

APPENDIX Q — CE SPREADSHEETS FOR BASE SCENARIO

The Cost-Effectiveness (CE) spreadsheet in APPENDIX Q is the Base Scenario spreadsheet, used for Table 17 and subsequently modified for the various CE sensitivity analyses summarized in Tables 18 through 26. The percentage point values assigned to different components of an EC, as well as the Elevation Accuracy Multipliers for different technologies, at the bottom of the spreadsheet, were all provided by FEMA during coordination meetings.

A	B	C	D	E	F	G	H	I	J	K
APPENDIX Q — Base Spreadsheet for Cost-Effectiveness (CE) Ratio and Relative Value of Different Methods for Generating Data for Elevation Registry Assumes value of elevations degrade non-linearly to zero, becoming worthless when 5% of elevations have errors equal to or greater than 4 ft	Address Geocoding to get Latitude/Longitude and BFE	FEMA Building Diagram No.	Top of Bottom Floor (TBF) in A-zone, Lowest Horiz Str. Member in V-zone	LAG and HAG Elevations	Other Elevations (garage and lowest machinery)	Number and Area of Flood Vents	Total Percent Value of EC	Using available data, additional cost per structure added to Registry	CE Ratio compared with \$300 value of ECs surveyed and entered in Registry when mass-produced community-wide	This Base Spreadsheet is the basis of model sensitivity analyses when parameters are subjective or variable in different communities. The most subjective parameters are elevation accuracy multipliers that determine relative value of lower accuracy datasets, and parameters that weight the relative value of Elevation Certificate components: the value of lat/long linked to addresses (5%), FEMA building diagram number (5%), TBF/LHSM (55%), LAG/HAG (25%), elevation of garage and lowest machinery (5%), number and area of flood vents (5%). Other spreadsheets vary other model parameters over their range of uncertainty to determine minimum/maximum CE ratios.
	Maximum Possible Percentage Points	5	5	55	25	5	5	100	N/A	N/A
0. Surveyed EC's accurate lat/long, batch entry	5.0	5.0	55.0	25.0	5.0	5.0	100	\$300	1.00	No offsets (columns D,F)
1. Digital EC's, no/inacc. lat/long, batch entry	0.0	5.0	55.0	25.0	5.0	5.0	95.0	\$2.50	114.00	0.85 K5
2. Hardcopy EC's, no/inacc. lat/long, batch entry	0.0	5.0	55.0	25.0	5.0	5.0	95.0	\$7.50	38.00	No footprints (LIDAR/IFSAR)
3. Hardcopy EC's, no/inacc. lat/long, 1 web entry	0.0	5.0	55.0	25.0	5.0	5.0	95.0	\$15.00	19.00	0.80 K7 Can't easily identify address or
4. Hardcopy EC's accurate lat/long, 1 web entry	5.0	5.0	55.0	25.0	5.0	5.0	100	\$15.00	20.00	Uncertain Bldg Diagram No.(Pictometry, VISAT)
5. Future EC's, no/inacc. lat/long, 1 web entry	0.0	5.0	55.0	25.0	5.0	5.0	95.0	\$10.00	28.50	0.50 K9
6. Future EC's, accurate lat/long, 1 web entry	5.0	5.0	55.0	25.0	5.0	5.0	100	\$10.00	30.00	Pictometry relative elevations (columns D,F)
7. Photogrammetry (2' CI), no offsets	0.0	0.0	9.5	17.2	0.9	0.0	27.5	\$12.50	6.60	0.20 K11
8. Photogrammetry (2' CI), surveyor offsets	5.0	5.0	47.3	21.5	4.3	5.0	88.1	\$62.50	4.23	VISAT measurement success (columns D,F)
