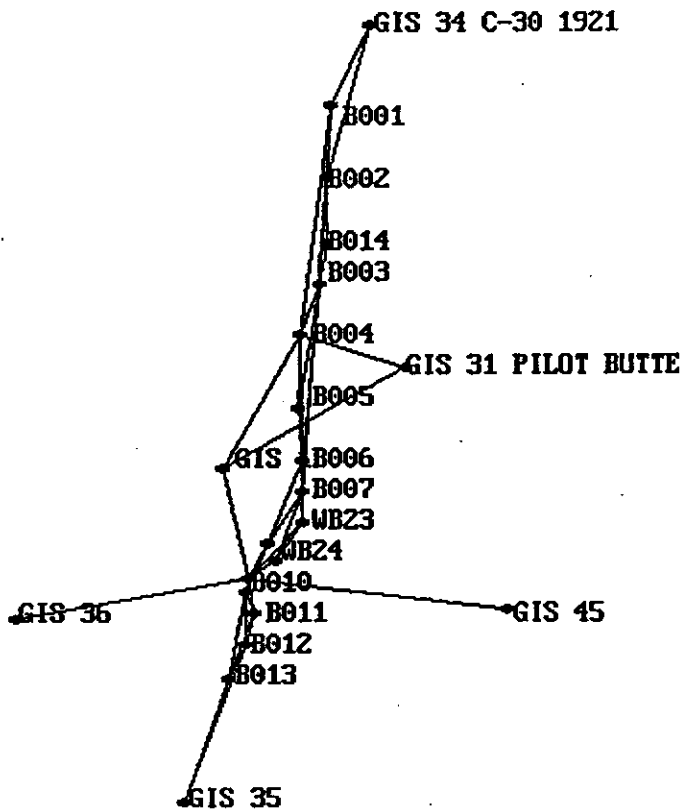


O.D.O.T.  
BEND PARKWAY  
G.P.S.  
CONTROL SURVEY

BY

DESCHUTES COUNTY  
SURVEYOR'S OFFICE



DGMC 46  
FILED

DATE 12-2-92  
DESCHUTES COUNTY SURVEYOR

BY Sheila O'Leary

**O.D.O.T.  
BEND PARKWAY  
G.P.S. CONTROL SURVEY**

**GENERAL:**

The purpose of this survey was to establish high precision control points to control conventional surveys in the survey of the Bend Parkway through the City of Bend by the O.D.O.T. (Oregon Department of Transportation). On the 15th. and 16th. of January, 1991, personal from O.D.O.T. performed a corridor network survey on 11 new and 4 previous Bend Parkway control points with 3 borrowed Trimble 4000 ST G.P.S. receivers from the Deschutes County Public Works Department. The Public Works Department reduced the baseline measurements and computed preliminary geodetic coordinates on the NAD 83-91 (North American Datum of 1983, readjusted in 1991) and NAD 83-91 Oregon State Plane South mapping coordinates in international feet. O.D.O.T. then developed a local coordinate system by multiplying all the coordinate by a grid to ground factor at mid-point of the project.

This project was left in obscurity when I was written out of the Public Works budget in May of 91, but was able to transfer to the County Surveyor's Office. Jeff Kern ,County Surveyor, gave his permission so I could finish this project in my spare time.

**MEASUREMENTS:**

I used Trim 640 single baseline processor for the reduction of GPS measurements to produce fix solution base lines and holding to Trimble's guideline to high confidence limits for the ratio and rms criteria.

Level loops were run with a Wild Ni 2 level and standard rod. Most were 1 turn from N.G.S. bench marks to control point B011, WB23 and WB24 to check the geoid modeling in the adjustment.

## **CLOSURES:**

I ran numerous loop closures on the base lines to check for HI errors and isolation of bad lines for remeasure. In the most part loop closures were 1 to 2 ppm for lines with 3 or more independent sessions. The computations of open end closure from fix point (GIS 35) on the south end to another fix point (GIS 34) on the north end using all independent sessions with a closures of 2.47 ppm.

## **ADJUSTMENT:**

### **HORIZONTAL**

A minimal constrained adjustment was accomplished by holding B004 fix with excellent result and many partial constrained adjustments using combinations of two to five fix points, all showing excellent internal consistency. For completion I added Pilot Butte, GIS 13,43,35,36 AND 45 to the system for the fully constrained adjustment of the network. Datum for all adjustments was NAD 83 (1991) in latitude, longitude and ellipsoidal height.

### **ORTHOMETRIC**

First we used NGS GEOID 90 program to compute geoid heights at each control point to make a geoid model of the control area. By fixing orthometric heights of three reliable points in a constrained adjustment, we can cause the geoid model transformation (deflection in latitude and longitude plus a height constant) onto the same orthometric datum. Here we can analyze the record elevation at our control points by using different combinations of fixed height to find errors in data entry, movement of bench marks and bad elevations. From N.G.S. bench marks M-791, N-791 and P-791, I leveled to B011, WB23 and WB24 with less that 0.02 feet difference in elevation than computed from G.P.S.data.

## **MARK DATA SHEET:**

The mark data sheet shows information about each control station in the network, such as name, number, horizontal & vertical datum, coordinates, scale factor, convergence, general information and sketch.

**NOTE: ALL VALUES ARE NAD 83 (1991) GPS**

## **DESCHUTES COUNTY COORDINATE SYSTEM:**

The County Surveyors Office and the County GIS Section agreed on a conformal mapping projection for the best fit of the 80 % population area of Deschutes County, for a grid to ground distances, being no worse than 1 part in 50,000. This system is the best for the integration maps, deeds, etc., into the County GIS and should be of assistance to local surveyors. The County Surveyor in the process of establishing coordinates at section and 1/4 section corners on the Deschutes County Plane Coordinate System.

### **SYSTEM DATA:**

DATUM = NAD 83(1991)

PROJECTION = TRANSVERSE MERCATOR

ZONE = DESCHUTES COUNTY

CENTRAL MERIDIAN = W 121° 17' 00.0000"

LATITUDE OF ORIGIN = N 43° 00' 00.000"

ORIGIN NORTHING = 0.00000

ORIGIN EASTING = 3,300,000.00

SCALE ALONG MERIDIAN = 1.00016000

LINEAR UNITS = INTERNATIONAL FOOT

**ACKNOWLEDGMENT:**

A control project of this magnitude and complexity could not be accomplished with the help and cooperation of many people.

To the people of the Oregon Department of Transportation, Wetzel, Gentner-Day and Harman, to carry out a G.P.S. survey with a minimal amount of training.

Mr. Lyle Riggers, Oregon Advisor, of the National Geodetic Survey deserves a special appreciation for his technical assistance and cooperation throughout the project.

A special recognition goes to the author-programmer of Trimnet-Plus, Mike Potterfield of Trimble Navigation, for the opportunity to beta test this very extraordinary gps survey adjustment program. Also his guidance and technical advice helped set the direction of this project.

A debt of gratitude to the Deschutes County Surveyor, Jeff Kern, for the support and permission to allow me to complete the O.D.O.T. Bend Parkway Control Network.



*W.C. Kauffman*

*12-2-92*



*Exp. 12/93*

**TYPICAL  
LOOP  
CLOSURE**

Trimble Loop Closure Utility

Start Traverse at Station: WB24

Starting Coords : 44°01'46.18553" N 121°18'41.92571" W 1103.717

Baseline 1

File Name: WB24WB23.FIX

From Station: WB24 To Station: WB23

Distance Travelled (m): 825.303

Current Coords : 44°02'07.83468" N 121°18'20.19047" W 1090.870

Baseline 2

File Name: WB23B007.FIX

From Station: WB23 To Station: B007

Distance Travelled (m): 1398.099

Current Coords : 44°02'26.37890" N 121°18'20.96373" W 1081.504

Baseline 3

File Name: B008B007.FIX

From Station: B007 To Station: B008

Distance Travelled (m): 2509.849

Current Coords : 44°01'56.30836" N 121°18'48.42786" W 1096.201

Baseline 4

File Name: B009B008.FIX

From Station: B008 To Station: B009

Distance Travelled (m): 3217.895

Current Coords : 44°01'36.28582" N 121°19'03.92741" W 1106.986

Baseline 5

File Name: WB24B009.FIX

From Station: B009 To Station: WB24

Distance Travelled (m): 3795.433

Current Coords : 44°01'46.18577" N 121°18'41.92564" W 1103.719

End Traverse at Station: WB24

Distance Travelled (m): 3795.433 Precision (ppm): 2.07

dx: 0.003 dy: 0.002 dz: 0.007 dh: 0.003

Ending Coords : 44°01'46.18577" N 121°18'41.92564" W 1103.719

Reference Coords: 44°01'46.18553" N 121°18'41.92571" W 1103.717

Trimble Loop Closure Utility

Start Traverse at Station: B005

Starting Coords : 44°03'13.87997" N 121°18'24.12373" W 1074.940

Baseline 1

File Name: B005B003.FIX

From Station: B005 To Station: B003

Distance Travelled (m): 2232.871

Current Coords : 44°04'25.20503" N 121°18'07.45156" W 1069.412

Baseline 2

File Name: B014B003.FIX

From Station: B003 To Station: B014

Distance Travelled (m): 2973.684

Current Coords : 44°04'48.83213" N 121°18'01.67822" W 1051.675

Baseline 3

File Name: B002B014.FIX

From Station: B014 To Station: B002

Distance Travelled (m): 4139.890

Current Coords : 44°05'26.60986" N 121°18'01.57160" W 1049.251

Baseline 4

File Name: B002B001.FIX

From Station: B002 To Station: B001

Distance Travelled (m): 5406.041

Current Coords : 44°06'07.54472" N 121°17'58.07058" W 1034.124

Baseline 5

File Name: B001B004.FIX

From Station: B001 To Station: B004

Distance Travelled (m): 9480.548

Current Coords : 44°03'56.85534" N 121°18'23.64219" W 1073.120

Baseline 6

File Name: B005B004.FIX

From Station: B004 To Station: B005

Distance Travelled (m): 10807.254

Current Coords : 44°03'13.87966" N 121°18'24.12398" W 1074.937

End Traverse at Station: B005

Distance Travelled (m): 10807.254 Precision (ppm): 1.06

dx: -0.007 dy: -0.001 dz: -0.009 dh: -0.003

Ending Coords : 44°03'13.87966" N 121°18'24.12398" W 1074.937

Reference Coords: 44°03'13.87997" N 121°18'24.12373" W 1074.940



**OPEN END**

**CLOSURE**

Trimble Loop Closure Utility

Start Traverse at Station: 0035  
Starting Coords : 43°59'27.22059" N 121°19'54.79581" W 1176.031

Baseline 1  
File Name: 0035B012.FIX  
From Station: 0035 To Station: B012  
Distance Travelled (m): 3023.259  
Current Coords : 44°00'58.37294" N 121°19'05.21402" W 1136.249

Baseline 2  
File Name: B011B012.FIX  
From Station: B012 To Station: B011  
Distance Travelled (m): 3604.334  
Current Coords : 44°01'16.63767" N 121°18'58.90785" W 1134.145

Baseline 3  
File Name: B010B011.FIX  
From Station: B011 To Station: B010  
Distance Travelled (m): 3989.942  
Current Coords : 44°01'28.32052" N 121°19'05.03437" W 1134.845

Baseline 4  
File Name: B010B009.FIX  
From Station: B010 To Station: B009  
Distance Travelled (m): 4256.529  
Current Coords : 44°01'36.92617" N 121°19'04.03572" W 1134.787

Baseline 5  
File Name: B009B008.FIX  
From Station: B009 To Station: B008  
Distance Travelled (m): 4964.575  
Current Coords : 44°01'56.94863" N 121°18'48.53621" W 1124.004

Baseline 6  
File Name: B008B007.FIX  
From Station: B008 To Station: B007  
Distance Travelled (m): 6076.326  
Current Coords : 44°02'27.01905" N 121°18'21.07213" W 1109.310

Baseline 7  
File Name: B006B007.FIX  
From Station: B007 To Station: B006  
Distance Travelled (m): 6610.310  
Current Coords : 44°02'44.31188" N 121°18'20.61274" W 1101.636

Baseline 8  
File Name: B006B005.FIX  
From Station: B006 To Station: B005  
Distance Travelled (m): 7532.918  
Current Coords : 44°03'14.10508" N 121°18'23.84253" W 1089.332

Baseline 9  
File Name: B005B004.FIX  
From Station: B005 To Station: B004  
Distance Travelled (m): 8859.624  
Current Coords : 44°03'57.08067" N 121°18'23.36069" W 1087.517

■ Baseline 10  
 ■ File Name: B004B003.FIX  
 ■ From Station: B004 To Station: B003  
 ■ Distance Travelled (m): 9806.064  
 ■ Current Coords : 44°04'25.42994" N 121°18'07.17029" W 1083.806

■ Baseline 11  
 ■ File Name: B014B003.FIX  
 ■ From Station: B003 To Station: B014  
 ■ Distance Travelled (m): 10546.877  
 ■ Current Coords : 44°04'49.05699" N 121°18'01.39693" W 1066.070

■ Baseline 12  
 ■ File Name: B002B014.FIX  
 ■ From Station: B014 To Station: B002  
 ■ Distance Travelled (m): 11713.082  
 ■ Current Coords : 44°05'26.83463" N 121°18'01.29026" W 1063.648

■ Baseline 13  
 ■ File Name: B002B001.FIX  
 ■ From Station: B002 To Station: B001  
 ■ Distance Travelled (m): 12979.234  
 ■ Current Coords : 44°06'07.76940" N 121°17'57.78918" W 1048.522

■ Baseline 14  
 ■ File Name: 0034B001.FIX  
 ■ From Station: B001 To Station: 0034  
 ■ Distance Travelled (m): 14558.667  
 ■ Current Coords : 44°06'53.97606" N 121°17'27.31088" W 1028.243

■ End Traverse at Station: 0034  
 ■ Distance Travelled (m): 14558.667 Precision (ppm): 2.47  
 ■ dx: -0.009 dy: -0.004 dz: -0.035 dh: -0.018  
 ■ Ending Coords : 44°06'53.97606" N 121°17'27.31088" W 1028.243  
 ■ Reference Coords: 44°06'53.97704" N 121°17'27.31060" W 1028.261

**G.P.S.**

**CONTROL**

**POINTS**

**HELD FIX**

**PILOT BUTTE**

PID: QD1681

HORIZONTAL DATUM: NAD 83 (1991)  
VERTICAL DATUM: NGVD 29

STATE: OREGON  
COUNTY: DESCHUTES

LATITUDE:	44° 03' 37.94301" N	±0.00010 SECONDS
LONGITUDE:	121° 16' 59.64811" W	±0.00020 SECONDS

ORTHOMETRIC HEIGHT:	1261.4	METERS
	4138.	FEET

GEOID HEIGHT:	-19.433	METERS
ELLIPSOIDAL HEIGHT:	1241.747	±0.034 METERS
X:	1801468.589	METERS
Y:	2876581.605	METERS
Z:	5383440.509	METERS

HORIZONTAL NETWORK ORDER: B  
ELLIPSOIDAL HEIGHT ORDER: SECOND CLASS III

THE HORIZONTAL COORDINATES WERE ESTABLISHED BY GPS OBSERVATIONS AND ADJUSTED BY THE NATIONAL GEODETIC SURVEY IN FEBRUARY 1991. THE ORTHOMETRIC HEIGHT WAS DETERMINED BY VERTICAL ANGLE OBSERVATIONS. THE GEOID HEIGHT WAS DETERMINED BY GEOID90. THE ELLIPSOIDAL HEIGHT WAS DETERMINED BY GPS OBSERVATIONS.

