TOTAL SOLAR ECLIPSE OF 2012 NOVEMBER 13

TABLE 4 (EXTENDED VERSION)

PHYSICAL EPHEMERIS OF THE UMBRAL SHADOW – TOTAL SOLAR ECLIPSE OF 2012 NOV 13

ΔT = 66.8 s

Universal Time	Central Line Latitude	Central Line Longitude	Diameter Ratio	Eclipse Obscur.	Sun Alt °	Sun Azm °	Path Width km	Major Axis km	Minor Axis km	Umbra Veloc. km/s	Central Durat.
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
20:37	14°22.7'S	139°55.1'E	1.0350	1.0713	7.3	107.0	135.6	932.1	117.8	7.147	01m53.3s
20:38	15°31.9'S	142°53.2'E	1.0361	1.0734	10.6	106.2	139.9	661.0	121.3	4.799	01m59.4s
20:39	16°25.4'S	145°04.7'E	1.0369	1.0751	13.1	105.4	143.1	547.5	123.8	3.817	02m04.1s
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
20:41	17°51.4'S	148°26.9'E	1.0381	1.0776	17.0	104.2	147.9	436.8	127.8	2.863	02m11.8s
20:42	18°28.3'S	149°50.6'E	1.0386	1.0787	18.7	103.6	149.9	404.3	129.4	2.583	02m15.2s
20:43	19°02.5'S	151°06.7'E	1.0391	1.0797	20.2	103.0	151.7	379.2	131.0	2.367	02m18.3s
20:44	19°34.6'S	152°16.9'E	1.0395	1.0806	21.7	102.5	153.3	359.1	132.3	2.195	02m21.3s
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
20:46	20°33.8'S	154°23.5'E	1.0403	1.0822	24.3	101.4	156.1	328.6	134.8	1.934	02m26.7s
20:47	21°01.3'S	155°21.4'E	1.0406	1.0829	25.5	100.9	157.4	316.6	136.0	1.832	02m29.3s
20:48	21°27.8'S	156°16.5'E	1.0410	1.0836	26.6	100.3	158.6	306.3	137.1	1.744	02m31.8s
20:49	21°53.3'S	157°09.0'E	1.0413	1.0843	27.7	99.8	159.7	297.2	138.1	1.667	02m34.2s
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
20:51	22°41.8'S	158°47.6'E	1.0419	1.0855	29.8	98.7	161.7	281.9	140.0	1.538	02m38.8s
20:52	23°05.0'S	159°34.2'E	1.0422	1.0861	30.8	98.2	162.6	275.4	140.9	1.483	02m41.0s
20:53	23°27.5'S	160°19.2'E	1.0424	1.0867	31.8	97.6	163.5	269.6	141.8	1.433	02m43.1s
20:54	23°49.4'S	161°02.8'E	1.0427	1.0872	32.7	97.1	164.3	264.2	142.6	1.388	02m45.2s
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
