**** For Points Shot Prior to 1-1-14, These are on the 2007 adjustment of O.D.O.T.'s VRS Network***

Coordinate System Details

*** (This is a copy of print out of a report from "Trimble Geomatics Office" program. All points to prior to 1-1-14 are processed with this program, using these settings)**

**** The items with a "*" and shown in red were added for additional clarification and definition by Dennis Pritscher on 1-13-14.***

**** (For the coordinates found in the "GPS REFERENCE" layer of the LCE GIS)***

Project : T2 USR 1-8-09

{*Test project, typical of all points shot before 1-1-14}

User name	Pritscher	**Date & Time**	9:22:44 AM 3/6/2009
Coordinate System	US State Plane 1983	**Zone**	Ohio North 3401
Project Datum	NAD 1983 (Conus)		
Vertical Datum		**Geoid Model**	Geoid 2003 US Lucas ***(Using this Geoid before 1-1-14)***
Coordinate Units	US survey feet		
Distance Units	US survey feet		
Height Units	US survey feet		

Coordinate System

Coordinate System : US State Plane 1983
Zone : Ohio North 3401
Datum : NAD 1983 (Conus) ~
Ellipsoid Name : Geodetic Ref System 1980
Geoid Model : Geoid 2003 US Lucas ~

Site : Not selected

**** Points in the LCE GIS were shot w/GPS using O.D.O.T.'s VRS Network. Most were shot with 180 epochs.***

**** NAD83 (2007)***

**** This is a part of the GEOID03 Geoid model***

Ellipsoid
Ellipsoid Name : Geodetic Ref System 1980
Flattening 1/f : 298.257
Semi Major Axis : 20925604.474sft

Datum Transformation : Three Parameter
WGS84 to Geodetic Ref System 1980

Translation X	0.000sft	Rotation X	N/A
Translation Y	0.000sft	Rotation Y	N/A
Translation Z	0.000sft	Rotation Z	N/A
Scale Factor	N/A ppm		

Lambert Conformal Conic Two Parallel Projection

Projection Origin		False Origin	
Latitude	39°40'00.00000"N	False Northing	0.000sft
Longitude	82°30'00.00000"W	False Easting	1968500.000sft
Height	N/A	False Elevation	N/A
Scale Factor	N/A		

Shift grid name	None
Azimuth at projection centre	N/A
Azimuth at equator	N/A
Projection Parallel 1	41°42'00.00000"N
Projection Parallel 2	40°26'00.00000"N
Projection Ferro Constant	N/A
Projection Point 1 Latitude	N/A
Projection Point 1 Longitude	N/A
Projection Point 2 Latitude	N/A
Projection Point 2 Longitude	N/A
Projection grid name	N/A

Local site settings

Project latitude	?
Project longitude	?
Project height	600.000sft
Ground scale factor	N/A
False northing offset	N/A
False easting offset	N/A

GPS Site Calibration Details

Horizontal Adjustment

North Origin	N/A	Translation North	N/A
East Origin	N/A	Translation East	N/A
Scale	N/A	Rotation	N/A

Vertical Adjustment

North Origin	N/A
East Origin	N/A
Vertical constant correction	N/A
Slope North	N/A
Slope East	N/A

Network Adjustment Parameters

Longitude Deflection	N/A
Latitude Deflection	N/A
Azimuth Rotation	N/A
Network Scale	N/A
Distance Scale	N/A
Distance Constant	N/A
Height Constant	N/A

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DJP 1-13-14

**** For Points Shot After 1-1-14, These are on the 2011 adjustment of O.D.O.T.'s VRS Network***

Coordinate System Details

**** This is a copy of a report generated from processing the GPS data, using the "Trimble Geomatics Office" program, and using the settings as shown. The items with a "*" and shown in red were added for additional clarification and definition by Dennis Pritscher on 1-13-14.***

