Foundation Specifications

for Type ES45T-T and ES45T-R 4.5-Meter Earth Station Antennas

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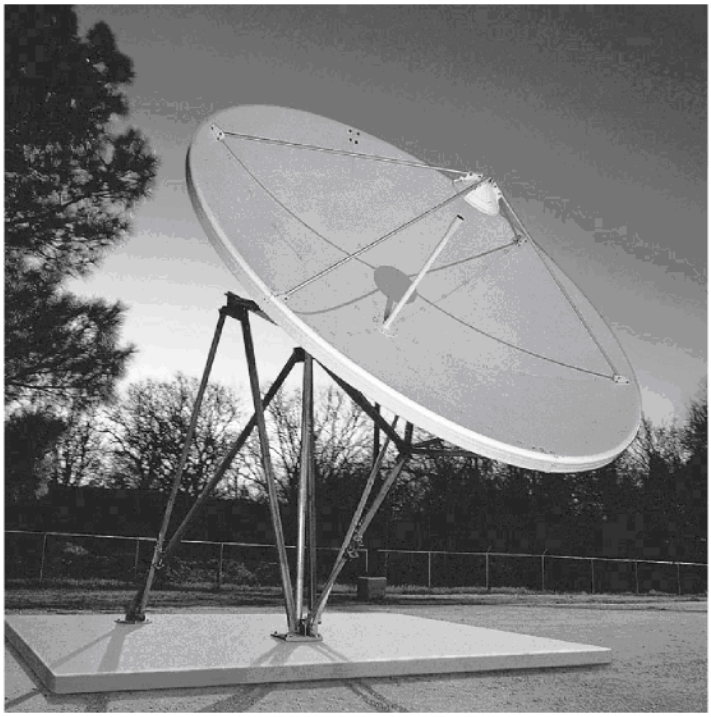
1.0 INTRODUCTION

1.1 This document specifies typical foundation characteristics, designs, requirements and dimensional specifications for the Kratos 4.5-Meter Earth Station Antennas.



2.0 FOUNDATION LOADING CHARACTERISTICS

2.1 Foundation loads are applied to the three foundation pads as shown in Figure 1. Positive applied forces are in the direction of the X, Y. and Z coordinate axes.

2.2 Varying load conditions are dependent upon icing, incident angle of the wind and elevation/azimuth angles of the antenna. Foundation loading for various icing, elevation/ azimuth and wind conditions are listed in Table 1.