20:56	24°31.7'S	162°26.2'E	1.0432	1.0882	34.5	96.0	165.9	254.8	144.2	1.309	02m49.2s
20:57	24°52.1'S	163°06.3'E	1.0434	1.0887	35.4	95.4	166.6	250.6	144.9	1.274	02m51.2s
20:58	25°12.0'S	163°45.3'E	1.0436	1.0892	36.2	94.8	167.2	246.8	145.6	1.241	02m53.1s
20:59	25°31.5'S	164°23.5'E	1.0438	1.0896	37.0	94.3	167.9	243.2	146.3	1.211	02m54.9s
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
21:01	26°09.4'S	165°37.3'E	1.0443	1.0905	38.6	93.1	169.1	236.7	147.6	1.157	02m58.6s
21:02	26°27.9'S	166°13.1'E	1.0445	1.0909	39.4	92.5	169.6	233.8	148.2	1.133	03m00.3s
21:03	26°45.9'S	166°48.3'E	1.0446	1.0913	40.1	91.9	170.1	231.0	148.9	1.110	03m02.1s
21:04	27°03.7'S	167°22.8'E	1.0448	1.0917	40.9	91.3	170.6	228.5	149.4	1.089	03m03.8s
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
21:06	27°38.3'S	168°30.1'E	1.0452	1.0924	42.3	90.0	171.6	223.7	150.6	1.049	03m07.1s
21:07	27°55.2'S	169°02.9'E	1.0454	1.0928	43.0	89.4	172.0	221.6	151.1	1.032	03m08.7s
21:08	28°11.8'S	169°35.3'E	1.0455	1.0931	43.7	88.8	172.4	219.5	151.6	1.015	03m10.3s
21:09	28°28.2'S	170°07.3'E	1.0457	1.0935	44.4	88.1	172.8	217.6	152.2	0.998	03m11.8s
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
21:11	29°00.1'S	171°09.9'E	1.0460	1.0941	45.7	86.8	173.6	213.9	153.1	0.969	03m14.9s
21:12	29°15.8'S	171°40.7'E	1.0461	1.0944	46.4	86.1	173.9	212.3	153.6	0.955	03m16.4s
21:13	29°31.2'S	172°11.1'E	1.0463	1.0947	47.0	85.4	174.2	210.7	154.1	0.942	03m17.8s
21:14	29°46.4'S	172°41.2'E	1.0464	1.0950	47.7	84.7	174.6	209.2	154.5	0.929	03m19.2s
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
21:16	30°16.1'S	173°40.4'E	1.0467	1.0956	48.9	83.2	175.1	206.3	155.4	0.906	03m22.0s
21:17	30°30.7'S	174°09.6'E	1.0468	1.0958	49.5	82.5	175.4	205.0	155.8	0.895	03m23.4s
21:18	30°45.1'S	174°38.6'E	1.0470	1.0961	50.1	81.7	175.7	203.8	156.2	0.885	03m24.7s
21:19	30°59.3'S	175°07.3'E	1.0471	1.0964	50.7	81.0	175.9	202.5	156.6	0.875	03m26.0s

