

Appendix 1—Data Used to Derive Position and Elevation of Reference Marks, by Base-Station Setup, from Real-Time Kinetic Global Positioning System Surveys, Seadrift, Texas, to Lake Charles, Louisiana, 2008

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Appendix 1. Data used to derive position and elevation of reference marks, by base-station setup, from real-time kinetic Global Positioning System surveys, Seadrift, Texas, to Lake Charles, Louisiana, 2008.

[Greyshade indicates base-station location (Wide Area Augmentation System corrected); RTK, real-time kinetic; UTM, Universal Transverse Mercator zone 15; m, meters; elevation, elevation above NAVD 88; NGS, National Geodetic Survey]

Name	RTK-derived northing (UTM-m)	Average northing (UTM-m)	RTK-derived easting (UTM-m)	Average easting (UTM-m)	RTK-derived elevation (m)	Average elevation (m)	NGS elevation (m)	Elevation difference (m)	Adjusted sensor elevation (m)
Pecan Isle base	3278251.283		558593.375		-3.572				
x215-a	3280207.134		551323.921		-3.311				
x215	3280207.127	3280207.131	551323.929	551323.925	-3.292	-3.302	1.090	4.392	
F382B	3283321.113		561609.892		-3.284				
F382	3283321.124	3283321.119	561609.898	561609.895	-3.287	-3.286	1.100	4.386	
							Avg Diff=	4.389	
SENSOR LOCATIONS									
SSS-LA-VER-006B	3279197.190		555379.980		-3.236				
SSS-LA-VER-006	3279197.193	3279197.192	555379.983	555379.982	-3.243	-3.240			1.149
SSS-LA-VER-007B	3274907.662		563652.692		-2.676				
SSS-LA-VER-007	3274907.661	3274907.662	563652.684	563652.688	-2.674	-2.675			1.714
HWY 82 base	3286523.503		527925.667		-7.652				
doland-b	3287645.304		525929.883		-8.373				
doland	3287645.310	3287645.307	525929.884	525929.884	-8.379	-8.376	0.650	9.026	
SENSOR LOCATION									
SSS-LA-CAM-013C	3286353.678		531281.039		-7.107				
SSS-LA-CAM-013	3286353.659	3286353.669	531281.027	531281.033	-7.119	-7.113			1.913
HWY 1143 base	3298356.756		493633.519		-2.021				
d215-b	3303324.893		491529.396		-1.979				
d215	3303324.896	3303324.895	491529.398	491529.397	-1.967	-1.973	0.650	2.623	
c213-c	3298376.659		488123.636		-1.932				
c213-b	3298376.645		488123.633		-1.929				
c213	3298376.653	3298376.652	488123.633	488123.634	-1.947	-1.936	0.690	2.626	
AV0412JB	3294110.673		495451.359		-1.397				
AV0412J	3294110.675	3294110.674	495451.370	495451.365	-1.396	-1.397	1.250	2.647	
							Avg. Diff.=	2.632	
SENSOR LOCATIONS									
SSS-LA-CAM-011B	3304438.551		492300.689		-1.212				
SSS-LA-CAM-011	3304438.554	3304438.553	492300.696	492300.693	-1.214	-1.213			1.419
SSS-LA-CAM-010B	3295083.458		488872.254		-1.072				
SSS-LA-CAM-010	3295083.468	3295083.463	488872.255	488872.255	-1.070	-1.071			1.561
SSS-LA-CAM-012B	3293360.585		498556.654		0.285				
SSS-LA-CAM-012	3293360.579	3293360.582	498556.648	498556.651	0.295	0.290			2.922

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Appendix 1. Data used to derive position and elevation of reference marks, by base-station setup, from real-time kinetic Global Positioning System surveys, Seadrift, Texas, to Lake Charles, Louisiana, 2008—Continued.

