

# NGS\_Benchmarks\_Sep\_2017

## Shapefile



## Tags

The geographic limits of USA including trust Territories, N/A, N/A, NSRS, geodetic, horizontal control, vertical control, ellipsoid height, benchmark, orthometric height, latitude, longitude

## Summary

Provide a base of reference for latitude, longitude and height throughout the United States.

## Description

This data contains a set of geodetic control stations maintained by the National Geodetic Survey. Each geodetic control station in this dataset has either a precise Latitude/Longitude used for horizontal control or a precise Orthometric Height used for vertical control, or both. The National Geodetic Survey (NGS) serves as the Nation's depository for geodetic data. The NGS distributes geodetic data worldwide to a variety of users. These geodetic data include the final results of geodetic surveys, software programs to format, compute, verify, and adjust original survey observations or to convert values from one geodetic datum to another, and publications that describe how to obtain and use Geodetic Data products and services.

## Credits

NOAA, National Geodetic Survey and cooperating organizations

## Use limitations

Not restricted; Geodetic Data, including software were developed and compiled with U.S. Government funding; no proprietary rights may be attached to them nor may they be sold to the U.S. Government as part of any procurement of ADP products or services.

## Extent

**West** -91.692696    **East** -88.098200

**North** 35.001016    **South** 30.161195

## Scale Range

**Maximum (zoomed in)** 1:5,000

**Minimum (zoomed out)** 1:150,000,000

[ArcGIS Metadata](#) ►

[Topics and Keywords](#) ►

THEMES OR CATEGORIES OF THE RESOURCE    location

\* CONTENT TYPE    Downloadable Data

EXPORT TO FGDC CSDGM XML FORMAT AS RESOURCE DESCRIPTION    No

PLACE KEYWORDS The geographic limits of USA including trust Territories

STRATUM KEYWORDS N/A

THESAURUS ▶

TITLE N/A

PUBLICATION DATE 2017-09-13 00:00:00

[Hide Thesaurus ▲](#)

TEMPORAL KEYWORDS N/A

THESAURUS ▶

TITLE N/A

PUBLICATION DATE 2017-09-13 00:00:00

EDITION DATE 2017-09-13

[Hide Thesaurus ▲](#)

THEME KEYWORDS NSRS, geodetic, horizontal control, vertical control, ellipsoid height, benchmark, orthometric height, latitude, longitude

THESAURUS ▶

TITLE geodesy

PUBLICATION DATE 2017-09-13 00:00:00

EDITION DATE 2017-09-13

[Hide Thesaurus ▲](#)

[Hide Topics and Keywords ▲](#)

## Citation ▶

\* TITLE NGS\_Benchmarks\_Sep\_2017

PUBLICATION DATE 2004-01-01

EDITION latest available

PRESENTATION FORMATS hardcopy diagram

FGDC GEOSPATIAL PRESENTATION FORMAT Diagram

SERIES

NAME N/A

ISSUE N/A

OTHER CITATION DETAILS

Questions concerning this data may be addressed to NGS Information Services Branch  
EMail - ngs.software@noaa.gov Phone - 301-713-3242

[Hide Citation ▲](#)

## Citation Contacts ►

### RESPONSIBLE PARTY

ORGANIZATION'S NAME NOAA, National Geodetic Survey  
CONTACT'S ROLE publisher

### CONTACT INFORMATION ►

#### ADDRESS

DELIVERY POINT NOAA Campus, Silver Spring, MD

[Hide Contact information ▲](#)

### RESPONSIBLE PARTY

ORGANIZATION'S NAME NOAA, National Geodetic Survey  
CONTACT'S ROLE originator

[Hide Citation Contacts ▲](#)

## Resource Details ►

DATASET LANGUAGES English (UNITED STATES)

STATUS completed

SPATIAL REPRESENTATION TYPE vector

\* PROCESSING ENVIRONMENT Microsoft Windows 7 Version 6.1 (Build 7601) Service Pack 1; Esri  
ArcGIS 10.4.1.5686

### CREDITS

NOAA, National Geodetic Survey and cooperating organizations

### ARCGIS ITEM PROPERTIES

\* NAME NGS\_Benchmarks\_Sep\_2017

\* SIZE 0.333

\* LOCATION file:///\\SWALKER-

PC\E\$\DATA\NGS\_Benchmarks\NGS\_Benchmarks\_Sep\_2017.shp

\* ACCESS PROTOCOL Local Area Network

[Hide Resource Details ▲](#)

## Extents ►

### EXTENT

#### GEOGRAPHIC EXTENT

#### BOUNDING RECTANGLE

WEST LONGITUDE -88.1

EAST LONGITUDE -91.6  
SOUTH LATITUDE 30.2  
NORTH LATITUDE 35

#### EXTENT

##### DESCRIPTION

retrieval date

##### TEMPORAL EXTENT

DATE AND TIME 2017-09-06

#### EXTENT

##### GEOGRAPHIC EXTENT

##### BOUNDING RECTANGLE

EXTENT TYPE Extent used for searching

\* WEST LONGITUDE -91.692696

\* EAST LONGITUDE -88.098200

\* NORTH LATITUDE 35.001016

\* SOUTH LATITUDE 30.161195

\* EXTENT CONTAINS THE RESOURCE Yes

##### EXTENT IN THE ITEM'S COORDINATE SYSTEM

\* WEST LONGITUDE 322641.328714

\* EAST LONGITUDE 650790.674057

\* SOUTH LATITUDE 1042159.829017

\* NORTH LATITUDE 1577361.376212

\* EXTENT CONTAINS THE RESOURCE Yes

*Hide Extents ▲*

## Resource Points of Contact ►

#### POINT OF CONTACT

INDIVIDUAL'S NAME NGS Information Services Branch

ORGANIZATION'S NAME NOAA, National Geodetic Survey

CONTACT'S POSITION IT Specialist

CONTACT'S ROLE point of contact

#### CONTACT INFORMATION ►

##### PHONE

VOICE 301-713-3242

FAX 301-713-4172

##### ADDRESS

TYPE both

DELIVERY POINT SSMC2/9152 1315 East-west Highway

CITY Silver Spring

ADMINISTRATIVE AREA MD

POSTAL CODE 20910

COUNTRY US

E-MAIL ADDRESS [ngs.software@noaa.gov](mailto:ngs.software@noaa.gov)

##### HOURS OF SERVICE

8:30am to 5:00pm EST

CONTACT INSTRUCTIONS

Prefer EMail

*Hide Contact information ▲*

*Hide Resource Points of Contact ▲*

## Resource Maintenance ►

RESOURCE MAINTENANCE

UPDATE FREQUENCY continual

*Hide Resource Maintenance ▲*

## Resource Constraints ►

LEGAL CONSTRAINTS

LIMITATIONS OF USE

The distributor does not assume liability

OTHER CONSTRAINTS

Geodetic Data are in the public domain, not restricted from access or distribution.

SECURITY CONSTRAINTS

CLASSIFICATION unclassified

CLASSIFICATION SYSTEM DOD

ADDITIONAL RESTRICTIONS

none

CONSTRAINTS

LIMITATIONS OF USE

Not restricted; Geodetic Data, including software were developed and compiled with U.S. Government funding; no proprietary rights may be attached to them nor may they be sold to the U.S. Government as part of any procurement of ADP products or services.

*Hide Resource Constraints ▲*

## Spatial Reference ►

ARCGIS COORDINATE SYSTEM

\* TYPE Projected

\* GEOGRAPHIC COORDINATE REFERENCE GCS\_North\_American\_1983

\* PROJECTION NAD\_1983\_Mississippi\_TM

\* COORDINATE REFERENCE DETAILS

PROJECTED COORDINATE SYSTEM

WELL-KNOWN IDENTIFIER 102609

X ORIGIN -5122200

Y ORIGIN -12297100

XY SCALE 450339697.45066422  
Z ORIGIN -100000  
Z SCALE 10000  
M ORIGIN -100000  
M SCALE 10000  
XY TOLERANCE 0.001  
Z TOLERANCE 0.001  
M TOLERANCE 0.001  
HIGH PRECISION true  
LATEST WELL-KNOWN IDENTIFIER 3814  
WELL-KNOWN TEXT  
PROJCS["NAD\_1983\_Mississippi\_TM",GEOGCS["GCS\_North\_American\_1983",DATUM["D\_North\_American\_1983",SPHEROID["GRS\_1980",6378137.0,298.257222101]],PRIMEM["Greenwich",0.0],UNIT["Degree",0.0174532925199433]],PROJECTION["Transverse\_Mercator"],PARAMETER["False\_Easting",500000.0],PARAMETER["False\_Northing",1300000.0],PARAMETER["Central\_Meridian",-89.75],PARAMETER["Scale\_Factor",0.9998335],PARAMETER["Latitude\_Of\_Origin",32.5],UNIT["Meter",1.0],AUTHORITY["EPSG",3814]]

REFERENCE SYSTEM IDENTIFIER

- \* VALUE 3814
- \* CODESPACE EPSG
- \* VERSION 6.17.1(10.0.0)

*Hide Spatial Reference ▲*

## Spatial Data Properties ►

VECTOR ►

- \* LEVEL OF TOPOLOGY FOR THIS DATASET geometry only

GEOMETRIC OBJECTS

- FEATURE CLASS NAME NGS\_Benchmarks\_Sep\_2017
- \* OBJECT TYPE point
  - \* OBJECT COUNT 12480

*Hide Vector ▲*

INDIRECT SPATIAL REFERENCING

Geodetic Data- horizontal positional datum conversion, use program NADCON (version 2.1) Geodetic Data - vertical positional datum conversion, use program VERTCON (version 2.0) These programs provide indirect spatial reference data and are available from NOAA, National Geodetic Survey at [http://www.ngs.noaa.gov/PC\\_PROD/pc\\_prod.shtml](http://www.ngs.noaa.gov/PC_PROD/pc_prod.shtml)

VECTOR ►

- \* LEVEL OF TOPOLOGY FOR THIS DATASET geometry only

GEOMETRIC OBJECTS

- FEATURE CLASS NAME NGS\_Benchmarks\_Sep\_2017
- \* OBJECT TYPE point
  - \* OBJECT COUNT 12480