Eclipse Predictions by Fred Espenak, NASA's GSFC (2012 August)

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TABLE 4 (EXTENDED VERSION)

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ΔT = 66.8 s

Universal Time	Central Line Latitude	Central Line Longitude	Diameter Ratio	Eclipse Obscur.	Sun Alt °	Sun Azm °	Path Width km	Major Axis km	Minor Axis km	Umbra Veloc. km/s	Central Durat.
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
21:21	31°27.1'S	176°04.1'E	1.0473	1.0969	51.8	79.4	176.4	200.3	157.3	0.857	03m28.6s
21:22	31°40.7'S	176°32.2'E	1.0474	1.0971	52.4	78.6	176.6	199.2	157.7	0.848	03m29.8s
21:23	31°54.2'S	177°00.1'E	1.0475	1.0973	52.9	77.8	176.8	198.2	158.1	0.840	03m31.0s
21:24	32°07.5'S	177°27.8'E	1.0476	1.0976	53.5	76.9	177.0	197.2	158.4	0.832	03m32.2s
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
21:26	32°33.6'S	178°22.8'E	1.0478	1.0980	54.5	75.2	177.4	195.4	159.0	0.817	03m34.5s
21:27	32°46.4'S	178°50.1'E	1.0479	1.0982	55.0	74.3	177.5	194.6	159.4	0.810	03m35.6s
21:28	32°59.0'S	179°17.3'E	1.0480	1.0984	55.5	73.4	177.7	193.7	159.7	0.803	03m36.7s
21:29	33°11.5'S	179°44.3'E	1.0481	1.0986	56.0	72.4	177.8	192.9	160.0	0.797	03m37.8s
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
21:31	33°36.0'S	179°22.0'W	1.0483	1.0990	57.0	70.5	178.1	191.5	160.5	0.785	03m39.9s
21:32	33°48.0'S	178°55.2'W	1.0484	1.0991	57.5	69.5	178.2	190.8	160.8	0.779	03m40.9s
21:33	33°59.9'S	178°28.6'W	1.0485	1.0993	58.0	68.5	178.3	190.1	161.1	0.774	03m41.9s
21:34	34°11.7'S	178°02.1'W	1.0486	1.0995	58.4	67.5	178.5	189.4	161.3	0.769	03m42.8s
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
21:36	34°34.7'S	177°09.2'W	1.0487	1.0998	59.3	65.4	178.7	188.2	161.8	0.759	03m44.7s
21:37	34°46.0'S	176°42.8'W	1.0488	1.1000	59.7	64.3	178.7	187.7	162.0	0.754	03m45.6s
21:38	34°57.2'S	176°16.5'W	1.0489	1.1001	60.2	63.2	178.8	187.1	162.3	0.750	03m46.5s
21:39	35°08.2'S	175°50.2'W	1.0489	1.1003	60.6	62.1	178.9	186.6	162.5	0.746	03m47.3s
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
21:41	35°29.9'S	174°57.8'W	1.0491	1.1005	61.4	59.7	179.0	185.6	162.9	0.738	03m49.0s
21:42	35°40.5'S	174°31.7'W	1.0491	1.1007	61.8	58.5	179.1	185.2	163.1	0.734	03m49.7s
21:43	35°51.0'S	174°05.5'W	1.0492	1.1008	62.1	57.3	179.2	184.7	163.3	0.730	03m50.5s
21:44	36°01.3'S	173°39.4'W	1.0492	1.1009	62.5	56.0	179.2	184.3	163.5	0.727	03m51.2s
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
21:46	36°21.6'S	172°47.1'W	1.0494	1.1011	63.2	53.4	179.3	183.5	163.8	0.721	03m52.6s
21:47	36°31.6'S	172°21.0'W	1.0494	1.1013	63.6	52.1	179.3	183.2	164.0	0.718	03m53.3s
21:48	36°41.4'S	171°54.9'W	1.0495	1.1014	63.9	50.7	179.4	182.8	164.1	0.715	03m53.9s
21:49	36°51.1'S	171°28.8'W	1.0495	1.1015	64.2	49.3	179.4	182.5	164.3	0.713	03m54.6s
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
21:51	37°10.1'S	170°36.5'W	1.0496	1.1016	64.8	46.5	179.4	181.9	164.6	0.708	03m55.7s
21:52	37°19.4'S	170°10.3'W	1.0496	1.1017	65.1	45.0	179.5	181.6	164.7	0.705	03m56.3s
21:53	37°28.6'S	169°44.0'W	1.0497	1.1018	65.4	43.5	179.5	181.4	164.8	0.703	03m56.8s
21:54	37°37.7'S	169°17.8'W	1.0497	1.1019	65.6	42.0	179.5	181.1	164.9	0.701	03m57.3s
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
21:56	37°55.4'S	168°25.2'W	1.0498	1.1020	66.1	38.9	179.5	180.7	165.2	0.698	03m58.2s
21:57	38°04.0'S	167°58.8'W	1.0498	1.1021	66.3	37.3	179.5	180.5	165.3	0.696	03m58.7s
21:58	38°12.6'S	167°32.3'W	1.0498	1.1022	66.5	35.6	179.5	180.3	165.3	0.695	03m59.1s
21:59	38°21.0'S	167°05.9'W	1.0499	1.1022	66.7	34.0	179.5	180.1	165.4	0.693	03m59.5s