HORIZONTAL DATUM SHIFT-----LATITUDE-----LONGITUDE  
NAD83 minus NAD27                    -00.58599"                    +04.10711" (Based on Adjusted Positions)

**PLANE COORDINATES**

GRID	ZONE	NORTHING METERS	EASTING METERS	POINT SCALE FACTOR	CONVERGENCE DEG MIN SEC	*GRID AZIMUTH TO PILOT BUTTE AZ MK DEG MIN SEC
SPC	OR S	266,223.939	1,437,243.481	1.00001595	- 0 32 9.1	267 51 56.9
SPC	OR N	44,073.993	2,437,239.542	1.00007981	- 0 33 19.7	267 52 56.9
UTM	10	4,880,029.657	637,500.737	0.99983253	+ 1 11 38.6	266 08 09.2

(\*ARC-TO-CHORD CORRECTION NOT APPLIED)

(Continued on Next Page)

**PILOT BUTTE**

PID: QD1681

**STATION MARKS AND REFERENCE OBJECTS**

PID	REFERENCE OBJECT	DISTANCE	GEODETTIC AZIMUTH
QD1680	PILOT BUTTE USGS 1932	10.270 METERS	030 17
	PILOT BUTTE RM 1	184.670 METERS	151 40
QD1679	SCENIC PIER ARROW PIVOT S 1945	7.814 METERS	158 27
QD1678	BEND WATER TANK	APPROX. 4.0 KM	188 02 02.9
	PILOT BUTTE RM 2	127.580 METERS	247 32
QD1683	BEND BROOKS SCANLON INC TANK	APPROX. 3.5 KM	247 41 28.4
	PILOT BUTTE AZ MK		267 19 47.8
QD1687	BEND PACIFIC GAS MICROWAVE	APPROX. 4.3 KM	295 30 55.1
QD1688	BEND BONNVILLE POW ADM RD MST	APPROX. 4.3 KM	295 50 23.0
QD1685	BEND RAD STA KBND NW MAST	APPROX. 1.9 KM	329 34 53.6
QD1686	BEND RAD STA KBND SE MAST	APPROX. 1.9 KM	331 20 53.0
QD1682	SCENIC PIER ARROW PIVOT N 1945	3.209 METERS	338 44
QD1689	BEND RAD STA KGRL MAST	APPROX. 2.1 KM	358 24 40.9

STATION MARK IS A .... HORIZONTAL CONTROL DISK  
WITH SETTING ..... TOP OF CONCRETE MONUMENT (ROUND)  
THE MARK IS STAMPED ... PILOT BUTTE 1932

**STATION MARK HISTORY**

<u>YEAR MONUMENTED OR RECOVERED</u>	<u>CONDITION OF MARK</u>	<u>RECOVERED OR DESCRIBED BY</u>
1932	STATION MONUMENTED	COAST AND GEODETIC SURVEY
1945		COAST AND GEODETIC SURVEY (CAG)
1958	GOOD	US GEOLOGICAL SURVEY
1959		BONNEVILLE POWER ADMINISTRATION
1966	GOOD	US GEOLOGICAL SURVEY
1971		NATIONAL GEODETIC SURVEY (LDF)
1987	GOOD	NATIONAL GEODETIC SURVEY (LLR)
1989	GOOD	LOCAL SURVEYOR (INDIVIDUAL OR FIRM)

**STATION DESCRIPTION**

DESCRIBED BY COAST AND GEODETIC SURVEY 1932

STATION IS LOCATED ABOUT 1.0 MILE E OF BEND ON THE TOP OF PILOT BUTTE.

STATION MARK IS A STANDARD BRONZE DISK SET IN CONCRETE AS DESCRIBED IN NOTE 1A. REFERENCE MARKS ARE STANDARD BRONZE DISKS IN OUTCROPPING BEDROCK AS DESCRIBED IN NOTE 12A.

U.S.G.S., PILOT BUTTE IS A U.S.G.S. STANDARD DISK IN OUTCROPPING BEDROCK NNE OF STATION.

REFERENCE MARK NO.1 IS WNW OF STATION.

SCENIC PIERS ARE NW AND SE OF STATION.

WATER TANK, (AZIMUTH MARK) IS S OF STATION.  
(Continued on Next Page)

## PILOT BUTTE

PID: QD1681

REFERENCE MARK NO.2 IS WSW OF STATION.

STATION IS REACHED FROM BEND BY GOING E ON THE GREENWOOD AVENUE OR BURNS HIGHWAY FOR ABOUT 3/4 MILE TO THE JUNCTION WITH THE PILOT BUTTE ROAD. TAKE THE PILOT BUTTE ROAD AND FOLLOW THE CORKSCREW ROAD TO THE TOP OF THE BUTTE AND THE STATION.

HEIGHT OF SIGNAL ABOVE STATION MARK - 1-1/2 METERS.

### STATION RECOVERY (1945)

RECOVERED BY COAST AND GEODETIC SURVEY 1945 (CAG)  
THE STATION AND ALL MARKS WERE RECOVERED AS DESCRIBED AND FOUND IN GOOD CONDITION WITH THE EXCEPTION OF REFERENCE MARK NO. 1 WHICH COULD NOT BE RECOVERED AND IS BELIEVED TO HAVE BEEN DESTROYED BY ROAD CONSTRUCTION. AN AZIMUTH MARK WAS ESTABLISHED.

A COMPLETE NEW DESCRIPTION FOLLOWS.

THE STATION IS LOCATED ABOUT 1 MILE EAST OF BEND ON THE HIGHEST PART OF PILOT BUTTE AND IS IN THE CENTER OF A TRAFFIC CIRCLE. IT IS DESCRIBED BY NOTE 1A AND IS FLUSH WITH THE SURFACE OF THE GROUND. IT IS STAMPED PILOT BUTTE 1932.

U.S.G.S. MARK IS A STANDARD DISK B.M. TABLET SET IN A SMALL LAVA BOULDER THAT IS FLUSH WITH THE GROUND SURFACE. IT IS STAMPED PILOT BUTTE 4136 1916.

REFERENCE MARK NO. 2 IS SET IN A LARGE BOULDER THAT PROJECTS ABOUT 3 FEET. IT IS ABOUT 5 FEET BELOW STATION ELEVATION. IT IS DESCRIBED BY NOTE 12C AND IS STAMPED PILOT BUTTE NO 2 1932.

SCENIC PIER, ARROW PIVOT, NORTH. IT IS A SMALL TOWER 3.5 FEET HIGH AND 2X2 FEET SQUARE. IT IS CONSTRUCTED OF ROCK AND HAS A FLAT TOP WITH A POINT IN THE CENTER FOR A ARROW PIVOT TO BE PLACED.

SCENIC PIER, ARROW PIVOT, SOUTH. IT IS A SMALL TOWER 3.5 FEET HIGH AND 2X2 FEET SQUARE. IT IS CONSTRUCTED OF ROCK AND HAS A FLAT TOP WITH A POINT IN THE CENTER FOR A ARROW PIVOT TO BE PLACED.

AZIMUTH MARK IS ABOUT 0.8 MILE WEST OF THE STATION. IT IS A STANDARD DISK CEMENTED INTO A DRILL HOLE IN A CONCRETE CURB. IT IS 141 FEET WEST OF THE CENTER OF THE INTERSECTION OF THIRD ST. AND U.S. HIGHWAY NO. 20, 125 FEET EAST OF THE NORTHEAST CORNER OF THE MISSIONARY BAPTIST CHURCH AND 28 FEET SOUTH OF THE CENTERLINE OF U.S. HIGHWAY NO. 20. IT IS STAMPED PILOT BUTTE 1945. TO REACH FROM THE JUNCTION OF U.S. HIGHWAY NO. 97 AND U.S. HIGHWAY NO. 20. GO EAST ON U.S. HIGHWAY NO. 20, TOWARDS BURNS, FOR 0.45 MILE TO THE AZIMUTH MARK ON THE RIGHT AS DESCRIBED.

TO REACH FROM THE JUNCTION OF U.S. HIGHWAY NO. 97 AND U.S. HIGHWAY NO. 20 IN BEND, GO EAST, TOWARDS BURNS, ON U.S. HIGHWAY NO. 20 FOR 1.7 MILES TO A ROAD FORKS. TURN LEFT ON TO PILOT BUTTE ROAD AND CONTINUE 1.1 MILES TO TOP OF BUTTE AND THE STATION AS DESCRIBED.

(Continued on Next Page)

## PILOT BUTTE

PID: QD1681

### STATION RECOVERY (1958)

RECOVERED BY US GEOLOGICAL SURVEY 1958  
RECOVERED AS DESCRIBED BY NGS. RMS NOT OBSERVED.

### STATION RECOVERY (1959)

RECOVERED BY BONNEVILLE POWER ADMINISTRATION 1959  
STATION RECOVERED AS DESCRIBED. THE HIGHWAY IS NOW UNITED STATES  
HIGHWAY NO. 20.

### STATION RECOVERY (1966)

RECOVERED BY US GEOLOGICAL SURVEY 1966  
RECOVERED AS DESCRIBED BY NGS. RMS NOT OBSERVED.

### STATION RECOVERY (1971)

RECOVERED BY NATIONAL GEODETIC SURVEY 1971 (LDF)  
STATION MARK, REFERENCE MARKS 1,2 AND THE AZIMUTH MARK WERE  
RECOVERED AND FOUND IN GOOD CONDITION. SCENIC PIER ARROW PIVOT  
NORTH WAS RECOVERED IN GOOD CONDITION BUT SCENIC PIER ARROW PIVOT  
SOUTH HAD BEEN REMOVED. A SLIGHT DIFFERENCE WAS NOTED IN THE  
DISTANCE AND DIRECTION TO BOTH REFERENCE MARKS AND A NOTICEABLE  
DIFFERENCE WAS NOTED IN THE DIRECTION TO THE AZIMUTH MARK AND  
WAS CHECKED IN THE FIELD.

FOLLOWING IS A NEW AND COMPLETE DESCRIPTION--

STATION IS LOCATED ABOUT 1 MILE EAST OF BEND AND IS ON THE HIGHEST  
POINT OF WHAT IS LOCALLY KNOWN AS PILOT BUTTE.

TO REACH THE STATION FROM THE JUNCTION OF U.S. HIGHWAYS 97 AND 20  
IN BEND, (THE AZIMUTH MARK IS LOCATED AT THIS JUNCTION) GO EAST ON  
U.S. HIGHWAY 20 FOR 0.75 MILE TO A FORK AND SIGN PILOT BUTTE STATE  
PARK. TAKE THE LEFT FORK AND GO EAST UP WINDING PAVED ROAD FOR  
1.0 MILE TO THE HIGHEST POINT AND THE STATION.

STATION MARK IS A STANDARD DISK, STAMPED PILOT BUTTE 1932, SET IN  
THE TOP OF A 12-INCH SQUARE CONCRETE MONUMENT WHICH PROJECTS ABOUT  
2 INCHES ABOVE THE SURFACE OF THE GROUND. IT IS IN THE CENTER OF  
A TRAFFIC CIRCLE AND IS 59 FEET NORTH OF A SET OF ROCK STEPS  
LEADING TO THE TOP OF THE HILL, 24.5 FEET NORTHWEST OF A ROCK  
MONUMENT AND 19 FEET EAST-SOUTHEAST OF A ROCK MONUMENT.

REFERENCE MARK 1 IS A STANDARD DISK, STAMPED PILOT BUTTE NO 1  
1932, CEMENTED IN A DRILL HOLE IN THE TOP OF A 1 X 2 FOOT OUTCROP  
WHICH PROJECTS ABOUT 2 INCHES ABOVE THE SURFACE OF THE GROUND. IT  
IS 93 FEET EAST-SOUTHEAST OF THE APPROXIMATE CENTER OF THE CIRCLE  
DRIVE ROAD AND 41 FEET WEST OF THE CENTER OF THE PAVED ROAD  
LEADING UP THE HILL.

