

# GPS Calibration Report

*Project : R2233aa*

<b>TIP Number</b>	r2233aa	<b>Date &amp; Time</b>	3:16:20 PM 12/6/2006
<b>User name</b>	sgosnell	<b>Zone</b>	North Carolina 3200(2)
<b>Coordinate System</b>	Site(at ground)		
<b>Horizontal Datum</b>	NAD 1983 (Conus)		
<b>Vertical Datum</b>	NAVD88	<b>Geoid Model</b>	Geoid99 (Conus) NC Sub Grid
<b>Coordinate Units</b>	US survey feet		
<b>Distance Units</b>	US survey feet		
<b>Height Units</b>	US survey feet		

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## LOCAL SITE INFORMATION

Localized around	
Latitude	35°14'58.77491"N
Longitude	81°52'27.53583"W
Site Scale Factor	1.0001612400
Height	765.0112sft

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The North Carolina Department of Transportation uses a **Localized Coordinate System** which is very similar to North Carolina Zone 3200 from which it is derived.  
**Please take care in utilizing these coordinates to eliminate confusion of the two systems.**  
This file is to aid in the use of Real Time Kinematic (RTK) GPS during construction layout.

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## Datum Transformation Parameters

Datum Transformation computation not requested

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## Updated Default Projection (Transverse Mercator) Definition

Updated default projection not requested

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## Horizontal Adjustment Parameters

<b>Northing coordinate of rotation center</b>	558935.4438sft
<b>Easting coordinate of rotation center</b>	1141387.2351sft
<b>Rotation about the center point</b>	0°00'00"
<b>Translation north</b>	0.0344sft
<b>Translation east</b>	-0.0154sft
<b>Scale factor</b>	1.00000000

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## Vertical Adjustment Parameters

<b>Northing coordinate of origin point</b>	582956.2429sft
<b>Easting coordinate of origin point</b>	1125588.3526sft
<b>Vertical separation at origin</b>	0.0542sft
<b>Slope north</b>	-1.077ppm
<b>Slope east</b>	1.163ppm

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# Geoid Model Definition

Geoid99 (Conus) NC Sub Grid

## Residual Differences Between GPS (WGS84) And Local Coordinates

### Summary

	Maximum error	Root Mean Square error	Point
Horizontal	0.021sft	0.004	AB-10_WGS84
Vertical	0.009sft	0.001	AA-11_WGS84
Three-dimensional	0.023sft	0.004	AB-10_WGS84

