

**SAN JUAN COUNTY  
PROCEDURAL OPERATIONS  
PUBLIC LAND SURVEY SYSTEM CORNER PERPETUATION PROJECT**

**PROJECT OVERVIEW:** *To establish State Plane Coordinates for existing **PLSS** corner monuments using the San Juan County **User Densification Network** and/ or the **Utah Reference Network** and to locate or establish accessories for the purpose of perpetuating these corner locations.*

*To document, record and make available to the general public these findings in the form of Section Corner Records (tie sheets), photographs, field notes and a detailed coordinate data base. Thus creating and or maintaining a pedigree for these monuments.*

***PROJECT CONTROL:*** The coordinates for the monuments in the **San Juan County User Densification Network (UDN)** were established using **Global Positioning System (GPS)** static survey methods.

All primary control was part of the **National Spatial Reference System (NSRS)** and were either **1<sup>st</sup> or 2<sup>nd</sup>** order vertical benchmarks and **A or B** order horizontal stations. A fully constrained horizontal and vertical least squares adjustment was performed in order to obtain the vertical and horizontal control coordinates.

Although the **UDN's** were not submitted for inclusion in the **National Geodetic Survey (NGS)** Data Base (Blue Booked), this secondary control is comparable to **GPS Order B** standards.

The **Utah Reference Network** is a system consisting of a distributed network of state-wide reference stations communicating with a control center to calculate GNSS error corrections over a wide area. Real-time correction data is transmitted by radio or cellular modem to the rover receiver within the network area.

***COORDINATE &***

***MEASUREMENT UNITS:*** The Horizontal Control Datum is the **North American Datum of 1983 (NAD 83)** and the Vertical Control Datum is the **North American Vertical Datum of 1988 (NAVD 88)**.

Coordinates are available in various formats but are kept on record as State Plane Coordinates, **Utah Coordinate System of 1983, Zone 4303, Utah South**. Coordinate and measurement units are in **U.S. Survey Feet** but are available in meters for publication as required by *Utah Code 57-10*.

***MONUMENT DETAILS:*** Presently the San Juan County **UDN** consists of 49 **NSRS** monuments, 51 monuments set by the San Juan County Survey Office and 5 monuments set by other agencies. All control network monuments are either aluminum or brass caps set in concrete or drilled into bedrock.

**FIELD PROCEDURES:**

*Base Station Set-Up*

*and Check Point Measurement:* The **GPS** base station is always set at the control network monument most advantageous to the project area being working in. After each initial base station set up in a project location a check point measurement is taken at a known network control point. Subsequent check point measurements are taken at either a known network control point or a point set in close proximity to the base control point. Check measurements are stored for comparison analysis.

*Survey Type:*

The survey type used is **Real Time Kinematic (Stop and Go) (RTK)** using **GPS** technology and the San Juan County **UDN** as the primary control. When using the **Utah Reference Network**, a **Virtual Reference Station** survey is selected resulting in a **Wide-Area RTK** survey with the State-Wide network as the primary control.

*Observation Methods:*

Observed Control Points – Horizontal tolerance = 0.049 sft  
Vertical tolerance = 0.066 sft  
# of measurements = 60  
Topo Points – Horizontal tolerance = 0.049 sft  
Vertical tolerance = 0.066 sft  
# of measurements = 3

*Point Measurement:*

For the purpose of work in the **Public Land Survey System (PLSS)** found monuments are measured as observed control points. Corner points are measured as topo points only if the corner is considered lost. Lost corners are measured for documentation purposes only and locations are calculated based on the record bearings and distances. After a point is measured, the rover receiver is forced to lose initialization “dumped”, then re-initialized and the point is then staked out to ensure a good measurement was obtained.

***Point Feature and Attribute Codes:***

When a point is measured there are a number of attributes that are attached to help identify and describe the particulars of a **PLSS** corner location.  
*Name:* This is the name of the **PLSS** corner. It is a unique identifier to San Juan County and is formatted as follows:  
*Section Corners:* **3323SE32** = T33S, R23E, southeast corner of section 32  
*Quarter Corners:* **3323S02** = T33S, R23E, south quarter corner of section 2  
*Sixteenth Corners:* **3323CW1617** = T33S, R23E, center west sixteenth of section 17, if between sections use /  
*Sixty fourth Corners:* **3323CSNE14** = T33S, R23E, center south northeast corner of section 14, if between sections use /  
*Two hundred fifty sixth corners:* **3323CNSENE20** = T33S, R23E, center north southeast northeast corner of section

20, if between sections use /

*Northing/Easting:* These are the State Plane Coordinates of the corner point.  
Utah Coordinate System of 1983.

