

**TOTAL SOLAR ECLIPSE OF 2012 NOVEMBER 13**

**TABLE 4**

**PHYSICAL EPHEMERIS OF THE UMBRAL SHADOW  
TOTAL SOLAR ECLIPSE OF 2012 NOVEMBER 13**

ΔT = 66.8 s

Universal Time	Central Line		Diameter Ratio	Eclipse Obscur.	Sun Alt °	Sun Azm °	Path Width km	Major Axis km	Minor Axis km	Umbra Veloc. km/s	Central Durat.
	Latitude	Longitude									
20:36.1	11°56.9'S	133°04.8'E	1.0327	1.0665	0.0	108.6	126.0	-	110.3	-	01m40.9s
20:40	17°10.9'S	146°53.1'E	1.0375	1.0764	15.2	104.8	145.7	481.3	125.9	3.246	02m08.2s
20:45	20°04.9'S	153°22.2'E	1.0399	1.0814	23.0	101.9	154.7	342.5	133.6	2.053	02m24.1s
20:50	22°18.0'S	157°59.3'E	1.0416	1.0849	28.8	99.2	160.7	289.1	139.1	1.599	02m36.5s
20:55	24°10.8'S	161°45.1'E	1.0429	1.0877	33.6	96.5	165.1	259.3	143.4	1.347	02m47.2s
21:00	25°50.7'S	165°00.8'E	1.0441	1.0900	37.8	93.7	168.5	239.8	147.0	1.183	02m56.8s
21:05	27°21.2'S	167°56.7'E	1.0450	1.0920	41.6	90.7	171.1	226.0	150.0	1.069	03m05.4s
21:10	28°44.3'S	170°38.8'E	1.0458	1.0938	45.1	87.5	173.2	215.7	152.7	0.983	03m13.4s
21:15	30°01.4'S	173°10.9'E	1.0466	1.0953	48.3	84.0	174.9	207.7	155.0	0.918	03m20.6s
21:20	31°13.3'S	175°35.8'E	1.0472	1.0966	51.2	80.2	176.2	201.4	157.0	0.866	03m27.3s
21:25	32°20.6'S	177°55.4'E	1.0477	1.0978	54.0	76.1	177.2	196.3	158.7	0.824	03m33.4s
21:30	33°23.8'S	179°48.8'W	1.0482	1.0988	56.5	71.5	178.0	192.2	160.3	0.791	03m38.9s
21:35	34°23.3'S	177°35.6'W	1.0486	1.0997	58.9	66.5	178.6	188.8	161.6	0.764	03m43.8s
21:40	35°19.1'S	175°24.0'W	1.0490	1.1004	61.0	60.9	179.0	186.1	162.7	0.742	03m48.1s
21:45	36°11.5'S	173°13.3'W	1.0493	1.1010	62.9	54.7	179.3	183.9	163.7	0.724	03m51.9s
21:50	37°00.7'S	171°02.6'W	1.0495	1.1016	64.5	47.9	179.4	182.2	164.4	0.710	03m55.2s
21:55	37°46.6'S	168°51.5'W	1.0497	1.1020	65.9	40.4	179.5	180.9	165.1	0.700	03m57.8s
22:00	38°29.3'S	166°39.3'W	1.0499	1.1023	66.9	32.3	179.4	179.9	165.5	0.692	03m59.8s
22:05	39°08.8'S	164°25.6'W	1.0500	1.1025	67.6	23.7	179.3	179.4	165.8	0.688	04m01.2s
22:10	39°45.1'S	162°09.8'W	1.0500	1.1026	67.9	14.7	179.1	179.1	166.0	0.686	04m02.0s
22:15	40°18.1'S	159°51.6'W	1.0500	1.1026	67.9	5.6	178.8	179.2	166.0	0.687	04m02.2s
22:20	40°47.7'S	157°30.5'W	1.0500	1.1025	67.4	356.6	178.4	179.6	165.8	0.691	04m01.8s
22:25	41°13.8'S	155°06.1'W	1.0499	1.1023	66.6	347.9	177.9	180.4	165.5	0.697	04m00.7s
22:30	41°36.4'S	152°38.0'W	1.0498	1.1020	65.5	339.6	177.4	181.5	165.1	0.707	03m59.0s
22:35	41°55.2'S	150°05.7'W	1.0496	1.1016	64.0	331.9	176.7	183.0	164.5	0.720	03m56.7s
22:40	42°10.0'S	147°28.7'W	1.0493	1.1011	62.3	324.7	176.0	184.9	163.7	0.736	03m53.7s
22:45	42°20.6'S	144°46.5'W	1.0490	1.1005	60.3	318.1	175.2	187.3	162.8	0.757	03m50.1s
22:50	42°26.7'S	141°58.5'W	1.0487	1.0997	58.2	311.9	174.2	190.3	161.7	0.782	03m45.8s
22:55	42°28.0'S	139°04.1'W	1.0483	1.0988	55.8	306.2	173.1	194.0	160.3	0.813	03m40.9s
23:00	42°24.1'S	136°02.2'W	1.0478	1.0978	53.2	300.7	171.9	198.5	158.8	0.851	03m35.3s
23:05	42°14.4'S	132°51.8'W	1.0472	1.0967	50.4	295.6	170.5	204.0	157.0	0.898	03m29.2s
23:10	41°58.2'S	129°31.4'W	1.0466	1.0953	47.3	290.7	168.9	210.9	155.0	0.957	03m22.3s
23:15	41°34.8'S	125°59.0'W	1.0458	1.0938	44.1	286.0	167.1	219.6	152.7	1.031	03m14.7s
23:20	41°02.8'S	122°11.6'W	1.0450	1.0920	40.5	281.4	164.9	231.0	150.0	1.127	03m06.4s
23:25	40°20.6'S	118°04.8'W	1.0440	1.0900	36.6	276.8	162.3	246.4	146.8	1.257	02m57.3s
23:30	39°25.2'S	113°31.3'W	1.0429	1.0875	32.2	272.2	159.2	268.6	143.1	1.445	02m47.1s
23:35	38°11.8'S	108°17.8'W	1.0414	1.0846	27.2	267.5	155.2	303.8	138.6	1.743	02m35.6s
23:40	36°29.6'S	101°54.6'W	1.0396	1.0808	21.0	262.3	149.8	371.3	132.7	2.318	02m22.0s
23:45	33°41.9'S	092°36.5'W	1.0368	1.0750	12.0	255.9	140.8	598.3	123.8	4.257	02m03.5s
23:47.4	29°32.3'S	079°58.5'W	1.0331	1.0672	0.0	248.9	127.5	-	111.5	-	01m42.0s