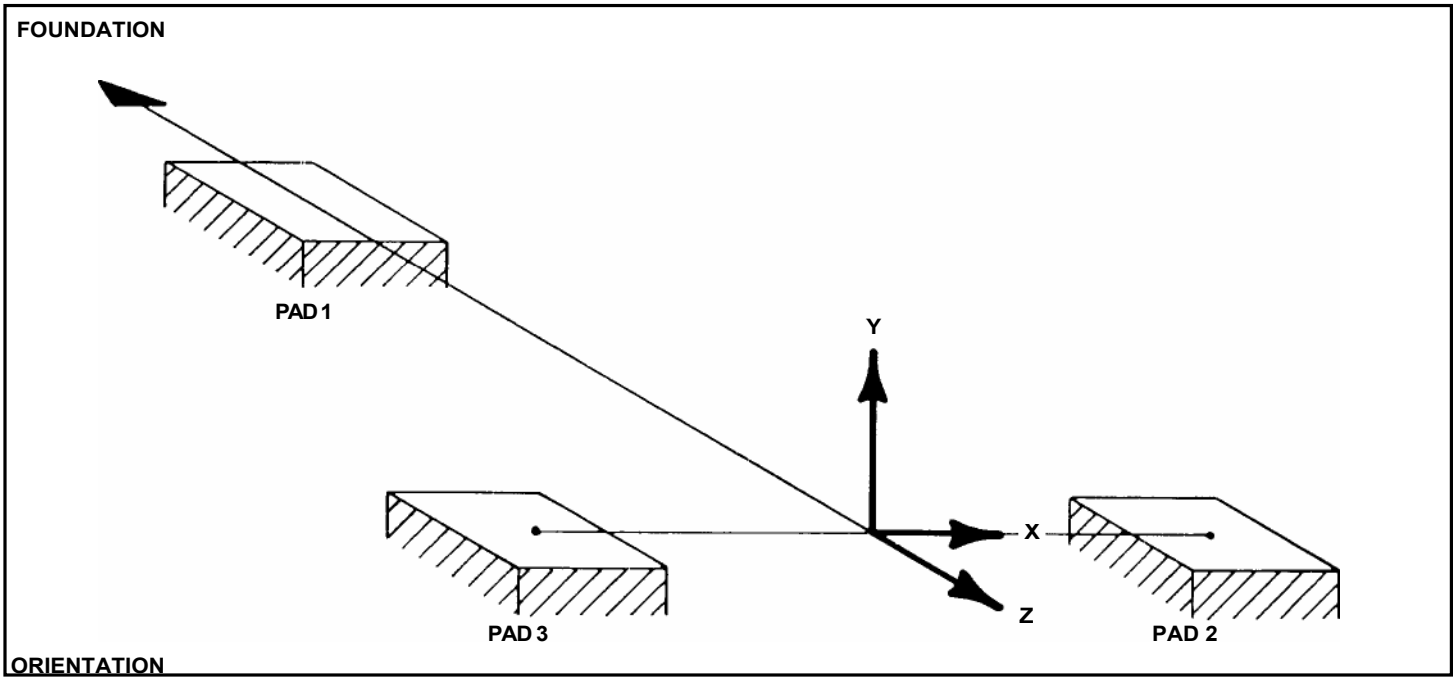


Figure 1

EL = 0°				LOAD (lb)											
Wind	Ice	AZ	∝	+60°			-60°			+135°			-135°		
(mph)	(in)	(deg)	Pad	X	Y	Z	X	Y	Z	X	Y	Z	X	Y	Z
125	0	30	1	-721	6803	3237	-1818	7311	1153	-1409	-7918	-2570	1750	-5391	1979
			2	-504	1207	-1009	-54	137	-109	-977	2461	-1954	1263	-3181	2526
			3	-4628	-10075	6913	-3122	-9450	8593	2554	3456	-699	1427	6570	-7262
87	2	30	1	-1419	-7320	3420	-1951	-7074	2410	-1752	-14449	608	-221	-13226	2811
			2	-173	436	-346	45	-113	90	-402	1011	-803	684	-1722	1367
			3	-1244	-2368	1354	-514	-2065	2168	2234	4186	-2334	1689	5696	-5513
125	0	0	1	848	8463	3052	-796	8453	2020	-2182	-7349	-1306	2175	-7401	622
			2	1919	-4833	3838	2320	-5842	4639	-2087	5256	-4174	-90	228	-181
			3	-3150	-5632	3957	-917	-4612	4177	1756	91	896	334	5172	-5075
87	2	0	1	433	-6878	3617	-364	-6883	3117	-1036	-14535	1506	1076	-14560	2440
			2	383	-966	767	578	-1455	1155	-1557	3921	-3113	-589	1484	-1178
			3	-1003	-1409	869	80	-914	976	1374	1362	-613	685	3824	-3506
125	0	-45	1	2762	5755	1582	826	5037	2006	-2509	-4014	605	2027	-7588	-1088
			2	3301	-10918	8946	5510	-11276	8677	-674	6592	-5756	-3851	4805	-3294
			3	1255	3161	-2510	1682	4237	-3364	-1819	-4581	3637	310	781	-620
87	2	-45	1	2851	-7399	2278	1911	-7747	2484	296	-12131	1805	2494	-13863	985
			2	463	-2431	2065	1536	-2605	1934	-1460	6050	-5056	-3000	5184	-3864
			3	230	578	-459	437	1101	-874	-1259	-3171	2518	-228	-573	455
125	0	-54	1	2963	4500	1118	1162	3676	1835	-2341	-3075	990	1787	-7184	-1387
			2	3595	-11459	9532	5574	-11637	8808	-735	6374	-5877	-3974	5486	-3541
			3	1968	4958	-3936	2366	5960	-4732	-2105	-5301	4210	-120	-303	241
87	2	-54	1	3175	-7668	1787	2301	-8068	2135	607	-11343	1723	2606	-13333	572
			2	562	-2581	2259	1522	-2668	1908	-1538	6062	-5207	-3107	5630	-4075
			3	396	997	-791	589	1483	-1178	-1576	-3971	3153	-615	-1549	1230
125	0	-83	1	3164	-1495	-996	1909	-2509	996	-1522	525	2506	839	-4529	-2506
			2	3626	-10714	9595	4680	-10206	7016	-451	4110	-5310	-3816	6637	-3224
			3	4052	10206	-8104	4254	10714	-8507	-2635	-6637	5270	-1632	-4110	3263
87	2	-83	1	3671	-9006	-483	3062	-9498	483	1401	-8027	1214	2545	-10477	-1214
			2	686	-2495	2508	1197	-2249	1258	-1287	4684	-4711	-2918	5908	-3700
			3	893	2249	-1786	990	2495	-1981	-2346	-5908	4691	-1860	-4684	3719

EL = 30°				LOAD (lb)											
Wind	Ice	AZ	∝	+60°			-60°			+135°			-135°		
(mph)	(in)	(deg)	Pad	X	Y	Z	X	Y	Z	X	Y	Z	X	Y	Z
125	0	30	1	-2060	-1568	4050	-2012	-1698	3000	-986	-7849	-1232	587	-5091	1922
			2	-121	305	-242	-236	595	-472	-1051	2647	-2102	1393	-3508	2785
			3	-2915	-6166	4089	-2044	-6326	5832	2682	4302	-1731	2083	7699	-7798
87	2	30	1	-2421	-12147	4428	-2397	-12210	3921	-1900	-15191	1871	-1138	-13856	3399
			2	38	-95	76	-18	45	-36	-412	1037	-824	772	-1944	1544
			3	-83	361	-679	338	284	164	2628	5434	-3501	2338	7080	-6440
125	0	0	1	154	-734	4460	-70	-732	3683	-1197	-7310	-402	1206	-7366	1199
			2	1408	-3546	2816	1306	-3288	2611	-2393	6028	-4787	-215	542	-430
			3	-1929	-3149	2117	-674	-3409	3090	1569	382	495	935	5925	-5503
87	2	0	1	104	-12221	5007	-5	-12220	4631	-551	-15409	2653	613	-15437	3428
			2	-44	111	-88	-94	236	-187	-1886	4750	-3771	-831	2092	-1661
			3	-239	230	-368	370	103	103	1457	1939	-1153	1150	4625	-4059
125	0	-45	1	3246	-2786	3074	2512	-2603	2684	-1167	-3503	559	1731	-7403	5
			2	2069	-7148	5882	3570	-7056	5396	-1497	7804	-6627	-3926	5855	-4219
			3	995	2505	-1989	885	2230	-1770	-2065	-5201	4130	257	648	-515
87	2	-45	1	3585	-12166	3502	3220	-12077	3313	1448	-12518	2284	2852	-14407	2016
			2	-507	339	-169	220	383	-404	-2236	7586	-6232	-3413	6642	-5066
			3	-21	-54	43	-74	-187	149	-1504	-3788	3008	-379	-955	758
125	0	-54	1	3691	-3640	2509	2932	-3429	2231	-1031	-2409	728	1679	-6893	-264
			2	2231	-7413	6209	3634	-7367	5528	-1536	7596	-6704	-4112	6627	-4590
			3	1439	3624	-2877	1337	3367	-2673	-2417	-6087	4833	-252	-635	504
87	2	-54	1	4102	-12132	2873	3734	-12030	2739	1817	-11539	2010	3130	-13712	1529
			2	-491	370	-138	189	392	-468	-2315	7635	-6387	-3564	7166	-5364
			3	-47	-119	94	-96	-243	193	-1912	-4816	3824	-863	-2174	1726
125	0	-83	1	4538	-7559	-242	3605	-7299	242	-575	1858	1471	1372	-3658	-1471
			2	2166	-6631	6074	3151	-6761	4560	-1035	5059	-5705	-4077	7817	-4520
			3	2684	6761	-5368	2633	6631	-5265	-3104	-7817	6207	-2009	-5059	4017
87	2	-83	1	5045	-11944	-117	4593	-11818	117	2569	-7384	713	3512	-10056	-713
			2	-374	372	97	104	309	-637	-1925	6035	-5609	-3398	7371	-5036
			3	-123	-309	245	-148	-372	295	-2926	-7371	5853	-2396	-6035	4792

TABLE 1

EL = 49°												
Wind	Ice	AZ	∝	+60°			-60°			±131°		
(mph)	(in)	(deg)	Pad	X	Y	Z	X	Y	Z	X	Y	Z
125	0	30	1	-2768	-7387	4420	-2197	-7705	4182	-507	-6595	857
			2	64	-162	129	-217	547	-434	170	-429	340
			3	-1242	-2508	1565	-905	-2899	2728	2587	6492	-5138
87	2	30	1	-2894	-15249	4829	-2627	-15403	4715	-1797	-14861	3105
			2	134	-339	269	-2	5	-4	188	-473	376
			3	847	2433	-2138	1010	2244	-1575	2701	6795	-5389
125	0	0	1	-205	-7165	5174	307	-7159	4758	4	-7518	1000
			2	712	-1794	1425	461	-1161	922	-1425	3590	-2851
			3	-795	-1099	670	-331	-1738	1582	1359	3396	-2691
87	2	0	1	-67	-15661	5612	181	-15658	5409	34	-15836	3589
			2	-447	1126	-894	-569	1432	-1137	-1483	3736	-2966
			3	375	1382	-1195	599	1072	-753	1419	3561	-2825
125	0	-45	1	3482	-8234	3837	3541	-7785	3186	711	-5473	712
			2	860	-3185	2638	1580	-2960	2242	-2942	7411	-5885
			3	540	1361	-1081	273	687	-546	-981	-2470	1962
87	2	-45	1	3882	-15036	4054	3911	-14819	3739	2540	-13701	2540
			2	-1231	2606	-2017	-882	2715	-2208	-3073	7741	-6147
			3	-287	-724	575	-417	-1050	834	-1024	-2580	2049
125	0	-54	1	4054	-8631	3220	4021	-8114	2561	810	-4580	587
			2	918	-3256	2756	1622	-3145	2328	-3053	7713	-6129
			3	726	1829	-1452	477	1201	-953	-1455	-3665	2910
87	2	-54	1	4489	-14743	3368	4474	-14493	3049	2916	-12778	2092
			2	-1271	2743	-2095	-930	2798	-2303	-3193	8054	-6397
			3	-458	-1155	917	-579	-1459	1159	-1515	-3817	3031
125	0	-83	1	5212	-10376	188	4719	-9740	-188	1006	-532	0
			2	840	-2737	2601	1460	-3055	1999	-2774	6986	-5548
			3	1213	3055	-2426	1087	2737	-2173	-2774	-6986	5548
87	2	-83	1	5630	-13308	91	5391	-13000	-91	3592	-8540	0
			2	-1145	2583	-1844	-845	2429	-2136	-2897	7297	-5794
			3	-964	-2429	1929	-1026	-2583	2051	-2897	-7297	5794