### Point Residuals

WGS84 Coordinates		Calculated point FOR DISPLAY ONLY		Local Coordinates	
<b>Point</b>	AB-22_WGS84	<b>Northing</b>	582956.2429sft	<b>Point</b> AB-22_Local	
<b>Latitude</b>	35°18'58.63955"N	<b>Easting</b>	1125588.3526sft	<b>Northing</b>	582956.2290sft
<b>Longitude</b>	81°55'54.01372"W	<b>Elevation</b>	1057.7092sft	<b>Easting</b>	1125588.3660sft
<b>Height</b>	952.6720sft	<b>Horz error</b>	0.019sft	<b>Elevation</b>	1057.7080sft
		<b>Vert error</b>	0.001sft	<b>Utilized</b>	Horz and Vert
		<b>3D error</b>	0.019sft	<b>Quality</b>	Survey quality
<b>Point</b>	AB-21_WGS84	<b>Northing</b>	583032.1005sft	<b>Point</b> AB-21_Local	
<b>Latitude</b>	35°18'59.58012"N	<b>Easting</b>	1126241.5243sft	<b>Northing</b>	583032.0880sft
<b>Longitude</b>	81°55'46.16287"W	<b>Elevation</b>	1043.3554sft	<b>Easting</b>	1126241.5380sft
<b>Height</b>	938.3151sft	<b>Horz error</b>	0.019sft	<b>Elevation</b>	1043.3550sft
		<b>Vert error</b>	0.000sft	<b>Utilized</b>	Horz and Vert
		<b>3D error</b>	0.019sft	<b>Quality</b>	Survey quality
<b>Point</b>	AB-20_WGS84	<b>Northing</b>	580024.6306sft	<b>Point</b> AB-20_Local	
<b>Latitude</b>	35°18'30.01782"N	<b>Easting</b>	1126818.2882sft	<b>Northing</b>	580024.6210sft
<b>Longitude</b>	81°55'38.13660"W	<b>Elevation</b>	1034.9189sft	<b>Easting</b>	1126818.3030sft
<b>Height</b>	929.8800sft	<b>Horz error</b>	0.018sft	<b>Elevation</b>	1034.9130sft
		<b>Vert error</b>	0.006sft	<b>Utilized</b>	Horz and Vert
		<b>3D error</b>	0.019sft	<b>Quality</b>	Survey quality
<b>Point</b>	AB-19_WGS84	<b>Northing</b>	580050.7197sft	<b>Point</b> AB-19_Local	
<b>Latitude</b>	35°18'30.61688"N	<b>Easting</b>	1127989.0423sft	<b>Northing</b>	580050.7110sft
<b>Longitude</b>	81°55'24.02684"W	<b>Elevation</b>	1029.7419sft	<b>Easting</b>	1127989.0540sft
<b>Height</b>	924.6963sft	<b>Horz error</b>	0.015sft	<b>Elevation</b>	1029.7430sft
		<b>Vert error</b>	0.001sft	<b>Utilized</b>	Horz and Vert
		<b>3D error</b>	0.015sft	<b>Quality</b>	Survey quality
<b>Point</b>	AB-18_WGS84	<b>Northing</b>	575859.5306sft	<b>Point</b> AB-18_Local	
<b>Latitude</b>	35°17'50.02993"N	<b>Easting</b>	1130897.6630sft	<b>Northing</b>	575859.5220sft
<b>Longitude</b>	81°54'47.46562"W	<b>Elevation</b>	1027.3587sft	<b>Easting</b>	1130897.6690sft
<b>Height</b>	922.3046sft	<b>Horz error</b>	0.011sft	<b>Elevation</b>	1027.3610sft
		<b>Vert error</b>	0.002sft	<b>Utilized</b>	Horz and Vert
		<b>3D error</b>	0.011sft	<b>Quality</b>	Survey quality
<b>Point</b>	AB-17_WGS84	<b>Northing</b>	575743.9371sft	<b>Point</b> AB-17_Local	
<b>Latitude</b>	35°17'49.16921"N	<b>Easting</b>	1131869.9702sft	<b>Northing</b>	575743.9290sft

<b>Longitude</b>	81°54'35.70050"W
<b>Height</b>	902.9772sft

<b>Elevation</b>	1008.0365sft
<b>Horz error</b>	0.011sft
<b>Vert error</b>	0.001sft
<b>3D error</b>	0.011sft

<b>Easting</b>	1131869.9770sft
<b>Elevation</b>	1008.0370sft
<b>Utilized</b>	Horz and Vert
<b>Quality</b>	Survey quality

<b>Point</b>	AB-16_WGS84
<b>Latitude</b>	35°16'44.13111"N
<b>Longitude</b>	81°53'48.35977"W
<b>Height</b>	878.9648sft

<b>Northing</b>	569055.7713sft
<b>Easting</b>	1135600.7719sft
<b>Elevation</b>	984.0277sft
<b>Horz error</b>	0.011sft
<b>Vert error</b>	0.006sft
<b>3D error</b>	0.012sft

<b>Point</b>	AB-16_Local
<b>Northing</b>	569055.7610sft
<b>Easting</b>	1135600.7740sft
<b>Elevation</b>	984.0340sft
<b>Utilized</b>	Horz and Vert
<b>Quality</b>	Survey quality

<b>Point</b>	AB-15_WGS84
<b>Latitude</b>	35°16'33.45717"N
<b>Longitude</b>	81°53'43.11220"W
<b>Height</b>	873.9025sft

<b>Northing</b>	567964.2653sft
<b>Easting</b>	1136004.2115sft
<b>Elevation</b>	978.9640sft
<b>Horz error</b>	0.010sft
<b>Vert error</b>	0.004sft
<b>3D error</b>	0.010sft