(Continued on Next Page)



## PILOT BUTTE

PID: QD1681

REFERENCE MARK 2 IS A STANDARD DISK, STAMPED PILOT BUTTE NO 2 1932, CEMENTED IN A DRILL HOLE IN THE TOP OF A LARGE BOULDER WHICH PROJECTS ABOUT 2-1/2 FEET ABOVE THE SURFACE OF THE GROUND. IT IS 88 FEET SOUTHWEST OF THE ROCK STEPS AND 47 FEET SOUTHWEST OF THE APPROXIMATE CENTER OF THE ROAD CIRCLING THE TOP OF THE HILL.

SCENIC PIER ARROW PIVOT NORTH IS A PUNCH HOLE IN THE TOP OF A ROUND METAL PLATE FASTENED TO THE TOP OF A ROCK AND CONCRETE MONUMENT WHICH PROJECTS ABOUT 3-1/2 FEET. IT IS ON THE HIGHEST PART OF THE HILL.

AZIMUTH MARK IS A STANDARD DISK, STAMPED PILOT BUTTE 1945, CEMENTED IN A DRILL HOLE IN THE SOUTH CURB OF U.S. HIGHWAY 20 (BUSINESS). IT IS 145 FEET WEST OF THE CENTER OF THIRD STREET, 125 FEET EAST OF THE NORTHEAST CORNER OF A CHURCH AND 28 FEET SOUTH OF THE CENTER OF THE ROAD.

STATION IS IN THE NORTHWEST 1/4 OF SECTION 34, T 17 S, R 12 E.

HEIGHT OF LIGHT ABOVE STATION MARK 30 FEET.

AIRLINE DISTANCE AND DIRECTION FROM NEAREST TOWN  
1 MILE EAST OF BEND.

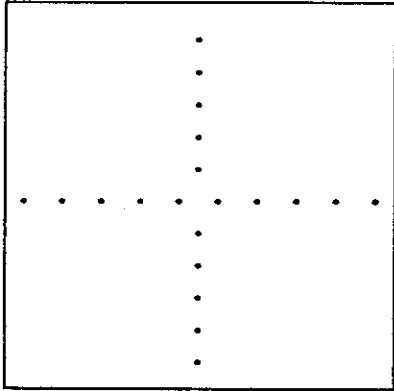
### STATION RECOVERY (1987)

RECOVERED BY NATIONAL GEODETIC SURVEY 1987 (LLR)  
THE STATION WAS RECOVERED AT THIS DATE.  
NONE OF THE OTHER MARKS WERE SEARCHED FOR AT THIS DATE. THE 1971 RECOVERY NOTE IS ADEQUATE FOR RECOVERY.

### STATION RECOVERY (1989)

RECOVERED BY LOCAL SURVEYOR (INDIVIDUAL OR FIRM) 1989  
TEXT WAS SUPERSEDED BY LATER RECOVERY.  
STATION IS LOCATED ABOUT 3.2 KM (2.00 MI) EAST OF DOWNTOWN BEND ON THE TOP OF PILOT BUTTE. OWNERSHIP--PILOT BUTTE STATE PARK, DISTRICT MANAGER-STEVE WEINMEYER, 62796 O B RILEY RD, BEND OR 97701, PHONE 503-388-6055.  
TO REACH THE STATION FROM THE JUNCTION OF U.S. HIGHWAY 20 AND U.S. HIGHWAY 97, IN BEND, GO EAST ON U.S. HIGHWAY 20 FOR 0.72 KM (0.45 MI) TO N.E. 8TH STREET. CONTINUE AHEAD, EAST, FOR 0.48 KM (0.30 MI) ON U.S. HIGHWAY 20 TO THE ENTRANCE OF PILOT BUTTE STATE PARK ON THE LEFT. TURN LEFT AND FOLLOW PARK ROAD PAST GATE (GATE MAYBE LOCKED BY HIGHWAY DEPARTMENT DURING WINTER MONTHS) GOING UPHILL, CIRCLING BUTTE FOR 1.8 KM (1.10 MI) TO TOP OF BUTTE AND STATION IN THE CENTER OF VIEWING AREA.  
STATION IS LOCATED 11.9 M (39.0 FT) WEST OF STONE MONUMENT PROJECTING 1.3 M (4.3 FT) ABOVE GROUND WITH PLAQUE HONORING TERRANCE FOLEY, 8.2 M (26.9 FT) NORTHWEST OF STONE MONUMENT PROJECTING 1.1 M (3.6 FT) ABOVE GROUND AND 6.1 M (20.0 FT) SOUTHEAST OF STONE MONUMENT WITH PLAQUE IDENTIFYING LOCAL MOUNTAIN PEAKS.

**DESCHUTES COUNTY PRIME CONTROL NETWORK  
CONTROL STATION DESCRIPTION**

<p>NAME: GIS 0013 GIS # 0013 ORDER C-1st. ( GPS )</p>	<p>HORIZONTAL DATUM: NAD 83 (1991) VERT. DATUM: NGVD 29 &amp; NAVD 88</p>
<p align="center">STATION LOCATION</p>  <p align="center">T. 18 S.- R. 12 E., SEC. 5</p>	<p>LATITUDE: 44° 02' 39.71324" N LONGITUDE: 121° 19' 25.05079" W</p> <p>----- EC CARTESIAN ----- X: -2387685.327 METERS Y: -3923407.174 METERS Z: +4412398.193 METERS</p> <p>----- HEIGHT ----- ELLIPSOIDAL: 1095.966 METERS NGVD 29 : 1115.545 METERS NAVD 88 : 1116.715 METERS ---- SPC -- OREGON SOUTH ---- NORTH: 264457.798±.002 METERS EAST: 1433989.701±.002 METERS</p> <p>SCALE FACTOR: 1.000011578 CONVERGENCE: - 0° 33' 48.53 "</p>

The horizontal coordinates & ellipsoidal height was determined by GPS observations constrained by Oregon High Percision Network. Adjusted by Deschutes Co. Surveyor's Office in July 1991. The orthometric height was determined by GPS.

**SURFACE MARKER:**  
MARK IS STAMPED - GIS 0013  
AGENCY INSCRIPTION - DESCHUTES COUNTY SURVEYORS OFFICE  
THE STATION IS LOCATED ABOUT 1 MILE SOUTHWEST OF BEND.

TO REACH THE STATION FROM BEND, START AT THE INTERSECTION OF US HWY 20 (GREENWOOD AV.) & US HWY 97 (3RD ST.), PROCEED SOUTH ON HWY 97 0.3 MI., TURN RIGHT ON FRANKLIN AVE & PROCEED 0.6 MI., TURN LEFT ON BOND ST. & PROCEED SOUTH FOR 0.4 MI., TURN RIGHT ON COLORADO AVE. AND PROCEED WESTERLY FOR 0.75 MI. TO THE STATION ON LEFT.

THE STATION MARK IS A 3 1/2 IN. STANDARD DESCHUTES COUNTY ALUMINUM DISK IN A MASS OF CONCRETE 0.3 FT ABOVE GROUND LEVEL, 2 FT. SOUTH OF BIKE PATH, N 60 E 110 FT.FROM A 1 FT. PINE TREE, ABOUT 450 FEET EASTERLY FO THE INTERSECTION TO COLORADO AVE. AND COLUMBIA STREET.

**DESCHUTES COUNTY PRIME CONTROL NETWORK  
CONTROL STATION DESCRIPTION**

<p>NAME: C-30 1921 GIS # 0034 ORDER C-1st. ( GPS )</p> <hr/> <p align="center">STATION LOCATION</p> <div style="border: 1px solid black; width: 150px; height: 150px; margin: 0 auto; display: flex; align-items: center; justify-content: center;"> <p style="font-size: 2em; margin: 0;">.</p> </div> <p align="center">T. 17 S.- R. 12 E., SEC.09</p>	<p>HORIZONTAL DATUM: NAD 83 (1991) VERT. DATUM: NGVD 29 &amp; NAVD 88</p> <hr/> <p>LATITUDE: 44° 06' 53.97704" N LONGITUDE: 121° 17' 27.31060" W</p> <hr/> <p align="center">----- EC CARTESIAN -----</p> <p>X: -2382584.114 METERS Y: -3920061.842 METERS Z: +4417989.709 METERS</p> <hr/> <p align="center">----- HEIGHT -----</p> <p>ELLIPSOIDAL: 1028.261 METERS NGVD 29 : 1048.013 METERS NAVD 88 : 1049.170 METERS</p> <hr/> <p align="center">---- SPC -- OREGON SOUTH ----</p> <p>NORTH: 272280.186±.003 METERS EAST: 1436684.962±.003 METERS</p> <hr/> <p>SCALE FACTOR: 1.000031262 CONVERGENCE: - 0° 32' 27.98 "</p>
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The horizontal coordinates & ellipsoidal height was determined by GPS observations constrained by Oregon High Percision Network. Adjusted by Deschutes Co. Surveyor's Office in July 1991. The orthometric height was determined by differential leveling.

**SURFACE MARKER:**  
 MARK IS STAMPED - C 30 1921 ELEV. 3438.349  
 AGENCY INSCRIPTION - US COST & GEODITIC SURVEY  
 THE STATION IS LOCATED ABOUT 4.0 MILES NORTH OF BEND.

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TO REACH THE STATION FROM BEND, START AT THE INTERSECTION OF US HWY 20 (GREENWOOD AV.) & US HWY 97 (3RD ST.), PROCEED NORTH ON HWY 97 FOR 4.00 MI., TURN RIGHT ON A DIRT ACCESS RD. LEADS TO RAILROAD CROSSING, PROCEED EAST FOR 144 FEET, WALK SOUTH 70 FEET TO THE STATION.

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THE STATION MARK IS A 3 1/2 IN. STANDARD US GEODETIC SURVEY BRASS DISK IN GROUT IN A ROCK LEDGE, 2 FEET ABOVE RAILROAD GRADE. 1 FOOT NORTH OF A WITNES POST. 25 FEET WEST OF THE CENTER OF RAILROAD TRACKS.

**DESCHUTES COUNTY PRIME CONTROL NETWORK  
CONTROL STATION DESCRIPTION**

<p>NAME: GIS 0035 GIS # 0035 ORDER C-1st. ( GPS )</p>	<p>HORIZONTAL DATUM: NAD 83 (1991) VERT. DATUM: NGVD 29 &amp; NAVD 88</p>
<p align="center">STATION LOCATION</p> <div style="border: 1px solid black; width: 200px; height: 150px; margin: 0 auto; text-align: center; vertical-align: middle;"> <p>.....</p> </div> <p align="center">T. 18 S.- R. 12 E., SEC.30</p>	<p>LATITUDE: 43° 59' 27.22059" N LONGITUDE: 121° 19' 54.79581" W</p> <p>----- EC CARTESIAN -----</p> <p>X: -2390428.171 METERS Y: -3926638.995 METERS Z: +4408180.587 METERS</p> <p>----- HEIGHT -----</p> <p>ELLIPSOIDAL: 1176.031 METERS NGVD 29 : 1195.480 METERS NAVD 88 : 1196.648 METERS</p> <p>---- SPC -- OREGON SOUTH ----</p> <p>NORTH: 258523.399±.003 METERS EAST: 1433268.500±.003 METERS</p> <p>SCALE FACTOR: 0.999997699 CONVERGENCE: - 0° 34' 08.88 "</p>

The horizontal coordinates & ellipsoidal height was determined by GPS observations constrained by Oregon High Percision Network. Adjusted by Deschutes Co. Surveyor's Office in July 1991. The orthometric height was determined by differential leveling.

**SURFACE MARKER:**  
MARK IS STAMPED - GIS 0035  
AGENCY INSCRIPTION - NONE  
THE STATION IS LOCATED ABOUT 5 MILE SOUTH OF BEND.

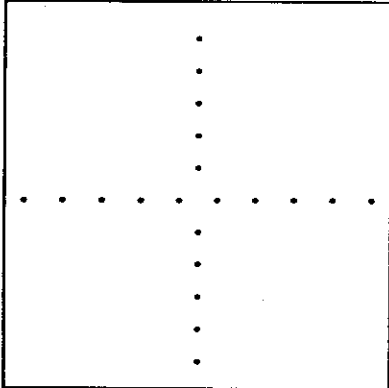
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TO REACH THE STATION FROM BEND, START AT THE INTERSECTION OF US HWY 20 (GREENWOOD AV.) & US HWY 97 (3RD ST.), PROCEED SOUTH ON HWY 97 FOR 5.1 MI TO THE INTERSECTION WITH BAKER ROAD, TURN LEFT ON DIRT ROAD (UNDER CONSTRUCTION FOR 10 YEARS) AND PROCEED EAST FOR 1000 FEET TO THE STATION ON THE RIGHT.