*Hide Vector ▲*

ARCGIS FEATURE CLASS PROPERTIES ►

FEATURE CLASS NAME NGS\_Benchmarks\_Sep\_2017  
\* FEATURE TYPE Simple  
\* GEOMETRY TYPE Point  
\* HAS TOPOLOGY FALSE  
\* FEATURE COUNT 12480  
\* SPATIAL INDEX TRUE  
\* LINEAR REFERENCING FALSE

*Hide ArcGIS Feature Class Properties ▲*

*Hide Spatial Data Properties ▲*

## Data Quality ►

SCOPE OF QUALITY INFORMATION ►

RESOURCE LEVEL dataset

*Hide Scope of quality information ▲*

DATA QUALITY REPORT - CONCEPTUAL CONSISTENCY ►

MEASURE DESCRIPTION

FGCS sponsored testing in cooperation with equipment manufacturers and National Institutes of Standards and Technology, Gaithersburg, MD 20850

*Hide Data quality report - Conceptual consistency ▲*

DATA QUALITY REPORT - COMPLETENESS OMISSION ►

MEASURE DESCRIPTION

This dataset DOES NOT include destroyed marks. All other non-publishable marks are NOT included. Non-publishable criteria is available at <[http://www.ngs.noaa.gov/cgi-bin/craigs\\_lib.prl?HELP\\_NONPUB=1](http://www.ngs.noaa.gov/cgi-bin/craigs_lib.prl?HELP_NONPUB=1)>

*Hide Data quality report - Completeness omission ▲*

DATA QUALITY REPORT - QUANTITATIVE ATTRIBUTE ACCURACY ►

MEASURE DESCRIPTION

Horizontal control stations (those with precise Latitude, Longitude) were established in accordance with FGDC publications "Standards and Specifications for Geodetic

Accuracy Standards" and "Geometric Geodetic Accuracy Standards and Specifications for Using GPS Relative Positioning Techniques" The final Latitude, Longitude of these stations were determined by a least squares adjustments of the horizontal observations. Horizontal control station have Latitude, Longitudes displayed to 5 places and are identified by attribute POS\_SRCE = 'ADJUSTED' Lesser quality Latitude, Longitudes may also be preset in the dataset. These are identified by a POS\_SRCE attributes HD\_HELD1, HD\_HELD2, or SCALED. These lesser quality positions are described at: <[http://www.ngs.noaa.gov/cgi-bin/ds\\_lookup.prl?Item=SCALED](http://www.ngs.noaa.gov/cgi-bin/ds_lookup.prl?Item=SCALED)> Vertical control stations (those with precise Orthometric Heights) were established in accordance with FGDC publications "Standards and Specifications for Geodetic Accuracy Standards" The final Orthometric Height of these stations were in most cases determined by a least squares adjustments of the vertical observations but in some cases may have been keyed from old survey documents. Vertical control stations have Orthometric Heights displayed to 2 or 3 places and are identified by attribute ELEV\_SRCE of ADJUSTED, ADJ UNCH, POSTED,READJUST,N HEIGHT,RESET,COMPUTED Lesser quality Orthometric Heights may also be preset in the dataset. These are identified by a ELEV\_SRCE attributes GPS\_OBS, VERT\_ANG, H\_LEVEL, VERTCON, SCALED. These lesser quality orthometric heights are described at: <[http://www.ngs.noaa.gov/cgi-bin/ds\\_lookup.prl?Item=SCALED](http://www.ngs.noaa.gov/cgi-bin/ds_lookup.prl?Item=SCALED)> IMPORTANT - Control stations do not always have both precise Latitude, Longitude AND precise Orthometric Height. A horizontal control station may have a orthometric height associated with it which is of non geodetic quality. These types of heights are displayed to 0, 1, or 2 decimal places. Worst case being off by +/- 1 meter. LIKEWISE - A Vertical control station may have a Latitude, Longitude associated with it which is of non geodetic quality. These types of Latitude, Longitudes are displayed to 0, 1 or 2 decimal places. Worst case being off by +/- 180 meter. Refer to <[http://www.ngs.noaa.gov/cgi-bin/ds\\_lookup.prl?Item=SCALED](http://www.ngs.noaa.gov/cgi-bin/ds_lookup.prl?Item=SCALED)> for a description of the various type of methods used in determining the Latitude, Longitude, and Orthometric Height. Attribute POS\_CHECK and ELEV\_CHECK indicate whether or not an observational check was made to the position and/or orthometric height. Care should be taken when using "No Check" coordinates. If attribute ELEV\_SRCE = 'VERTCON' then the Orthometric Height was determined by applying NGS program VERTCON to an Old NGVD 29 height. In most areas VERTCON gives results to +/- 2 cm. See <<http://www.ngs.noaa.gov/TOOLS/Vertcon/vertcon.html>> for a more detailed explanation of VERTCON accuracy. Ellipsoid Heights are also present in the dataset. The ellipsoid heights consist of those determined using a precise geoid model, which are displayed to 2 decimal places and are considered good to +/- .005 meters, and those displayed to 1 decimal place and are considered only good to +/- .5 meters

#### QUANTITATIVE TEST RESULTS

VALUE 95 percent confidence level for geodetic quality data.

#### EVALUATION METHOD

Geodetic Data are continuously being processed; their standards and specifications are being reviewed for next publication release. "Standards and Specifications for Geodetic Control Networks", 1984 and "Geometric Geodetic Accuracy Standards and Specifications for Using GPS Relative Positioning Techniques," FGCS (formally FGCC) publication version 5.0 1989, are most current published documents.

*Hide Data quality report - Quantitative attribute accuracy ▲*



DATA QUALITY REPORT - ABSOLUTE EXTERNAL POSITIONAL ACCURACY ►

DIMENSION horizontal

MEASURE DESCRIPTION

The description of tests are explained in "Geometric Geodetic Accuracy Standards and Specifications For Using GPS Relative Positioning Techniques," FGCS (formally FGCC) publication version 5.0, 1989.

QUANTITATIVE TEST RESULTS

VALUE .05 meters for highest order of accuracy

EVALUATION METHOD

Horizontal positional accuracy statements pertain to horizontal control stations only. i.e. Those with geodetic quality Latitude, Longitudes. Positional Accuracy explanation contained in "Geometric Geodetic Accuracy Standards and Specifications For Using GPS Relative Positioning Techniques," FGCS (formally FGCC) publication version 5.0, 1989, (See table 1, p6). with the exception of Order A and Order B which have an accuracy of as described at: <[http://www.ngs.noaa.gov/cgi-bin/ds\\_lookup.prl?Item=HORZ%20ORDER](http://www.ngs.noaa.gov/cgi-bin/ds_lookup.prl?Item=HORZ%20ORDER)>

*Hide Data quality report - Absolute external positional accuracy ▲*

DATA QUALITY REPORT - ABSOLUTE EXTERNAL POSITIONAL ACCURACY ►

DIMENSION vertical

MEASURE DESCRIPTION

The description of tests are explained in "Geometric Geodetic Accuracy Standards and Specifications for Using GPS Relative Positioning Techniques," FGCS (formally FGCC) publication version 5.0, 1989, (See table 1, p6).

QUANTITATIVE TEST RESULTS

VALUE .05 meter for highest order of accuracy

EVALUATION METHOD

Vertical positional accuracy statements pertain to vertical control stations only. i.e. Those with geodetic quality Orthometric Heights. Orthometric Height accuracy explanation is contained in FGDC publication "Standards and Specifications for Geodetic Control Networks" with the exception of vertical control of class 0 POSTED and READJUSTED Heights which are described at: <[http://www.ngs.noaa.gov/cgi-bin/ds\\_lookup.prl?Item=VERT%20ORDER](http://www.ngs.noaa.gov/cgi-bin/ds_lookup.prl?Item=VERT%20ORDER)> Ellipsoid height accuracy explanation contained in "Geometric Geodetic Accuracy Standards and Specifications for Using GPS Relative Positioning Techniques," FGCS (formally FGCC) publication version 5.0, 1989. (see table 1, p6). The accuracies for ellipsoid heights are described at: <[http://www.ngs.noaa.gov/cgi-bin/ds\\_lookup.prl?Item=ELLP%20ORDER](http://www.ngs.noaa.gov/cgi-bin/ds_lookup.prl?Item=ELLP%20ORDER)>

[Hide Data quality report - Absolute external positional accuracy ▲](#)

[Hide Data Quality ▲](#)

## Lineage ►

### PROCESS STEP ►

WHEN THE PROCESS OCCURRED

INDETERMINATE DATE inapplicable

DESCRIPTION

The National Geodetic Survey produces geodetic data. Geodetic data comprise the results of geodetic surveys to determine, among other things, latitude, longitude, height, scale, and orientation control. The National Geodetic Survey original field survey project observations and final reports are accessioned into records system of the National Archives and Records Administration of the U.S.A. These surveys provide information valuable for a variety of uses in the mapping, charting and surveying community. The NGS' final product is the geodetic data sheet. Geodetic data sheets are comprehensive summaries of all published information for a given geodetic reference point, including: the geographic position and/or height based on the current reference datum, condition of the survey mark when it was last visited, a description of where the point is located and how to reach it, and an explanation of the terms used in the data sheet. In support of these geodetic data, the NGS provides software, publications, and various user services, including geodetic advisor program, instrument calibration, surveying standards, and technical workshops. This dataset contains certain information extracted from the above mentioned data sheet.

### PROCESS CONTACT

INDIVIDUAL'S NAME NGS Information Services Branch

CONTACT'S POSITION IT Specialist

CONTACT'S ROLE processor

### CONTACT INFORMATION ►

PHONE

VOICE 301-713-3242

FAX 301-713-4172

ADDRESS

TYPE both

DELIVERY POINT SSMC2/9152 1315 East-west Highway

CITY Silver Spring

ADMINISTRATIVE AREA MD

POSTAL CODE 20910

COUNTRY US

E-MAIL ADDRESS [ngs.software@noaa.gov](mailto:ngs.software@noaa.gov)

HOURS OF SERVICE

8:30am to 5:00pm EST

CONTACT INSTRUCTIONS

Prefer EMail

[Hide Contact information ▲](#)

SOURCE DATA ▶

RELATIONSHIP TO THE PROCESS STEP used

SOURCE CITATION ▶

ALTERNATE TITLES Geodetic Data

[Hide Source citation ▲](#)

[Hide Source data ▲](#)

SOURCE DATA ▶

RELATIONSHIP TO THE PROCESS STEP produced

SOURCE CITATION ▶

ALTERNATE TITLES NOAA, National Geodetic Survey and cooperating organizations.