Name	RTK-derived northing (UTM-m)	Average northing (UTM-m)	RTK-derived easting (UTM-m)	Average easting (UTM-m)	RTK-derived elevation (m)	Average elevation (m)	NGS elevation (m)	Elevation difference (m)	Adjusted sensor elevation (m)
6-mile base	3292521.080		446087.717		-1.154				
F212B	3293590.382		456369.303		-2.724				
F212	3293590.377	3293590.380	456369.305	456369.304	-2.718	-2.721	1.020	3.741	
SENSOR LOCATIONS									
SSS-LA-CAM-002B	3292537.349		443665.649		-1.799				
SSS-LA-CAM-002	3292537.349	3292537.349	443665.642	443665.646	-1.800	-1.800			1.942
SSS-LA-CAM-001B	3291343.791		435825.473		-2.198				
SSS-LA-CAM-001	3291343.782	3291343.787	435825.472	435825.473	-2.209	-2.204			1.538
Sabine base	3285514.607		407532.339		5.209				
NEW SABINE LAKEB	3293656.297		414156.775		4.134				
NEW SABINE LAKE	3293656.287	3293656.292	414156.778	414156.777	4.147	4.141	1.110	-3.031	
SENSOR LOCATIONS									
SSS-LA-JEF-006B	3287117.078		416793.647		4.546				
SSS-LA-JEF-006	3287117.073	3287117.076	416793.652	416793.650	4.561	4.554			1.523
SSS-LA-JEF-002B	3283406.396		398978.971		4.502				
SSS-LA-JEF-002	3283406.396	3283406.396	398978.973	398978.972	4.501	4.502			1.471
SSS-LA-JEF-007B	3294223.137		408978.910		5.123				
SSS-LA-JEF-007	3294223.153	3294223.145	408978.909	408978.910	5.125	5.124			2.094
SSS-LA-JEF-008B	3293081.790		413173.299		3.725				
SSS-LA-JEF-008	3293081.793	3293081.792	413173.302	413173.301	3.725	3.725			0.695
Morgan Point base	3284617.087		306650.351		3.978				
MORGAN PT3C	3285123.874		307877.043		3.201				
MORGAN PT3	3285123.881		307877.042		3.202				
MORGAN PT3B	3285123.872	3285123.878	307877.037	307877.043	3.174	3.202	4.373	1.172	
laport-b	3284201.459		299773.129		5.395				
laport	3284201.459	3284201.459	299773.125	299773.127	5.399	5.397	6.610	1.213	
							Avg. Diff.=	1.192	
SENSOR LOCATIONS									
SSS-TX-HAR-002B	3278372.581		306539.662		0.894				
SSS-TX-HAR-002	3278372.592	3278372.587	306539.627	306539.645	0.881	0.888			2.080
SSS-TX-HAR-004B	3288636.340		307162.722		1.303				

Appendix 1. Data used to derive position and elevation of reference marks, by base-station setup, from real-time kinetic Global Positioning System surveys, Seadrift, Texas, to Lake Charles, Louisiana, 2008—Continued.

Name	RTK-derived northing (UTM-m)	Average northing (UTM-m)	RTK- derived easting (UTM-m)	Average easting (UTM-m)	RTK- derived elevation (m)	Average elevation (m)	NGS elevation (m)	Elevation difference (m)	Adjusted sensor elevation (m)
SSS-TX-HAR-004B	3288636.347	3288636.344	307162.726	307162.724	1.317	1.310			2.502
League City base	3267911.128		299919.648		0.896				
z1516-b	3271786.252		295320.417		1.434				
z1516	3271786.250	3271786.251	295320.442	295320.430	1.433	1.434	5.422	3.989	
Y1516B	3270838.362		295388.840		1.129				
Y1516	3270838.378	3270838.370	295388.834	295388.837	1.133	1.131	5.128	3.997	
							Avg. Diff.=	3.993	
SENSOR LOCATIONS									
SSS-TX-GAL-019B	3265678.550		310235.823		-1.080				
SSS-TX-GAL-019	3265678.545	3265678.548	310235.825	310235.824	-1.081	-1.081			2.912
SSS-TX-GAL-020B	3260400.044		301383.811		-2.490				
SSS-TX-GAL-020	3260400.022	3260400.032	301383.793	301383.807	-2.530	-2.483			1.510
SSS-TX-GAL-021B	3266699.943		296077.241		-2.378				
SSS-TX-GAL-021	3266699.943	3266699.943	296077.237	296077.239	-2.369	-2.374			1.619
SSS-TX-GAL-022B	3270884.892		303813.945		-2.844				
SSS-TX-GAL-022	3270884.885	3270884.886	303813.958	303813.956	-2.811	-2.839			1.154
SSS-TX-HAR-003B	3275462.814		293882.052		2.688				
SSS-TX-HAR-003	3275462.814	3275462.814	293882.058	293882.055	2.694	2.691			6.684
Lamarque base 2	3249181.767		309845.324		1.334				
2V1516 RM1B	3243773.660		314826.303		0.133				
2V1516 RM1	3243773.697	3243773.679	314826.293	314826.298	0.119	0.126	1.580	1.454	
x1516 offset2	3253496.626		307251.243		2.269				
x1516 offset	3253496.625	3253496.626	307251.251	307251.247	2.254	2.262	3.724	1.463	
w1516-e	3252453.778		308126.934		2.329				
w1516-d	3252453.780		308126.937		2.337				
w1516-c	3252453.761	3252453.773	308126.916	308126.929	2.348	2.338	3.821	1.483	
							Avg. Diff.=	1.467	
Differential levels from NGS benchmarks X 1516 and V 1516 to offsets listed above to determine the NGS eleva- tion at the offset point.									
SENSOR LOCATIONS									
SSS-TX-GAL-016B	3243233.992		314915.645		0.638				
SSS-TX-GAL-016	3243233.977	3243233.990	314915.632	314915.637	0.617	0.643			2.109