<b>Point</b>	AB-15_Local
<b>Northing</b>	567964.2560sft
<b>Easting</b>	1136004.2140sft
<b>Elevation</b>	978.9680sft
<b>Utilized</b>	Horz and Vert
<b>Quality</b>	Survey quality

<b>Point</b>	AB-14_WGS84
<b>Latitude</b>	35°16'02.34472"N
<b>Longitude</b>	81°53'21.79440"W
<b>Height</b>	859.9556sft

<b>Northing</b>	564768.2349sft
<b>Easting</b>	1137679.5236sft
<b>Elevation</b>	965.0144sft
<b>Horz error</b>	0.013sft
<b>Vert error</b>	0.002sft
<b>3D error</b>	0.013sft

<b>Point</b>	AB-14_Local
<b>Northing</b>	564768.2220sft
<b>Easting</b>	1137679.5240sft
<b>Elevation</b>	965.0120sft
<b>Utilized</b>	Horz and Vert
<b>Quality</b>	Survey quality

<b>Point</b>	AB-13_WGS84
<b>Latitude</b>	35°15'52.72975"N
<b>Longitude</b>	81°53'12.15208"W
<b>Height</b>	858.3447sft

<b>Northing</b>	563773.1904sft
<b>Easting</b>	1138450.5184sft
<b>Elevation</b>	963.4028sft
<b>Horz error</b>	0.010sft
<b>Vert error</b>	0.001sft
<b>3D error</b>	0.010sft

<b>Point</b>	AB-13_Local
<b>Northing</b>	563773.1810sft
<b>Easting</b>	1138450.5160sft
<b>Elevation</b>	963.4040sft
<b>Utilized</b>	Horz and Vert
<b>Quality</b>	Survey quality

<b>Point</b>	AB-12_WGS84
<b>Latitude</b>	35°15'03.10433"N
<b>Longitude</b>	81°52'42.59000"W
<b>Height</b>	794.7720sft

<b>Northing</b>	558686.3658sft
<b>Easting</b>	1140755.5551sft
<b>Elevation</b>	899.8154sft
<b>Horz error</b>	0.008sft
<b>Vert error</b>	0.003sft
<b>3D error</b>	0.008sft

<b>Point</b>	AB-12_Local
<b>Northing</b>	558686.3580sft
<b>Easting</b>	1140755.5550sft
<b>Elevation</b>	899.8180sft
<b>Utilized</b>	Horz and Vert
<b>Quality</b>	Survey quality

<b>Point</b>	AB-11_WGS84
<b>Latitude</b>	35°14'58.77459"N
<b>Longitude</b>	81°52'27.53561"W
<b>Height</b>	765.0083sft

<b>Northing</b>	558212.5827sft
<b>Easting</b>	1141991.0113sft
<b>Elevation</b>	870.0536sft
<b>Horz error</b>	0.001sft
<b>Vert error</b>	0.004sft
<b>3D error</b>	0.005sft

<b>Point</b>	AB-11_Local
<b>Northing</b>	558212.5820sft
<b>Easting</b>	1141991.0100sft
<b>Elevation</b>	870.0580sft
<b>Utilized</b>	Horz and Vert
<b>Quality</b>	Survey quality

<b>Point</b>	AA-11_WGS84
<b>Latitude</b>	35°14'58.77460"N
<b>Longitude</b>	81°52'27.53525"W
<b>Height</b>	764.9591sft

<b>Northing</b>	558212.5829sft
<b>Easting</b>	1141991.0412sft
<b>Elevation</b>	870.0044sft
<b>Horz error</b>	<b>0.007sft</b>
<b>Vert error</b>	<b>0.009sft</b>
<b>3D error</b>	<b>0.011sft</b>

<b>Point</b>	AA-11_Local
<b>Northing</b>	558212.5880sft
<b>Easting</b>	1141991.0370sft
<b>Elevation</b>	869.9950sft
<b>Utilized</b>	Horz and Vert
<b>Quality</b>	Survey quality

