 78.0 @ 23.4	RIDGE	3:1
45+00	457.8	465.0	456.4	F 1.4 @ 10.0 TOE	F 72.0 @ 21.5	RIDGE	3:1
44+50	456.2	465.0	455.2	F 1.0 @ 10.0 TOE	F 88.0 @ 26.5	RIDGE	3:1
44+00	454.5	465.0	454.5	C 0.0 @ 10.0 TOE	F 105.0 @ 31.5	RIDGE	3:1
43+50	452.9	466.0	452.9	C 0.0 @ 10.0 TOE	F 131.0 @ 39.3	RIDGE	3:1
43+00	451.6	466.0	451.6	C 0.0 @ 10.0 TOE	F 144.0 @ 43.2	RIDGE	3:1
42+50	450.0	466.0	450.0	C 0.0 @ 10.0 TOE	F 160.0 @ 48.0	RIDGE	3:1
42+00	447.6	459.0	447.6	C 0.0 @ 10.0 TOE	F 11.4 @ 42.0	RIDGE	37:1
41+50	445.9	453.0	445.9	C 0.0 @ 10.0 TOE	F 7.1 @ 30.0	RIDGE	42:1
41+00							
BENCH MARK:							

ED-78 (2-83)

SLOPE STAKES:

Column 1: Centerline stationing, per plan, reading from bottom to top.

Column 2: Plan grade, at the toe of slope.

Column 3: Plan grade at the ridge of the slope.

Column 4: Stake elevation. Stake set as 10' Reference point to the toe.

Column 5,6: Cut or fill to the toe and the distance to the toe.

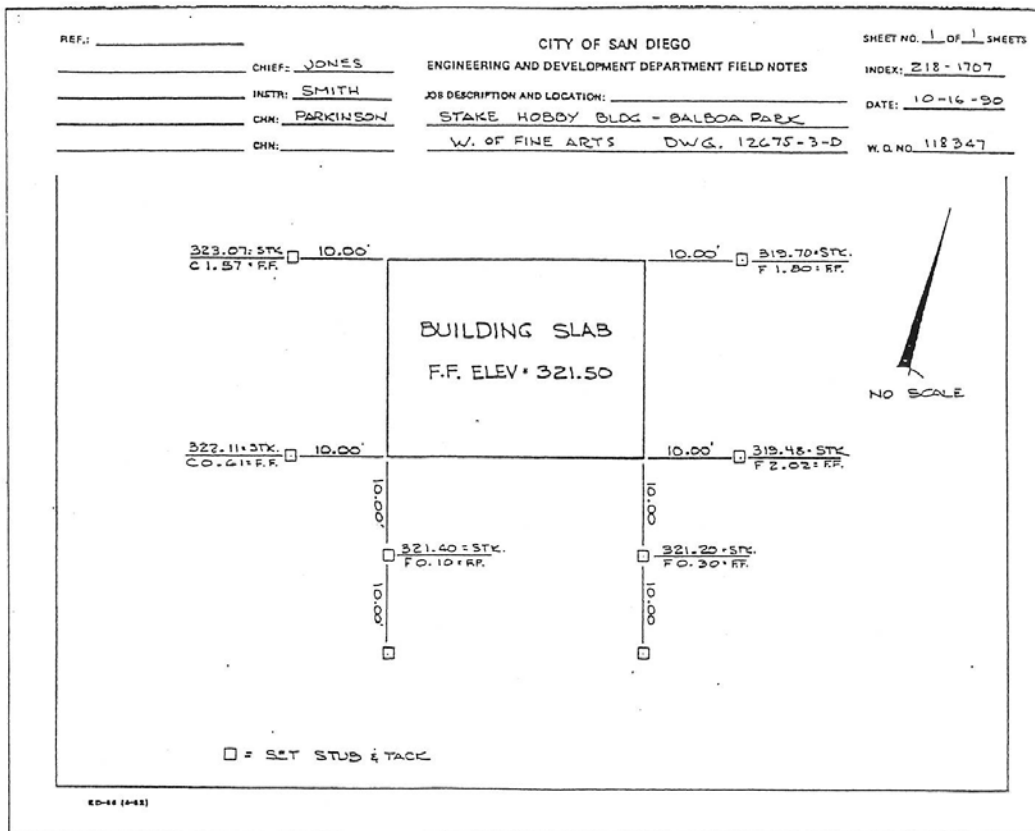
Column 7,8: Cut or fill to the ridge and the distance out to the ridge.

