



June 21, 2018

City of Wheat Ridge Datum Conversion Information & Procedure

BACKGROUND

Most land surveyors using modern GPS (Global Positioning System) field equipment set up their data collectors to use North American Datum 1983(2011) (NAD83(2011)).

It has been reported that field surveyors are having difficulty converting between NAD83(2011) and City of Wheat Ridge datum. The national datum is being updated to a new system scheduled to be completed in 2022. The City of Wheat Ridge may have to revise its datum upon completion of the new system in 2022, but if necessary, such a revision will not be made until the revised national system is in common use.

For this reason, we have created this narrative describing the process to set up a data collector for use within the City of Wheat Ridge, and instructions on how to convert other datum coordinates to City of Wheat Ridge datum, referred to hereafter as the “*Current City Datum*”.

The *Current City Datum* is related to Colorado State Plane Central Zone 0502 NAD83 using the following elements:

An Average Latitude of 39°46'35.634" and an Average Longitude of 105°06'17.736" has been established at the Center of Project.

Computation Notes:

Center of Project has been determined to be at the approximate location of the Center West 16th corner of Section 22, T3S, R69W, at the intersection of Hoyt Court and 43rd Avenue extended.

The Combined Factor of 0.999747803 was determined by multiplying the Scale Factor by the Elevation Factor.

The City of Wheat Ridge Datum coordinates were determined by multiplying the Colorado State Plane Central Zone 0502 NAD83 Coordinates by the inverse (1.00025226062) of the Combined Factor and then truncating 1,000,000 from the Northing Coordinate and 3,000,000 from the Easting Coordinate.

U.S Army Corp of Engineer Geodetic conversion program Corpscon V6.0 was used for the Average Latitude and Average Longitude to calculate a Scale Factor of 1.000005363 at the Center of Project.

Project Average Elevation has been determined to be 5440.00 u.s. survey feet by averaging the elevations of all observed monuments.

The Elevation Factor of 0.99974244138 was determined by dividing the Accepted Earth Radius (20,906,000 feet) by the sum of the Accepted Earth Radius and the Average Elevation.

DATA COLLECTOR SETUP

Coordinate System: US State Plane 1983; Colorado Central Zone 0502; NAD83; GEOID12*

Coordinates: Ground (keyed in scale factor)

Ground Scale Factor: 1.00025226062

False Northing Offset: 1,000,000 survey feet

False Easting Offset: 3,000,000 survey feet

Project Location: Lat=34°38'17.63747"N; Lon=115°27'50.62743"W; Height=5440.00sft

This setup should give satisfactory results Citywide.

PROCEDURE

Upon setup of the data collector using the above parameters, tie into at least two Wheat Ridge control points. Control point coordinates can be found at:

<http://www.ci.wheatridge.co.us/DocumentView.asp?DID=68>

A map of the control points can be found at:

<http://www.ci.wheatridge.co.us/DocumentView.asp?DID=69>

Survey monument sheets and some restrictions and requirements are set out at:

<http://www.ci.wheatridge.co.us/85/Survey-Monument-Sheets>

The overall Monumentation / Benchmark site can be found at:

<http://www.ci.wheatridge.co.us/81/Monumentation-Benchmarks>

The surveyor should then determine if results are satisfactory for the job at hand.