**** Points shot prior to 1-1-14 are on the NAD83 (2007) adjustment.***

**** (For the coordinates found in the "GPS REFERENCE" layer of the LCE GIS)***

Project : Test 2011 Adj. (1-10-14)

{*Test project, typ. of all points shot after 1-1-14}

User name	dpritscher	**Date & Time**	2:04:36 PM 1/13/2014
Coordinate System	US State Plane 1983	**Zone**	Ohio North 3401
Project Datum	NAD 1983 (Conus)		
Vertical Datum		**Geoid Model**	GEOID12A (Conus) ***(Using this Geoid after 1-1-14)*** *(We previously used the 2003 Geoid)*
Coordinate Units	US survey feet		
Distance Units	US survey feet		
Height Units	US survey feet		

Coordinate System ~ ****Points shot w/GPS using O.D.O.T's VRS Network. Most were shot with 180 epochs.***

Coordinate System : US State Plane 1983
Zone : Ohio North 3401
Datum : NAD 1983 (Conus) ***~ * NAD83 (2011)***
Ellipsoid Name : Geodetic Ref System 1980
Geoid Model : GEOID12A (Conus)
Site : Not selected

Ellipsoid
Ellipsoid Name : Geodetic Ref System 1980
Flattening 1/f : 298.257
Semi Major Axis : 20925604.474sft

Datum Transformation : Three Parameter
WGS84 to Geodetic Ref System 1980

Translation X	0.000sft	Rotation X	N/A
Translation Y	0.000sft	Rotation Y	N/A
Translation Z	0.000sft	Rotation Z	N/A
Scale Factor	N/A ppm		

Lambert Conformal Conic Two Parallel Projection

Projection Origin		False Origin	
Latitude	39°40'00.00000"N	False Northing	0.000sft
Longitude	82°30'00.00000"W	False Easting	1968500.000sft
Height	N/A	False Elevation	N/A
Scale Factor	N/A		

Shift grid name	None
Azimuth at projection centre	N/A
Azimuth at equator	N/A
Projection Parallel 1	41°42'00.00000"N
Projection Parallel 2	40°26'00.00000"N
Projection Ferro Constant	N/A
Projection Point 1 Latitude	N/A
Projection Point 1 Longitude	N/A
Projection Point 2 Latitude	N/A
Projection Point 2 Longitude	N/A
Projection grid name	N/A

Local site settings

Project latitude	?
Project longitude	?
Project height	500.000sft
Ground scale factor	N/A
False northing offset	N/A
False easting offset	N/A

GPS Site Calibration Details

Horizontal Adjustment

North Origin	N/A	Translation North	N/A
East Origin	N/A	Translation East	N/A
Scale	N/A	Rotation	N/A

Vertical Adjustment

North Origin	N/A
East Origin	N/A
Vertical constant correction	N/A
Slope North	N/A
Slope East	N/A

Network Adjustment Parameters

Longitude Deflection	N/A
Latitude Deflection	N/A
Azimuth Rotation	N/A
Network Scale	N/A
Distance Scale	N/A
Distance Constant	N/A
Height Constant	N/A

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DJP 1-13-14

BENCHMARK INFORMATION

DATE: JULY 2, 2007 (modified 4-15-13)