EL = 68°				LOAD (lb)					
Wind	Ice	AZ	∝	±68°			±112°		
(mph)	(in)	(deg)	Pad	X	Y	Z	X	Y	Z
125	0	30	1	-1883	-8797	3248	-548	-5216	937
			2	-18	45	-36	124	-313	249
			3	-166	-424	342	2959	4914	-3889
87	2	30	1	-2510	-16036	4343	-1863	-14291	3221
			2	100	-252	200	167	-422	335
			3	1413	3558	-2824	2439	6135	-4865
125	0	0	1	36	-8738	3756	14	-5904	1097
			2	86	-217	173	-1063	2676	-2125
			3	-86	-222	177	1031	2613	-2079
87	2	0	1	50	-16541	5016	39	-15164	3726
			2	-773	1948	-1547	-1330	3350	-2660
			3	741	1863	-1479	1281	3236	-2571
125	0	-45	1	2657	-8864	2657	773	-4357	773
			2	186	-469	372	-2228	5612	-4457
			3	62	156	-124	-743	-1871	1486
87	2	-45	1	3547	-15421	3547	2633	-13235	2633
			2	-1603	4037	-3205	-2773	6985	-5546
			3	-534	-1346	1068	-924	-2328	1849
125	0	-54	1	3049	-8909	2191	861	-3663	635
			2	197	-488	386	-2309	5846	-4647
			3	87	220	-174	-1111	-2798	2222
87	2	-54	1	4076	-14945	2922	3024	-12397	2168
			2	-1669	4207	-3341	-2882	7275	-5780
			3	-791	-1993	1582	-1372	-3456	2745
125	0	-83	1	3757	-9177	0	1093	-615	0
			2	174	-439	349	-2100	5289	-4200
			3	174	439	-349	-2100	-5289	4200
87	2	-83	1	5017	-12730	0	3724	-8578	0
			2	-1513	3812	-3027	-2615	6586	-5229
			3	-1513	-3812	3027	-2615	-6586	5229

EL = 90°				LOAD (lb)					
Wind	Ice	AZ	∝	+90°			-90°		
(mph)	(in)	(deg)	Pad	X	Y	Z	X	Y	Z
125	0	0	1	0	2532	-771	-407	-1548	829
			2	712	-1793	1424	1522	-3834	3044
			3	-712	-1793	1424	962	4328	-3873
87	2	0	1	0	-10941	2711	-197	-12917	3486
			2	-426	1074	-852	-34	85	-68
			3	426	1074	-852	1237	4038	-3418
125	0	+83	1	0	-5629	1556	407	-1548	-44
			2	-908	2287	-1816	-1718	4328	-3436
			3	908	2287	-1816	-766	-3834	3480
87	2	+83	1	0	-14894	3838	197	-12917	3063
			2	-1211	3050	-2422	-1603	4038	-3207
			3	1211	3050	-2422	400	85	143

TABLE 1 (con't)

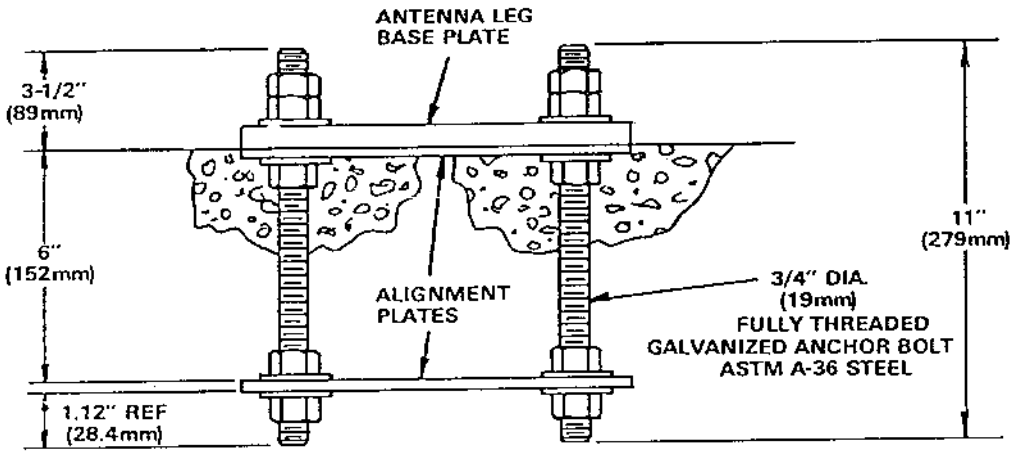
3.2 Kratos Type 47429A Anchor Bolt Kit includes anchor bolts, alignment plates and required mounting hardware as shown in Figures 3 and 4.

4.0 FOUNDATION DESIGNS

4.1 The selected foundation for a particular site is dependent upon local conditions. Soil borings and foundation analysis should be performed by a qualified civil engineer.