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Appendix 1. Data used to derive position and elevation of reference marks, by base-station setup, from real-time kinetic Global Positioning System surveys, Seadrift, Texas, to Lake Charles, Louisiana, 2008—Continued.

Name	RTK-derived northing (UTM-m)	Average northing (UTM-m)	RTK-derived easting (UTM-m)	Average easting (UTM-m)	RTK-derived elevation (m)	Average elevation (m)	NGS elevation (m)	Elevation difference (m)	Adjusted sensor elevation (m)
SSS-TX-GAL-018B	3249136.940		301994.613		2.854				
SSS-TX-GAL-018	3249136.923	3249136.936	301994.612	301994.609	2.898	2.858	(+.872m TAPEUP)		5.196
la marque gage2	3247949.047		309422.862		4.370				
la marque gage	3247949.058	3247949.053	309422.862	309422.862	4.350	4.360			5.827
Differential Levels									
SSS-LA-CAM-003	RMI = 4.65 FT								
GAL-001 base	3236445.993		318665.404		0.964				
h168-c	3238900.847		322601.864		-0.461				
h168-b	3238900.845	3238900.849	322601.862	322601.862	-0.491	-0.464	4.129	4.593	
coe 7409-b	3237717.953		320677.237		0.006				
coe 7409	3237717.958	3237717.956	320677.251	320677.244	0.018	0.012	4.604	4.592	
16287.6 off2	3236280.831		318473.939		-0.022				
16287.6 offs	3236280.822	3236280.827	318473.942	318473.941	-0.016	-0.019	4.586	4.605	
							Avg. Diff.=	4.597	
SENSOR LOCATIONS									
SSS-TX-GAL-010B	3235870.785		317530.342		-2.572				
SSS-TX-GAL-010	3235870.781	3235870.783	317530.349	317530.346	-2.583	-2.578			2.019
SSS-TX-GAL-011B	3233986.343		310982.142		-3.312				
SSS-TX-GAL-011	3233986.355	3233986.352	310982.151	310982.148	-3.280	-3.302			1.295
SSS-TX-GAL-011	differential levels from offset point listed above								1.140
Gal Isle 2 base	3246185.674		330828.830		-1.013				
TOWNSENDC	3245974.358		331316.054		-0.201				
TOWNSENB	3245974.361	3245974.359	331316.052	331316.057	-0.187	-0.201	1.403	1.604	
WALL	3242287.083		327301.984		2.778				
WALL2	3242287.070	3242287.077	327301.983	327301.984	2.759	2.769	4.349	1.581	
							Avg. Diff.=	1.592	
SENSOR LOCATION									
SSS-TX-GAL-008B	3246279.930		330411.554		-0.596				
SSS-TX-GAL-008	3246279.923	3246279.927	330411.545	330411.550	-0.596	-0.596			0.996
Port Bolivar base	3254881.525		334112.083		-0.976				

Appendix 1. Data used to derive position and elevation of reference marks, by base-station setup, from real-time kinetic Global Positioning System surveys, Seadrift, Texas, to Lake Charles, Louisiana, 2008—Continued.