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THE STATION MARK IS A 2 IN BRASS DISK GROUTED IN A ROCK OUTCROP AT GROUND LEVEL.  
8.6 FEET NORTHERLY FROM A WIRE FENCE LINE  
2 FEET NORTH FROM A WITNES POST

**DESCHUTES COUNTY PRIME CONTROL NETWORK  
CONTROL STATION DESCRIPTION**

<p>NAME: GIS 0036 GIS # 0036 ORDER C-1st. ( GPS )</p>	<p>HORIZONTAL DATUM: NAD 83 (1991) VERT. DATUM: NGVD 29 &amp; NAVD 88</p>
<p align="center">STATION LOCATION</p>  <p align="center">T. 18 S.- R. 11 E., SEC.12</p>	<p>LATITUDE: 44° 01' 12.53426" N LONGITUDE: 121° 22' 09.96186" W</p> <p>----- EC CARTESIAN ----- X: -2391820.319 METERS Y: -3923135.440 METERS Z: +4410510.159 METERS</p> <p>----- HEIGHT ----- ELLIPSOIDAL: 1163.330 METERS NGVD 29 : 1182.830 METERS NAVD 88 : 1184.017 METERS ---- SPC -- OREGON SOUTH ---- NORTH: 261804.279±.003 METERS EAST: 1430290.515±.003 METERS</p> <p>SCALE FACTOR: 1.000005183 CONVERGENCE: - 0° 35' 41.36 "</p>

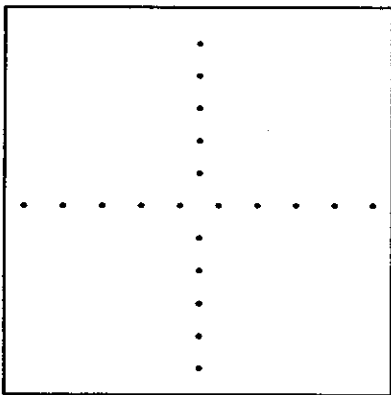
The horizontal coordinates & ellipsoidal height was determined by GPS observations constrained by Oregon High Percision Network. Adjusted by Deschutes Co. Surveyor's Office in July 1991. The orthometric height was determined by differential leveling.

**SURFACE MARKER:**  
MARK IS STAMPED - GIS 0036  
AGENCY INSCRIPTION - DESCHUTES COUNTY SURVEYORS OFFICE  
THE STATION IS LOCATED ABOUT 3 MILE SOUTHWEST OF BEND.

TO REACH THE STATION FROM BEND, START AT THE INTERSECTION OF US HWY 20 (GREENWOOD AV.) & US HWY 97 (3RD ST.), PROCEED SOUTH ON HWY 97 0.3 MI., TURN RIGHT ON FRANKLIN AVE & PROCEED 0.6 MI., LEFT ON BOND ST. & PROCEED SOUTH 0.4 MI., TURN RIGHT ON COLORADO AVE AND PROCEED 1.10 MI. TO THE INTERSECTION WITH CENTURY DRIVE HWY., TURN LEFT AND PROCEED SOUTHERLY 2.5 MI. TO THE STATION ON THE LEFT.

THE STATION MARK IS A 2 IN. BRASS DISK CROUTRED IN A LARGE BOULDER 0.4 FEET ABOVE GROUND LEVEL.  
155 FEET SOUTHEASTERLY FROM ROAD CUT LINE  
2 FEET NORTHER FROM A WITNES POST

**DESCHUTES COUNTY PRIME CONTROL NETWORK  
CONTROL STATION DESCRIPTION**

NAME: GIS 0045 GIS # 0045 ORDER C-1st. ( GPS )	HORIZONTAL DATUM: NAD 83 (1991) VERT. DATUM: NGVD 29 & NAVD 88
<p align="center">STATION LOCATION</p>  <p align="center">T. 18 S.- R. 12 E., SEC.14</p>	<hr/> LATITUDE: 44° 01' 18.86119" N LONGITUDE: 121° 15' 37.12025" W  ----- EC CARTESIAN ----- X: -2384255.491 METERS Y: -3927537.569 METERS Z: +4410616.609 METERS  ----- HEIGHT ----- ELLIPSOIDAL: 1114.408 METERS NGVD 29 : 1133.921 METERS NAVD 88 : 1135.085 METERS ----- SPC -- OREGON SOUTH ----- NORTH: 261914.419±.002 METERS EAST: 1439041.270±.002 METERS  SCALE FACTOR: 1.000005641 CONVERGENCE: - 0° 31' 12.59 "

The horizontal coordinates & ellipsoidal height was determined by GPS observations constrained by Oregon High Percision Network. Adjusted by Deschutes Co. Surveyor's Office in July 1991. The orthometric height was determined by differential leveling.

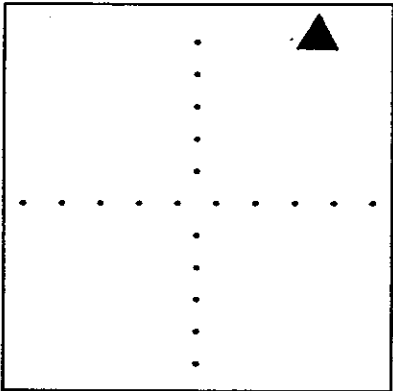
**SURFACE MARKER:**  
 MARK IS STAMPED - GIS 0045  
 AGENCY INSCRIPTION - DESCHUTES COUNTY SUTVEYORS OFFICE  
 THE STATION IS LOCATED ABOUT 3.5 MILES SOUTHEAST OF BEND

TO REACH THE STATION FROM BEND, START AT THE INTERSECTION OF US HWY 20 (GREENWOOD AV.) & US HWY 97 (3RD ST.), PROCEED EAST ON HWY 20 FOR 2.04 MI., TURN RIGHT ON SE 27TH STREET & PROCEED SOUTH FOR 2.35 MI., TURN LEFT AT THE DRIVE WAY TO THE DESCHUTES CO. PUBLIC WORKS DEPT., PROCEED 50 FEET AND KEEP LEFT ON THE NORTH DRIVE WAY FOR 300 FEET TO THE BACK GATE TO THE PUBLIC WORKS COMPOUND, CONTINUE EAST FOR 350 FEET TO THE STATION ON THE LEFT.

THE STATION MARK IS A 3 1/2 IN. STANDARD DESCHUTES COUNTY ALUMINUM DISK IN A MASS OF CONCRETE AT GROUND LEVEL.  
 40 FEET NORTH OF THE EDGE OF PAVEMENT.  
 160 FEET EAST OF A CONCRETE LOADING DOCK.  
 6.0 FEET SOUTH OF A CHAIN LINK FENCE.

DESCHUTES COUNTY SURVEYOR'S OFFICE  
 61150 S.E. 27th St.  
 Bend, Oregon. 97702  
 (503) 383-4395

**DESCHUTES COUNTY PRIME CONTROL NETWORK  
CONTROL STATION DESCRIPTION**

<p>NAME: B004 ODOT 1990 GIS # NONE ORDER C-1st. ( GPS )</p>	<p>HORIZONTAL DATUM: NAD 83 (1991) VERT. DATUM: NGVD 29 &amp; NAVD 88</p>
<p align="center">STATION LOCATION</p>  <p align="center">T. 17 S.- R. 12 E., SEC.32</p>	<p>LATITUDE: 44° 03' 57.08173" N LONGITUDE: 121° 18' 23.36057" W</p> <p>----- EC CARTESIAN ----- X: -2385645.695 METERS Y: -3922696.988 METERS Z: +4414108.786 METERS</p> <p>----- HEIGHT ----- ELLIPSOIDAL: 1087.536 METERS NGVD 29 : 1107.173 METERS NAVD 88 : 1108.360 METERS ---- SPC -- OREGON SOUTH ---- NORTH: 266832.319±.004 METERS EAST: 1435386.050±.003 METERS</p> <p>SCALE FACTOR: 1.000017405 CONVERGENCE: - 0° 33' 06.33 "</p>

The horizontal coordinates & ellipsoidal height was determined by GPS observations constrained by Oregon High Percision Network. Adjusted by Deschutes Co. Surveyor's Office in July 1991. The orthometric height was determined by differential leveling.

**SURFACE MARKER:**  
MARK IS STAMPED - B004 1990  
AGENCY INSCRIPTION - OREGON HIGHWAY DEPARTMENT  
THE STATION IS LOCATED ABOUT ( IN BEND )

TO REACH THE STATION FROM BEND, START AT THE INTERSECTION OF US HWY 20 (GREENWOOD AV.) & US HWY 97 (3RD ST.), PROCEED NORTH ON HWY 97 FOR 1.45 MI., TURN LEFT ON REVER STREET AND PROCEED WEST FOR 0.44 MI. TO DIVISION STREET AND TURN LEFT AND PROCEED SOUTH FOR 0.45 MI AND TURN LEFT AT DRIVE WAY TO PARKING LOT IN BACK OF ITALIAN COTTAGE RESTAURANT

THE STATION MARK IS A STANDARD HIGHWAY BRASS CAP IN CONCRETE IN A 6 IN. DIA. PIPE MON. BOX 1.0 FEET BELOW ASPHALT SURFACE IN NORTHEAST CORNER OF THE PARKING LOT.  
134.5 FEET EAST OF NORTHEAST OF RESTAURANT  
53.1 FEET SOUTH OF YARD LIGHT POLE

**O.D.O.T.**

**BEND PARKWAY**

**G.P.S.**

**CONTROL**

**POINTS**



## CONTROL MARK DATA

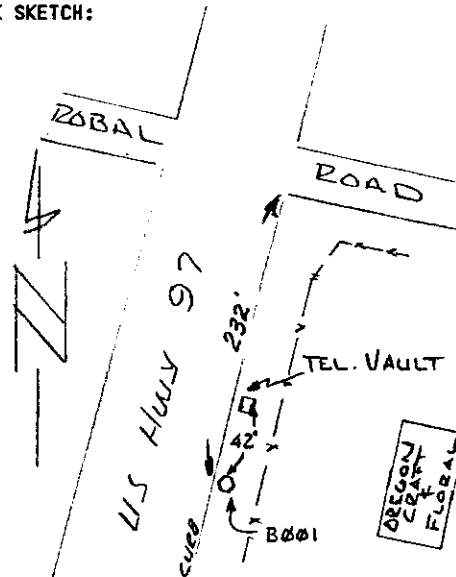
NAME OF MARK: B001 COUNTY: DESCHUTES  
 MARK SET BY: OREGON HIGHWAY DIVISION STATE: OREGON  
 DATE OF MARK: 1991 COUNTRY: U.S.A.  
 LOCATION: SECTION 16 TOWNSHIP 17 S. RANGE 12 E. MERIDIAN: WILLAMETTE  
 REFERENCE NUMBER: NONE

**MARK DESCRIPTION:**  
 TO REACH THE MARK FROM THE INTERSECTION OF HWY. 97 (3 RD STREET) & HWY. 20 (GREENWOOD AVE.) PROCEED NORTH ON HWY. 97 FOR 2.95 MILES TO THE MARK ON THE RIGHT.

THE MARK IS A STANDARD OREGON STATE HWY. REFERENCE BRASS CAP IN A 6 IN. STEEL PIPE 1.0 FT. BELOW GROUND LEVEL.

3 FEET EAST OF EAST CURB.  
 43 FEET SOUTH OF A TELEPHONE VAULT.  
 232 FEET SOUTH OF ROBAL ROAD.

**MARK SKETCH:**



DATA COMPUTED BY: DESCHUTES COUNTY SURVEYOR'S OFFICE DATE: 1991-1992  
 FIELD METHOD: GPS FIELD EQUIPMENT: TRIMBLE 4000ST ADJUSTED WITH: TRIMNET PLUS

DATUM: HORIZONTAL= <u>NAD (83-91)</u>	CENTRAL MERIDIAN: <u>W 121°17'00.000000"</u>
VERTICAL= <u>NGVD 29</u>	LATITUDE OF ORIGIN: <u>N 43°00'00.000000"</u>
COORDINATE SYSTEM: <u>TRANSVERSE MERCATOR</u>	ORIGIN NORTHING: <u>0.0000 F</u>
ZONE: <u>DESCHUTES COUNTY</u>	ORIGIN EASTING: <u>3,300,000.0000 F</u>
LINEAR UNITS: <u>INTERNATIONAL FOOT</u>	SCALE ALONG MERIDIAN: <u>1.000160000000</u>

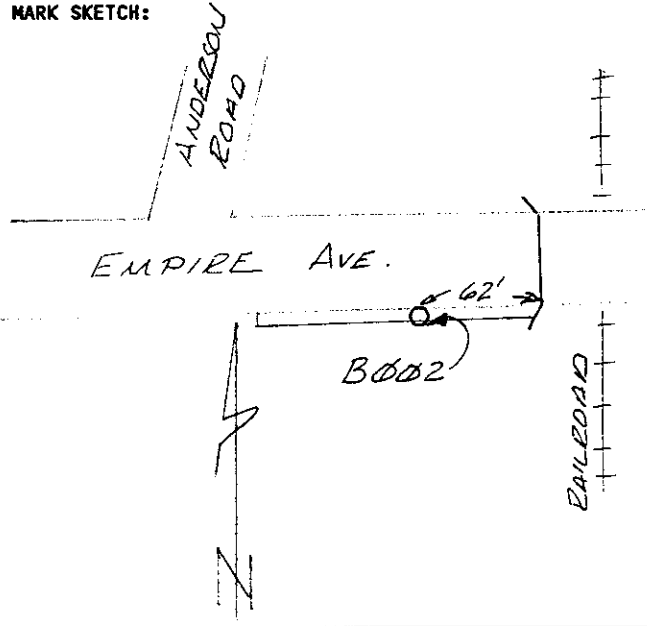
**GEODETIC AND MAPPING COORDINATES**

			ONE SIGMA ERROR
B001	Latitude	N 44°06'07.770647"	
	Longitude	W 121°17'57.788789"	
	Scale Factor	1.000160020312	
	Convergence	-0°00'40.2175"	
	Northing(y)	401815.5080	0.010729F
	Easting (x)	3295782.4815	0.009904F
	Ellipsoid Height	3440.0961	0.012874F
	Orthometric Height	3504.8094	0.017670F
	Geoid Height	-64.7133	0.012104F

## CONTROL MARK DATA

NAME OF MARK: BO02 COUNTY: DESCHUTES  
 MARK SET BY: OREGON HIGHWAY DIVISION STATE: OREGON  
 DATE OF MARK: 1991 COUNTRY: U.S.A.  
 LOCATION: SECTION 21 TOWNSHIP 17 S. RANGE 12 E. MERIDIAN: WILLAMETTE  
 REFERENCE NUMBER: NONE

**MARK DESCRIPTION:**  
 TO REACH THE MARK FROM THE INTERSECTION OF HWY. 97 (3 RD STREET) & HWY. 20 (GREENWOOD AVE.) PROCEED NORTH ON HWY. 97 FOR 2.15 MILES TO EMPIRE AVE., TURN RIGHT & PROCEED 0.18 MI. TO THE MARK ON THE RIGHT.  
  