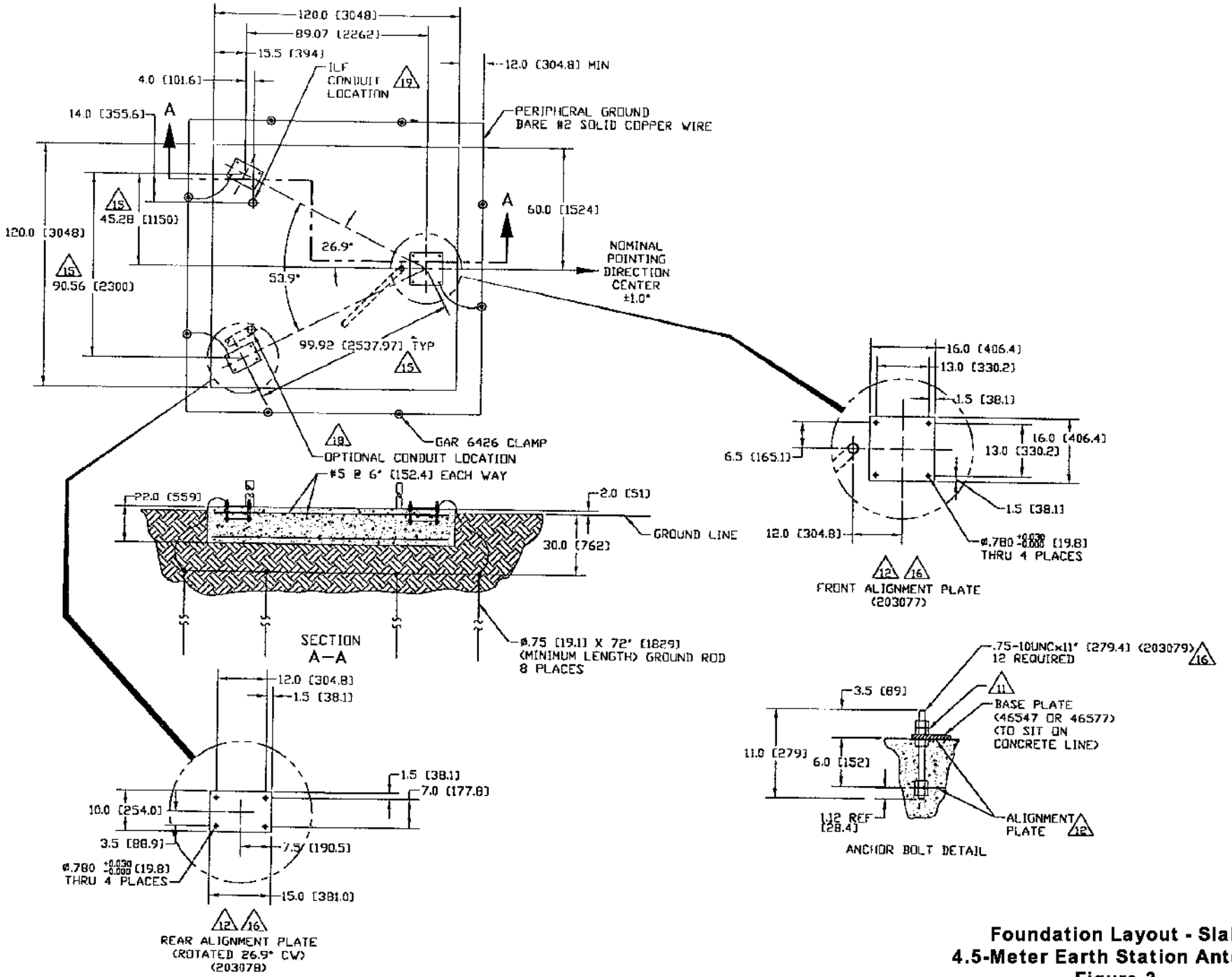
5.0 FOUNDATION ORIENTATION

5.1 Proper foundation orientation is required to obtain the desired orbital arc coverage from a particular site location. The required azimuth and elevation angles of the antenna, relative to the mount must be determined to establish the appropriate foundation orientation. A specific foundation orientation requirement may be requested with the antenna as part of the installation package.



TYPE 47429A ANCHOR BOLT KIT

Figure 2



Foundation Layout - Slab
4.5-Meter Earth Station Antenna
Figure 3

General Notes - Figure 3

Foundation Notes:

1. Contractor shall verify all dimensions before execution of work.

2. All concrete used in the work shall be 3000 PSI (20685 kN/M^2) strength as per ACI-31 8-71.

3. Reinforcement for foundation slab shall have a clear cover of 3" (76.2).

4. All reinforcement bars shall conform to the requirements of ASTM A-615 grade 60.

5. All structural steel used in this work shall be of ASTM A-36 grade.

6. All structural steel fabrication detailing design and erection shall conform to requirements of AISC code.

7. All reinforcing detailing fabrication and placement shall conform to ACI-318-71 specifications and latest CRSI manual.

8. Foundations have been designed to rest on undisturbed soil with a minimum allowable bearing capacity of 2000 PSF (9770 Kgf/m^2). If undesirable soil conditions are encountered the engineer shall be notified.

9. Volume of concrete: Approx. 5.6 cubic yards (4.3 cubic meters).

10. The foundation is a typical design only. Certification by a professional engineer as to its suitability for a particular installation considering soil conditions, water table and frost line is required prior to its use for actual fabrication.

11. Anchor bolts to be tightened 1/6 of a turn after using snug tightening as defined by the AISC turn of the nut method.

12. Both top and bottom alignment plates are needed to hold bolts to correct dimensions. Base plates will not fit if alignment is not proper.

13. Concrete is to be poured against undisturbed soil.

14. The concrete shall be maintained above 50° F (10° C) and in a moist condition for at least the first 7 days after placing before starting steel erection.

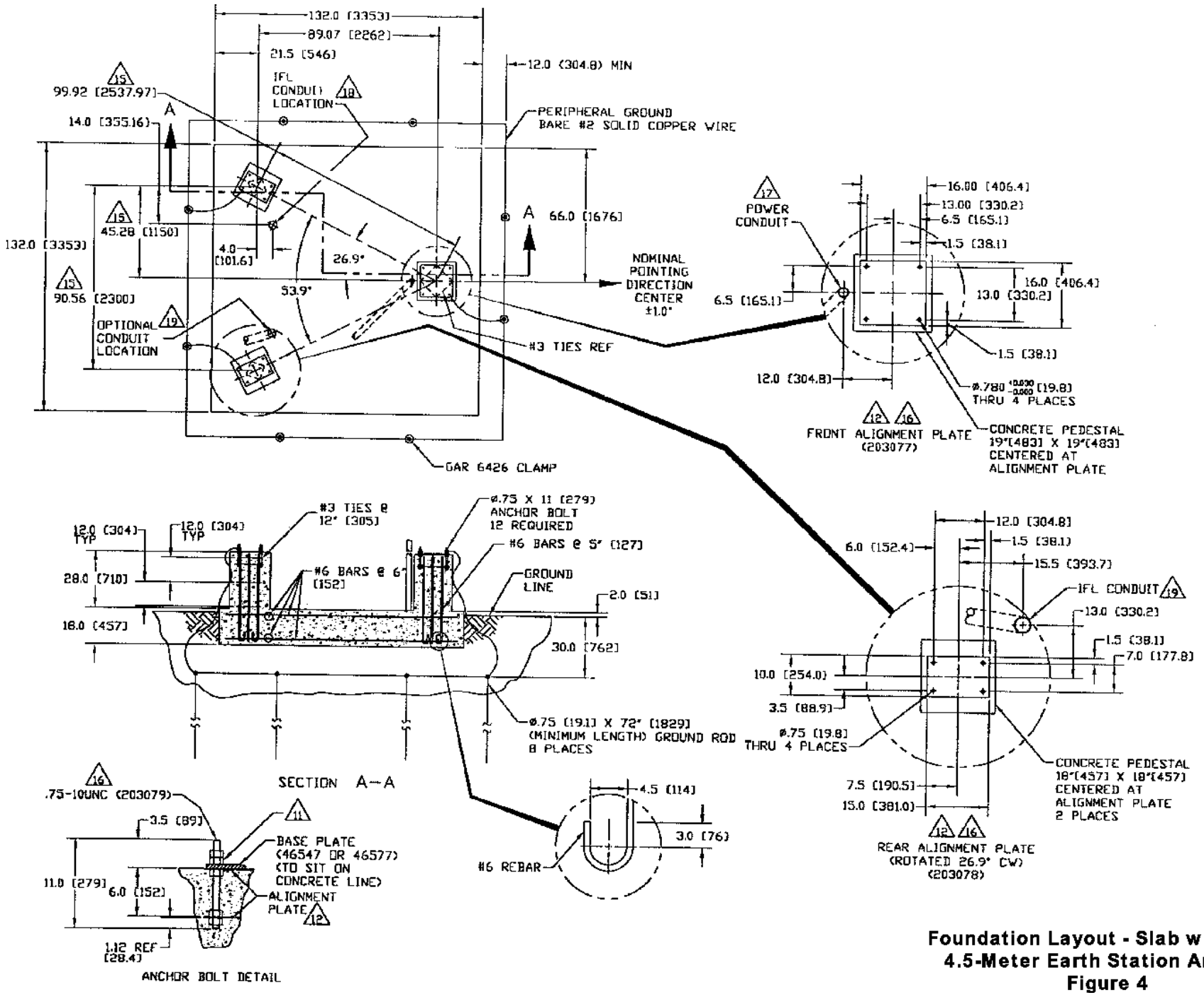
15. Tolerance to ±1/8. All other dimensions given for guidance only.