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Universal Time	Central Line Latitude	Central Line Longitude	Diameter Ratio	Eclipse Obscur.	Sun Alt °	Sun Azm °	Path Width km	Major Axis km	Minor Axis km	Umbra Veloc. km/s	Central Durat.
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
22:01	38°37.4'S	166°12.7'W	1.0499	1.1023	67.1	30.6	179.4	179.8	165.6	0.691	04m00.1s
22:02	38°45.5'S	165°46.0'W	1.0499	1.1024	67.2	28.9	179.4	179.7	165.7	0.690	04m00.5s
22:03	38°53.4'S	165°19.3'W	1.0500	1.1024	67.4	27.2	179.4	179.6	165.7	0.689	04m00.7s
22:04	39°01.1'S	164°52.5'W	1.0500	1.1024	67.5	25.5	179.3	179.5	165.8	0.688	04m01.0s
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
22:06	39°16.3'S	163°58.6'W	1.0500	1.1025	67.7	21.9	179.3	179.3	165.9	0.687	04m01.4s
22:07	39°23.7'S	163°31.5'W	1.0500	1.1025	67.8	20.1	179.2	179.2	165.9	0.687	04m01.6s
22:08	39°30.9'S	163°04.4'W	1.0500	1.1025	67.8	18.3	179.2	179.2	165.9	0.686	04m01.8s
22:09	39°38.1'S	162°37.2'W	1.0500	1.1026	67.9	16.5	179.1	179.1	166.0	0.686	04m01.9s
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
22:11	39°51.9'S	161°42.4'W	1.0500	1.1026	67.9	12.9	179.0	179.1	166.0	0.686	04m02.1s
22:12	39°58.7'S	161°14.9'W	1.0500	1.1026	67.9	11.1	179.0	179.1	166.0	0.686	04m02.2s
22:13	40°05.3'S	160°47.2'W	1.0500	1.1026	67.9	9.2	178.9	179.1	166.0	0.686	04m02.2s
22:14	40°11.7'S	160°19.5'W	1.0500	1.1026	67.9	7.4	178.8	179.2	166.0	0.686	04m02.2s
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
22:16	40°24.3'S	159°23.6'W	1.0500	1.1026	67.8	3.8	178.7	179.3	166.0	0.687	04m02.2s
22:17	40°30.3'S	158°55.6'W	1.0500	1.1026	67.7	2.0	178.6	179.3	165.9	0.688	04m02.1s
22:18	40°36.2'S	158°27.3'W	1.0500	1.1025	67.6	0.1	178.5	179.4	165.9	0.689	04m02.0s
22:19	40°42.0'S	157°59.0'W	1.0500	1.1025	67.5	358.3	178.5	179.5	165.9	0.690	04m01.9s
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
22:21	40°53.2'S	157°01.9'W	1.0500	1.1025	67.3	354.8	178.3	179.7	165.8	0.692	04m01.6s
22:22	40°58.6'S	156°33.2'W	1.0500	1.1024	67.1	353.0	178.2	179.9	165.7	0.693	04m01.4s
22:23	41°03.8'S	156°04.3'W	1.0499	1.1024	67.0	351.3	178.1	180.0	165.7	0.694	04m01.2s
22:24	41°08.9'S	155°35.3'W	1.0499	1.1023	66.8	349.6	178.0	180.2	165.6	0.696	04m01.0s
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
22:26	41°18.6'S	154°36.8'W	1.0499	1.1022	66.4	346.2	177.8	180.6	165.5	0.699	04m00.4s
22:27	41°23.3'S	154°07.3'W	1.0499	1.1022	66.2	344.5	177.7	180.8	165.4	0.701	04m00.1s
22:28	41°27.8'S	153°37.7'W	1.0498	1.1021	66.0	342.8	177.6	181.0	165.3	0.703	03m59.8s
22:29	41°32.2'S	153°07.9'W	1.0498	1.1021	65.7	341.2	177.5	181.2	165.2	0.705	03m59.4s
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
22:31	41°40.5'S	152°07.9'W	1.0497	1.1019	65.2	338.0	177.2	181.7	165.0	0.709	03m58.6s
22:32	41°44.4'S	151°37.6'W	1.0497	1.1018	64.9	336.4	177.1	182.0	164.9	0.712	03m58.1s
22:33	41°48.1'S	151°07.1'W	1.0497	1.1018	64.6	334.9	177.0	182.3	164.8	0.714	03m57.7s
22:34	41°51.7'S	150°36.5'W	1.0496	1.1017	64.3	333.4	176.9	182.6	164.6	0.717	03m57.2s
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
22:36	41°58.5'S	149°34.6'W	1.0495	1.1015	63.7	330.4	176.6	183.3	164.4	0.723	03m56.1s
22:37	42°01.6'S	149°03.4'W	1.0495	1.1014	63.4	328.9	176.4	183.7	164.2	0.726	03m55.5s
22:38	42°04.6'S	148°32.1'W	1.0494	1.1013	63.0	327.5	176.3	184.1	164.1	0.729	03m54.9s
22:39	42°07.4'S	148°00.5'W	1.0494	1.1012	62.7	326.1	176.1	184.5	163.9	0.733	03m54.3s

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PHYSICAL EPHEMERIS OF THE UMBRAL SHADOW – TOTAL SOLAR ECLIPSE OF 2012 NOV 13