<b>Point</b>	AB-10_WGS84
<b>Latitude</b>	35°14'32.26957"N

<b>Northing</b>	555362.7933sft
<b>Easting</b>	1147835.4384sft

<b>Point</b>	AB-10_Local
<b>Northing</b>	555362.8100sft

<b>Longitude</b>	81°51'16.11469"W
<b>Height</b>	778.2465sft

<b>Elevation</b>	883.2834sft
<b>Horz error</b>	<b>0.021sft</b>
<b>Vert error</b>	<b>0.007sft</b>
<b>3D error</b>	<b>0.023sft</b>

<b>Easting</b>	1147835.4250sft
<b>Elevation</b>	883.2760sft
<b>Utilized</b>	Horz and Vert
<b>Quality</b>	Survey quality

<b>Point</b>	AA-10_WGS84
<b>Latitude</b>	35°14'32.26966"N
<b>Longitude</b>	81°51'16.11478"W
<b>Height</b>	778.2235sft

<b>Northing</b>	555362.8026sft
<b>Easting</b>	1147835.4312sft
<b>Elevation</b>	883.2605sft
<b>Horz error</b>	0.013sft
<b>Vert error</b>	0.003sft
<b>3D error</b>	0.013sft

<b>Point</b>	AA-10_Local
<b>Northing</b>	555362.8130sft
<b>Easting</b>	1147835.4240sft
<b>Elevation</b>	883.2630sft
<b>Utilized</b>	Horz and Vert
<b>Quality</b>	Survey quality

<b>Point</b>	AA-9_WGS84
<b>Latitude</b>	35°14'28.44935"N
<b>Longitude</b>	81°51'27.81107"W
<b>Height</b>	748.8436sft

<b>Northing</b>	555004.5931sft
<b>Easting</b>	1146854.4879sft
<b>Elevation</b>	853.8767sft
<b>Horz error</b>	0.012sft
<b>Vert error</b>	0.004sft
<b>3D error</b>	0.013sft

<b>Point</b>	AA-9_Local
<b>Northing</b>	555004.6020sft
<b>Easting</b>	1146854.4810sft
<b>Elevation</b>	853.8730sft
<b>Utilized</b>	Horz and Vert
<b>Quality</b>	Survey quality

<b>Point</b>	AA-8_WGS84
<b>Latitude</b>	35°13'43.96982"N
<b>Longitude</b>	81°50'26.74379"W
<b>Height</b>	765.7006sft

<b>Northing</b>	550363.6334sft
<b>Easting</b>	1151789.4128sft
<b>Elevation</b>	870.7065sft
<b>Horz error</b>	0.017sft
<b>Vert error</b>	0.004sft
<b>3D error</b>	0.018sft

<b>Point</b>	AA-8_Local
<b>Northing</b>	550363.6470sft
<b>Easting</b>	1151789.4030sft
<b>Elevation</b>	870.7110sft
<b>Utilized</b>	Horz and Vert
<b>Quality</b>	Survey quality

<b>Point</b>	AA-7_WGS84
<b>Latitude</b>	35°13'37.73053"N
<b>Longitude</b>	81°50'34.62791"W
<b>Height</b>	782.6034sft

<b>Northing</b>	549751.7475sft
<b>Easting</b>	1151117.5077sft
<b>Elevation</b>	887.6043sft
<b>Horz error</b>	0.019sft
<b>Vert error</b>	0.006sft
<b>3D error</b>	0.020sft

<b>Point</b>	AA-7_Local
<b>Northing</b>	549751.7620sft
<b>Easting</b>	1151117.4940sft
<b>Elevation</b>	887.6100sft
<b>Utilized</b>	Horz and Vert
<b>Quality</b>	Survey quality

<b>Point</b>	AA-6_WGS84
<b>Latitude</b>	35°12'52.09969"N
<b>Longitude</b>	81°50'24.84113"W
<b>Height</b>	733.4237sft

<b>Northing</b>	545116.5707sft
<b>Easting</b>	1151797.1649sft
<b>Elevation</b>	838.3897sft
<b>Horz error</b>	0.010sft
<b>Vert error</b>	0.002sft
<b>3D error</b>	0.010sft

