

1.3 Report on Point Density and Nominal Pulse Spacing (NPS) (Swath Data)

The USGS LiDAR Base Specification Version 1.0 states: "An NPS of 2 meters or less is required. Dependent on the local terrain and land cover conditions in the project area, a greater point density may be required on specific projects. Assessment of the NPS will be made against single swath, first-return only data, located within the geometrically usable center portion (typically 90 percent) of each swath, acceptable data voids excluded. NPS will be calculated as the square root of the average area per point. Average along-track and cross-track point spacing should be comparable (within 10 percent)."

The purpose of this section is to report on the LiDAR point density and nominal point spacing by swath file. Averages by swath files (not including overlap), project boundary polygons (including swath overlap), and aggregate project boundary polygons (including swath overlap) are reported.

[Boresighted Files - E:\Pope_Hardin\Swath_LAS](#)

Units: US Survey Feet

File	Number of First Returns	Area of Swath	Point Density	NPS
00001.las	4,516,639	24,042,176	0.19/2.05	2.31/0.70
00002.las	9,197,143	53,588,352	0.17/1.83	2.41/0.73
00003.las	21,731,853	112,347,008	0.19/2.05	2.27/0.69
00004.las	30,111,848	177,564,416	0.17/1.83	2.43/0.74
00005.las	36,618,427	194,831,936	0.19/2.05	2.31/0.70
00006.las	31,556,680	199,828,544	0.16/1.72	2.52/0.77
00007.las	39,421,303	221,096,384	0.18/1.94	2.37/0.72
00008.las	38,442,888	238,419,904	0.16/1.72	2.49/0.76
00009.las	49,353,180	268,623,872	0.18/1.94	2.33/0.71
00010.las	53,686,789	325,785,984	0.16/1.72	2.46/0.75
00011_Split1.las	61,260,425	308,480,448	0.20/2.15	2.24/0.68
00011_Split2.las	23,500,897	118,064,640	0.20/2.15	2.24/0.68
00012_Split1.las	60,262,267	366,094,080	0.16/1.72	2.46/0.75
00012_Split2.las	23,387,293	140,040,832	0.17/1.83	2.45/0.75
00013_Split1.las	59,950,158	314,043,968	0.19/2.05	2.29/0.70
00013_Split2.las	41,516,106	228,380,928	0.18/1.94	2.35/0.72
00014_Split1.las	59,760,560	365,923,840	0.16/1.72	2.47/0.75
00014_Split2.las	28,895,500	188,544,896	0.15/1.61	2.55/0.78
00015_Split1.las	58,293,744	307,957,440	0.19/2.05	2.30/0.70
00015_Split2.las	48,675,912	249,395,968	0.20/2.15	2.26/0.69
00016_Split1.las	56,061,848	332,012,096	0.17/1.83	2.43/0.74
00016_Split2.las	22,267,095	129,080,640	0.17/1.83	2.41/0.73
00017_Split1.las	54,676,395	300,673,536	0.18/1.94	2.35/0.72
00017_Split2.las	16,601,581	81,796,992	0.20/2.15	2.22/0.68
00018_Split1.las	55,634,819	334,440,704	0.17/1.83	2.45/0.75