 THE MARK IS A OREGON STATE HIGHWAY DIVISION TRIANGULATION BRASS CAP GROUDED IN THE SOUTH SIDEWALK OF EMPIRE AVE. AND MARKED "WB 7 1988".  
  
 1 FOOT SOUTH OF SOUTH CURB.  
 62 FT. WEST OF WESTERLY BRIDGE ABUTMENT.



DATA COMPUTED BY: DESCHUTES COUNTY SURVEYOR'S OFFICE DATE: 1991-1992  
 FIELD METHOD: GPS FIELD EQUIPMENT: TRIMBLE 4000ST ADJUSTED WITH: TRIMNET PLUS

DATUM: HORIZONTAL= NAD (83-91) VERTICAL= NGVD 29	CENTRAL MERIDIAN: W 121°17'00.000000" LATITUDE OF ORIGIN: N 43°00'00.000000"
COORDINATE SYSTEM: TRANSVERSE MERCATOR	ORIGIN NORTHING: 0.0000 F
ZONE: DESCHUTES COUNTY	ORIGIN EASTING: 3,300,000.0000 F
LINEAR UNITS: INTERNATIONAL FOOT	SCALE ALONG MERIDIAN: 1.000160000000

**GEODETTIC AND MAPPING COORDINATES**

		ONE SIGMA ERROR
BO02	Latitude	N 44°05'26.835694"
	Longitude	W 121°18'01.289967"
	Scale Factor	1.000160022857
	Convergence	-0°00'42.6454"
	Northing (y)	397669.6902 0.011107F
	Easting (x)	3295526.1026 0.010561F
	Ellipsoid Height	3489.7181 0.012837F
	Orthometric Height	3554.3446 0.018463F
	Geoid Height	-64.6266 0.013270F

## CONTROL MARK DATA

NAME OF MARK: B003 COUNTY: DESCHUTES  
 MARK SET BY: OREGON HIGHWAY DIVISION STATE: OREGON  
 DATE OF MARK: 1991 COUNTRY: U.S.A.  
 LOCATION: SECTION 28 TOWNSHIP 17 S. RANGE 12 E. MERIDIAN: WILLAMETTE  
 REFERENCE NUMBER: NONE

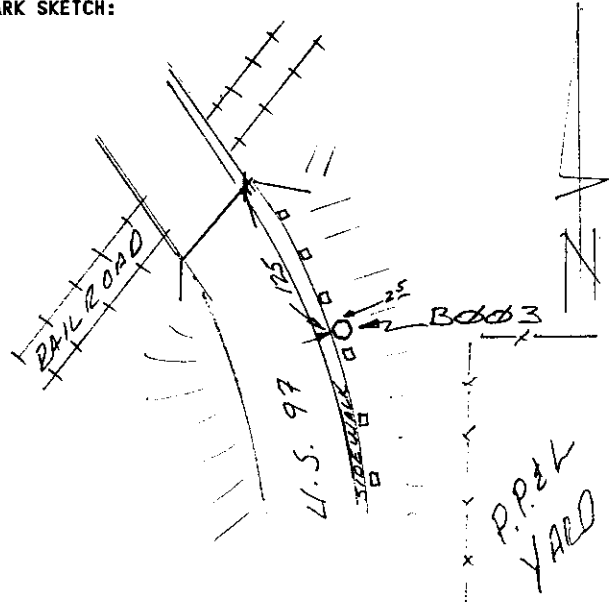
**MARK DESCRIPTION:**

TO REACH THE MARK FROM THE INTERSECTION OF HWY. 97 (3 RD STREET) & HWY. 20 (GREENWOOD AVE.) PROCEED NORTH ON HWY. 97 FOR 0.9 MI. TO THE MARK ON THE RIGHT

THE MARK IS A STANDARD OREGON STATE HIGHWAY REFERENCE BRASS CAP MARKED "GPS B003" 1 FT. BELOW GROUND LEVEL IN A 6" STEEL PIPE IN CONCRETE.

2.5 FT. EAST OF EAST SIDE OF SIDEWALK.  
125.5 FT. SOUTHERLY FROM BRIDGE DECK.

**MARK SKETCH:**



DATA COMPUTED BY: DESCHUTES COUNTY SURVEYOR'S OFFICE DATE: 1991-1992

FIELD METHOD: GPS FIELD EQUIPMENT: TRIMBLE 4000ST ADJUSTED WITH: TRIMNET PLUS

DATUM: HORIZONTAL= <u>NAD (83-91)</u> VERTICAL= <u>NGVD 29</u>	CENTRAL MERIDIAN: <u>W 121°17'00.000000"</u> LATITUDE OF ORIGIN: <u>N 43°00'00.000000"</u>
COORDINATE SYSTEM: <u>TRANSVERSE MERCATOR</u>	ORIGIN NORTHING: <u>0.0000 F</u>
ZONE: <u>DESCHUTES COUNTY</u>	ORIGIN EASTING: <u>3,300,000.0000 F</u>
LINEAR UNITS: <u>INTERNATIONAL FOOT</u>	SCALE ALONG MERIDIAN: <u>1.000160000000</u>

**GEODETTIC AND MAPPING COORDINATES**

		ONE SIGMA ERROR
B003	Latitude	N 44°04'25.430925"
	Longitude	W 121°18'07.169984"
	Scale Factor	1.000160027469
	Convergence	-0°00'46.7223"
	Northing(y)	391450.7581      0.010431F
	Easting (x)	3295095.4784      0.010339F
	Ellipsoid Height	3555.8490      0.011250F
	Orthometric Height	3620.3488      0.014877F
	Geoid Height	-64.4998      0.009736F

## CONTROL MARK DATA

NAME OF MARK: B005 COUNTY: DESCHUTES  
 MARK SET BY: OREGON HIGHWAY DIVISION STATE: OREGON  
 DATE OF MARK: 1991 COUNTRY: U.S.A.  
 LOCATION: SECTION 32 TOWNSHIP 17 S. RANGE 12 E. MERIDIAN: WILLAMETTE  
 REFERENCE NUMBER: NONE

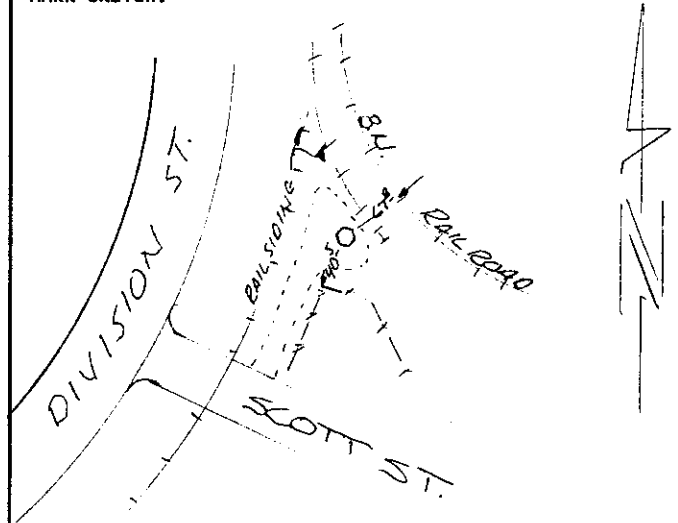
**MARK DESCRIPTION:**

TO REACH THE MARK FROM THE INTERSECTION OF HWY. 97 (3 RD STREET) & HWY. 20 (GREENWOOD AVE.) PROCEED SOUTH ON HWY. 97 FOR 1.8 MI. TO WILSON AVE., TURN RIGHT & PROCEED WEST FOR 0.16 MI. TO DIVISION ST., TURN RIGHT & PROCEED NORTH FOR 0.68 MI TO SCOTT ST., TURN RIGHT & PROCEED EAST FOR 100 FT. TO CANAL ST., TURN LEFT & PROCEED NORTH FOR 300 FT. TO THE MARK ON THE RIGHT

THE MARK IS A STANDARD OREGON STATE HIGHWAY REFERENCE BRASS CAP MARKED "GPS B005" SET 1 FT. BELOW GROUND LEVEL IN A 6" STEEL PIPE IN CONCRETE.

68 FT. WEST OF MAINLINE RAILROAD TRACK.  
 40.5 FT. NORTH OF BOARD FENCE CORNER.

**MARK SKETCH:**



DATA COMPUTED BY: DESCHUTES COUNTY SURVEYOR'S OFFICE DATE: 1991-1992  
 FIELD METHOD: GPS FIELD EQUIPMENT: TRIMBLE 4000ST ADJUSTED WITH: TRIMNET PLUS

DATUM: HORIZONTAL= NAD (83-91) CENTRAL MERIDIAN: W 121°17'00.000000"  
 VERTICAL= NGVD 29 LATITUDE OF ORIGIN: N 43°00'00.000000"  
 COORDINATE SYSTEM: TRANSVERSE MERCATOR ORIGIN NORTHING: 0.0000 F  
 ZONE: DESCHUTES COUNTY ORIGIN EASTING: 3,300,000.0000 F  
 LINEAR UNITS: INTERNATIONAL FOOT SCALE ALONG MERIDIAN: 1.000160000000

**GEODETTIC AND MAPPING COORDINATES**

			ONE SIGMA ERROR
B005	Latitude	N 44°03'14.105975"	
	Longitude	W 121°18'23.842497"	
	Scale Factor	1.000160042826	
	Convergence	-0°00'58.2986"	
	Northing (y)	384227.3586	0.011252F
	Easting (x)	3293876.0667	0.010921F
	Ellipsoid Height	3573.9459	0.012233F
	Orthometric Height	3638.2754	0.015532F
	Geoid Height	-64.3295	0.009570F

## CONTROL MARK DATA

NAME OF MARK: B006 COUNTY: DESCHUTES  
 MARK SET BY: OREGON HIGHWAY DIVISION STATE: OREGON  
 DATE OF MARK: 1991 COUNTRY: U.S.A.  
 LOCATION: SECTION 5 TOWNSHIP 18 S. RANGE 12 E. MERIDIAN: WILLAMETTE  
 REFERENCE NUMBER: NONE

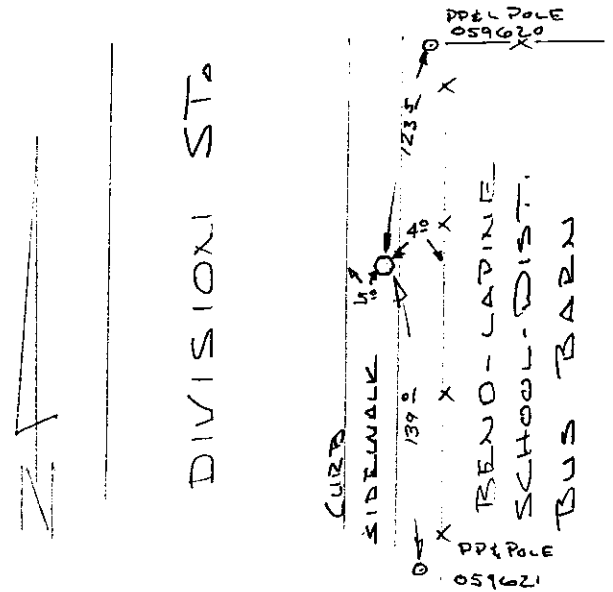
**MARK DESCRIPTION:**

TO REACH THE MARK FROM THE INTERSECTION  
 OF HWY. 97 (3 RD STREET) & HWY. 20  
 (GREENWOOD AVE.) PROCEED SOUTH ON HWY.  
 97 FOR 1.8 MI. TO WILSON AVE., TURN  
 RIGHT & PROCEED WEST FOR 0.16 MI. TO  
 DIVISION ST., TURN RIGHT & PROCEED NORTH  
 FOR 0.1 MI TO THE MARK ON THE RIGHT

THE MARK IS A STANDARD OREGON STATE  
 HIGHWAY REFERENCE BRASS CAP MARKED "GPS  
 B006" SET IN THE SURFACE OF THE EAST  
 SIDEWALK.