ΔT = 66.8 s

Universal Time	Central Line Latitude	Central Line Longitude	Diameter Ratio	Eclipse Obscur.	Sun Alt °	Sun Azm °	Path Width km	Major Axis km	Minor Axis km	Umbra Veloc. km/s	Central Durat.
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
22:41	42°12.5'S	146°56.7'W	1.0493	1.1010	61.9	323.3	175.8	185.4	163.5	0.740	03m53.0s
22:42	42°14.8'S	146°24.5'W	1.0492	1.1008	61.6	322.0	175.7	185.8	163.4	0.744	03m52.3s
22:43	42°16.9'S	145°52.0'W	1.0492	1.1007	61.2	320.7	175.5	186.3	163.2	0.748	03m51.6s
22:44	42°18.8'S	145°19.4'W	1.0491	1.1006	60.8	319.4	175.3	186.8	163.0	0.752	03m50.8s
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
22:46	42°22.2'S	144°13.4'W	1.0490	1.1003	59.9	316.8	175.0	187.9	162.6	0.761	03m49.3s
22:47	42°23.6'S	143°40.1'W	1.0489	1.1002	59.5	315.6	174.8	188.5	162.4	0.766	03m48.4s
22:48	42°24.8'S	143°06.5'W	1.0488	1.1000	59.1	314.3	174.6	189.0	162.1	0.771	03m47.6s
22:49	42°25.9'S	142°32.6'W	1.0487	1.0999	58.6	313.1	174.4	189.7	161.9	0.777	03m46.7s
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
22:51	42°27.4'S	141°24.2'W	1.0486	1.0995	57.7	310.7	174.0	191.0	161.4	0.788	03m44.9s
22:52	42°27.8'S	140°49.6'W	1.0485	1.0994	57.2	309.6	173.8	191.7	161.1	0.794	03m43.9s
22:53	42°28.1'S	140°14.7'W	1.0484	1.0992	56.7	308.4	173.6	192.4	160.9	0.800	03m42.9s
22:54	42°28.2'S	139°39.5'W	1.0483	1.0990	56.3	307.3	173.4	193.2	160.6	0.807	03m41.9s
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
22:56	42°27.7'S	138°28.3'W	1.0482	1.0986	55.3	305.0	172.9	194.8	160.0	0.820	03m39.8s
22:57	42°27.1'S	137°52.3'W	1.0481	1.0984	54.7	304.0	172.7	195.7	159.7	0.828	03m38.8s
22:58	42°26.3'S	137°15.9'W	1.0480	1.0982	54.2	302.9	172.4	196.6	159.4	0.835	03m37.6s
22:59	42°25.3'S	136°39.2'W	1.0479	1.0980	53.7	301.8	172.2	197.5	159.1	0.843	03m36.5s
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
23:01	42°22.6'S	135°24.8'W	1.0477	1.0976	52.6	299.7	171.6	199.5	158.5	0.860	03m34.2s
23:02	42°20.9'S	134°47.1'W	1.0476	1.0974	52.1	298.7	171.4	200.5	158.1	0.869	03m33.0s
23:03	42°19.0'S	134°09.1'W	1.0474	1.0971	51.5	297.6	171.1	201.6	157.8	0.878	03m31.7s
23:04	42°16.8'S	133°30.6'W	1.0473	1.0969	50.9	296.6	170.8	202.8	157.4	0.888	03m30.4s
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
23:06	42°11.7'S	132°12.6'W	1.0471	1.0964	49.8	294.6	170.2	205.3	156.6	0.909	03m27.8s
23:07	42°08.7'S	131°32.9'W	1.0470	1.0961	49.2	293.6	169.9	206.6	156.3	0.920	03m26.5s
23:08	42°05.5'S	130°52.9'W	1.0468	1.0959	48.6	292.7	169.6	207.9	155.8	0.932	03m25.1s
23:09	42°02.0'S	130°12.4'W	1.0467	1.0956	48.0	291.7	169.3	209.4	155.4	0.944	03m23.7s
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
23:11	41°54.2'S	128°50.0'W	1.0464	1.0950	46.7	289.8	168.6	212.5	154.6	0.970	03m20.8s
23:12	41°49.8'S	128°08.0'W	1.0463	1.0947	46.1	288.8	168.2	214.1	154.1	0.984	03m19.4s
23:13	41°45.1'S	127°25.6'W	1.0461	1.0944	45.4	287.9	167.8	215.9	153.6	0.999	03m17.8s
23:14	41°40.1'S	126°42.5'W	1.0460	1.0941	44.7	286.9	167.5	217.7	153.2	1.014	03m16.3s
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
23:16	41°29.1'S	125°14.8'W	1.0457	1.0934	43.4	285.1	166.7	221.7	152.2	1.048	03m13.1s
23:17	41°23.1'S	124°30.0'W	1.0455	1.0931	42.7	284.1	166.3	223.8	151.6	1.066	03m11.5s
23:18	41°16.7'S	123°44.6'W	1.0453	1.0928	42.0	283.2	165.8	226.1	151.1	1.085	03m09.8s
23:19	41°10.0'S	122°58.4'W	1.0452	1.0924	41.2	282.3	165.4	228.5	150.5	1.105	03m08.1s