1.3 Report on Point Density and NPS (Swath Data) - continued

File	Number of First Returns	Area of Swath	Point Density	NPS
00018_Split2.las	7,873,684	47,060,416	0.17/1.83	2.44/0.74
00019_Split1.las	56,114,319	286,865,792	0.20/2.15	2.26/0.69
00019_Split2.las	16,299,473	86,186,880	0.19/2.05	2.30/0.70
00020_Split1.las	56,595,042	329,334,080	0.17/1.83	2.41/0.73
00020_Split2.las	7,857,391	45,326,656	0.17/1.83	2.40/0.73
00021_Split1.las	57,070,116	304,264,896	0.19/2.05	2.31/0.70
00021_Split2.las	11,571,721	61,224,960	0.19/2.05	2.30/0.70
00022_Split1.las	56,415,635	325,042,112	0.17/1.83	2.40/0.73
00022_Split2.las	4,514,289	25,067,328	0.18/1.94	2.36/0.72
00023_Split1.las	55,550,622	294,954,112	0.19/2.05	2.30/0.70
00023_Split2.las	9,313,306	46,849,216	0.20/2.15	2.24/0.68
00024_Split1.las	55,409,977	323,269,696	0.17/1.83	2.42/0.74
00024_Split2.las	1,133,010	7,170,880	0.16/1.72	2.52/0.77
00025_Split1.las	55,937,323	290,458,432	0.19/2.05	2.28/0.69
00025_Split2.las	5,499,057	28,906,112	0.19/2.05	2.29/0.70
00026.las	54,183,739	308,666,432	0.18/1.94	2.39/0.73
00027_Split1.las	56,568,260	294,158,976	0.19/2.05	2.28/0.69
00027_Split2.las	1,220,863	6,379,264	0.19/2.05	2.29/0.70
00028.las	50,487,250	289,888,576	0.17/1.83	2.40/0.73
00029.las	54,766,008	279,013,504	0.20/2.15	2.26/0.69
00030.las	46,033,915	268,878,016	0.17/1.83	2.42/0.74
00031.las	50,217,440	259,229,952	0.19/2.05	2.27/0.69
00032.las	42,311,495	247,659,392	0.17/1.83	2.42/0.74
00033.las	46,880,997	237,234,560	0.20/2.15	2.25/0.69
00034.las	37,864,748	225,434,368	0.17/1.83	2.44/0.74
00035.las	41,819,073	214,288,064	0.20/2.15	2.26/0.69
00036.las	36,191,703	205,589,760	0.18/1.94	2.38/0.73
00037.las	35,968,592	192,280,832	0.19/2.05	2.31/0.70
00038.las	31,069,324	182,570,176	0.17/1.83	2.42/0.74
00039.las	31,230,623	171,683,008	0.18/1.94	2.34/0.71
00040.las	26,598,228	158,599,808	0.17/1.83	2.44/0.74
00041.las	28,076,671	148,447,168	0.19/2.05	2.30/0.70
00042.las	22,336,453	138,544,448	0.16/1.72	2.49/0.76

1.3 Report on Point Density and NPS (Swath Data) - continued

File	Number of First Returns	Area of Swath	Point Density	NPS
00043.las	18,632,560	97,462,528	0.19/2.05	2.29/0.70
00044_Split1.las	58,030,880	330,536,320	0.18/1.94	2.39/0.73
00044_Split2.las	3,738,233	20,255,552	0.18/1.94	2.33/0.71
00045.las	37,149,311	196,636,928	0.19/2.05	2.30/0.70
00066.las	44,032,147	414,301,568	0.11/1.18	3.07/0.94
00067_Split1.las	55,394,933	377,155,200	0.15/1.61	2.61/0.80
00067_Split2.las	17,121,904	99,540,224	0.17/1.83	2.41/0.73
00068_Split1.las	54,692,441	316,886,272	0.17/1.83	2.41/0.73
00068_Split2.las	32,554,785	203,841,984	0.16/1.72	2.50/0.76
00069_Split1.las	54,420,834	288,694,208	0.19/2.05	2.30/0.70
00069_Split2.las	42,389,322	244,223,232	0.17/1.83	2.40/0.73
00070_Split1.las	55,331,448	320,191,552	0.17/1.83	2.41/0.73
00070_Split2.las	35,733,843	225,039,808	0.16/1.72	2.51/0.77
00071_Split1.las	56,417,732	299,115,840	0.19/2.05	2.30/0.70
00071_Split2.las	54,030,338	301,564,096	0.18/1.94	2.36/0.72
00072_Split1.las	57,782,786	341,752,768	0.17/1.83	2.43/0.74
00072_Split2.las	55,668,554	334,026,368	0.17/1.83	2.45/0.75
00073_Split1.las	59,785,345	328,072,960	0.18/1.94	2.34/0.71
00073_Split2.las	55,259,920	297,701,568	0.19/2.05	2.32/0.71
00073_Split3.las	16,011,371	97,412,864	0.16/1.72	2.47/0.75
00074_Split1.las	59,954,139	359,740,224	0.17/1.83	2.45/0.75
00074_Split2.las	55,820,188	323,881,536	0.17/1.83	2.41/0.73
00074_Split3.las	8,534,257	57,105,792	0.15/1.61	2.59/0.79
00075_Split1.las	61,426,189	346,689,856	0.18/1.94	2.38/0.73
00075_Split2.las	54,842,838	292,473,408	0.19/2.05	2.31/0.70
00075_Split3.las	21,067,413	118,099,648	0.18/1.94	2.37/0.72
00076_Split1.las	61,236,307	386,787,136	0.16/1.72	2.51/0.77
00076_Split2.las	55,108,296	322,488,256	0.17/1.83	2.42/0.74
00076_Split3.las	12,992,260	79,060,032	0.16/1.72	2.47/0.75
00077_Split1.las	58,671,827	344,688,640	0.17/1.83	2.42/0.74
00077_Split2.las	53,588,827	288,422,336	0.19/2.05	2.32/0.71
00077_Split3.las	33,411,963	180,736,192	0.18/1.94	2.33/0.71
00078_Split1.las	56,948,169	363,339,904	0.16/1.72	2.53/0.77