Column 9: The slope ratio. 3:1 = 3 feet out for 1 foot vertical.

CUT SHEET										
CITY OF SAN DIEGO					SHEET No. <u>1</u> OF <u>4</u>					
ENGINEERING DEPARTMENT FIELD NOTES					DATE <u>8 OCT 90</u>					
Job Description and Location <u>STAKE ALLEY E'LY OF</u>					DRAWING No. <u>24648</u>					
<u>QUAIL ST. AND NLY OF BROADWAY</u>										
CHIEF: <u>KELLEY</u>										
INSTR: <u>DANN</u>										
CHN: <u>WELBAUM</u>										
CHN: <u>MARQUIS</u>										
W. O. No. <u>119053</u>										
C/F	STAKE ELEV.	DESCRIBE	LT. FIN. GRD.	LT. O/S	STATION	RT. O/S	RT. FIN. GRD.	DESCRIBE	STAKE ELEV.	C/F
FO. 80		TP	80.20	0.75	2+00	0.75	81.20	TP	81.43	C 0.23
					2+00	3.75	80.28	GRD BRK.		C 0.28
					1+90		81.24	TC		C 0.24
					1+90	0.75	80.24	TP	81.24	C 0.24
FO. 80		TP	80.10	3.50	1+75		81.20	TC		FO. 80
FO. 80	79.60	E	79.20	13.25	1+75	1.00	80.20	TP	81.38	C 0.28
C 0.24		TP	80.20	1.00	1+50		81.20	TC		C 0.24
C 0.24	80.64	E	80.20	10.75	1+50	1.00	80.20	TP	81.52	C 0.28
FO. 80		TP	80.30	0.50	1+25					
C 0.15	80.22	E	80.10	10.25	1+25	1.00	80.20	TP	80.99	C 0.15
FO. 80		TP	81.20	0.25	1+00		82.20	TC		FO. 80
C 0.14	80.96	E	80.20	10.00	1+00	0.65	81.20	TP	81.84	C 0.24
FO. 80		TP	81.20	0.50	0+75		82.20	TC		C 0.20
C 0.22	81.29	E	81.20	10.25	0+75	1.00	81.20	TP	82.67	C 0.22
FO. 80		TP	81.20	0.50	0+50		82.20	TC		C 0.14
FO. 80	81.34	E	81.20	10.25	0+50	1.25	82.10	TP	82.94	C 0.24
					0+40		82.26	TC		FO. 80
					0+40	0.50	82.26	TP	82.54	C 0.28
					0+30	MEET				
BENCH MARK: CHISEL "X" 0+20 E ALLEY: 181.51 MSL @ QUAIL ST.										

ALLEY STAKES:

The stationing is in the center of the sheet, corresponding to the centerline of the alley. The stationing reads from bottom to top as the user would hold the sheet and walk the job. Lt/Rt = left and right sides of the alley, looking up station. The columns, working right and left away from the center of the sheet are: offset dist: the distance from the stake to the edge of pavement, Descr: type of stake, fin grade: the grade per the construction plan, stake elev: the elevation of the top of the stake, C/F: the cut or fill from the top of the stake to the edge of pavement.



BUILDING LAYOUT:

In most cases a sketch is provided for building layout. Building slabs usually have odd shapes and sometimes require innovative staking procedures.

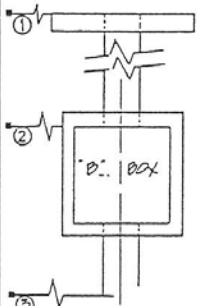
REF.: _____ CITY OF SAN DIEGO SHEET NO. 1 OF 1 SHEETS

INSP: YAGHOUPEZ CHIEF: DOODY ENGINEERING AND DEVELOPMENT DEPARTMENT FIELD NOTES INDEX: _____

INSTR: RAMETTA JOB DESCRIPTION AND LOCATION: CORRENTO VALLEY DATE: 13 DEC 89

CHN: RUTHGROM STORM DRAIN W. O. NO. 157200

CHN: _____

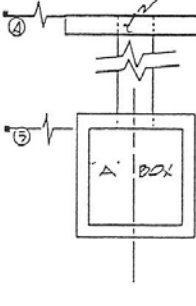


GTA. 7+29

① 10' RP, C-1.58 IE
F-0.90 TOP HDWL.

