

# SURVEY CONTROL SHEET

## GPS Calibration Report

Project : R3100AB

TIP Number R3100AB

User name rrwagoner

Coordinate System US State Plane 1983(at ground)

Horizontal Datum NAD 1983 (Conus)

Vertical Datum

Coordinate Units US survey feet

Distance Units US survey feet

Height Units US survey feet

Date & Time 10:14:36 AM 1/2/2013

Zone North Carolina 3200

Geoid Model G09NC

### LOCAL SITE INFORMATION

Localized around

Latitude 35°37'02.01571"N

Longitude 81°07'50.83708"W

Site Scale Factor 1.0001489800

Height 895.6521sft

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.

### Updated Default Projection (Transverse Mercator) Definition

Updated default projection not requested

### Horizontal Adjustment Parameters

Northing coordinate of rotation center 685416.7397sft

Easting coordinate of rotation center 1366641.4640sft

Rotation about the center point 0°00'00"

Translation north -0.0173sft

Translation east 0.0130sft

Scale factor 1.00000042

### Vertical Adjustment Parameters

Northing coordinate of origin point 698288.3852sft

Easting coordinate of origin point 1347899.5503sft

Vertical separation at origin 0.0962sft

Slope north -1.841ppm

Slope east 0.371ppm

### Geoid Model Definition

G09NC

### Datum Transformation Parameters

Datum Transformation computation not requested

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

	Maximum error	Root Mean Square error	Point
Horizontal	0.003sft		R31001 GPS
	0.002sft	0.000	R31008 GPS
Three-dimensional	0.003sft	0.001	31001 GPS

### Point Residuals

WGS84 Coordinates	Calculated point FOR DISPLAY ONLY	Local Coordinates
<b>Point R3100-1 GPS</b>	<b>Northing</b> 698288.3852sft	<b>Point R31001</b>
<b>Latitude</b> 35°38'55.82624"N	<b>Easting</b> 1347899.5503sft	<b>Northing</b> 698288.3882sft
<b>Longitude</b> 81°11'42.53922"W	<b>Elevation</b> 955.1513sft	<b>Easting</b> 1347899.5490sft
<b>Height</b> 850.4663sft	<b>Horz error</b> 0.003sft	<b>Elevation</b> 955.1508sft
	<b>Vert error</b> 0.001sft	<b>Utilized</b> Horz and Vert
	<b>3D error</b> 0.003sft	<b>Quality</b> Adjusted quality
<b>Point R3100-2 GPS</b>	<b>Northing</b> 697483.1581sft	<b>Point R31002</b>
<b>Latitude</b> 35°38'48.01588"N	<b>Easting</b> 1348589.3641sft	<b>Northing</b> 697483.1588sft
<b>Longitude</b> 81°11'33.96810"W	<b>Elevation</b> 922.0063sft	<b>Easting</b> 1348589.3643sft
<b>Height</b> 817.3438sft	<b>Horz error</b> 0.001sft	<b>Elevation</b> 922.0066sft
	<b>Vert error</b> 0.000sft	<b>Utilized</b> Horz and Vert
	<b>3D error</b> 0.001sft	<b>Quality</b> Adjusted quality
<b>Point R3100-3 GPS</b>	<b>Northing</b> 694183.3115sft	<b>Point R31003</b>
<b>Latitude</b> 35°38'17.01055"N	<b>Easting</b> 1356047.9152sft	<b>Northing</b> 694183.3110sft
<b>Longitude</b> 81°10'02.75257"W	<b>Elevation</b> 1000.6671sft	<b>Easting</b> 1356047.9145sft
<b>Height</b> 896.1587sft	<b>Horz error</b> 0.001sft	<b>Elevation</b> 1000.6662sft
	<b>Vert error</b> 0.001sft	<b>Utilized</b> Horz and Vert
	<b>3D error</b> 0.001sft	<b>Quality</b> Adjusted quality
<b>Point R3100-4 GPS</b>	<b>Northing</b> 695342.2363sft	<b>Point R31004</b>
<b>Latitude</b> 35°38'28.45183"N	<b>Easting</b> 1355969.8386sft	<b>Northing</b> 695342.2358sft
<b>Longitude</b> 81°10'04.00474"W	<b>Elevation</b> 1005.5504sft	<b>Easting</b> 1355969.8384sft
<b>Height</b> 901.0196sft	<b>Horz error</b> 0.001sft	<b>Elevation</b> 1005.5490sft
	<b>Vert error</b> 0.001sft	<b>Utilized</b> Horz and Vert
	<b>3D error</b> 0.001sft	<b>Quality</b> Adjusted quality
<b>Point R3100-5 GPS</b>	<b>Northing</b> 690477.8015sft	<b>Point R31005</b>
<b>Latitude</b> 35°37'41.39710"N	<b>Easting</b> 1360802.1304sft	<b>Northing</b> 690477.8011sft
<b>Longitude</b> 81°09'04.19975"W	<b>Elevation</b> 1013.6907sft	<b>Easting</b> 1360802.1290sft
<b>Height</b> 909.3142sft	<b>Horz error</b> 0.001sft	<b>Elevation</b> 1013.6900sft
	<b>Vert error</b> 0.001sft	<b>Utilized</b> Horz and Vert
	<b>3D error</b> 0.002sft	<b>Quality</b> Adjusted quality
<b>Point R3100-6 GPS</b>	<b>Northing</b> 689613.6673sft	<b>Point R31006</b>
<b>Latitude</b> 35°37'32.99566"N	<b>Easting</b> 1361466.1481sft	<b>Northing</b> 689613.6668sft
<b>Longitude</b> 81°08'55.93199"W	<b>Elevation</b> 1031.1178sft	<b>Easting</b> 1361466.1478sft
<b>Height</b> 926.7660sft	<b>Horz error</b> 0.001sft	<b>Elevation</b> 1031.1185sft
	<b>Vert error</b> 0.001sft	<b>Utilized</b> Horz and Vert
	<b>3D error</b> 0.001sft	<b>Quality</b> Adjusted quality