1.3 Report on Point Density and NPS (Swath Data) - continued

File	Number of First Returns	Area of Swath	Point Density	NPS
00078_Split2.las	52,590,876	304,128,768	0.17/1.83	2.40/0.73
00078_Split3.las	32,847,236	192,587,456	0.17/1.83	2.42/0.74
00079_Split1.las	55,326,564	308,245,696	0.18/1.94	2.36/0.72
00079_Split2.las	50,649,081	264,376,576	0.19/2.05	2.28/0.69
00079_Split3.las	51,228,510	269,067,200	0.19/2.05	2.29/0.70
00080_Split1.las	57,679,674	331,298,048	0.17/1.83	2.40/0.73
00080_Split2.las	50,742,627	276,402,688	0.18/1.94	2.33/0.71
00080_Split3.las	44,089,768	244,034,496	0.18/1.94	2.35/0.72
00081_Split1.las	57,939,916	315,440,000	0.18/1.94	2.33/0.71
00081_Split2.las	50,809,094	265,575,360	0.19/2.05	2.29/0.70
00081_Split3.las	51,002,808	270,275,648	0.19/2.05	2.30/0.70
00081_Split4.las	1,897,562	9,880,704	0.19/2.05	2.28/0.69
00082_Split1.las	58,203,459	345,029,376	0.17/1.83	2.43/0.74
00082_Split2.las	51,637,821	295,773,888	0.17/1.83	2.39/0.73
00082_Split3.las	42,209,538	242,998,976	0.17/1.83	2.40/0.73
00083_Split1.las	58,373,495	323,734,144	0.18/1.94	2.35/0.72
00083_Split2.las	50,792,894	270,095,744	0.19/2.05	2.31/0.70
00083_Split3.las	52,856,084	288,196,096	0.18/1.94	2.34/0.71
00084_Split1.las	56,779,391	336,838,592	0.17/1.83	2.44/0.74
00084_Split2.las	51,273,332	292,306,048	0.18/1.94	2.39/0.73
00084_Split3.las	43,586,852	251,266,112	0.17/1.83	2.40/0.73
00085_Split1.las	56,228,934	316,145,984	0.18/1.94	2.37/0.72
00085_Split2.las	50,328,168	261,812,608	0.19/2.05	2.28/0.69
00085_Split3.las	51,511,901	277,210,432	0.19/2.05	2.32/0.71
00085_Split4.las	4,038,261	22,322,880	0.18/1.94	2.35/0.72
00086_Split1.las	54,767,490	322,325,824	0.17/1.83	2.43/0.74
00086_Split2.las	49,817,055	287,714,624	0.17/1.83	2.40/0.73
00086_Split3.las	46,124,191	268,853,120	0.17/1.83	2.41/0.73
00087_Split1.las	54,720,055	295,912,704	0.18/1.94	2.33/0.71
00087_Split2.las	49,457,490	252,167,424	0.20/2.15	2.26/0.69
00087_Split3.las	50,688,560	263,342,656	0.19/2.05	2.28/0.69
00087_Split4.las	12,034,588	62,674,624	0.19/2.05	2.28/0.69
00088.las	46,481,251	274,683,200	0.17/1.83	2.43/0.74