② 10' RP, C-3.02 IE

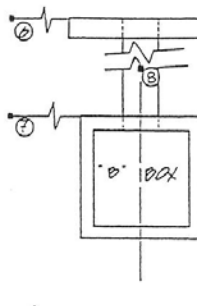
③ 10' RP, C-2.73 IE
GTK. 14 @ 0+03, ELEV.
FOR PIPE IN ONLY



GTA. 9+55.38

④ 10' RP, C-3.06 IE
F-0.50 TOP HDWL.

⑤ 10' RP, F-0.37 IE



GTA. 11+89.75

⑥ 10' RP, C-2.47 IE
F-1.03 TOP HDWL.

⑦ 10' RP, C-4.47 IE

⑧ 4.50' LEFT RP &
PIPE, C-3.18 IE

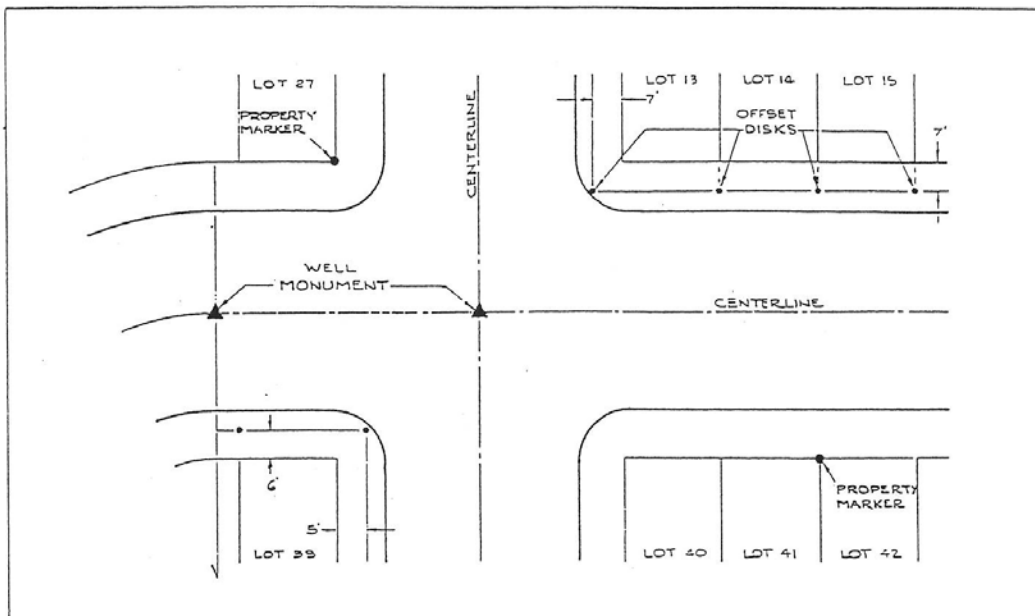
HEADWALL (TYP)

NTS

ED:18 (1-88)

SPECIAL OR ODD SHAPED STRUCTURES:

Sometimes a structure has an odd shape, where standard staking practices will not work. In such cases, a sketch is drawn by the Party Chief, showing the location of the stakes to the structure, and the construction data.



STREET AND PROPERTY MONUMENTATION:

On City construction contracts, the City is responsible for the preservation of street monumentation. It is very important to preserve as much of the original monumentation as possible. If it is determined that construction will destroy street or property markers, the surveyors should be notified so they can reference the point. After construction the references are used to reset the point in the same location. (& COLNER RECORD FILED IF REQUIRED)

Whenever a monument is replaced the surveyor has an obligation to make the replacement point a matter of record, per the provisions of the Land Surveyors Act.

Well Monument: Usually in the street at intersections, points of curve or on points of intersection. However, they may also be at an offset to the centerline.

Property Markers: Usually a pipe or metal pin set exactly on a property corner. They may or may not have a LS or RCE disk.

Offset Disks: A LS or RCE disk or a lead and tack set as a reference to a property line or corner at some known offset distance. Usually even foot offsets are used, but an offset disk may be at any offset distance. Occasionally they are also found behind property lines.