[Hide Source citation ▲](#)

[Hide Source data ▲](#)

[Hide Process step ▲](#)

SOURCE DATA ▶

DESCRIPTION

The geodetic data must be submitted in the digital formats specified in the FGCS (formally FGCC) publication "Input Formats and Specifications of the National Geodetic Survey Data Base" which describes the formats and procedures for submission of data for adjustment and assimilation into the National Geodetic Survey Data Base. Separate volumes of this publication refer to horizontal (volume 1), vertical (volume 2), and gravity (volume 3) control, and are available from NOAA, National Geodetic Survey, 1315 East-West Hwy, Code N/CGS1, Silver Spring, MD, 20910 (1-301-713-3242). Note guidelines for submission of three-dimensional Global Positioning System (GPS) relative positioning data are contained in annex L to volume 1.

SOURCE MEDIUM NAME hardcopy—printing on paper

SOURCE CITATION ▶

TITLE "Input Formats and Specifications of the National Geodetic Survey Data Base" published by FGCS (formally FGCC)

ALTERNATE TITLES Blue Book

PUBLICATION DATE 2017-09-06

EDITION latest available

PRESENTATION FORMATS hardcopy diagram  
FGDC GEOSPATIAL PRESENTATION FORMAT diagram

SERIES

NAME N/A  
ISSUE N/A

OTHER CITATION DETAILS

N/A

RESPONSIBLE PARTY

ORGANIZATION'S NAME NOAA, National Geodetic Survey  
CONTACT'S ROLE originator

RESPONSIBLE PARTY

ORGANIZATION'S NAME NOAA, National Geodetic Survey  
CONTACT'S ROLE publisher

CONTACT INFORMATION ►

ADDRESS

DELIVERY POINT NOAA Campus, Silver Spring, MD

*Hide Contact information ▲*

RESOURCE LOCATION ONLINE

LOCATION <<http://www.ngs.noaa.gov/FGCS/BlueBook/>>

*Hide Source citation ▲*

EXTENT OF THE SOURCE DATA

DESCRIPTION

publication date

TEMPORAL EXTENT

DATE AND TIME 1994-01-01

*Hide Source data ▲*

*Hide Lineage ▲*

## Distribution ►

DISTRIBUTOR ►

CONTACT INFORMATION

INDIVIDUAL'S NAME NGS Information Services Branch

ORGANIZATION'S NAME NOAA, National Geodetic Survey  
CONTACT'S POSITION IT Specialist  
CONTACT'S ROLE distributor

CONTACT INFORMATION ►

PHONE

VOICE 301-713-3242

FAX 301-713-4172

ADDRESS

TYPE both

DELIVERY POINT SSMC2/9152 1315 East-west Highway

CITY Silver Spring

ADMINISTRATIVE AREA MD

POSTAL CODE 20910

COUNTRY US

E-MAIL ADDRESS [ngs.software@noaa.gov](mailto:ngs.software@noaa.gov)

HOURS OF SERVICE

8:30am to 5:00pm EST

CONTACT INSTRUCTIONS

Prefer EMail

*[Hide Contact information ▲](#)*

AVAILABLE FORMAT

NAME ShapeFile

VERSION 0.3.0; 1999

FILE DECOMPRESSION TECHNIQUE Download options include PC Zip and Unix compressed tar

ORDERING PROCESS

TERMS AND FEES free if you retrieve it yourself

TRANSFER OPTIONS

ONLINE SOURCE

LOCATION [www.ngs.noaa.gov/cgi-bin/datasheet.prl](http://www.ngs.noaa.gov/cgi-bin/datasheet.prl)

DESCRIPTION Distributed through <http://www.ngs.noaa.gov/cgi-bin/datasheet.prl>

TRANSFER OPTIONS

ONLINE SOURCE

LOCATION [www.ngs.noaa.gov/](http://www.ngs.noaa.gov/)

DESCRIPTION Datasheet Shapefile

*[Hide Distributor ▲](#)*

DISTRIBUTOR ►

CONTACT INFORMATION

INDIVIDUAL'S NAME Steve Walker

ORGANIZATION'S NAME MARIS

CONTACT'S POSITION GIS Operations Manager

CONTACT'S ROLE distributor

CONTACT INFORMATION ►

ADDRESS

TYPE

E-MAIL ADDRESS [swalker@mississippi.edu](mailto:swalker@mississippi.edu)

ONLINE RESOURCE

LOCATION [www.maris.state.ms.us/stsatewide/](http://www.maris.state.ms.us/stsatewide/)

[Hide Contact information ▲](#)

[Hide Distributor ▲](#)

DISTRIBUTION FORMAT

\* NAME Shapefile

VERSION ArcGIS 10.4

TRANSFER OPTIONS

\* TRANSFER SIZE 0.333

ONLINE SOURCE

LOCATION <http://www.ngs.noaa.gov/cgi-bin/datasheet.prl>

[Hide Distribution ▲](#)

## Fields ►

DETAILS FOR OBJECT [NGS\\_Benchmarks\\_Sep\\_2017](#) ►

\* TYPE Feature Class

\* ROW COUNT 12480

FIELD FID ►

\* ALIAS FID

\* DATA TYPE OID

\* WIDTH 4

\* PRECISION 0

\* SCALE 0

\* FIELD DESCRIPTION

Internal feature number.

\* DESCRIPTION SOURCE

Esri

\* DESCRIPTION OF VALUES

Sequential unique whole numbers that are automatically generated.

[Hide Field FID ▲](#)

FIELD Shape ▶

- \* ALIAS Shape
- \* DATA TYPE Geometry
- \* WIDTH 0
- \* PRECISION 0
- \* SCALE 0
- \* FIELD DESCRIPTION  
Feature geometry.
  
- \* DESCRIPTION SOURCE  
Esri
  
- \* DESCRIPTION OF VALUES  
Coordinates defining the features.

*Hide Field Shape ▲*

FIELD FeatureId ▶

- \* ALIAS FeatureId
- \* DATA TYPE Integer
- \* WIDTH 5
- \* PRECISION 5
- \* SCALE 0

*Hide Field FeatureId ▲*

FIELD DATA\_DATE ▶

- \* ALIAS DATA\_DATE
- \* DATA TYPE String
- \* WIDTH 8
- \* PRECISION 0
- \* SCALE 0
- \* FIELD DESCRIPTION  
The date when this information was retrieved from the NGS database.
  
- \* DESCRIPTION SOURCE  
NGS

*Hide Field DATA\_DATE ▲*

FIELD DATA\_SRCE ▶

- \* ALIAS DATA\_SRCE
- \* DATA TYPE String
- \* WIDTH 57
- \* PRECISION 0

\* SCALE 0

FIELD DESCRIPTION

Data Source where the information for the mark came from. You should use this link to obtain a full datasheet for the mark or obtain the datasheets from <http://www.ngs.noaa.gov/cgi-bin/datasheet.prl> if you intend to use the data for survey control.

DESCRIPTION SOURCE

NGS

[Hide Field DATA\\_SRCE ▲](#)

FIELD DEC\_LONG ►

\* ALIAS DEC\_LONG

\* DATA TYPE String

\* WIDTH 15

\* PRECISION 0

\* SCALE 0

FIELD DESCRIPTION

Decimal equivalent of the LONGITUDE Always displayed to 10 decimal places, but you should see POS\_SRCE and POS\_ORDER to determine the true accuracy.

DESCRIPTION SOURCE

NGS

[Hide Field DEC\\_LONG ▲](#)

FIELD DEC\_LAT ►

\* ALIAS DEC\_LAT

\* DATA TYPE String

\* WIDTH 13

\* PRECISION 0

\* SCALE 0

FIELD DESCRIPTION

Decimal equivalent of the LATITUDE PID- Permanent Identifier assigned by NGS to each mark

DESCRIPTION SOURCE

NGS

[Hide Field DEC\\_LAT ▲](#)

FIELD PID ►

\* ALIAS PID

\* DATA TYPE String

\* WIDTH 6

\* PRECISION 0

\* SCALE 0

FIELD DESCRIPTION

PID- Permanent Identifier assigned by NGS to each mark



DESCRIPTION SOURCE  
NGS

*Hide Field PID ▲*

FIELD NAME ►

\* ALIAS NAME  
\* DATA TYPE String  
\* WIDTH 40  
\* PRECISION 0  
\* SCALE 0

FIELD DESCRIPTION

Station Name (a.k.a. Designation)

DESCRIPTION SOURCE  
NGS

*Hide Field NAME ▲*

FIELD STATE ►

\* ALIAS STATE  
\* DATA TYPE String  
\* WIDTH 2  
\* PRECISION 0  
\* SCALE 0

FIELD DESCRIPTION

Mississippi

DESCRIPTION SOURCE  
NGS

*Hide Field STATE ▲*

FIELD COUNTY ►

\* ALIAS COUNTY  
\* DATA TYPE String  
\* WIDTH 26  
\* PRECISION 0  
\* SCALE 0

FIELD DESCRIPTION

County of location

DESCRIPTION SOURCE  
NGS

*Hide Field COUNTY ▲*

FIELD QUAD ►

- \* ALIAS QUAD
- \* DATA TYPE String
- \* WIDTH 40
- \* PRECISION 0
- \* SCALE 0

FIELD DESCRIPTION

USGS Quad Name of Location

DESCRIPTION SOURCE

NGS

*Hide Field QUAD ▲*

FIELD LATITUDE ►

- \* ALIAS LATITUDE
- \* DATA TYPE String
- \* WIDTH 17
- \* PRECISION 0
- \* SCALE 0

FIELD DESCRIPTION

Latitude in Deg-Min-Sec format

DESCRIPTION SOURCE

NGS

*Hide Field LATITUDE ▲*

FIELD LONGITUDE ►

- \* ALIAS LONGITUDE
- \* DATA TYPE String
- \* WIDTH 18
- \* PRECISION 0
- \* SCALE 0

FIELD DESCRIPTION

Longitude in Deg-Min-Sec format

DESCRIPTION SOURCE

NGS

*Hide Field LONGITUDE ▲*

FIELD POS\_DATUM ►

- \* ALIAS POS\_DATUM
- \* DATA TYPE String
- \* WIDTH 6
- \* PRECISION 0
- \* SCALE 0

FIELD DESCRIPTION

Datum of the LATITUDE, LONGITUDE Should always be NAD83

DESCRIPTION SOURCE  
NGS

[Hide Field POS\\_DATUM ▲](#)