*Elevation:* This is the **NAVD 88** elevation of the corner point.

*HZ Precision:* This is the horizontal precision as recorded at the time the point was measured.

*VT Precision:* This is the vertical precision as recorded at the time the point was measured.

*RMS:* This is the Root Mean Square as recorded at the time the point was measured. **RMS** is used to express the accuracy of the point measurement. It is the radius of the error circle within which approximately 70% of position fixes are to be found.

*Max PDOP:* This is maximum **Position Dilution of Precision** as recorded at the time the point was measured. Expresses the relationship between the error in user position and the error in satellite position. (3 coordinates)

*Max HDOP:* This is the maximum **Horizontal Dilution of Precision** as recorded at the time the point was measured. An indicator of the quality of the horizontal position. (2 coordinates)

*Max VDOP:* This is the maximum **Vertical Dilution of Precision** as recorded at the time the point was measured. An indicator of the quality of the vertical position. (Height only)

*Min Sats:* This is the minimum number of satellites in common with the base receiver and the rover receiver that were tracked and used at the time the point was measured.

*GCDB I.D. # :* This is the B.L.M. **Geographic Coordinate Data Base (GCDB)** corner point I.D. numbering system identifier.

*Corner Type:* This field contains a description of the most common type of **PLSS** corner being measured.

- Section Corner**
- Quarter Corner**
- Sixteenth Corner**
- Closing Corner**
- Witness Corner**
- Meander Corner**
- Other**

*Agency:* This is the agency that set the monument.

- GLO** - Government Land Office
- BLM** - Bureau of Land Management
- USFS** - United States Forest Service
- USC&GS** - United States Coast & Geodetic Survey
- County** - County Governmental Agent
- Local** - Local Professional Land Surveyor
- Other** - All others, i.e. Engineering Firm, Mining Company, Tribal

*Monument Type:* This field contains a description of type of monument being measured.

- Brass Cap**
- Aluminum Cap**
- Stone Corner**
- Wood Post**
- Rebar**
- Other**
- None**

*Stamp Date:* The **year date** stamped on the monument cap, or if a stone the **year date** of the survey.

*Status:* This field contains an **opinion of the field surveyor** as to the status of the particular corner being measured, based on the evidence obtained at the corner location. It is not the intent of this survey office to make a definitive determination as to the status of a particular corner. That responsibility lies with the end user of this information.

- Existent Corner** { **As defined in Chapter 6 & 7, Manual of**
- Obliterated Corner** { **Surveying Instructions - 2009**
- Lost Corner** {

*Evidence/Accessories:* This field varies in its content but at a minimum describes the evidence/accessories and indicates the section(s) in which they are found.

*Photo I.D. #:* This field contains a photograph number that is unique to San Juan County and is used for documentation purposes. It is alpha-numeric in nature and identifies the field survey team that took the photograph.

*Note A / Note B:* These two fields contain descriptive information about the corner location and/or the monument. These are **observations of the field surveyor** and vary widely in content. However some **standard acronyms/terms** have been developed for our purposes.

**CFM = Called for Monument.** A monument that is called for in the official field notes of the government survey.

**UCFM = Un-called for Monument.** A monument that is not called for in the official field notes of the government survey.

**JCT = Junction**

**VL = Verified Lost.** A term used to describe a corner location that can be verified as described in **5 - 20 of the Manual of Surveying instructions, 1973**

**UVL = Unverified Lost.** A term used to describe a corner location that cannot be verified as described in **5 - 20 of the Manual of Surveying Instructions, 1973.**

**SP = Survey Plat.** This acronym is used to reference a particular survey plat recorded in the office of the San Juan County Surveyor.

**Bk,Pg = Book & Page.** Refers to the **PLSS** book and page number that contains the field notes of the surveyor and are recorded and retained in the office of the San Juan County Surveyor.

**Calcpt = Calculated Point.** A point that has been computed using coordinate geometry and replicates the bearing & distance called for by the original surveyor.