<b>Point</b>	AA-6_Local
<b>Northing</b>	545116.5740sft
<b>Easting</b>	1151797.1550sft
<b>Elevation</b>	838.3880sft
<b>Utilized</b>	Horz and Vert
<b>Quality</b>	Survey quality

<b>Point</b>	AA-5_WGS84
<b>Latitude</b>	35°12'42.22110"N
<b>Longitude</b>	81°50'22.82577"W
<b>Height</b>	692.4855sft

<b>Northing</b>	544113.3529sft
<b>Easting</b>	1151935.7621sft
<b>Elevation</b>	797.4424sft
<b>Horz error</b>	0.010sft
<b>Vert error</b>	0.002sft
<b>3D error</b>	0.011sft

<b>Point</b>	AA-5_Local
<b>Northing</b>	544113.3570sft
<b>Easting</b>	1151935.7540sft
<b>Elevation</b>	797.4400sft
<b>Utilized</b>	Horz and Vert
<b>Quality</b>	Survey quality

<b>Point</b>	AA-4_WGS84
<b>Latitude</b>	35°11'44.39100"N
<b>Longitude</b>	81°50'22.82524"W
<b>Height</b>	721.1698sft

<b>Northing</b>	538268.4425sft
<b>Easting</b>	1151768.5618sft
<b>Elevation</b>	826.0644sft
<b>Horz error</b>	0.012sft
<b>Vert error</b>	0.002sft
<b>3D error</b>	0.012sft

<b>Point</b>	AA-4_Local
<b>Northing</b>	538268.4510sft
<b>Easting</b>	1151768.5530sft
<b>Elevation</b>	826.0620sft
<b>Utilized</b>	Horz and Vert
<b>Quality</b>	Survey quality

<b>Point</b>	AA-3_WGS84
<b>Latitude</b>	35°11'29.95038"N

<b>Northing</b>	536825.2182sft
<b>Easting</b>	1151157.6043sft

<b>Point</b>	AA-3_Local
<b>Northing</b>	536825.2260sft

<b>Longitude</b>	81°50'29.68556"W
<b>Height</b>	677.4101sft

<b>Elevation</b>	782.2839sft
<b>Horz error</b>	0.008sft
<b>Vert error</b>	0.002sft
<b>3D error</b>	0.008sft

<b>Easting</b>	1151157.6030sft
<b>Elevation</b>	782.2820sft
<b>Utilized</b>	Horz and Vert
<b>Quality</b>	Survey quality

<b>Point</b>	AA-2_WGS84
<b>Latitude</b>	35°10'52.74373"N
<b>Longitude</b>	81°50'40.34618"W
<b>Height</b>	676.2683sft

<b>Northing</b>	533090.0826sft
<b>Easting</b>	1150165.3161sft
<b>Elevation</b>	781.0894sft
<b>Horz error</b>	0.005sft
<b>Vert error</b>	0.001sft
<b>3D error</b>	0.006sft

<b>Point</b>	AA-2_Local
<b>Northing</b>	533090.0880sft
<b>Easting</b>	1150165.3170sft
<b>Elevation</b>	781.0880sft
<b>Utilized</b>	Horz and Vert
<b>Quality</b>	Survey quality

<b>Point</b>	AA-1_WGS84
<b>Latitude</b>	35°10'50.10561"N
<b>Longitude</b>	81°50'52.37989"W
<b>Height</b>	719.9493sft

<b>Northing</b>	532852.0864sft
<b>Easting</b>	1149159.1121sft
<b>Elevation</b>	824.7670sft
<b>Horz error</b>	0.011sft
<b>Vert error</b>	0.005sft
<b>3D error</b>	0.012sft

<b>Point</b>	AA-1_Local
<b>Northing</b>	532852.0940sft
<b>Easting</b>	1149159.1200sft
<b>Elevation</b>	824.7720sft
<b>Utilized</b>	Horz and Vert
<b>Quality</b>	Survey quality