FIELD DATUM\_TAG ►

\* ALIAS DATUM\_TAG  
\* DATA TYPE String  
\* WIDTH 6  
\* PRECISION 0  
\* SCALE 0

FIELD DESCRIPTION

- Datum Tag of the LATITUDE, LONGITUDE NAD83 (1986) indicates positions on the NAD83 datum for the North American Adjustment, completed in 1986. NAD83 (nnnn) indicates positions on the NAD83 datum for the North American Adjustment, but readjusted to a State High Accuracy Reference Network (HARN) on the date shown in (nnnn). NAD83 (CORS) indicates positions which are part of the CORS network

DESCRIPTION SOURCE  
NGS

[Hide Field DATUM\\_TAG ▲](#)

FIELD POS\_SRCE ►

\* ALIAS POS\_SRCE  
\* DATA TYPE String  
\* WIDTH 12  
\* PRECISION 0  
\* SCALE 0

FIELD DESCRIPTION

Position Source for the LATITUDE, LONGITUDE ADJUSTED = Least squares adjustment. (Lat, Lon Rounded to 5 decimal places.) HD\_HELD1 = Differentially corrected hand held GPS observations. (Lat, Lon Rounded to 2 decimal places.) HD\_HELD2 = Autonomous hand held GPS observations. (Lat, Lon Rounded to 1 decimal places.) SCALED = Scaled from a topographic map. (Lat, Lon Rounded to 0 decimal places.)

DESCRIPTION SOURCE  
NGS

[Hide Field POS\\_SRCE ▲](#)

FIELD ELEVATION ►

\* ALIAS ELEVATION  
\* DATA TYPE String  
\* WIDTH 9  
\* PRECISION 0  
\* SCALE 0

FIELD DESCRIPTION

- Present if available. The Orthometric Height in METERS indicating the height above the Geoid.

DESCRIPTION SOURCE

NGS

[Hide Field ELEVATION ▲](#)

FIELD ELEV\_DATUM ►

- \* ALIAS ELEV\_DATUM
- \* DATA TYPE String
- \* WIDTH 12
- \* PRECISION 0
- \* SCALE 0

FIELD DESCRIPTION

Datum of the ELEVATION

DESCRIPTION SOURCE

NGS

[Hide Field ELEV\\_DATUM ▲](#)

FIELD ELEV\_SRCE ►

- \* ALIAS ELEV\_SRCE
- \* DATA TYPE String
- \* WIDTH 12
- \* PRECISION 0
- \* SCALE 0

FIELD DESCRIPTION

Direct Digital Output from Least Squares Adjustment of Precise Leveling. (Rounded to 3 decimal places.) ADJ UNCH = Manually Entered (and NOT verified) Output of Least Squares Adjustment of Precise Leveling. (Rounded to 3 decimal places.) POSTED = Pre-1991 Precise Leveling Adjusted to the NAVD 88 Network After Completion of the NAVD 88 General Adjustment of 1991. (Rounded to 3 decimal places.) READJUST = Precise Leveling Readjusted as Required by Crustal Motion or Other Cause. (Rounded to 2 decimal places.) N HEIGHT = Computed from Precise Leveling Connected at Only One Published Bench Mark. (Rounded to 2 decimal places.) RESET = Reset Computation of Precise Leveling. (Rounded to 2 decimal places.) COMPUTED = Computed from Precise Leveling Using Non-rigorous Adjustment Technique. (Rounded to 2 decimal places.) LEVELING = Precise Leveling Performed by Horizontal Field Party. (Rounded to 2 decimal places.) H LEVEL = Level between control points not connected to bench mark. (Rounded to 1 decimal places.) GPS OBS = Computed from GPS Observations. (Rounded to 1 decimal places.) VERT ANG = Computed from Vertical Angle Observations. (Rounded to 1 decimal place; If No Check, to 0 decimal places.) SCALED = Scaled from a Topographic Map. (Rounded to 0 decimal places.) U HEIGHT = Unvalidated height from precise leveling connected at only one NSRS point. (Rounded to 2 decimal places.) VERTCON = The NAVD 88 height was computed by applying the VERTCON shift value to the NGVD 29 height. (Rounded to 0 decimal places.)

DESCRIPTION SOURCE

NGS

[Hide Field ELEV\\_SRCE ▲](#)

FIELD ELLIP\_HT ►

- \* ALIAS ELLIP\_HT
- \* DATA TYPE String
- \* WIDTH 9
- \* PRECISION 0
- \* SCALE 0

FIELD DESCRIPTION

Present if available. The ellipsoid height in METERS referenced to GRS80 ellipsoid.

DESCRIPTION SOURCE

NGS

[Hide Field ELLIP\\_HT ▲](#)

FIELD ELLIP\_SRCE ►

- \* ALIAS ELLIP\_SRCE
- \* DATA TYPE String
- \* WIDTH 12
- \* PRECISION 0
- \* SCALE 0

FIELD DESCRIPTION

Ellipsoid Ht Source for the ELLIP\_HT Should always be GPS\_OBS when present.

DESCRIPTION SOURCE

NGS

[Hide Field ELLIP\\_SRCE ▲](#)

FIELD POS\_ORDER ►

- \* ALIAS POS\_ORDER
- \* DATA TYPE String
- \* WIDTH 1
- \* PRECISION 0
- \* SCALE 0

FIELD DESCRIPTION

- Order of accuracy for the LATITUDE, LONGITUDE Should be one of the following- A, B, 1, 2, 3 Order and class for Orders 1, 2, and 3 are defined in the Federal Geodetic Control Committee publication "Standards and Specifications for Geodetic Control Networks". In addition- Order A stations have a relative accuracy of 5 mm +/- 1-10,000,000 relative to other A-order stations. Order B stations have a relative accuracy of 8 mm +/- 1-1,000,000 relative to other A- and B-order stations.

DESCRIPTION SOURCE

NGS

[Hide Field POS\\_ORDER ▲](#)

FIELD POS\_CHECK ►

- \* ALIAS POS\_CHECK
- \* DATA TYPE String
- \* WIDTH 1
- \* PRECISION 0
- \* SCALE 0

FIELD DESCRIPTION

Y=Observational Check was made for the position, N=NO Observational Check was made for the positions

DESCRIPTION SOURCE

NGS

*Hide Field POS\_CHECK ▲*

FIELD ELEV\_ORDER ►

- \* ALIAS ELEV\_ORDER
- \* DATA TYPE String
- \* WIDTH 1
- \* PRECISION 0
- \* SCALE 0

FIELD DESCRIPTION

Order of accuracy for the ELEVATION Should be 1,2, or 3 for Vertical Control Stations. Will be blank for stations used for Horizontal Control only. Also see attribute DIST\_RATE which is used for some vertical control stations. Elevation order and class for 1, 2, and 3 are defined in the Federal Geodetic Control Committee publication "Standards and Specifications for Geodetic Control Networks". In addition- Vertical control which were determined only for the purpose of supplying a height for Horizontal Distance Reductions are assigned an order of 3. Class 0 is used for special cases of orthometric vertical control as follows- Vertical Order/Class Tolerance Factor --  
----- 1 class 0 2.0 mm or less 2 class 0 8.4 mm or less 3 class 0 12.0 mm or less

DESCRIPTION SOURCE

NGS

*Hide Field ELEV\_ORDER ▲*

FIELD ELEV\_CLASS ►

- \* ALIAS ELEV\_CLASS
- \* DATA TYPE String
- \* WIDTH 1
- \* PRECISION 0
- \* SCALE 0

FIELD DESCRIPTION

Should be 0, 1, or 2 See details under ELEV\_ORDER

DESCRIPTION SOURCE

NGS

[Hide Field ELEV\\_CLASS ▲](#)

FIELD ELEV\_CHECK ►

- \* ALIAS ELEV\_CHECK
- \* DATA TYPE String
- \* WIDTH 1
- \* PRECISION 0
- \* SCALE 0

FIELD DESCRIPTION

- Y=Observational Check was made for the orthometric height, N=NO Observational Check was made for the orthometric heights VERTCONED- Y=Orthometric Height was determined by applying VERTCON to an old NGVD 29 height. N=Orthometric Height determined by observations.

DESCRIPTION SOURCE

NGS

[Hide Field ELEV\\_CHECK ▲](#)

FIELD DIST\_RATE ►

- \* ALIAS DIST\_RATE
- \* DATA TYPE String
- \* WIDTH 1
- \* PRECISION 0
- \* SCALE 0

FIELD DESCRIPTION

Distribution rate for POSTED and READJUSTED benchmarks which do not have an Order and Class are as follows "Posted bench marks" are vertical control points in the NGS data base which were excluded from the NAVD 88 general adjustment. Some of the bench marks were excluded due to large adjustment residuals, possibly caused by vertical movement of the bench marks during the time interval between different leveling epochs. Adjusted NAVD 88 are computed for posted bench marks by supplemental adjustments. A range of mean distribution rate corrections is listed for each posted bench mark in the data portion of the publication. A summary table of the mean distribution rates and their codes is listed below. The mean distribution rate corrections which were applied to the original leveling observations is a good indication of the usefulness of the posted bench marks' adjusted NAVD 88 heights. Distribution  
Distribution Rate Code Rate Correction ----- "a" 0.0 thru 1.0  
mm/km "b" 1.1 thru 2.0 "c" 2.1 thru 3.0 "d" 3.1 thru 4.0 "e" 4.1 thru 8.0 "f"  
greater than 8.0 mm/km POSTED BENCH MARKS SHOULD BE USED WITH CAUTION.  
As is the case for all leveling projects, the mandatory FGCS check leveling two-mark or three-mark tie procedure will usually detect any isolated movement (or other problem) at an individual bench mark. Of course, regional movement affecting all the marks equally is not detected by the two- or three-mark tie procedure.

