

## OPUS solution : 018506\_14\_249\_A0.14O OP1410277875027

opus &lt;opus@ngs.noaa.gov&gt;

Tue 9/9/2014 9:55 AM

To: John Freetly &lt;John.Freetly@neciusa.com&gt;;

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## NGS OPUS SOLUTION REPORT

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All computed coordinate accuracies are listed as peak-to-peak values.

For additional information: <http://www.ngs.noaa.gov/OPUS/about.jsp#accuracy>USER: john.freetly@neciusa.com  
RINEX FILE: 0185249q.14oDATE: September 09, 2014  
TIME: 15:54:13 UTCSOFTWARE: page5 1209.04 master92.pl 022814 START: 2014/09/06 16:20:00  
EPHEMERIS: igr18086.eph [rapid] STOP: 2014/09/06 21:12:00  
NAV FILE: brdc2490.14n OBS USED: 10455 / 12287 : 85%  
ANT NAME: CHCX90D-OPUS NONE # FIXED AMB: 77 / 85 : 91%  
ARP HEIGHT: 1.8000 OVERALL RMS: 0.013(m)

REF FRAME: NAD\_83(2011)(EPOCH:2010.0000) IGS08 (EPOCH:2014.6816)

X: -1336587.504(m) 0.002(m) -1336588.366(m) 0.002(m)  
Y: -4251158.942(m) 0.007(m) -4251157.693(m) 0.007(m)  
Z: 4549174.230(m) 0.004(m) 4549174.194(m) 0.004(m)LAT: 45 46 59.02992 0.003(m) 45 46 59.05076 0.003(m)  
E LON: 252 32 47.64696 0.001(m) 252 32 47.59156 0.001(m)  
W LON: 107 27 12.35304 0.001(m) 107 27 12.40844 0.001(m)  
EL HGT: 989.642(m) 0.008(m) 988.965(m) 0.008(m)  
ORTHO HGT: 1004.285(m) 0.016(m) [NAVD88 (Computed using GEOID12A)]

## UTM COORDINATES STATE PLANE COORDINATES

UTM (Zone 13) SPC (2500 MT )

Northing (Y) [meters] 5072872.223 172454.146  
Easting (X) [meters] 309285.585 759073.845  
Convergence [degrees] -1.75891324 1.49707354  
Point Scale 1.00004718 0.99962034  
Combined Factor 0.99989205 0.99946527

US NATIONAL GRID DESIGNATOR: 13TCL0928572872(NAD 83)

## BASE STATIONS USED

PID	DESIGNATION	LATITUDE	LONGITUDE	DISTANCE(m)
DL7728	P051 BILLINGSAPMT2005	CORS ARP	N454823.741 W1083246.070	85009.2
DL7758	P722 YNPBASSRCHMT2005	CORS ARP	N452725.985 W1093415.586	169099.1
DI3062	BIL5 BILLINGS 5	CORS ARP	N455816.237 W1075947.298	47065.5

## NEAREST NGS PUBLISHED CONTROL POINT

QV0311	LH 3	N454330.673	W1072954.907	7335.6
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This position and the above vector components were computed without any knowledge by the National Geodetic Survey regarding the equipment or field operating procedures used.