16. Part of anchor bolt kit 47429A.

17. Electrical power to antenna required for half or full main reflector anti-icing systems only. 1-1/2 to 2-1/2 size conduit recommended. Type and depth to bury conduit to be determined by location of communications building/shelter. Conduit to extend 6" (minimum) above surface of foundation slab. Open ends of conduit to be sealed to prevent moisture and foreign particle contamination.

18. IFL conduit required if no other means for routing cable is provided.

19. For routing IFL cables, 4" size recommended. Type and depth to bury conduit to be determined by customer, in compliance with local codes. Location of conduit on foundation and direction to route conduit to be determined by location of communications building/shelter. Conduit to extend 36" (minimum) above surface of foundation slab. All bends to be large radius, maximum two bends per run. Open ends of conduit to be sealed to prevent moisture or foreign particle contamination.



Foundation Layout - Slab with Piers
4.5-Meter Earth Station Antenna
Figure 4

General Notes - Figure 4

Foundation Notes:

1. Contractor shall verify all dimensions before execution of work.

2. All concrete used in the work shall be 3000 PSI (20685 kN/M^2) strength as per ACI-31 8-71.

3. Reinforcement for foundation slab shall have a clear cover of 3" (76.2).

4. All reinforcement bars shall conform to the requirements of ASTM A-615 grade 60.

5. All structural steel used in this work shall be of ASTM A-36 grade.

6. All structural steel fabrication detailing design and erection shall conform to requirements of AISC code.

7. All reinforcing detailing fabrication and placement shall conform to ACI-318-71 specifications and latest CRSI manual.

8. Foundations have been designed to rest on undisturbed soil with a minimum allowable bearing capacity of 2000 PSF (9770 Kgf/m^2). If undesirable soil conditions are encountered the engineer shall be notified.

9. Volume of concrete: Approx. 7.3 cubic yards (5.6 cubic meters).

10. The foundation is a typical design only. Certification by a professional engineer as to its suitability for a particular installation considering soil conditions, water table and frost line is required prior to its use for actual fabrication.

11. Anchor bolts to be tightened 1/6 of a turn after using snug tightening as defined by the AISC turn of the nut method.

12. Both top and bottom alignment plates are needed to hold bolts to correct dimensions. Base plates will not fit if alignment is not proper.

13. Concrete is to be poured against undisturbed soil.

14. The concrete shall be maintained above 50° F (10° C) and in a moist condition for at least the first 7 days after placing before starting steel erection.

15. Tolerance to ±1/8. All other dimensions given for guidance only.

16. Part of anchor bolt kit 47429A.

17. Electrical power to antenna required for half or full main reflector anti-icing systems only. 1-1/2 to 2-1/2 size conduit recommended. Type and depth to bury conduit to be determined by location of communications building/shelter. Conduit to extend 34" (minimum) above surface of foundation slab. Open ends of conduit to be sealed to prevent moisture and foreign particle contamination.

18. IFL conduit required if no other means for routing cable is provided.

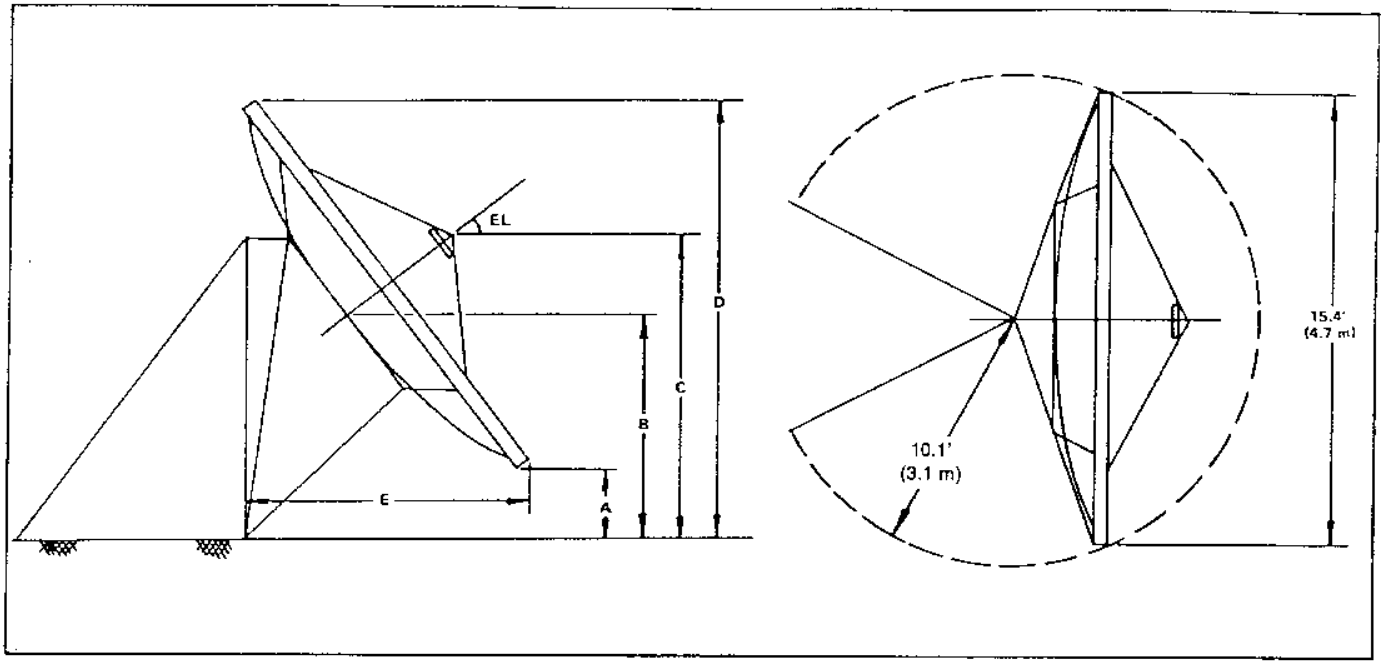
19. For routing IFL cables, 4" size recommended. Type and depth to bury conduit to be determined by customer, in compliance with local codes. Location of conduit on foundation and direction to route conduit to be determined by location of communications building/shelter. Conduit to extend 64" (minimum) above surface of foundation slab. All bends to be large radius, maximum two bends per run. Open ends of conduit to be sealed to prevent moisture or foreign particle contamination.