DESCRIPTION SOURCE

NGS

[Hide Field DIST\\_RATE ▲](#)

FIELD ELLP\_ORDER ►

- \* ALIAS ELLP\_ORDER
- \* DATA TYPE String
- \* WIDTH 1
- \* PRECISION 0
- \* SCALE 0

FIELD DESCRIPTION

- Order of accuracy for the ELLIP\_HT Should be 1,2,3,4, or 5 if present. The following ellipsoid height order and class relative accuracy standards have not yet been adopted by the Federal Geodetic Control Subcommittee, but are currently in use by NGS- Ellipsoid Height Maximum Height Classification Difference Accuracy -----  
----- 1 class 1 0.5 (mm)/sqrt(km) 1 class 2 0.7 2 class 1 1.0 2 class 2 1.3 3 class 1 2.0 3 class 2 3.0 4 class 1 6.0 4 class 2 15.0 5 class 1 30.0 5 class 2 60.0 The ellipsoid height difference accuracy (b) is computed from a minimally constrained correctly weighted least squares adjustment by-  $b = s / \sqrt{d}$  where b = height difference accuracy s = propagated standard deviation of ellipsoid height difference in millimeters between control points obtained from the least squares adjustment. d = horizontal distance between control points in kilometers

DESCRIPTION SOURCE

NGS

[Hide Field ELLP\\_ORDER ▲](#)

FIELD ELLP\_CLASS ►

- \* ALIAS ELLP\_CLASS
- \* DATA TYPE String
- \* WIDTH 1
- \* PRECISION 0
- \* SCALE 0

FIELD DESCRIPTION

Class of accuracy for ELLIP\_HT Should be 1 or 2 See details under ELLP\_ORDER

DESCRIPTION SOURCE

NGS

[Hide Field ELLP\\_CLASS ▲](#)

FIELD FIRST\_RECV ►

- \* ALIAS FIRST\_RECV
- \* DATA TYPE String
- \* WIDTH 8
- \* PRECISION 0
- \* SCALE 0

FIELD DESCRIPTION

Date when the station was first monumented or in the case of landmarks, first observed.

DESCRIPTION SOURCE



NGS

*Hide Field FIRST\_RECV ▲*

FIELD LAST\_RECV ►

- \* ALIAS LAST\_RECV
- \* DATA TYPE String
- \* WIDTH 8
- \* PRECISION 0
- \* SCALE 0

*Hide Field LAST\_RECV ▲*

FIELD LAST\_COND ►

- \* ALIAS LAST\_COND
- \* DATA TYPE String
- \* WIDTH 16
- \* PRECISION 0
- \* SCALE 0

FIELD DESCRIPTION

Last recovered condition of the mark. Should be one of the following- MONUMENTED  
FIRST OBSERVED GOOD POOR MARK NOT FOUND SEE DESCRIPTION DESTROYED

DESCRIPTION SOURCE

NGS

*Hide Field LAST\_COND ▲*

FIELD LAST\_RECBY ►

- \* ALIAS LAST\_RECBY
- \* DATA TYPE String
- \* WIDTH 6
- \* PRECISION 0
- \* SCALE 0

FIELD DESCRIPTION

Agency who reported the last condition of the mark.

DESCRIPTION SOURCE

NGS

*Hide Field LAST\_RECBY ▲*

FIELD SAT\_USE ►

- \* ALIAS SAT\_USE
- \* DATA TYPE String
- \* WIDTH 1
- \* PRECISION 0
- \* SCALE 0

[Hide Field SAT\\_USE ▲](#)

FIELD SAT\_DATE ►

- \* ALIAS SAT\_DATE
- \* DATA TYPE String
- \* WIDTH 8
- \* PRECISION 0
- \* SCALE 0

[Hide Field SAT\\_DATE ▲](#)

FIELD STABILITY ►

- \* ALIAS STABILITY
- \* DATA TYPE String
- \* WIDTH 1
- \* PRECISION 0
- \* SCALE 0

FIELD DESCRIPTION

The stability of the mark may have 1 of 4 codes as indicated below- A = MOST RELIABLE AND EXPECTED TO HOLD POSITION/ELEVATION WELL B = PROBABLY HOLD POSITION/ELEVATION WELL C = MAY HOLD, BUT OF TYPE COMMONLY SUBJECT TO SURFACE MOTION - E.G. FROST HEAVE, ETC D = MARK OF QUESTIONABLE OR UNKNOWN STABILITY

DESCRIPTION SOURCE

NGS

[Hide Field STABILITY ▲](#)

[Hide Details for object NGS\\_Benchmarks\\_Sep\\_2017 ▲](#)

OVERVIEW DESCRIPTION ►

ENTITY AND ATTRIBUTE OVERVIEW

The current attributes and their meaning are shown below. #FeatureId Temporary unique ID assigned to this station. DATA\_DATE- The date when this information was retrieved from the NGS database. DATA\_SRCE- Data Source where the information for the mark came from. You should use this link to obtain a full datasheet for the mark or obtain the datasheets from <<http://www.ngs.noaa.gov/cgi-bin/datasheet.prl>> if you intend to use the data for survey control. DEC\_LONG- Decimal equivalent of the LONGITUDE Always displayed to 10 decimal places, but you should see POS\_SRCE and POS\_ORDER to determine the true accuracy. DEC\_LAT- Decimal equivalent of the LATITUDE PID- Permanent Identifier assigned by NGS to each mark NAME- Station Name (a.k.a. Designation) STATE- State Code COUNTY- County Name QUAD- USGS Topographic Quad Map Name LATITUDE- Latitude in Deg-Min-Sec format LONGITUDE- Longitude in Deg-Min-Sec format POS\_DATUM- Datum of the LATITUDE, LONGITUDE Should always be NAD83 DATUM\_TAG- Datum Tag of the LATITUDE, LONGITUDE NAD83 (1986) indicates positions on the NAD83 datum for the North American Adjustment, completed in 1986. NAD83 (nnnn) indicates positions on the NAD83 datum for the North American Adjustment, but readjusted to a State High Accuracy

Reference Network (HARN) on the date shown in (nnnn). NAD83 (CORS) indicates positions which are part of the CORS network. POS\_SRCE- Position Source for the LATITUDE, LONGITUDE ADJUSTED = Least squares adjustment. (Lat, Lon Rounded to 5 decimal places.) HD\_HELD1 = Differentially corrected hand held GPS observations. (Lat, Lon Rounded to 2 decimal places.) HD\_HELD2 = Autonomous hand held GPS observations. (Lat, Lon Rounded to 1 decimal places.) SCALED = Scaled from a topographic map. (Lat, Lon Rounded to 0 decimal places.) ELEVATION- Present if available. The Orthometric Height in METERS indicating the height above the Geoid. ELEV\_DATUM- Datum of the ELEVATION ELEV\_SRCE- Elevation Source for the ELEVATION ADJUSTED = Direct Digital Output from Least Squares Adjustment of Precise Leveling. (Rounded to 3 decimal places.) ADJ UNCH = Manually Entered (and NOT verified) Output of Least Squares Adjustment of Precise Leveling. (Rounded to 3 decimal places.) POSTED = Pre-1991 Precise Leveling Adjusted to the NAVD 88 Network After Completion of the NAVD 88 General Adjustment of 1991. (Rounded to 3 decimal places.) READJUST = Precise Leveling Readjusted as Required by Crustal Motion or Other Cause. (Rounded to 2 decimal places.) N HEIGHT = Computed from Precise Leveling Connected at Only One Published Bench Mark. (Rounded to 2 decimal places.) RESET = Reset Computation of Precise Leveling. (Rounded to 2 decimal places.) COMPUTED = Computed from Precise Leveling Using Non-rigorous Adjustment Technique. (Rounded to 2 decimal places.) LEVELING = Precise Leveling Performed by Horizontal Field Party. (Rounded to 2 decimal places.) H LEVEL = Level between control points not connected to bench mark. (Rounded to 1 decimal places.) GPS OBS = Computed from GPS Observations. (Rounded to 1 decimal places.) VERT ANG = Computed from Vertical Angle Observations. (Rounded to 1 decimal place; If No Check, to 0 decimal places.) SCALED = Scaled from a Topographic Map. (Rounded to 0 decimal places.) U HEIGHT = Unvalidated height from precise leveling connected at only one NSRS point. (Rounded to 2 decimal places.) VERTCON = The NAVD 88 height was computed by applying the VERTCON shift value to the NGVD 29 height. (Rounded to 0 decimal places.) ELLIP\_HT- Present if available. The ellipsoid height in METERS referenced to GRS80 ellipsoid. ELLIP\_SRCE- Ellipsoid Ht Source for the ELLIP\_HT Should always be GPS\_OBS when present. POS\_ORDER- Order of accuracy for the LATITUDE, LONGITUDE Should be one of the following- A, B, 1, 2, 3 Order and class for Orders 1, 2, and 3 are defined in the Federal Geodetic Control Committee publication "Standards and Specifications for Geodetic Control Networks". In addition- Order A stations have a relative accuracy of 5 mm +/- 1-10,000,000 relative to other A-order stations. Order B stations have a relative accuracy of 8 mm +/- 1- 1,000,000 relative to other A- and B-order stations. POS\_CHECK- Y=Observational Check was made for the position, N=NO Observational Check was made for the positions ELEV\_ORDER- Order of accuracy for the ELEVATION Should be 1, 2, or 3 for Vertical Control Stations. Will be blank for stations used for Horizontal Control only. Also see attribute DIST\_RATE which is used for some vertical control stations. Elevation order and class for 1, 2, and 3 are defined in the Federal Geodetic Control Committee publication "Standards and Specifications for Geodetic Control Networks". In addition- Vertical control which were determined only for the purpose of supplying a height for Horizontal Distance Reductions are assigned an order of 3. Class 0 is used for special cases of orthometric vertical control as follows- Vertical Order/Class Tolerance Factor --

-----	-----	1 class 0 2.0 mm or less	2 class 0 8.4 mm or less	3 class 0 12.0 mm or less
-------	-------	--------------------------	--------------------------	---------------------------