1.3 Report on Point Density and NPS (Swath Data) - continued

File	Number of First Returns	Area of Swath	Point Density	NPS
00129_Split1.las	53,299,520	314,975,488	0.17/1.83	2.43/0.74
00129_Split2.las	48,420,903	268,901,120	0.18/1.94	2.36/0.72
00129_Split3.las	51,089,120	292,051,840	0.17/1.83	2.39/0.73
00130_Split1.las	53,502,114	288,917,312	0.19/2.05	2.32/0.71
00130_Split2.las	49,608,721	239,901,120	0.21/2.26	2.20/0.67
00130_Split3.las	49,840,485	248,298,112	0.20/2.15	2.23/0.68
00130_Split4.las	17,664,588	88,959,936	0.20/2.15	2.24/0.68
00131_Split1.las	52,450,058	309,373,376	0.17/1.83	2.43/0.74
00131_Split2.las	48,803,084	279,934,912	0.17/1.83	2.39/0.73
00131_Split3.las	47,920,629	275,230,272	0.17/1.83	2.40/0.73
00132_Split1.las	52,443,451	274,253,120	0.19/2.05	2.29/0.70
00132_Split2.las	49,032,210	250,249,792	0.20/2.15	2.26/0.69
00132_Split3.las	51,712,483	260,694,720	0.20/2.15	2.25/0.69
00132_Split4.las	14,715,688	74,461,696	0.20/2.15	2.25/0.69
00133_Split1.las	52,240,495	306,888,832	0.17/1.83	2.42/0.74
00133_Split2.las	48,594,365	278,415,680	0.17/1.83	2.39/0.73
00133_Split3.las	47,339,421	270,500,864	0.18/1.94	2.39/0.73
00134_Split1.las	53,882,889	294,205,568	0.18/1.94	2.34/0.71
00134_Split2.las	48,250,396	241,668,672	0.20/2.15	2.24/0.68
00134_Split3.las	52,583,840	269,915,200	0.19/2.05	2.27/0.69
00134_Split4.las	9,564,929	50,399,296	0.19/2.05	2.30/0.70
00135_Split1.las	54,422,432	323,293,312	0.17/1.83	2.44/0.74
00135_Split2.las	49,119,848	281,022,464	0.17/1.83	2.39/0.73
00135_Split3.las	43,164,310	252,863,232	0.17/1.83	2.42/0.74
00136_Split1.las	55,213,019	306,129,152	0.18/1.94	2.35/0.72
00136_Split2.las	49,552,230	259,043,072	0.19/2.05	2.29/0.70
00136_Split3.las	52,016,536	271,900,800	0.19/2.05	2.29/0.70
00136_Split4.las	3,635,948	18,460,160	0.20/2.15	2.25/0.69
00137_Split1.las	54,819,154	328,365,056	0.17/1.83	2.45/0.75
00137_Split2.las	49,800,989	282,912,448	0.18/1.94	2.38/0.73
00137_Split3.las	41,616,186	240,296,896	0.17/1.83	2.40/0.73
00138_Split1.las	54,621,215	306,849,344	0.18/1.94	2.37/0.72
00138_Split2.las	48,853,938	257,944,512	0.19/2.05	2.30/0.70

1.3 Report on Point Density and NPS (Swath Data) - continued

File	Number of First Returns	Area of Swath	Point Density	NPS
00138_Split3.las	51,269,870	272,719,488	0.19/2.05	2.31/0.70
00138_Split4.las	761,652	3,876,160	0.20/2.15	2.26/0.69
00139_Split1.las	53,469,875	324,547,904	0.16/1.72	2.46/0.75
00139_Split2.las	48,699,026	282,476,544	0.17/1.83	2.41/0.73
00139_Split3.las	39,462,999	227,113,664	0.17/1.83	2.40/0.73
00140_Split1.las	53,905,720	300,547,712	0.18/1.94	2.36/0.72
00140_Split2.las	48,989,109	255,941,760	0.19/2.05	2.29/0.70
00140_Split3.las	47,880,047	247,948,096	0.19/2.05	2.28/0.69
00140_Split4.las	4,995,984	26,673,280	0.19/2.05	2.31/0.70
00141_Split1.las	54,121,414	323,204,224	0.17/1.83	2.44/0.74
00141_Split2.las	48,637,835	277,775,168	0.18/1.94	2.39/0.73
00141_Split3.las	30,229,225	170,237,504	0.18/1.94	2.37/0.72
00142_Split1.las	52,453,919	284,816,960	0.18/1.94	2.33/0.71
00142_Split2.las	33,160,888	174,435,264	0.19/2.05	2.29/0.70
00143.las	29,443,891	177,273,856	0.17/1.83	2.45/0.75
Average			0.18/1.94	2.37/0.72
			pp Square US Survey Feet/ pp Square Meter	US Survey Feet/ Meter
0	7,249,584,634	20,096,000,028	0.36/3.88	1.66/0.51
Aggregate	7,249,584,634	20,096,000,028	0.36/3.88	1.66/0.51
			pp Square US Survey Feet/ pp Square Meter	US Survey Feet/ Meter