### DATUM DESCRIPTION

THE LOCALIZED COORDINATE SYSTEM DEVELOPED FOR THIS PROJECT IS BASED ON THE STATE PLANE COORDINATES ESTABLISHED BY NCDOT FOR MONUMENT "R3100-7"

WITH NAD 83/NSRS 2007 STATE PLANE GRID COORDINATES OF NORTHING: 686365.8891(±) EASTING: 1366771.8845(±) ELEVATION: 999.75(±)

THE AVERAGE COMBINED GRID FACTOR USED ON THIS PROJECT (GROUND TO GRID) IS: 0.999851042

THE N.C. LAMBERT GRID BEARING AND LOCALIZED HORIZONTAL GROUND DISTANCE FROM "R3100-7" TO -L- STATION 10+00.00 IS N 59°05'59.5" W 20821.85'

ALL LINEAR DIMENSIONS ARE LOCALIZED HORIZONTAL DISTANCES VERTICAL DATUM USED IS NAVD 88

### NOTES:

1. THE SITE CALIBRATION SHOWN IS BASED UPON A NETWORK TIED TO THE HARN (HIGH ACCURACY REFERENCE NETWORK) NAD 8395 ADJUSTMENT. THIS CALIBRATION WILL ALLOW THE END USER TO WORK WITHIN THE SAME COORDINATE SYSTEM WHEN USING RTK (REAL TIME KINEMATIC) GPS AND A LOCAL BASE STATION. IF ANOTHER SYSTEM SUCH AS VRS (VIRTUAL REFERENCE STATION) IS USED, ADDITIONAL FIELD TIES MAY BE NEEDED TO REDUCE POSSIBLE ERRORS, OR BIASES.
2. THE CONTROL DATA FOR THIS PROJECT CAN BE FOUND ELECTRONICALLY BY SELECTING PROJECT CONTROL DATA AT:  
[HTTPS://CONNECT.NCDOT.GOV/RESOURCES/LOCATION/](https://connect.ncdot.gov/resources/location/)  
 THE FILES TO BE FOUND ARE AS FOLLOWS:  
 R3100B-R3100\_LS\_GPSCALIB.HTML  
 R3100B-R3100\_LS\_WGS84.TXT  
 R3100B\_LS\_LOCAL.TXT  
 R3100B\_LS\_CONTROL.TXT  
 THE WGS84 AND LOCAL FILES ARE COMMA DELIMITED AND CAN BE USED TO REPRODUCE THE SITE CALIBRATION FOR THE END USER'S GPS EQUIPMENT. IF FURTHER INFORMATION IS NEEDED, PLEASE CONTACT THE LOCATION AND SURVEYS UNIT.

PROJECT CONTROL ESTABLISHED USING GLOBAL POSITIONING SYSTEM.  
 NETWORK ESTABLISHED FROM EXISTING HARN MONUMENTATION