ELEV\_CLASS- Should be 0, 1, or 2 See details under ELEV\_ORDER ELEV\_CHECK- Y=Observational Check was made for the orthometric height, N=NO Observational Check was made for the orthometric heights VERTCONED- Y=Orthometric Height was determined by applying VERTCON to an old NGVD 29 height. N=Orthometric Height determined by observations. DIST\_RATE- Distribution rate for POSTED and READJUSTED benchmarks which do not have an Order and Class are as follows "Posted bench marks" are vertical control points in the NGS data base which were excluded from the NAVD 88 general adjustment. Some of the bench marks were excluded due to large adjustment residuals, possibly caused by vertical

movement of the bench marks during the time interval between different leveling epochs. Adjusted NAVD 88 are computed for posted bench marks by supplemental adjustments. A range of mean distribution rate corrections is listed for each posted bench mark in the data portion of the publication. A summary table of the mean distribution rates and their codes is listed below. The mean distribution rate corrections which were applied to the original leveling observations is a good indication of the usefulness of the posted bench marks' adjusted NAVD 88 heights. Distribution

Distribution Rate Code	Rate Correction
"a"	0.0 thru 1.0 mm/km
"b"	1.1 thru 2.0 "
"c"	2.1 thru 3.0 "
"d"	3.1 thru 4.0 "
"e"	4.1 thru 8.0 "
"f"	greater than 8.0 mm/km

POSTED BENCH MARKS SHOULD BE USED WITH CAUTION. As is the case for all leveling projects, the mandatory FGCS check leveling two-mark or three-mark tie procedure will usually detect any isolated movement (or other problem) at an individual bench mark. Of course, regional movement affecting all the marks equally is not detected by the two- or three-mark tie procedure. ELLP\_ORDER- Order of accuracy for the ELLIP\_HT Should be 1,2,3,4, or 5 if present. The following ellipsoid height order and class relative accuracy standards have not yet been adopted by the Federal Geodetic Control Subcommittee, but are currently in use by NGS- Ellipsoid Height Maximum Height Classification Difference Accuracy -----

Ellipsoid Height	Maximum Height	Classification	Difference Accuracy
1 class 1	0.5 (mm)/sqrt(km)	1 class 2	0.7 2 class 1 1.0 2 class 2 1.3 3 class 1 2.0 3 class 2 3.0 4 class 1 6.0 4 class 2 15.0 5 class 1 30.0 5 class 2 60.0

The ellipsoid height difference accuracy (b) is computed from a minimally constrained correctly weighted least squares adjustment by-  $b = s / \sqrt{d}$  where b = height difference accuracy s = propagated standard deviation of ellipsoid height difference in millimeters between control points obtained from the least squares adjustment. d = horizontal distance between control points in kilometers ELLP\_class- Class of accuracy for ELLIP\_HT Should be 1 or 2 See details under ELLP\_ORDER FIRST\_RECV- Date when the station was first monumented or in the case of landmarks, first observed. LAST\_RECV- Date when the station was last recovered. LAST\_COND- Last recovered condition of the mark. Should be one of the following- MONUMENTED FIRST OBSERVED GOOD POOR MARK NOT FOUND SEE DESCRIPTION DESTROYED LAST\_RECBY- Agency who reported the last condition of the mark. STABILITY- The stability of the mark may have 1 of 4 codes as indicated below- A = MOST RELIABLE AND EXPECTED TO HOLD POSITION/ELEVATION WELL B = PROBABLY HOLD POSITION/ELEVATION WELL C = MAY HOLD, BUT OF TYPE COMMONLY SUBJECT TO SURFACE MOTION - E.G. FROST HEAVE, ETC D = MARK OF QUESTIONABLE OR UNKNOWN STABILITY

#### ENTITY AND ATTRIBUTE DETAIL CITATION

All values were obtained from the NGA Datasheet available at <http://www.ngs.noaa.gov/cgi-bin/datasheet.prl>

[Hide Overview Description ▲](#)

[Hide Fields ▲](#)

## Metadata Details ►

METADATA LANGUAGE English (UNITED STATES)

METADATA CHARACTER SET utf8 - 8 bit UCS Transfer Format

SCOPE OF THE DATA DESCRIBED BY THE METADATA dataset  
SCOPE NAME \* dataset

\* LAST UPDATE 2017-09-13

#### ARCGIS METADATA PROPERTIES

METADATA FORMAT ArcGIS 1.0  
METADATA STYLE ISO 19139 Metadata Implementation Specification  
STANDARD OR PROFILE USED TO EDIT METADATA ISO19139

CREATED IN ARCGIS FOR THE ITEM 2017-09-13 14:00:19  
LAST MODIFIED IN ARCGIS FOR THE ITEM 2017-09-13 14:41:36

#### AUTOMATIC UPDATES

HAVE BEEN PERFORMED Yes  
LAST UPDATE 2017-09-13 14:20:27

[Hide Metadata Details ▲](#)

## Metadata Contacts ►

#### METADATA CONTACT

INDIVIDUAL'S NAME NGS Information Services Branch  
ORGANIZATION'S NAME NOAA, National Geodetic Survey  
CONTACT'S POSITION IT Specialist  
CONTACT'S ROLE point of contact

#### CONTACT INFORMATION ►

PHONE  
VOICE 301-713-3242  
FAX 301-713-4172

#### ADDRESS

TYPE both  
DELIVERY POINT SSMC2/9152 1315 East-west Highway  
CITY Silver Spring  
ADMINISTRATIVE AREA MD  
POSTAL CODE 20910  
COUNTRY US  
E-MAIL ADDRESS [ngs.software@noaa.gov](mailto:ngs.software@noaa.gov)

#### HOURS OF SERVICE

8:30am to 5:00pm EST

#### CONTACT INSTRUCTIONS

Prefer EMail

[Hide Contact information ▲](#)

[Hide Metadata Contacts ▲](#)

## Metadata Constraints ►

LEGAL CONSTRAINTS

ACCESS CONSTRAINTS other restrictions

OTHER CONSTRAINTS

Geodetic Data are in the public domain, not restricted from access or distribution.

SECURITY CONSTRAINTS

CLASSIFICATION unclassified

CLASSIFICATION SYSTEM DOD

ADDITIONAL RESTRICTIONS

none

CONSTRAINTS

LIMITATIONS OF USE

not restricted; Geodetic Data, including software were developed and compiled with U.S. Government funding; no proprietary rights may be attached to them nor may they be sold to the U.S. Government as part of any procurement of ADP products or services.

*Hide Metadata Constraints ▲*

## Thumbnail and Enclosures ►

THUMBNAIL

THUMBNAIL TYPE JPG

*Hide Thumbnail and Enclosures ▲*

## FGDC Metadata (read-only) ▼

DETAILED DESCRIPTION

ENTITY TYPE

ENTITY TYPE LABEL NGS\_Benchmarks\_Sep\_2017

ATTRIBUTE

ATTRIBUTE LABEL FID

ATTRIBUTE DEFINITION

Internal feature number.

ATTRIBUTE DEFINITION SOURCE Esri

ATTRIBUTE DOMAIN VALUES

UNREPRESENTABLE DOMAIN

Sequential unique whole numbers that are automatically generated.

ATTRIBUTE

ATTRIBUTE LABEL Shape

ATTRIBUTE DEFINITION

Feature geometry.

ATTRIBUTE DEFINITION SOURCE Esri

ATTRIBUTE DOMAIN VALUES

UNREPRESENTABLE DOMAIN

Coordinates defining the features.

ATTRIBUTE

ATTRIBUTE LABEL FeatureId

ATTRIBUTE

ATTRIBUTE LABEL DATA\_DATE

ATTRIBUTE DEFINITION

The date when this information was retrieved from the NGS database.

ATTRIBUTE DEFINITION SOURCE NGS

ATTRIBUTE

ATTRIBUTE LABEL DATA\_SRCE

ATTRIBUTE DEFINITION

Data Source where the information for the mark came from. You should use this link to obtain a full datasheet for the mark or obtain the datasheets from <<http://www.ngs.noaa.gov/cgi-bin/datasheet.prl>> if you intend to use the data for survey control.

ATTRIBUTE DEFINITION SOURCE NGS

ATTRIBUTE

ATTRIBUTE LABEL DEC\_LONG

ATTRIBUTE DEFINITION

Decimal equivalent of the LONGITUDE Always displayed to 10 decimal places, but you should see POS\_SRCE and POS\_ORDER to determine the true accuracy.

ATTRIBUTE DEFINITION SOURCE NGS

ATTRIBUTE

ATTRIBUTE LABEL DEC\_LAT

ATTRIBUTE DEFINITION

Decimal equivalent of the LATITUDE PID- Permanent Identifier assigned by NGS to each mark

ATTRIBUTE DEFINITION SOURCE NGS

ATTRIBUTE

ATTRIBUTE LABEL PID

ATTRIBUTE DEFINITION

PID- Permanent Identifier assigned by NGS to each mark

ATTRIBUTE DEFINITION SOURCE NGS

ATTRIBUTE

ATTRIBUTE LABEL NAME

ATTRIBUTE DEFINITION

Station Name (a.k.a. Designation)

ATTRIBUTE DEFINITION SOURCE NGS

ATTRIBUTE

ATTRIBUTE LABEL STATE

ATTRIBUTE DEFINITION

Mississippi

ATTRIBUTE DEFINITION SOURCE NGS

ATTRIBUTE

ATTRIBUTE LABEL COUNTY

ATTRIBUTE DEFINITION

County of location

ATTRIBUTE DEFINITION SOURCE NGS

ATTRIBUTE

ATTRIBUTE LABEL QUAD

ATTRIBUTE DEFINITION

USGS Quad Name of Location  
ATTRIBUTE DEFINITION SOURCE NGS

ATTRIBUTE  
ATTRIBUTE LABEL LATITUDE  
ATTRIBUTE DEFINITION  
Latitude in Deg-Min-Sec format  
ATTRIBUTE DEFINITION SOURCE NGS

ATTRIBUTE  
ATTRIBUTE LABEL LONGITUDE  
ATTRIBUTE DEFINITION  
Longitude in Deg-Min-Sec format  
ATTRIBUTE DEFINITION SOURCE NGS

ATTRIBUTE  
ATTRIBUTE LABEL POS\_DATUM  
ATTRIBUTE DEFINITION  
Datum of the LATITUDE, LONGITUDE Should always be NAD83  
ATTRIBUTE DEFINITION SOURCE NGS