6.0 ANTENNA GEOMETRY

6.1 Figure 5 illustrates basic dimensional characteristics and varying dimensions from ground reference of selected antenna points as the elevation angle fluctuates from 2° - 62° and 33° - 90° with high-look angle.

7.0 ANTENNA POINTING

7.1 The procedure for pointing the antenna at the desired satellite of interest is included as part of the installation instructions supplied with the antenna. Refer to Appendix (Type 49640-( ) Ground Mount Assembly).



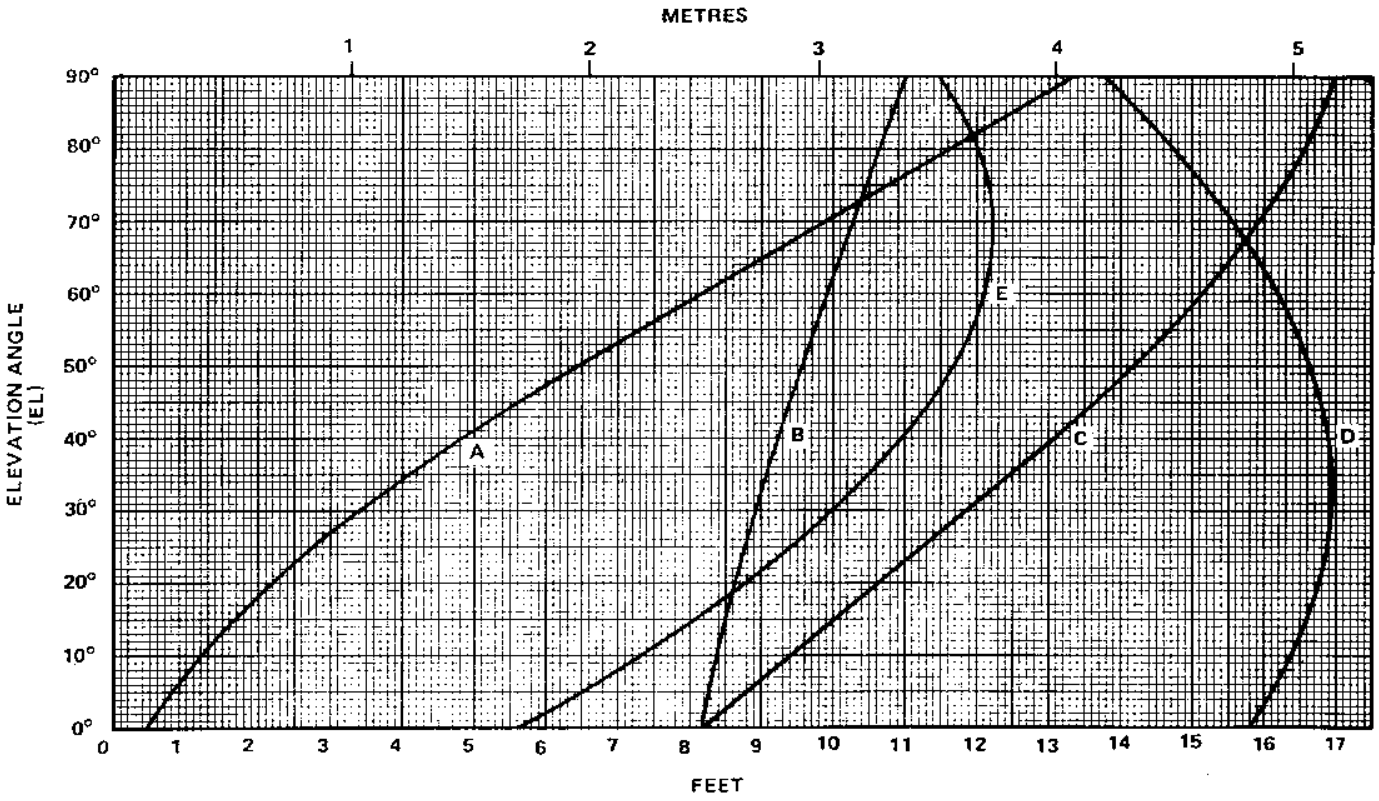


Figure 5

APPENDIX

1.0 CALCULATIONS FOR ANTENNA POINTING

1.1 The earth station antenna mount permits the antenna to be pointed through an azimuth range ±82° with standard elevation ranges from 2° - 62° and 33° - 90° with high-look strut configuration. The foundation must be oriented properly at each site to permit the antenna to be pointed at any satellite in the desired orbital arc. The antenna has a fine adjustment capability in both azimuth and elevation which provides strut adjustment from the coarse settings of the antenna. Refer to Figures 2-2 and 2-3.

1.2 This section contains formulas and graphs for determining the pointing capabilities of the antenna. Mount support pads permit attachment of the azimuth strut in left elevation axis, right rear pad position, right elevation axis, right rear pad position, left elevation axis, left rear pad position, or right elevation axis, left rear pad position. Refer to Figure 2-3. Additional azimuth strut positions provide greater flexibility when repositioning the antenna to view other satellites of interest.

1.3 Formulas. Formulas for calculating true azimuth (AZ), true elevation (EL), relative angle between true azimuth and mount pointing angle (dAZ), and strut lengths of Kratos earth station antennas are given below. Knowing earth station latitude, longitude, azimuth setting of mount (AZm) and satellite longitude (over the equator), the following calculations should be performed:

1.4 $AZ = 180° + \tan^{-1} \tan \theta / \sin \alpha$

= true azimuth with respect to earth. **NOTE:** This equation applies to earth stations north of the equator. For earth stations south of the equator.

$AZ = 360° - \tan^{-1} \tan \theta / \sin \alpha$

where:

α = earth station latitude
θ = relative longitude
= satellite longitude minus earth station longitude

NOTE: Earth station latitude values are positive (+) for sites located north of the equator and negative (-) for sites located south of the equator. Earth station longitude values are positive (+) for sites west of Greenwich and negative (-) for sites located east of Greenwich.