TOTAL SOLAR ECLIPSE OF 2012 NOVEMBER 13

TABLE 4 (EXTENDED VERSION)

PHYSICAL EPHEMERIS OF THE UMBRAL SHADOW – TOTAL SOLAR ECLIPSE OF 2012 NOV 13

ΔT = 66.8 s

Universal Time	Central Line Latitude	Central Line Longitude	Diameter Ratio	Eclipse Obscur.	Sun Alt °	Sun Azm °	Path Width km	Major Axis km	Minor Axis km	Umbra Veloc. km/s	Central Durat.
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
23:21	40°55.3'S	121°23.9'W	1.0448	1.0916	39.8	280.5	164.4	233.7	149.4	1.150	03m04.7s
23:22	40°47.3'S	120°35.5'W	1.0446	1.0912	39.0	279.6	163.9	236.6	148.8	1.174	03m02.9s
23:23	40°38.9'S	119°46.2'W	1.0444	1.0908	38.2	278.6	163.4	239.7	148.1	1.200	03m01.0s
23:24	40°30.0'S	118°56.0'W	1.0442	1.0904	37.4	277.7	162.9	242.9	147.5	1.228	02m59.2s
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
23:26	40°10.7'S	117°12.5'W	1.0438	1.0895	35.8	275.9	161.8	250.2	146.1	1.289	02m55.3s
23:27	40°00.2'S	116°19.1'W	1.0436	1.0890	34.9	275.0	161.2	254.3	145.4	1.324	02m53.3s
23:28	39°49.2'S	115°24.5'W	1.0433	1.0886	34.1	274.1	160.5	258.6	144.7	1.361	02m51.3s
23:29	39°37.5'S	114°28.6'W	1.0431	1.0881	33.2	273.2	159.9	263.4	143.9	1.401	02m49.2s
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
23:31	39°12.2'S	112°32.4'W	1.0426	1.0870	31.3	271.3	158.5	274.3	142.3	1.493	02m44.9s
23:32	38°58.4'S	111°31.8'W	1.0423	1.0864	30.3	270.4	157.7	280.5	141.4	1.546	02m42.7s
23:33	38°43.8'S	110°29.3'W	1.0420	1.0858	29.3	269.4	156.9	287.4	140.5	1.605	02m40.4s
23:34	38°28.3'S	109°24.7'W	1.0417	1.0852	28.3	268.4	156.1	295.1	139.6	1.670	02m38.0s
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
23:36	37°54.2'S	107°08.2'W	1.0411	1.0839	26.1	266.5	154.3	313.5	137.6	1.826	02m33.1s
23:37	37°35.4'S	105°55.7'W	1.0408	1.0832	24.9	265.5	153.3	324.7	136.5	1.922	02m30.5s
23:38	37°15.2'S	104°39.6'W	1.0404	1.0825	23.7	264.5	152.2	337.7	135.3	2.032	02m27.8s
23:39	36°53.4'S	103°19.5'W	1.0400	1.0817	22.4	263.4	151.0	353.0	134.1	2.162	02m24.9s
23:40	36°29.6'S	101°54.5'W	1.0396	1.0808	21.0	262.3	149.8	371.3	132.7	2.318	02m22.0s
23:41	36°03.7'S	100°23.7'W	1.0392	1.0799	19.5	261.2	148.4	393.9	131.3	2.510	02m18.8s
23:42	35°35.0'S	098°45.5'W	1.0387	1.0789	17.9	260.0	146.9	422.5	129.7	2.754	02m15.5s
23:43	35°02.8'S	096°57.8'W	1.0382	1.0778	16.2	258.8	145.2	460.4	128.0	3.077	02m11.9s
23:44	34°25.8'S	094°56.9'W	1.0376	1.0765	14.3	257.4	143.2	514.0	126.1	3.536	02m08.0s
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
23:46	32°46.0'S	089°42.1'W	1.0360	1.0732	9.2	254.1	137.8	760.6	120.9	5.646	01m58.2s
23:47	31°20.5'S	085°21.4'W	1.0346	1.0705	5.1	251.7	133.2	1336.9	116.6	10.586	01m50.6s
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