ATTRIBUTE  
ATTRIBUTE LABEL DATUM\_TAG  
ATTRIBUTE DEFINITION  
- Datum Tag of the LATITUDE, LONGITUDE NAD83 (1986) indicates positions on the NAD83 datum for the North American Adjustment, completed in 1986. NAD83 (nnnn) indicates positions on the NAD83 datum for the North American Adjustment, but readjusted to a State High Accuracy Reference Network (HARN) on the date shown in (nnnn). NAD83 (CORS) indicates positions which are part of the CORS network  
ATTRIBUTE DEFINITION SOURCE NGS

ATTRIBUTE  
ATTRIBUTE LABEL POS\_SRCE  
ATTRIBUTE DEFINITION  
Position Source for the LATITUDE, LONGITUDE ADJUSTED = Least squares adjustment. (Lat, Lon Rounded to 5 decimal places.) HD\_HELD1 = Differentially corrected hand held GPS observations. (Lat, Lon Rounded to 2 decimal places.) HD\_HELD2 = Autonomous hand held GPS observations. (Lat, Lon Rounded to 1 decimal places.) SCALED = Scaled from a topographic map. (Lat, Lon Rounded to 0 decimal places.)  
ATTRIBUTE DEFINITION SOURCE NGS

ATTRIBUTE  
ATTRIBUTE LABEL ELEVATION  
ATTRIBUTE DEFINITION  
- Present if available. The Orthometric Height in METERS indicating the height above the Geoid.  
ATTRIBUTE DEFINITION SOURCE NGS

ATTRIBUTE  
ATTRIBUTE LABEL ELEV\_DATUM  
ATTRIBUTE DEFINITION  
Datum of the ELEVATION  
ATTRIBUTE DEFINITION SOURCE NGS

ATTRIBUTE  
ATTRIBUTE LABEL ELEV\_SRCE  
ATTRIBUTE DEFINITION



Direct Digital Output from Least Squares Adjustment of Precise Leveling. (Rounded to 3 decimal places.) ADJ UNCH = Manually Entered (and NOT verified) Output of Least Squares Adjustment of Precise Leveling. (Rounded to 3 decimal places.) POSTED = Pre-1991 Precise Leveling Adjusted to the NAVD 88 Network After Completion of the NAVD 88 General Adjustment of 1991. (Rounded to 3 decimal places.) READJUST = Precise Leveling Readjusted as Required by Crustal Motion or Other Cause. (Rounded to 2 decimal places.) N HEIGHT = Computed from Precise Leveling Connected at Only One Published Bench Mark. (Rounded to 2 decimal places.) RESET = Reset Computation of Precise Leveling. (Rounded to 2 decimal places.) COMPUTED = Computed from Precise Leveling Using Non-rigorous Adjustment Technique. (Rounded to 2 decimal places.) LEVELING = Precise Leveling Performed by Horizontal Field Party. (Rounded to 2 decimal places.) H LEVEL = Level between control points not connected to bench mark. (Rounded to 1 decimal places.) GPS OBS = Computed from GPS Observations. (Rounded to 1 decimal places.) VERT ANG = Computed from Vertical Angle Observations. (Rounded to 1 decimal place; If No Check, to 0 decimal places.) SCALED = Scaled from a Topographic Map. (Rounded to 0 decimal places.) U HEIGHT = Unvalidated height from precise leveling connected at only one NSRS point. (Rounded to 2 decimal places.) VERTCON = The NAVD 88 height was computed by applying the VERTCON shift value to the NGVD 29 height. (Rounded to 0 decimal places.)

ATTRIBUTE DEFINITION SOURCE NGS

ATTRIBUTE

ATTRIBUTE LABEL ELLIP\_HT

ATTRIBUTE DEFINITION

Present if available. The ellipsoid height in METERS referenced to GRS80 ellipsoid.

ATTRIBUTE DEFINITION SOURCE NGS

ATTRIBUTE

ATTRIBUTE LABEL ELLIP\_SRCE

ATTRIBUTE DEFINITION

Ellipsoid Ht Source for the ELLIP\_HT Should always be GPS\_OBS when present.

ATTRIBUTE DEFINITION SOURCE NGS

ATTRIBUTE

ATTRIBUTE LABEL POS\_ORDER

ATTRIBUTE DEFINITION

- Order of accuracy for the LATITUDE, LONGITUDE Should be one of the following- A, B, 1, 2, 3 Order and class for Orders 1, 2, and 3 are defined in the Federal Geodetic Control Committee publication "Standards and Specifications for Geodetic Control Networks". In addition- Order A stations have a relative accuracy of 5 mm +/- 1-10,000,000 relative to other A-order stations. Order B stations have a relative accuracy of 8 mm +/- 1-1,000,000 relative to other A- and B-order stations.

ATTRIBUTE DEFINITION SOURCE NGS

ATTRIBUTE

ATTRIBUTE LABEL POS\_CHECK

ATTRIBUTE DEFINITION

Y=Observational Check was made for the position, N=NO Observational Check was made for the positions

ATTRIBUTE DEFINITION SOURCE NGS

ATTRIBUTE

ATTRIBUTE LABEL ELEV\_ORDER

ATTRIBUTE DEFINITION

Order of accuracy for the ELEVATION Should be 1, 2, or 3 for Vertical Control Stations. Will be blank for stations used for Horizontal Control only. Also see attribute

DIST\_RATE which is used for some vertical control stations. Elevation order and class for 1, 2, and 3 are defined in the Federal Geodetic Control Committee publication "Standards and Specifications for Geodetic Control Networks". In addition- Vertical control which were determined only for the purpose of supplying a height for Horizontal Distance Reductions are assigned an order of 3. Class 0 is used for special cases of orthometric vertical control as follows- Vertical Order/Class Tolerance Factor --  
----- 1 class 0 2.0 mm or less 2 class 0 8.4 mm or less 3 class 0 12.0 mm or less

ATTRIBUTE DEFINITION SOURCE NGS

ATTRIBUTE

ATTRIBUTE LABEL ELEV\_CLASS

ATTRIBUTE DEFINITION

Should be 0, 1, or 2 See details under ELEV\_ORDER

ATTRIBUTE DEFINITION SOURCE NGS

ATTRIBUTE

ATTRIBUTE LABEL ELEV\_CHECK

ATTRIBUTE DEFINITION

- Y=Observational Check was made for the orthometric height, N=NO Observational Check was made for the orthometric heights VERTCONED- Y=Orthometric Height was determined by applying VERTCON to an old NGVD 29 height. N=Orthometric Height determined by observations.

ATTRIBUTE DEFINITION SOURCE NGS

ATTRIBUTE

ATTRIBUTE LABEL DIST\_RATE

ATTRIBUTE DEFINITION

Distribution rate for POSTED and READJUSTED benchmarks which do not have an Order and Class are as follows "Posted bench marks" are vertical control points in the NGS data base which were excluded from the NAVD 88 general adjustment. Some of the bench marks were excluded due to large adjustment residuals, possibly caused by vertical movement of the bench marks during the time interval between different leveling epochs. Adjusted NAVD 88 are computed for posted bench marks by supplemental adjustments. A range of mean distribution rate corrections is listed for each posted bench mark in the data portion of the publication. A summary table of the mean distribution rates and their codes is listed below. The mean distribution rate corrections which were applied to the original leveling observations is a good indication of the usefulness of the posted bench marks' adjusted NAVD 88 heights. Distribution Rate Code Rate Correction ----- "a" 0.0 thru 1.0 mm/km "b" 1.1 thru 2.0 "c" 2.1 thru 3.0 "d" 3.1 thru 4.0 "e" 4.1 thru 8.0 "f" greater than 8.0 mm/km POSTED BENCH MARKS SHOULD BE USED WITH CAUTION. As is the case for all leveling projects, the mandatory FGCS check leveling two-mark or three-mark tie procedure will usually detect any isolated movement (or other problem) at an individual bench mark. Of course, regional movement affecting all the marks equally is not detected by the two- or three-mark tie procedure.

ATTRIBUTE DEFINITION SOURCE NGS

ATTRIBUTE

ATTRIBUTE LABEL ELLP\_ORDER

ATTRIBUTE DEFINITION

- Order of accuracy for the ELLIP\_HT Should be 1,2,3,4, or 5 if present. The following ellipsoid height order and class relative accuracy standards have not yet been adopted by the Federal Geodetic Control Subcommittee, but are currently in use by NGS- Ellipsoid Height Maximum Height Classification Difference Accuracy -----  
----- 1 class 1 0.5 (mm)/sqrt(km) 1 class 2 0.7 2 class 1 1.0 2 class 2 1.3 3

class 1 2.0 3 class 2 3.0 4 class 1 6.0 4 class 2 15.0 5 class 1 30.0 5 class 2 60.0 The ellipsoid height difference accuracy (b) is computed from a a minimally constrained correctly weighted least squares adjustment by-  $b = s / \sqrt{d}$  where b = height difference accuracy s = propagated standard deviation of ellipsoid height difference in millimeters between control points obtained from the least squares adjustment. d = horizontal distance between control points in kilometers

ATTRIBUTE DEFINITION SOURCE NGS

ATTRIBUTE

ATTRIBUTE LABEL ELLP\_CLASS

ATTRIBUTE DEFINITION

Class of accuracy for ELLIP\_HT Should be 1 or 2 See details under ELLP\_ORDER

ATTRIBUTE DEFINITION SOURCE NGS

ATTRIBUTE

ATTRIBUTE LABEL FIRST\_RECV

ATTRIBUTE DEFINITION

Date when the station was first monumented or in the case of landmarks, first observed.

ATTRIBUTE DEFINITION SOURCE NGS

ATTRIBUTE

ATTRIBUTE LABEL LAST\_RECV

ATTRIBUTE

ATTRIBUTE LABEL LAST\_COND

ATTRIBUTE DEFINITION

Last recovered condition of the mark. Should be one of the following- MONUMENTED FIRST OBSERVED GOOD POOR MARK NOT FOUND SEE DESCRIPTION DESTROYED

ATTRIBUTE DEFINITION SOURCE NGS

ATTRIBUTE

ATTRIBUTE LABEL LAST\_RECBY

ATTRIBUTE DEFINITION

Agency who reported the last condition of the mark.