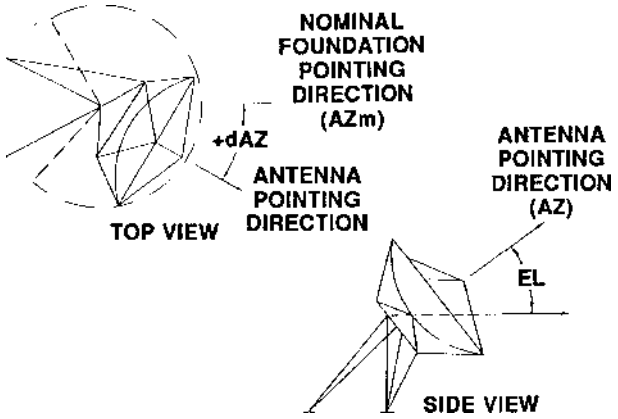


Figure 2-1

1.5 dAZ = AZ - AZm = relative angle between true azimuth angle and mount pointing direction.

where:

AZm = azimuth at which mount is set (nominal foundation pointing angle). Refer to paragraph 1.9.

1.6 EL = 90° - T - R = true elevation with respect to earth.

where:

$R = \cos^{-1}(\cos \theta \cos \alpha)$ and $T = \tan^{-1} \sin R / 6.61\ 66 - \cos R$

1.7 $\sqrt{18266.38 - 16064.52 \cos (EL° + 9.04°)}$ = elevation strut length

1.8 $\sqrt{12661.88 + X^2 + Z^2}$ = azimuth strut length

For azimuth strut attached from **left elevation axis** pickup to **right rear pad** (as viewed from rear of antenna):

X = 43.201 + 56.331 cos (23.927° + dAZ) and Z = 84.978 + 56.331 sin (23.927° + dAZ)

For azimuth strut attached from **right elevation axis** pick-up to **right rear pad** (as viewed from rear of antenna):

X = 43.201 - 56.331 cos (23.927° - dAZ) and Z = 84.978 + 56.331 sin (23.927° - dAZ)

For azimuth strut attached from **left elevation axis** pickup to **left rear pad** (as viewed from rear of antenna):

X = 43.201 - 56.331 cos (23.927° + dAZ) and Z = 84.978 + 56.331 sin (23.927° + dAZ)

For azimuth strut attached from **right elevation axis** pick-up to **left rear pad** (as viewed from rear of antenna):

X = 43.201 + 56.331 cos (23.927° - dAZ) and Z = 84.978 + 56.331 sin (23.927° - dAZ)

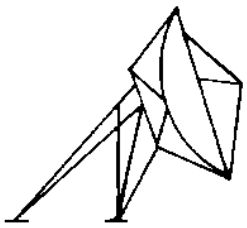
1.9 Foundation Orientation. Generally, the foundation is oriented on a true north-south line. In the Northern Hemisphere, the foundation would point due south equivalent to the direction, AZ = 180°. In the Southern Hemisphere, the foundation would point due north, equivalent to the direction, AZ = 0°. **NOTE:** True north is **not** equivalent to magnetic north.

1.10 Pointing Considerations. Knowing the foundation orientation (AZm), it is necessary to determine the coarse and fine settings of the mount struts to see a particular satellite within that orbital arc.

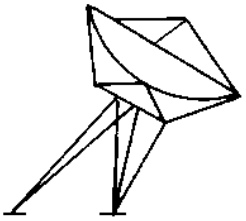
1.11 Using formulas in paragraphs 1.4 through 1.6, calculate AZ, dAZ and EL for the satellite of interest Figure 2-1 shows these angles in relation to the antenna geometry.

1.12 Using Figure 2-2, determine the elevation strut length knowing EL.

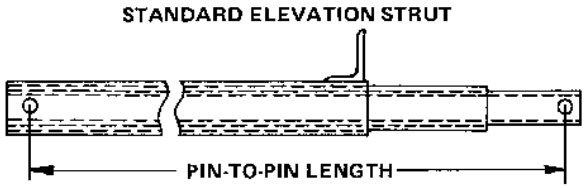
1.13 Using Figure 2-3, determine the azimuth strut length knowing dAZ.

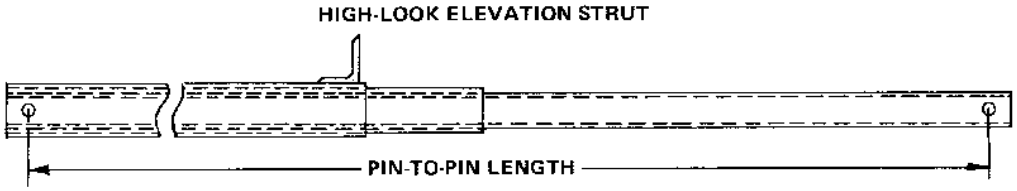


STANDARD ELEVATION STRUT
EL = 2° to 62°



HIGH-LOOK ELEVATION STRUT
EL = 33° to 90°





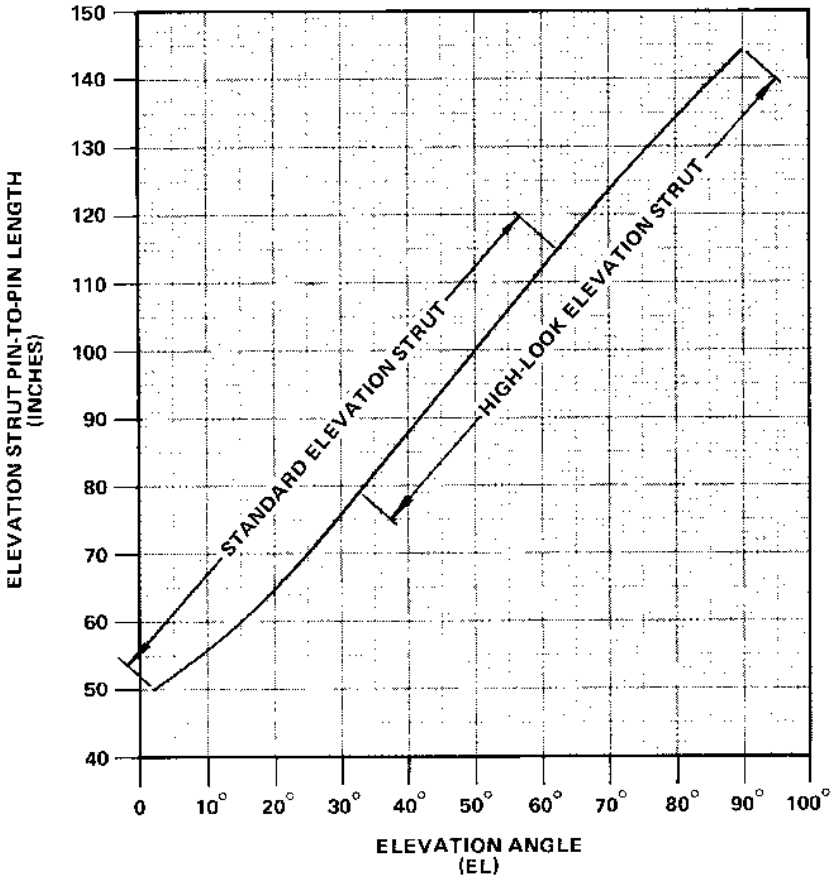
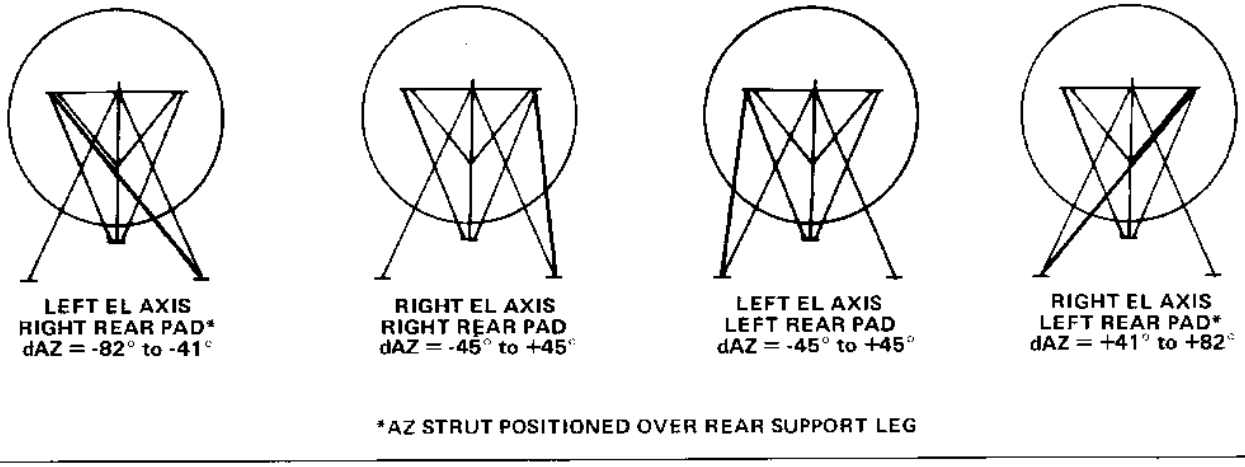