BY: DENNIS J. PRITSCHER, P.S., CHIEF SURVEYOR, LUCAS COUNTY ENGINEERS OFFICE

1. **BMNO;** Bench Mark Number (County).
2. **CAL_GPS_EL**; Calibrated G.P.S. Elevation. This number is based on multiple GPS measurements, averaged together, and then calibrated to existing benchmarks on the NAVD 88 Datum. This number should be accurate to within about ±0.2 of a foot.
3. **COUNTY_ELE**; County Elevation.
    a. I am unsure of the initial reference point for this datum! I believe it is an older adjustment of government bench runs, before the 1929 adjustment.
    b. It is "approximately" related to the NVGD 29 datum, with an average difference being 0.49 feet. The average County elevation is higher than NVGD 29. That difference is rarely accurate and should not be relied upon. It could vary as much as one foot or more!
4. **NORTHING** and **EASTING**; these are State Plane Coordinates (Ohio North 3401), NAD 83 (NSRS 2007).
5. **FEMA_ELEV**;
    a. These numbers were taken from the Federal Emergency Management Agency, "F.E.M.A.", Flood Insurance Rate Maps, "FIRM". (Maps dated 10/6/2000)
    b. These elevations are on the NVGD 29 datum.
6. **NAVD_88_FE**; North American Vertical Datum, 1988 adjustment, Feet.
7. **NAVD_88_ME**; North American Vertical Datum, 1988 adjustment, Meters.
8. **NGVD_29_ME**; National Geodetic Vertical Datum, 1929 adjustment, Meters.

Additional information on items 6,7, & 8, above;

1. The **"NAVD 29"** and **"NAVD 88"** numbers are based on "Precise" level runs, by Lucas County survey crews, starting in 1982.
2. The bench run began in Wood County, at the intersection of Reitz Rd. and the R.R. tracks about 1 mile east of Route 64.
    a. This point is a National Geodetic Survey "N.G.S" first order benchmark. This point has the **designation of "D 181"** and the **PID "MC0549"**. The elevation used was 200.087 meters, **NGVD 29 datum.**
3. In 2003 we converted this to the NAVD 88 datum using the "VERTCON" program on the NGS website. The result was an elevation of 199.893 meters.
4. The difference of 0.194 meters was then applied to all the numbers from our bench runs to come up with the NAVD 88 datum elevation.
    a. The precise level run loops were adjusted in 2005, using " **STAR*NET-LEV"**, a least squares survey network adjustment program. The adjusted numbers are shown in this benchmark report.
    b. The numbers shown on the Lucas County website, are shown on both the '29 datum and the '88 datum and are noted accordingly.
    c. NAVD88 meters were converted to feet (U.S. Survey Foot) and also shown for convenience.
5. In 2005 and 2006 additional precise level loops were run on the east side of the Maumee River. These were run through Jerusalem Township and the City of Oregon. These runs started in Ottawa County at NGS points "N316, PID # MC1022", "P316, PID # MC1021", and "Q316, PID # MC1020". These loops are on the NAVD88 Datum.
6. Also in 2006 two loops were run in Washington Township. These were based on NGS points "E313, PID #MC0265", "D313, PID #MC0266", and "Z 312 Reset, PID #MC1691"
7. The LCEO Survey Crews continue to add additional bench runs and expand the Precise Level Network each summer as time allows.
8. Additional information on all the precise level runs, field notes, digital files, etc., can be found in the Lucas County Engineers Office.

LUCAS COUNTY REFERENCE SHEETS

DATE: MONDAY, APRIL 15, 2013

BY: DENNIS J. PRITSCHER, P.S., CHIEF SURVEYOR, LUCAS COUNTY ENGINEERS OFFICE, 419-213-4540

1. The Engineers Office will try to scan in any new or updated reference sheets periodically as we do them.

    a. The web site will be updated when new sheets are scanned.

STATE REFERENCE SHEETS

DATE: NOVEMBER 30, 2007

BY: DENNIS J. PRITSCHER, P.S., CHIEF SURVEYOR, LUCAS COUNTY ENGINEERS OFFICE

1. The State reference sheets shown herein were received from ODOT District 2 in 2006.

2. The Lucas County Engineers Office scanned these sheets into our computer and placed the linked dot on the map during 2007.

3. The Engineers Office will try to scan in any new or updated reference sheets as we get them.
    a. The web site will be updated when new sheets are scanned.

4. ODOT might have more recent Staet reference sheets, that we do not have.

5. Some phone numbers for District 2 are;
    a. R/W ~ 419-373-(4474), (4498), (4316)
    b. Survey ~ 419-373-(4463), (4436), (4363)