9. Photogr.(2' CI) with footprints, owner offsets	5.0	5.0	47.3	21.5	4.3	5.0	88.1	\$20.00	13.22	\$35.00 K13
10. Photogrammetry (5' CI), no offsets	0.0	0.0	3.9	7.0	0.4	0.0	11.2	\$12.50	2.69	VISAT Unit Costs
11. Photogrammetry (5' CI), surveyor offsets	5.0	5.0	19.3	8.8	1.8	5.0	44.8	\$62.50	2.15	\$5.00 K15
12. Pictometry with LIDAR DTM	0.0	4.0	18.9	17.2	1.7	0.0	41.8	\$52.50	2.39	Unit cost to digitize EC's
13. LIDAR (2' CI), no footprints, no offsets	0.0	0.0	8.0	14.6	0.7	0.0	23.4	\$12.50	5.61	\$2.50 K17 unit cost for batch entry
14. LIDAR (2' CI) with footprints, no offsets	5.0	0.0	11.8	21.5	1.1	0.0	39.4	\$7.50	15.76	\$10.00 K18 unit cost for 1 web entry
15. LIDAR (2' CI), no footprints, surveyor offsets	5.0	5.0	40.2	18.3	3.7	5.0	77.1	\$62.50	3.70	\$10.00 K19
16. LIDAR (2' CI), no footprints, owner offsets/data	0.0	5.0	40.2	18.3	3.7	5.0	72.1	\$20.00	10.82	Unit Costs for photogrammetric spot heights
17. LIDAR (2' CI) with footprints, surveyor offsets	5.0	5.0	47.3	21.5	4.3	5.0	88.1	\$57.50	4.60	\$50.00 K21
18. LIDAR (2' CI) with footprints, owner offsets/data	5.0	5.0	47.3	21.5	4.3	5.0	88.1	\$15.00	17.62	Local surveyor cost for georeferencing/offsets etc.
19. IFSAR (10' CI) with footprints, surveyor offsets	5.0	5.0	0.0	0.0	0.0	5.0	15.0	\$57.50	0.78	\$300 K23
20. Photogrammetric Van (VISAT)	5.0	4.0	8.8	4.0	0.8	1.0	23.6	\$37.50	1.89	Total unit cost of surveyed EC's in Registry
* Note: no "owner" method works without footprints, centroids or parcels linked to street addresses										\$50 K25
Conventional/GPS Survey Accuracy Multiplier =	1.00	when vertical accuracy =		0.50	ft at 95% confidence level					Pictometry Unit Costs
2' CI Photogrammetry Accuracy Multiplier =	0.86	when vertical accuracy =		1.20	ft at 95% confidence level					\$10,000 K27
5' CI Photogrammetry Accuracy Multiplier =	0.35	when vertical accuracy =		3.00	ft at 95% confidence level					CCS/county with no footprints (LIDAR)
Pictometry (LIDAR DTM) Accuracy Multiplier =	0.86	when vertical accuracy =		1.20	ft at 95% confidence level					\$5,000 K29
LIDAR Accuracy Multiplier (assuming 2' CI standard) =	0.86	when vertical accuracy =		1.20	ft at 95% confidence level					D&D/county with footprints (LIDAR/IFSAR)
IFSAR Accuracy Multiplier (assuming 10' CI standard) =	0.00	when vertical accuracy =		6.00	ft at 95% confidence level					1000 K31
VISAT Photogrammetric Van Accuracy Multiplier =	0.80	when vertical accuracy =		1.50	ft at 95% confidence level					Number of structures/county for LIDAR or IFSAR

Note: 2' CI = 1.2' accuracy at 95% confidence level; 5' CI = 3.0' accuracy at 95% confidence level

Elevation Accuracy Multipliers that degrade maximum value when less than best accuracy:

If 95% of elevations accurate within 6"	1.00	Assumed elevation accuracy of conventional or GPS surveys
If 95% of elevations accurate within 1'	0.90	
If 95% of elevations accurate within 2'	0.70	
If 95% of elevations accurate within 3' (5' contours)	0.35	
If 95% of elevations accurate within 4'	0.00	
If 95% of elevations accurate within 5'	0.00	
If 95% of elevations accurate within 6' (10' contours)	0.00	