5 FT. EAST OF EAST CURB FACE.  
 139.0 FT. NORTH OF A POWER POLE.  
 123.5 FT. SOUTH OF A POWER POLE.

**MARK SKETCH:**



DATA COMPUTED BY: DESCHUTES COUNTY SURVEYOR'S OFFICE DATE: 1991-1992

FIELD METHOD: GPS FIELD EQUIPMENT: TRIMBLE 4000ST ADJUSTED WITH: TRIMNET PLUS

DATUM: HORIZONTAL= <u>NAD (83-91)</u>	CENTRAL MERIDIAN: <u>W 121°17'00.000000"</u>
VERTICAL= <u>NGVD 29</u>	LATITUDE OF ORIGIN: <u>N 43°00'00.000000"</u>
COORDINATE SYSTEM: <u>TRANSVERSE MERCATOR</u>	ORIGIN NORTHING: <u>0.0000 F</u>
ZONE: <u>DESCHUTES COUNTY</u>	ORIGIN EASTING: <u>3,300,000.0000 F</u>
LINEAR UNITS: <u>INTERNATIONAL FOOT</u>	SCALE ALONG MERIDIAN: <u>1.000160000000</u>

**GEODETTIC AND MAPPING COORDINATES**

		ONE SIGMA ERROR
B006	Latitude	N 44°02'44.312637"
	Longitude	W 121°18'20.612704"
	Scale Factor	1.000160039601
	Convergence	-0°00'56.0445"
	Northing(y)	381209.8653 0.011620F
	Easting (x)	3294111.1538 0.011253F
	Ellipsoid Height	3614.2905 0.013094F
	Orthometric Height	3678.5459 0.016791F
	Geoid Height	-64.2554 0.010511F

## CONTROL MARK DATA

NAME OF MARK: B007 COUNTY: DESCHUTES  
 MARK SET BY: OREGON HIGHWAY DIVISION STATE: OREGON  
 DATE OF MARK: 1991 COUNTRY: U.S.A.  
 LOCATION: SECTION 5 TOWNSHIP 18 S. RANGE 12 E. MERIDIAN: WILLAMETTE  
 REFERENCE NUMBER: NONE

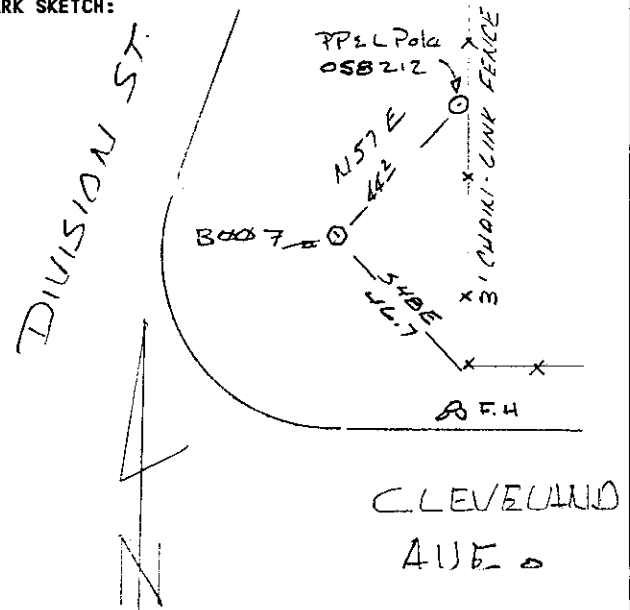
**MARK DESCRIPTION:**

TO REACH THE MARK FROM THE INTERSECTION OF HWY. 97 (3 RD STREET) & HWY. 20 (GREENWOOD AVE.) PROCEED SOUTH ON HWY. 97 FOR 1.8 MI. TO WILSON AVE., TURN RIGHT & PROCEED WEST FOR 0.16 MI. TO DIVISION ST., TURN LEFT & PROCEED SOUTH FOR 0.24 MI TO THE MARK ON THE LEFT.

THE MARK IS A STANDARD OREGON STATE HIGHWAY REFERENCE BRASS CAP MARKED "GPS B007" SET 1 FT. BELOW GROUND LEVEL IN A 6" STEEL PIPE IN CONCRETE. THE IS NEAR THE RADIUS OF THE NE CURB RETURN

44.2 FT. SW FROM A POWER POLE.  
46.7 FT. NW FROM A CHAIN-LINK FENCE COR.

**MARK SKETCH:**



DATA COMPUTED BY: DESCHUTES COUNTY SURVEYOR'S OFFICE DATE: 1991-1992

FIELD METHOD: GPS FIELD EQUIPMENT: TRIMBLE 4000ST ADJUSTED WITH: TRIMNET PLUS

DATUM: HORIZONTAL= <u>NAD (83-91)</u>	CENTRAL MERIDIAN: <u>W 121°17'00.000000"</u>
VERTICAL= <u>NGVD 29</u>	LATITUDE OF ORIGIN: <u>N 43°00'00.000000"</u>
COORDINATE SYSTEM: <u>TRANSVERSE MERCATOR</u>	ORIGIN NORTHING: <u>0.0000 F</u>
ZONE: <u>DESCHUTES COUNTY</u>	ORIGIN EASTING: <u>3,300,000.0000 F</u>
LINEAR UNITS: <u>INTERNATIONAL FOOT</u>	SCALE ALONG MERIDIAN: <u>1.000160000000</u>

**GEODETTIC AND MAPPING COORDINATES**

		ONE SIGMA ERROR
B007	Latitude	N 44°02'27.019645"
	Longitude	W 121°18'21.072018"
	Scale Factor	1.000160040060
	Convergence	-0°00'56.3589"
	Northing(y)	379458.4663 0.010490F
	Easting (x)	3294077.1219 0.010372F
	Ellipsoid Height	3639.4525 0.012271F
	Orthometric Height	3703.6639 0.016525F
	Geoid Height	-64.2114 0.011068F

## CONTROL MARK DATA

NAME OF MARK: B008 COUNTY: DESCHUTES  
 MARK SET BY: OREGON HIGHWAY DIVISION STATE: OREGON  
 DATE OF MARK: 1991 COUNTRY: U.S.A.  
 LOCATION: SECTION 8 TOWNSHIP 18 S. RANGE 12 E. MERIDIAN: WILLAMETTE  
 REFERENCE NUMBER: NONE

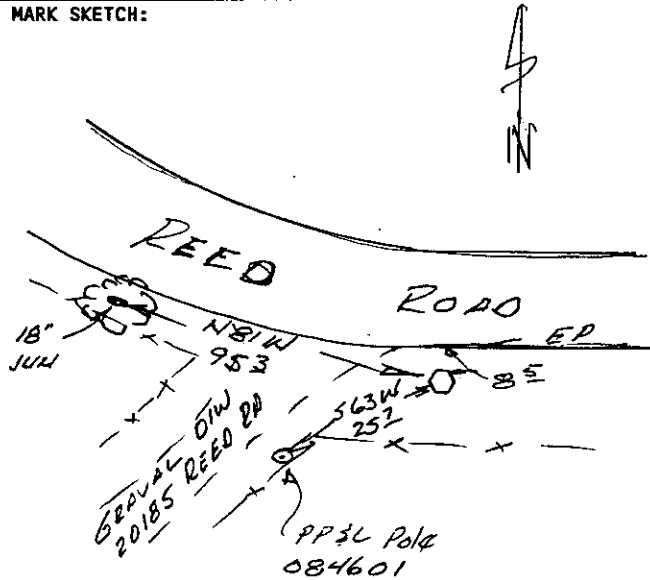
**MARK DESCRIPTION:**

TO REACH THE MARK FROM THE INTERSECTION OF HWY. 97 (3 RD STREET) & HWY. 20 (GREENWOOD AVE.) PROCEED SOUTH ON HWY. 97 FOR 2.0 MI. TO REED ROAD, TURN RIGHT & PROCEED WEST FOR 0.27 MI. TO THE MARK ON THE LEFT.

THE MARK IS A STANDARD OREGON STATE HIGHWAY REFERENCE BRASS CAP MARKED "GPS B008 SET 1 FT. BELOW GROUND LEVEL IN A 6" STEEL PIPE IN CONCRETE.

8.5 FT. SOUTH OF SOUTH ED OF RD.  
 25.7 FT. NE FROM A POWER POLE.  
 95.3 FT. SE FROM A JUNIPER TREE.

**MARK SKETCH:**



DATA COMPUTED BY: DESCHUTES COUNTY SURVEYOR'S OFFICE DATE: 1991-1992

FIELD METHOD: GPS FIELD EQUIPMENT: TRIMBLE 4000ST ADJUSTED WITH: TRIMNET PLUS

DATUM: HORIZONTAL= <u>NAD (83-91)</u>	CENTRAL MERIDIAN: <u>W 121°17'00.000000"</u>
VERTICAL= <u>NGVD 29</u>	LATITUDE OF ORIGIN: <u>N 43°00'00.000000"</u>
COORDINATE SYSTEM: <u>TRANSVERSE MERCATOR</u>	ORIGIN NORTHING: <u>0.0000 F</u>
ZONE: <u>DESCHUTES COUNTY</u>	ORIGIN EASTING: <u>3,300,000.0000 F</u>
LINEAR UNITS: <u>INTERNATIONAL FOOT</u>	SCALE ALONG MERIDIAN: <u>1.000160000000</u>

**GEODETTIC AND MAPPING COORDINATES**

		ONE SIGMA ERROR
B008	Latitude	N 44°01'56.949175"
	Longitude	W 121°18'48.536165"
	Scale Factor	1.000160071819
	Convergence	-0°01'15.4398"
	Northing(y)	376413.6190      0.011461F
	Easting (x)	3292069.5598      0.011400F
	Ellipsoid Height	3687.6805      0.013100F
	Orthometric Height	3751.8184      0.017582F
	Geoid Height	-64.1379      0.011727F





## CONTROL MARK DATA

NAME OF MARK: B010 COUNTY: DESCHUTES  
 MARK SET BY: OREGON HIGHWAY DIVISION STATE: OREGON  
 DATE OF MARK: 1991 COUNTRY: U.S.A.  
 LOCATION: SECTION 8 TOWNSHIP 18 S. RANGE 12 E. MERIDIAN: WILLAMETTE  
 REFERENCE NUMBER: NONE

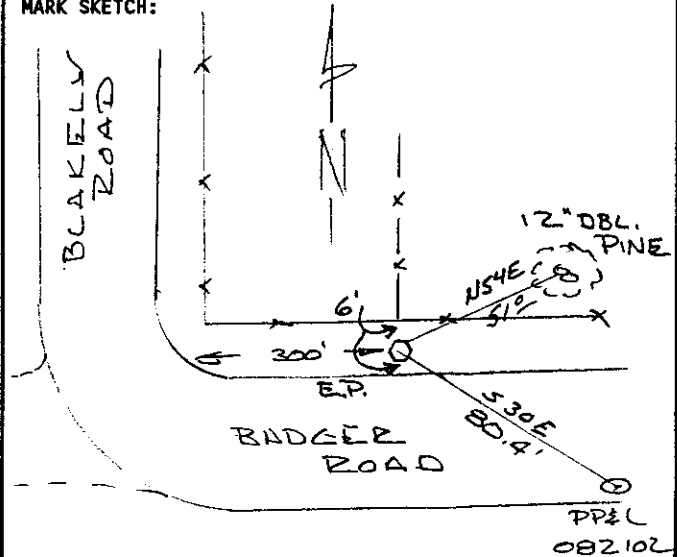
**MARK DESCRIPTION:**

TO REACH THE MARK FROM THE INTERSECTION OF HWY. 97 (3 RD STREET) & HWY. 20 (GREENWOOD AVE.) PROCEED SOUTH ON HWY. 97 FOR 2.64 MI. TO BADGER ROAD, TURN RIGHT & PROCEED WEST FOR 0.16 MI. TO THE MARK ON THE RIGHT.

THE MARK IS A STANDARD OREGON STATE HIGHWAY REFERENCE BRASS CAP MARKED "GPS B010" SET 1 FT. BELOW GROUND LEVEL IN A 6" STEEL PIPE IN CONCRETE.

6 FT. NORTH OF NORTH EDGE OF RD.  
 6 FT. SOUTH OF A WIRE FENCE.  
 300 FT EAST OF BLAKELY RD.

**MARK SKETCH:**



DATA COMPUTED BY: DESCHUTES COUNTY SURVEYOR'S OFFICE DATE: 1991-1992  
 FIELD METHOD: GPS FIELD EQUIPMENT: TRIMBLE 4000ST ADJUSTED WITH: TRIMNET PLUS

DATUM: HORIZONTAL= NAD (83-91) CENTRAL MERIDIAN: W 121°17'00.000000"  
 VERTICAL= NGVD 29 LATITUDE OF ORIGIN: N 43°00'00.000000"  
 COORDINATE SYSTEM: TRANSVERSE MERCATOR ORIGIN NORTHING: 0.0000 F  
 ZONE: DESCHUTES COUNTY ORIGIN EASTING: 3,300,000.0000 F  
 LINEAR UNITS: INTERNATIONAL FOOT SCALE ALONG MERIDIAN: 1.000160000000

**GEODETTIC AND MAPPING COORDINATES**

			ONE SIGMA ERROR
B010	Latitude	N 44°01'28.321010"	
	Longitude	W 121°19'05.034357"	
	Scale Factor	1.000160095338	
	Convergence	0°01'26.8947"	
	Northing(y)	373514.6835	0.011594F
	Easting (x)	3290862.8606	0.011377F
	Ellipsoid Height	3723.2493	0.013132F
	OrthoMetric Height	3787.3182	0.018420F
	Geoid Height	-64.0688	0.012917F

## CONTROL MARK DATA

NAME OF MARK: B011 COUNTY: DESCHUTES  
 MARK SET BY: OREGON HIGHWAY DIVISION STATE: OREGON  
 DATE OF MARK: 1991 COUNTRY: U.S.A.  
 LOCATION: SECTION 17 TOWNSHIP 18 S. RANGE 12 E. MERIDIAN: WILLAMETTE  
 REFERENCE NUMBER: NONE

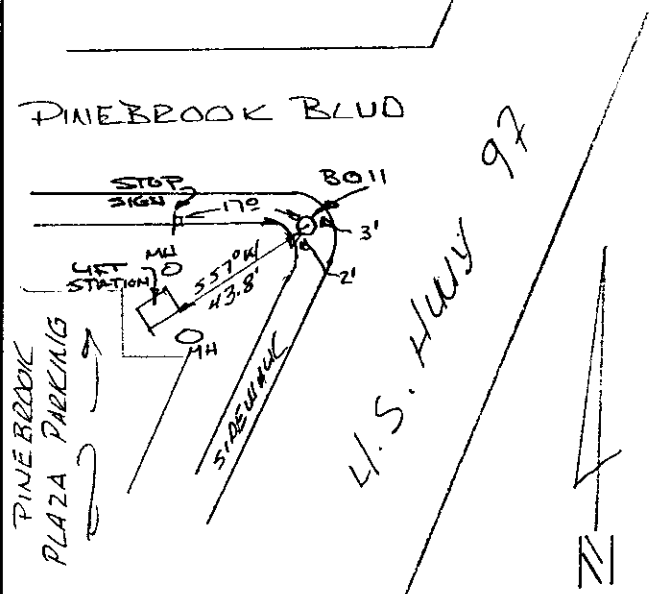
**MARK DESCRIPTION:**

TO REACH THE MARK FROM THE INTERSECTION OF HWY. 97 (3 RD STREET) & HWY. 20 (GREENWOOD AVE.) PROCEED SOUTH ON HWY. 97 FOR 2.85 MI. TO THE MARK ON THE RIGHT.