Figure 2-2


LEFT EL AXIS
RIGHT REAR PAD*
dAZ = -82° to -41°
RIGHT EL AXIS
RIGHT REAR PAD
dAZ = -45° to +45°
LEFT EL AXIS
LEFT REAR PAD
dAZ = -45° to +45°
RIGHT EL AXIS
LEFT REAR PAD*
dAZ = +41° to +82°
*AZ STRUT POSITIONED OVER REAR SUPPORT LEG

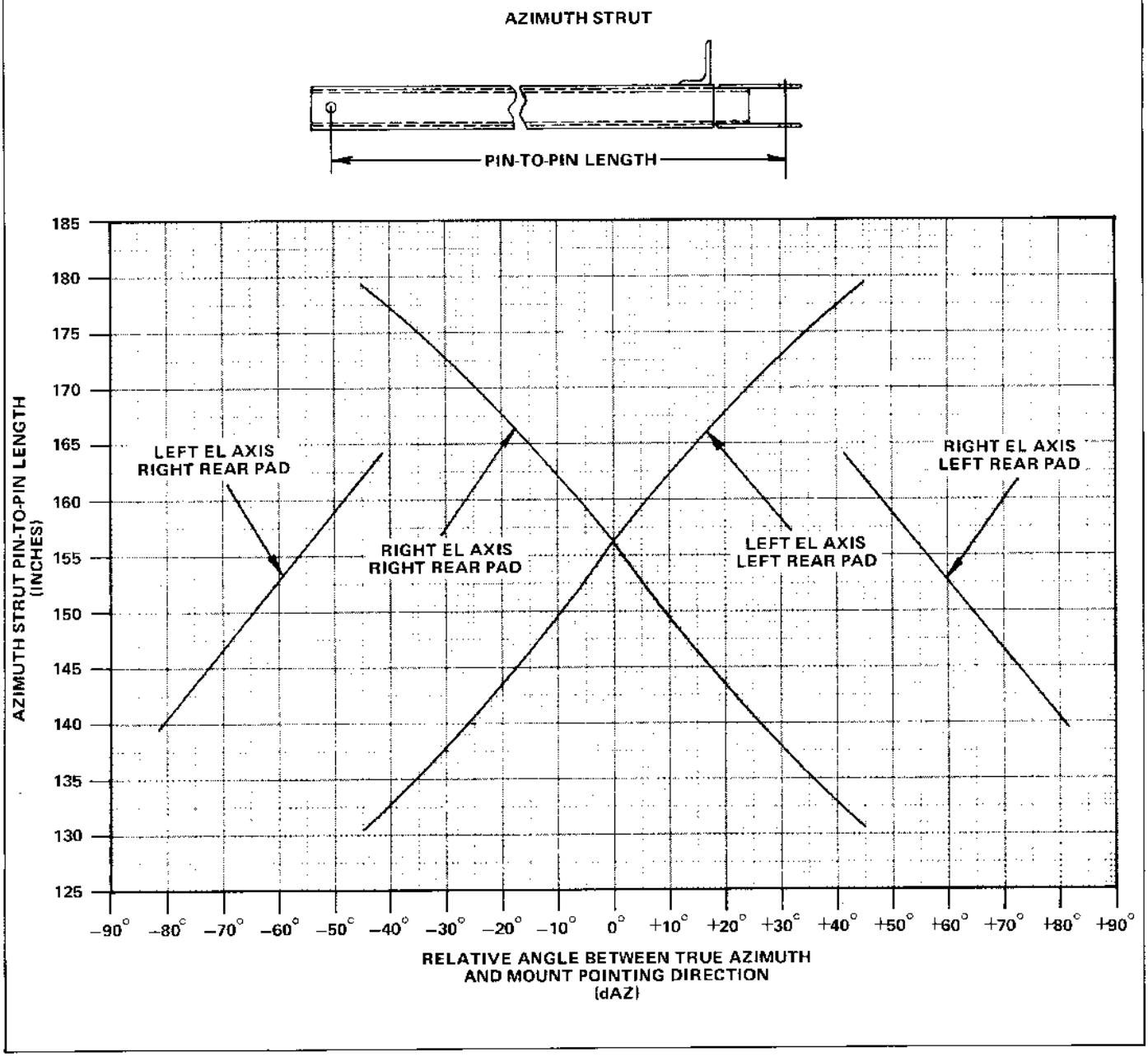

AZIMUTH STRUT
PIN-TO-PIN LENGTH
AZIMUTH STRUT PIN-TO-PIN LENGTH (INCHES)
185
180
175
170
165
160
155
150
145
140
135
130
125
LEFT EL AXIS
RIGHT REAR PAD
RIGHT EL AXIS
RIGHT REAR PAD
LEFT EL AXIS
LEFT REAR PAD
RIGHT EL AXIS
LEFT REAR PAD
−90° −80° −70° −60° −50° −40° −30° −20° −10° 0° +10° +20° +30° +40° +50° +60° +70° +80° +90°
RELATIVE ANGLE BETWEEN TRUE AZIMUTH
AND MOUNT POINTING DIRECTION
(dAZ)

Figure 2-3