Name	RTK-derived northing (UTM-m)	Average northing (UTM-m)	RTK- derived easting (UTM-m)	Average easting (UTM-m)	RTK- derived elevation (m)	Average elevation (m)	NGS elevation (m)	Elevation difference (m)	Adjusted sensor elevation (m)
2TOWNSEND	3245974.849		331316.307		-1.401				
2TOWNSENDER	3245974.859	3245974.854	331316.317	331316.312	-1.418	-1.410	1.403	2.813	
3TOWNSEND	3245974.857		331316.324		-1.427				
3TOWNSENDER	3245974.873	3245974.865	331316.323	331316.324	-1.417	-1.422	1.403	2.825	
							Avg. Diff.=	2.819	
SENSOR LOCATIONS									
BOLIVAR FERRY BM	3249438.105		327407.309		-1.445				
BOLIVAR FERRY B2	3249438.106	3249438.106	327407.305	327407.307	-1.457	-1.451			1.368
SSS-TX-GAL-001	3259393.789		341307.120		-0.602				
SSS-TX-GAL-001B	3259393.791	3259393.790	341307.104	341307.112	-0.596	-0.599			2.220
SSS-TX-GAL-002	3260739.121		340179.313		-1.557				
SSS-TX-GAL-002B	3260739.121	3260739.121	340179.310	340179.312	-1.556	-1.557			1.262
SSS-TX-GAL-002	differential levels from offset point listed above								1.053
Taylor-Alligator Bayou real-time gaging station									
Alligator base	3296810.226		408234.226		-0.577				
SABINE LAKE2	3293655.402		414154.911		-1.561				
SABINE LAKE	3293655.393	3293655.398	414154.918	414154.915	-1.554	-1.558	1.110	2.668	
Gaging Station location									
1066 D	3303892.177		404276.728		2.199				
1066 B	3303892.181		404276.715		2.193				
1066 A	3303892.202		404276.715		2.158				
1066 C	3303892.187	3303892.179	404276.727	404276.722	2.214	2.196			4.864
Pine Island Bayou and Neches River Saltwater Barrier real-time gaging stations									
Beaumont base	3336084.253		387722.224		11.893				
BEA5-B-OFF2 offset	3336466.432		386297.223		14.359				
BEA5-B-OFF offset	3336466.433	3336466.433	386297.222	386297.223	14.343	14.351	13.266	-1.085	
THD-11-B offset	3332349.165		389730.073		10.529				
THD-11 offset	3332349.156	3332349.161	389730.062	389730.068	10.546	10.538	9.450	-1.088	
							Avg. Diff.=	-1.086	

26 GPS Surveys of Storm-Surge Sensors Deployed During Hurricane Ike, Seadrift, Texas, to Lake Charles, Louisiana, 2008

Appendix 1. Data used to derive position and elevation of reference marks, by base-station setup, from real-time kinetic Global Positioning System surveys, Seadrift, Texas, to Lake Charles, Louisiana, 2008—Continued.

Name	RTK-derived northing (UTM-m)	Average northing (UTM-m)	RTK-derived easting (UTM-m)	Average easting (UTM-m)	RTK-derived elevation (m)	Average elevation (m)	NGS elevation (m)	Elevation difference (m)	Adjusted sensor elevation (m)
Differential levels from NGS									
BM THD-11 to offset point; offset elev. = 9.450 m									
Tape-up from NGS BM									
BEA5 B to rim where RTK offset was measured = 0.151 m; offset elev. = 13.266 m									
Gaging-station location									
Neches Salt-b	3336295.382		392567.791		3.676				
Neches Salt	3336295.382	3336295.382	392567.775	392567.783	3.685	3.681			2.594
PI BAYOU-B	3339205.671		385481.165		5.256				
PI BAYOU	3339205.670	3339205.671	385481.166	385481.166	5.254	5.255			4.169
Moses Lake real-time gaging station									
Moses base	3255651.783		309818.791		-0.369				
w1516 1996	3252452.863		308127.364		0.882				
w1516 1996-b	3252452.861	3252452.862	308127.362	308127.363	0.892	0.887	3.821	2.934	
x1516 1996-b offset	3253495.730		307251.679		0.771				
x1516 1996-c offset	3253495.733	3253495.732	307251.662	307251.671	0.778	0.775	3.724	2.950	
							Avg. Diff.=	2.942	
Gaging Station location									
MOSES LAKE	3258847.086		314018.763		2.218				
MOSES LAKEB	3258847.094	3258847.090	314018.714	314018.739	2.212	2.215			5.157
Clear Lake real-time gaging station									
Clear Lake base	3269918.332		300533.955		0.254				
Z1516B	3271788.218		295319.556		0.987				
Z1516	3271788.225	3271788.222	295319.548	295319.552	1.006	0.997	5.422	4.426	
2Y1516	3270840.335		295387.985		0.689				
2Y1516B	3270840.321	3270840.328	295387.979	295387.982	0.672	0.681	5.128	4.448	
							Avg. Diff.=	4.437	
Gaging Station location									
clear lake rm1	3271046.926		304165.262		-2.672				
clear lake rm1-b	3271046.923	3271046.925	304165.271	304165.267	-2.661	-2.667			1.770

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Buffalo Bayou real-time gaging station									
Houston base	3291521.128		274336.513		7.090				
R1516	3296295.073		269968.427		12.263				
R1516B	3296295.083	3296295.078	269968.429	269968.428	12.268	12.266	15.648	3.383	
Gaging-station location									
Buffalo Bayou	3293194.999		278404.341		2.039				
Buffalo Bayou 2	3293194.999	3293194.999	278404.350	278404.346	2.051	2.045			5.428