THE MARK IS A STANDARD OREGON STATE HIGHWAY REFERENCE BRASS CAP MARKED "GPS B011" GROUTED INTO THE CONCRETE SIDEWALK AN THE SW COR. OF 97 & PINEBROOK BLVD.

3 FT. WEST OF CURB FACE.  
17 FT. EAST OF STOP SIGN.

**MARK SKETCH:**



DATA COMPUTED BY: DESCHUTES COUNTY SURVEYOR'S OFFICE DATE: 1991-1992  
 FIELD METHOD: GPS FIELD EQUIPMENT: TRIMBLE 4000ST ADJUSTED WITH: TRIMNET PLUS

DATUM: HORIZONTAL= <u>NAD (83-91)</u>	CENTRAL MERIDIAN: <u>W 121°17'00.000000"</u>
VERTICAL= <u>NGVD 29</u>	LATITUDE OF ORIGIN: <u>N 43°00'00.000000"</u>
COORDINATE SYSTEM: <u>TRANSVERSE MERCATOR</u>	ORIGIN NORTHING: <u>0.0000 F</u>
ZONE: <u>DESCHUTES COUNTY</u>	ORIGIN EASTING: <u>3,300,000.0000 F</u>
LINEAR UNITS: <u>INTERNATIONAL FOOT</u>	SCALE ALONG MERIDIAN: <u>1.000160000000</u>

**GEODETTIC AND MAPPING COORDINATES**

		ONE SIGMA ERROR
B011	Latitude	N 44°01'16.638100"
	Longitude	W 121°18'58.907837"
	Scale Factor	1.000160086234
	Convergence	-0°01'22.6321"
	Northing(y)	372331.2762      0.011777F
	Easting (x)	3291310.0944      0.011678F
	Ellipsoid Height	3720.9551      0.013249F
	OrthoMetric Height	3784.9941      0.018770F
	Geoid Height	-64.0390      0.013296F

## CONTROL MARK DATA

NAME OF MARK: B012 COUNTY: DESCHUTES  
 MARK SET BY: OREGON HIGHWAY DIVISION STATE: OREGON  
 DATE OF MARK: 1991 COUNTRY: U.S.A.  
 LOCATION: SECTION 17 TOWNSHIP 18 S. RANGE 12 E. MERIDIAN: WILLAMETTE  
 REFERENCE NUMBER: NONE

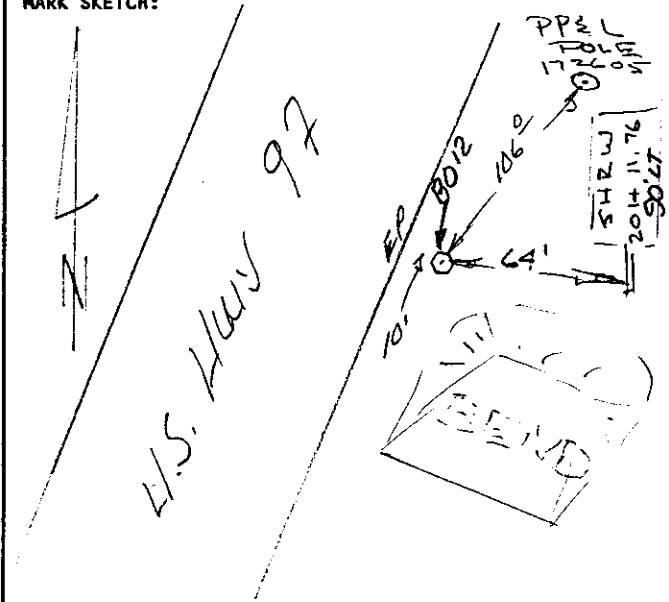
**MARK DESCRIPTION:**

TO REACH THE MARK FROM THE INTERSECTION OF HWY. 97 (3 RD STREET) & HWY. 20 (GREENWOOD AVE.) PROCEED SOUTH ON HWY. 97 FOR 3.21 MI. TO THE MARK ON THE LEFT.

THE MARK IS A STANDARD OREGON STATE HIGHWAY REFERENCE BRASS CAP MARKED "GPS B012" SET 1 FT. BELOW GROUND LEVEL IN A 6" STEEL PIPE IN CONCRETE.

10 FT. EAST OF EAST EDGE OF HWY 97  
106 FT. SW FROM A POWER POLE.

**MARK SKETCH:**



DATA COMPUTED BY: DESCHUTES COUNTY SURVEYOR'S OFFICE DATE: 1991-1992

FIELD METHOD: GPS FIELD EQUIPMENT: TRIMBLE 4000ST ADJUSTED WITH: TRIMNET PLUS

DATUM: HORIZONTAL=	NAD (83-91)	CENTRAL MERIDIAN:	W 121°17'00.000000"
VERTICAL=	NGVD 29	LATITUDE OF ORIGIN:	N 43°00'00.000000"
COORDINATE SYSTEM:	TRANSVERSE MERCATOR	ORIGIN NORTHING:	0.0000 F
ZONE:	DESCHUTES COUNTY	ORIGIN EASTING:	3,300,000.0000 F
LINEAR UNITS:	INTERNATIONAL FOOT	SCALE ALONG MERIDIAN:	1.000160000000

**GEODETTIC AND MAPPING COORDINATES**

			ONE SIGMA ERROR
B012	Latitude	N 44°00'58.373239"	
	Longitude	W 121°19'05.213924"	
	Scale Factor	1.000160095639	
	Convergence	-0°01'27.0064"	
	Northing(y)	370481.6361	0.011539F
	Easting (x)	3290848.4588	0.011373F
	Ellipsoid Height	3727.8585	0.012897F
	OrthoMetric Height	3791.8544	0.018622F
	Geoid Height	-63.9958	0.013433F

## CONTROL MARK DATA

NAME OF MARK: B013 COUNTY: DESCHUTES  
 MARK SET BY: OREGON HIGHWAY DIVISION STATE: OREGON  
 DATE OF MARK: 1991 COUNTRY: U.S.A.  
 LOCATION: SECTION 17 TOWNSHIP 18 S. RANGE 12 E. MERIDIAN: WILLAMETTE  
 REFERENCE NUMBER: NONE

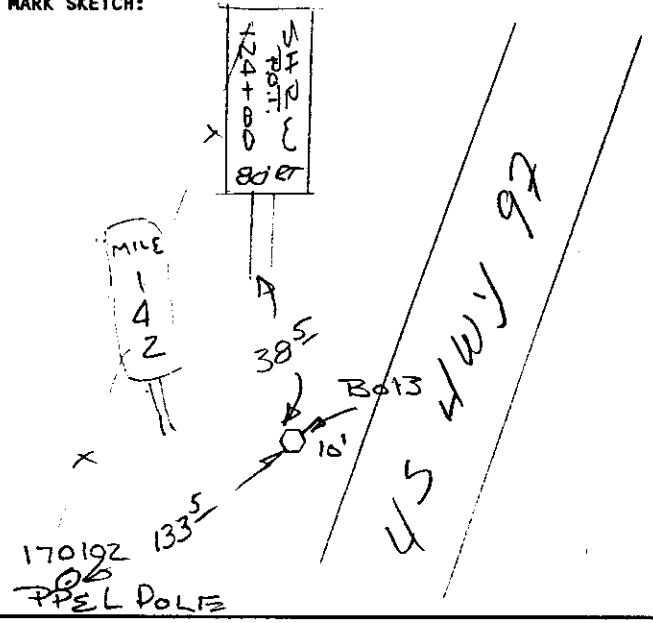
**MARK DESCRIPTION:**

TO REACH THE MARK FROM THE INTERSECTION OF HWY. 97 (3 RD STREET) & HWY. 20 (GREENWOOD AVE.) PROCEED SOUTH ON HWY. 97 FOR 3.64 MI. TO THE MARK ON THE RIGHT.

THE MARK IS A STANDARD OREGON STATE HIGHWAY REFERENCE BRASS CAP MARKED "GPS B013" SET 1 FT. BELOW GROUND LEVEL IN A 6" STEEL PIPE IN CONCRETE.

6 FT. WEST OF WEST EDGE OF HWY. 97  
133.5 FT. NORTHERLY FROM A POWER POLE.

**MARK SKETCH:**



DATA COMPUTED BY: DESCHUTES COUNTY SURVEYOR'S OFFICE DATE: 1991-1992

FIELD METHOD: GPS FIELD EQUIPMENT: TRIMBLE 4000ST ADJUSTED WITH: TRIMNET PLUS

DATUM: HORIZONTAL=	NAD (83-91)	CENTRAL MERIDIAN:	W 121°17'00.000000"
VERTICAL=	NGVD 29	LATITUDE OF ORIGIN:	N 43°00'00.000000"
COORDINATE SYSTEM:	TRANSVERSE MERCATOR	ORIGIN NORTHING:	0.0000 F
ZONE:	DESCHUTES COUNTY	ORIGIN EASTING:	3,300,000.0000 F
LINEAR UNITS:	INTERNATIONAL FOOT	SCALE ALONG MERIDIAN:	1.000160000000

**GEODETIC AND MAPPING COORDINATES**

		ONE SIGMA ERROR
B013	Latitude	N 44°00'38.581111"
	Longitude	W 121°19'19.550405"
	Scale Factor	1.000160118816
	Convergence	-0°01'36.9586"
	Northing (y)	368477.5970 0.010992F
	Easting (x)	3289799.7025 0.010564F
	Ellipsoid Height	3770.6373 0.012537F
	OrthoMetric Height	3834.5894 0.018080F
	Geoid Height	-63.9521 0.013027F

## CONTROL MARK DATA

NAME OF MARK: B014 COUNTY: DESCHUTES  
 MARK SET BY: OREGON HIGHWAY DIVISION STATE: OREGON  
 DATE OF MARK: 1991 COUNTRY: U.S.A.  
 LOCATION: SECTION 21 TOWNSHIP 17 S. RANGE 12 E. MERIDIAN: WILLAMETTE  
 REFERENCE NUMBER: NONE

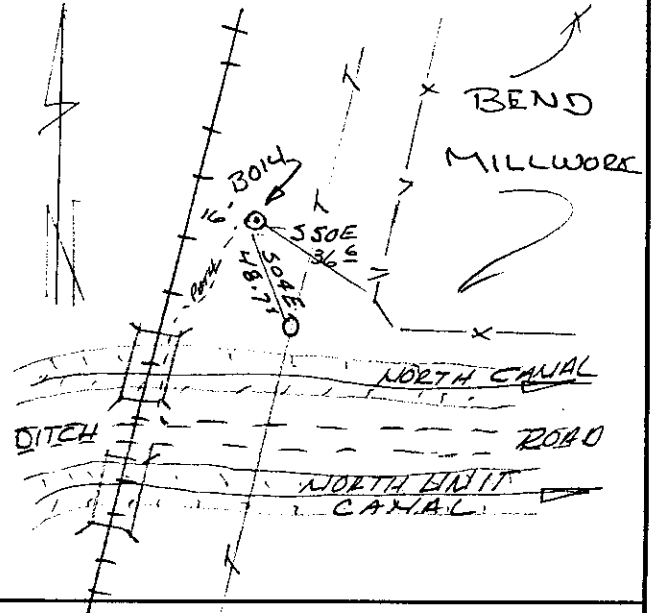
**MARK DESCRIPTION:**

TO REACH THE MARK FROM THE INTERSECTION  
 OF HWY. 97 (3 RD STREET) & HWY. 20  
 (GREENWOOD AVE.) PROCEED NORTH ON HWY.  
 97 FOR 0.5 MI. TO REVERE ST. AND TURN  
 LEFT & PROCEED 0.18 MI. TO DIVISION ST.  
 & PROCEED NORTH FOR 0.6 MI. & TURN RIGHT  
 ON CANAL RD. & PROCEED EASTERLY FOR 0.35  
 MI TO THE MARK ON THE LEFT.

THE MARK IS A 1 1/2 " ALUM. CAP ON A  
 1/2" I.R. & MARKED "WB 9 1988" FLUSH  
 WITH GROUND LEVEL.