ATTRIBUTE DEFINITION SOURCE NGS

ATTRIBUTE

ATTRIBUTE LABEL SAT\_USE

ATTRIBUTE

ATTRIBUTE LABEL SAT\_DATE

ATTRIBUTE

ATTRIBUTE LABEL STABILITY

ATTRIBUTE DEFINITION

The stability of the mark may have 1 of 4 codes as indicated below- A = MOST RELIABLE AND EXPECTED TO HOLD POSITION/ELEVATION WELL B = PROBABLY HOLD POSITION/ELEVATION WELL C = MAY HOLD, BUT OF TYPE COMMONLY SUBJECT TO SURFACE MOTION - E.G. FROST HEAVE, ETC D = MARK OF QUESTIONABLE OR UNKNOWN STABILITY

ATTRIBUTE DEFINITION SOURCE NGS

OVERVIEW DESCRIPTION

ENTITY AND ATTRIBUTE OVERVIEW

The current attributes and their meaning are shown below. #FeatureId Temporary unique ID assigned to this station. DATA\_DATE- The date when this information was

retrieved from the NGS database. DATA\_SRCE- Data Source where the information for the mark came from. You should use this link to obtain a full datasheet for the mark or obtain the datasheets from <<http://www.ngs.noaa.gov/cgi-bin/datasheet.prl>> if you intend to use the data for survey control. DEC\_LONG- Decimal equivalent of the LONGITUDE Always displayed to 10 decimal places, but you should see POS\_SRCE and POS\_ORDER to determine the true accuracy. DEC\_LAT- Decimal equivalent of the LATITUDE PID- Permanent Identifier assigned by NGS to each mark NAME- Station Name (a.k.a. Designation) STATE- State Code COUNTY- County Name QUAD- USGS Topographic Quad Map Name LATITUDE- Latitude in Deg-Min-Sec format LONGITUDE- Longitude in Deg-Min-Sec format POS\_DATUM- Datum of the LATITUDE, LONGITUDE Should always be NAD83 DATUM\_TAG- Datum Tag of the LATITUDE, LONGITUDE NAD83 (1986) indicates positions on the NAD83 datum for the North American Adjustment, completed in 1986. NAD83 (nnnn) indicates positions on the NAD83 datum for the North American Adjustment, but readjusted to a State High Accuracy Reference Network (HARN) on the date shown in (nnnn). NAD83 (CORS) indicates positions which are part of the CORS network. POS\_SRCE- Position Source for the LATITUDE, LONGITUDE ADJUSTED = Least squares adjustment. (Lat, Lon Rounded to 5 decimal places.) HD\_HELD1 = Differentially corrected hand held GPS observations. (Lat, Lon Rounded to 2 decimal places.) HD\_HELD2 = Autonomous hand held GPS observations. (Lat, Lon Rounded to 1 decimal places.) SCALED = Scaled from a topographic map. (Lat, Lon Rounded to 0 decimal places.) ELEVATION- Present if available. The Orthometric Height in METERS indicating the height above the Geoid. ELEV\_DATUM- Datum of the ELEVATION ELEV\_SRCE- Elevation Source for the ELEVATION ADJUSTED = Direct Digital Output from Least Squares Adjustment of Precise Leveling. (Rounded to 3 decimal places.) ADJ UNCH = Manually Entered (and NOT verified) Output of Least Squares Adjustment of Precise Leveling. (Rounded to 3 decimal places.) POSTED = Pre-1991 Precise Leveling Adjusted to the NAVD 88 Network After Completion of the NAVD 88 General Adjustment of 1991. (Rounded to 3 decimal places.) READJUST = Precise Leveling Readjusted as Required by Crustal Motion or Other Cause. (Rounded to 2 decimal places.) N HEIGHT = Computed from Precise Leveling Connected at Only One Published Bench Mark. (Rounded to 2 decimal places.) RESET = Reset Computation of Precise Leveling. (Rounded to 2 decimal places.) COMPUTED = Computed from Precise Leveling Using Non-rigorous Adjustment Technique. (Rounded to 2 decimal places.) LEVELING = Precise Leveling Performed by Horizontal Field Party. (Rounded to 2 decimal places.) H LEVEL = Level between control points not connected to bench mark. (Rounded to 1 decimal places.) GPS OBS = Computed from GPS Observations. (Rounded to 1 decimal places.) VERT ANG = Computed from Vertical Angle Observations. (Rounded to 1 decimal place; If No Check, to 0 decimal places.) SCALED = Scaled from a Topographic Map. (Rounded to 0 decimal places.) U HEIGHT = Unvalidated height from precise leveling connected at only one NSRS point. (Rounded to 2 decimal places.) VERTCON = The NAVD 88 height was computed by applying the VERTCON shift value to the NGVD 29 height. (Rounded to 0 decimal places.) ELLIP\_HT- Present if available. The ellipsoid height in METERS referenced to GRS80 ellipsoid. ELLIP\_SRCE- Ellipsoid Ht Source for the ELLIP\_HT Should always be GPS\_OBS when present. POS\_ORDER- Order of accuracy for the LATITUDE, LONGITUDE Should be one of the following- A, B, 1, 2, 3 Order and class for Orders 1, 2, and 3 are defined in the Federal Geodetic Control Committee publication "Standards and Specifications for Geodetic Control Networks". In addition- Order A stations have a relative accuracy of 5 mm +/- 1-10,000,000 relative to other A-order stations. Order B stations have a relative accuracy of 8 mm +/- 1- 1,000,000 relative to other A- and B-order stations. POS\_CHECK- Y=Observational Check was made for the position, N=NO Observational Check was made for the positions ELEV\_ORDER- Order of accuracy for the ELEVATION Should be 1, 2, or 3 for Vertical Control Stations. Will be blank for stations used for Horizontal Control only. Also see attribute DIST\_RATE which is used for some vertical control stations. Elevation order and class for 1, 2, and 3 are defined in the Federal Geodetic Control Committee publication

"Standards and Specifications for Geodetic Control Networks". In addition- Vertical control which were determined only for the purpose of supplying a height for Horizontal Distance Reductions are assigned an order of 3. Class 0 is used for special cases of orthometric vertical control as follows- Vertical Order/Class Tolerance Factor --

-----	1	class 0	2.0 mm or less
-----	2	class 0	8.4 mm or less
-----	3	class 0	12.0 mm or less

ELEV\_CLASS- Should be 0, 1, or 2 See details under ELEV\_ORDER ELEV\_CHECK- Y=Observational Check was made for the orthometric height, N=NO Observational Check was made for the orthometric heights VERTCONED- Y=Orthometric Height was determined by applying VERTCON to an old NGVD 29 height. N=Orthometric Height determined by observations. DIST\_RATE- Distribution rate for POSTED and READJUSTED benchmarks which do not have an Order and Class are as follows "Posted bench marks" are vertical control points in the NGS data base which were excluded from the NAVD 88 general adjustment. Some of the bench marks were excluded due to large adjustment residuals, possibly caused by vertical movement of the bench marks during the time interval between different leveling epochs. Adjusted NAVD 88 are computed for posted bench marks by supplemental adjustments. A range of mean distribution rate corrections is listed for each posted bench mark in the data portion of the publication. A summary table of the mean distribution rates and their codes is listed below. The mean distribution rate corrections which were applied to the original leveling observations is a good indication of the usefulness of the posted bench marks' adjusted NAVD 88 heights. Distribution

Distribution Rate Code	Rate Correction
-----	-----
"a"	0.0 thru 1.0 mm/km
"b"	1.1 thru 2.0 "
"c"	2.1 thru 3.0 "
"d"	3.1 thru 4.0 "
"e"	4.1 thru 8.0 "
"f"	greater than 8.0 mm/km

POSTED BENCH MARKS SHOULD BE USED WITH CAUTION. As is the case for all leveling projects, the mandatory FGCS check leveling two-mark or three-mark tie procedure will usually detect any isolated movement (or other problem) at an individual bench mark. Of course, regional movement affecting all the marks equally is not detected by the two- or three-mark tie procedure. ELLP\_ORDER- Order of accuracy for the ELLIP\_HT Should be 1,2,3,4, or 5 if present. The following ellipsoid height order and class relative accuracy standards have not yet been adopted by the Federal Geodetic Control Subcommittee, but are currently in use by NGS- Ellipsoid Height Maximum Height Classification Difference Accuracy -----

-----	1	class 1	0.5 (mm)/sqrt(km)
-----	2	class 2	0.7
-----	1	class 1	1.0
-----	2	class 2	1.3
-----	3	class 1	2.0
-----	3	class 2	3.0
-----	4	class 1	6.0
-----	4	class 2	15.0
-----	5	class 1	30.0
-----	5	class 2	60.0

The ellipsoid height difference accuracy (b) is computed from a a minimally constrained correctly weighted least squares adjustment by-  $b = s / \sqrt{d}$  where b = height difference accuracy s = propagated standard deviation of ellipsoid height difference in millimeters between control points obtained from the least squares adjustment. d = horizontal distance between control points in kilometers ELLP\_class- Class of accuracy for ELLIP\_HT Should be 1 or 2 See details under ELLP\_ORDER FIRST\_RECV- Date when the station was first monumented or in the case of landmarks, first observed. LAST\_RECV- Date when the station was last recovered. LAST\_COND- Last recovered condition of the mark. Should be one of the following- MONUMENTED FIRST OBSERVED GOOD POOR MARK NOT FOUND SEE DESCRIPTION DESTROYED LAST\_RECBY- Agency who reported the last condition of the mark. STABILITY- The stability of the mark may have 1 of 4 codes as indicated below- A = MOST RELIABLE AND EXPECTED TO HOLD POSITION/ELEVATION WELL B = PROBABLY HOLD POSITION/ELEVATION WELL C = MAY HOLD, BUT OF TYPE COMMONLY SUBJECT TO SURFACE MOTION - E.G. FROST HEAVE, ETC D = MARK OF QUESTIONABLE OR UNKNOWN STABILITY

ENTITY AND ATTRIBUTE DETAIL CITATION  
All values were obtained from the NGA Datasheet available at  
<<http://www.ngs.noaa.gov/cgi-bin/datasheet.pl>>