16 FT. EAST OF RAILROAD.  
 36.6 FT. FROM FENCE CORNER.  
 48.7 FT. FROM TELEGRAPH POLE.

**MARK SKETCH:**



DATA COMPUTED BY: DESCHUTES COUNTY SURVEYOR'S OFFICE DATE: 1991-1992  
 FIELD METHOD: GPS FIELD EQUIPMENT: TRIMBLE 4000ST ADJUSTED WITH: TRIMNET PLUS

DATUM: HORIZONTAL= NAD (83-91) CENTRAL MERIDIAN: W 121°17'00.000000"  
 VERTICAL= NGVD 29 LATITUDE OF ORIGIN: N 43°00'00.000000"  
 COORDINATE SYSTEM: TRANSVERSE MERCATOR ORIGIN NORTHING: 0.0000 F  
 ZONE: DESCHUTES COUNTY ORIGIN EASTING: 3,300,000.0000 F  
 LINEAR UNITS: INTERNATIONAL FOOT SCALE ALONG MERIDIAN: 1.000160000000

**GEODETTIC AND MAPPING COORDINATES**

			ONE SIGMA ERROR
B014	Latitude	N 44°04'49.058014"	
	Longitude	W 121°18'01.396639"	
	Scale Factor	1.000160022944	
	Convergence	-0°00'42.7115"	
	Northing(y)	393843.5969	0.015181F
	Easting (x)	3295517.5237	0.014853F
	Ellipsoid Height	3497.6613	0.016416F
	OrthoMetric Height	3562.2071	0.020314F
	Geoid Height	-64.5458	0.011965F

### CONTROL MARK DATA

NAME OF MARK: WB 23 COUNTY: DESCHUTES  
MARK SET BY: OREGON HIGHWAY DIVISION STATE: OREGON  
DATE OF MARK: 1991 COUNTRY: U.S.A.  
LOCATION: SECTION 8 TOWNSHIP 18 S. RANGE 12 E. MERIDIAN: WILLAMETTE  
REFERENCE NUMBER: NONE

MARK DESCRIPTION:

MARK SKETCH:

DESTROYED BY ODOT ROAD CONSTRUCTION

DATA COMPUTED BY: DESCHUTES COUNTY SURVEYOR'S OFFICE DATE: 1991-1992  
FIELD METHOD: GPS FIELD EQUIPMENT: TRIMBLE 4000ST ADJUSTED WITH: TRIMNET PLUS

DATUM: HORIZONTAL= NAD (83-91) CENTRAL MERIDIAN: W 121°17'00.000000"  
VERTICAL= NGVD 29 LATITUDE OF ORIGIN: N 43°00'00.000000"  
COORDINATE SYSTEM: TRANSVERSE MERCATOR ORIGIN NORTHING: 0.0000 F  
ZONE: DESCHUTES COUNTY ORIGIN EASTING: 3,300,000.0000 F  
LINEAR UNITS: INTERNATIONAL FOOT SCALE ALONG MERIDIAN: 1.000160000000

#### GEODETTIC AND MAPPING COORDINATES

		ONE SIGMA ERROR
WB23	Latitude	N 44°02'08.475581"
	Longitude	W 121°18'20.298696"
	Scale Factor	1.000160039306
	Convergence	0°00'55.8161"
	Northing(y)	377580.3377 0.012530F
	Easting (x)	3294133.1102 0.012511F
	Ellipsoid Height	3670.1840 0.014643F
	OrthoMetric Height	3734.3524 0.018861F
	Geoid Height	-64.1684 0.011889F

**CONTROL MARK DATA**

NAME OF MARK: WB 24 COUNTY: DESCHUTES  
MARK SET BY: OREGON HIGHWAY DIVISION STATE: OREGON  
DATE OF MARK: 1991 COUNTRY: U.S.A.  
LOCATION: SECTION 8 TOWNSHIP 18 S. RANGE 12 E. MERIDIAN: WILLAMETTE  
REFERENCE NUMBER: NONE

MARK DESCRIPTION:

MARK SKETCH:

DESTROYED BY ODOT ROAD CONSTRUCTION

DATA COMPUTED BY: DESCHUTES COUNTY SURVEYOR'S OFFICE DATE: 1991-1992  
FIELD METHOD: GPS FIELD EQUIPMENT: TRIMBLE 4000ST ADJUSTED WITH: TRIMNET PLUS

DATUM: HORIZONTAL= NAD (83-91) CENTRAL MERIDIAN: W 121°17'00.000000"  
VERTICAL= NGVD 29 LATITUDE OF ORIGIN: N 43°00'00.000000"  
COORDINATE SYSTEM: TRANSVERSE MERCATOR ORIGIN NORTHING: 0.0000 F  
ZONE: DESCHUTES COUNTY ORIGIN EASTING: 3,300,000.0000 F  
LINEAR UNITS: INTERNATIONAL FOOT SCALE ALONG MERIDIAN: 1.000160000000

GEODETIC AND MAPPING COORDINATES

			ONE SIGMA ERROR
WB24	Latitude	N 44°01'46.826539"	
	Longitude	W 121°18'42.034079"	
	Scale Factor	1.000160063478	
	Convergence	0°01'10.9168"	
	Northing(y)	375388.2473	0.012457F
	Easting (x)	3292544.2969	0.012256F
	Ellipsoid Height	3712.3323	0.014775F
	OrthoMetric Height	3776.4464	0.019307F
	Geoid Height	-64.1141	0.012428F

**DESCHUTES COUNTY**  
**PLANE COORDINATES**



# DESCHUTES COUNTY PLANE COORDINATES

## Geodetic and Mapping Coordinates & Heights

Datum = NAD-83(1991) & NGVD-29  
 Projection: Transverse Mercator  
 Zone = DESCHUTES COUNTY  
 Central Meridian = W 121°17'00.000000"  
 Latitude of Origin = N 43°00'00.000000"  
 Origin Northing= 0.00 Easting= 3300000.00  
 Scale along Central Meridian = 1.000160000000  
 Linear units = International Foot

GIS NUMBER	STATION NAME	DATA	ONE SIGMA ERROR	
GIS 13		Latitude	N 44°02'39.713240"	
		Longitude	W 121°19'25.050790"	
		Scale Factor	1.000160128220	
		Convergence	-0°01'40.8415"	
		Northing(y)	380745.8354	FIXED
		Easting (x)	3289403.6534	FIXED
		Ellipsoid Height	3595.6890	FIXED
		OrthoMetric Height	3659.9245	FIXED
		Geoid Height	-64.2356	FIXED
GIS 31 PILOT BUTTE		Latitude	N 44°03'37.943010"	
		Longitude	W 121°16'59.648110"	
		Scale Factor	1.000160000001	
		Convergence	+0°00'00.2447"	
		Northing(y)	386640.6780	FIXED
		Easting (x)	3300025.6995	FIXED
		Ellipsoid Height	4073.9731	FIXED
		OrthoMetric Height	4138.3333	FIXED
		Geoid Height	-64.3602	FIXED
GIS 34 C-30 1921		Latitude	N 44°06'53.977040"	
		Longitude	W 121°17'27.310600"	
		Scale Factor	1.000160004535	
		Convergence	-0°00'19.0109"	
		Northing(y)	406494.9563	FIXED
		Easting (x)	3298007.2599	FIXED
		Ellipsoid Height	3373.5597	FIXED
		OrthoMetric Height	3438.3629	FIXED
		Geoid Height	-64.8031	FIXED
GIS 35		Latitude	N 43°59'27.220590"	
		Longitude	W 121°19'54.795810"	
		Scale Factor	1.000160186537	
		Convergence	-0°02'01.4034"	
		Northing(y)	361251.7287	FIXED
		Easting (x)	3287219.2203	FIXED
		Ellipsoid Height	3858.3694	FIXED
		OrthoMetric Height	3922.1785	FIXED
		Geoid Height	-63.8091	FIXED

GIS NUMBER	STATION NAME	DATA	ONE SIGMA ERROR	
GIS 36		Latitude	N 44°01'12.534260"	
		Longitude	W 121°22'09.961860"	
		Scale Factor	1.000160585990	
		Convergence	-0°03'35.3961"	
		Northing(y)	371925.7343	FIXED
		Easting (x)	3277347.2379	FIXED
		Ellipsoid Height	3816.6995	FIXED
		OrthoMetric Height	3880.6759	FIXED
		Geoid Height	-63.9764	FIXED
GIS 45		Latitude	N 44°01'18.861190"	
		Longitude	W 121°15'37.120250"	
		Scale Factor	1.000160041893	
		Convergence	+0°00'57.5959"	
		Northing(y)	372555.5316	FIXED
		Easting (x)	3306056.8735	FIXED
		Ellipsoid Height	3656.1942	FIXED
		OrthoMetric Height	3720.2133	FIXED
		Geoid Height	-64.0190	FIXED
B001		Latitude	N 44°06'07.770647"	
		Longitude	W 121°17'57.788789"	
		Scale Factor	1.000160020312	
		Convergence	-0°00'40.2175"	
		Northing(y)	401815.5080	0.010729F
		Easting (x)	3295782.4815	0.009904F
		Ellipsoid Height	3440.0961	0.012874F
		OrthoMetric Height	3504.8094	0.017670F
		Geoid Height	-64.7133	0.012104F
B002		Latitude	N 44°05'26.835694"	
		Longitude	W 121°18'01.289967"	
		Scale Factor	1.000160022857	
		Convergence	-0°00'42.6454"	
		Northing(y)	397669.6902	0.011107F
		Easting (x)	3295526.1026	0.010561F
		Ellipsoid Height	3489.7181	0.012837F
		OrthoMetric Height	3554.3446	0.018463F
		Geoid Height	-64.6266	0.013270F
B003		Latitude	N 44°04'25.430925"	
		Longitude	W 121°18'07.169984"	
		Scale Factor	1.000160027469	
		Convergence	-0°00'46.7223"	
		Northing(y)	391450.7581	0.010431F
		Easting (x)	3295095.4784	0.010339F
		Ellipsoid Height	3555.8490	0.011250F
		OrthoMetric Height	3620.3488	0.014877F
		Geoid Height	-64.4998	0.009736F
B004		Latitude	N 44°03'57.081734"	
		Longitude	W 121°18'23.360550"	
		Scale Factor	1.000160042318	
		Convergence	-0°00'57.9760"	
		Northing(y)	388579.8815	FIXED
		Easting (x)	3293912.4918	FIXED
		Ellipsoid Height	3568.0118	FIXED
		OrthoMetric Height	3632.4573	FIXED
		Geoid Height	-64.4455	FIXED

GIS NUMBER	STATION NAME	DATA	ONE SIGMA ERROR	
B005		Latitude	N 44°03'14.105975"	
		Longitude	W 121°18'23.842497"	
		Scale Factor	1.000160042826	
		Convergence	-0°00'58.2986"	
		Northing(y)	384227.3586	0.011252F
		Easting (x)	3293876.0667	0.010921F
		Ellipsoid Height	3573.9459	0.012233F
		OrthoMetric Height	3638.2754	0.015532F
		Geoid Height	-64.3295	0.009570F
B006		Latitude	N 44°02'44.312637"	
		Longitude	W 121°18'20.612704"	
		Scale Factor	1.000160039601	
		Convergence	-0°00'56.0445"	
		Northing(y)	381209.8653	0.011620F
		Easting (x)	3294111.1538	0.011253F
		Ellipsoid Height	3614.2905	0.013094F
		OrthoMetric Height	3678.5459	0.016791F
		Geoid Height	-64.2554	0.010511F
B007		Latitude	N 44°02'27.019645"	
		Longitude	W 121°18'21.072018"	
		Scale Factor	1.000160040060	
		Convergence	-0°00'56.3589"	
		Northing(y)	379458.4663	0.010490F
		Easting (x)	3294077.1219	0.010372F
		Ellipsoid Height	3639.4525	0.012271F
		OrthoMetric Height	3703.6639	0.016525F
		Geoid Height	-64.2114	0.011068F
B008		Latitude	N 44°01'56.949175"	
		Longitude	W 121°18'48.536165"	
		Scale Factor	1.000160071819	
		Convergence	-0°01'15.4398"	
		Northing(y)	376413.6190	0.011461F
		Easting (x)	3292069.5598	0.011400F
		Ellipsoid Height	3687.6805	0.013100F
		OrthoMetric Height	3751.8184	0.017582F
		Geoid Height	-64.1379	0.011727F
B009		Latitude	N 44°01'36.926693"	
		Longitude	W 121°19'04.035684"	
		Scale Factor	1.000160093814	
		Convergence	-0°01'26.2043"	
		Northing(y)	374386.2208	0.007863F
		Easting (x)	3290936.2048	0.008004F
		Ellipsoid Height	3723.0593	0.010448F
		OrthoMetric Height	3787.1463	0.016355F
		Geoid Height	-64.0871	0.012583F
B010		Latitude	N 44°01'28.321010"	
		Longitude	W 121°19'05.034357"	
		Scale Factor	1.000160095338	
		Convergence	-0°01'26.8947"	
		Northing(y)	373514.6835	0.011594F
		Easting (x)	3290862.8606	0.011377F
		Ellipsoid Height	3723.2493	0.013132F
OrthoMetric Height	3787.3182	0.018420F		
		Geoid Height	-64.0688	0.012917F

GIS NUMBER	STATION NAME	DATA	ONE SIGMA ERROR	
B011		Latitude	N 44°01'16.638100"	
		Longitude	W 121°18'58.907837"	
		Scale Factor	1.000160086234	
		Convergence	-0°01'22.6321"	
		Northing(y)	372331.2762	0.011777F
		Easting (x)	3291310.0944	0.011678F
		Ellipsoid Height	3720.9551	0.013249F
		OrthoMetric Height	3784.9941	0.018770F
		Geoid Height	-64.0390	0.013296F
B012		Latitude	N 44°00'58.373239"	
		Longitude	W 121°19'05.213924"	
		Scale Factor	1.000160095639	
		Convergence	-0°01'27.0064"	
		Easting (x)	3290848.4588	0.011373F
		Ellipsoid Height	3727.8585	0.012897F
		OrthoMetric Height	3791.8544	0.018622F
				Geoid Height
B013		Latitude	N 44°00'38.581111"	
		Longitude	W 121°19'19.550405"	
		Scale Factor	1.000160118816	
		Convergence	-0°01'36.9586"	
		Northing(y)	368477.5970	0.010992F
		Easting (x)	3289799.7025	0.010564F
		Ellipsoid Height	3770.6373	0.012537F
		OrthoMetric Height	3834.5894	0.018080F
		Geoid Height	-63.9521	0.013027F
B014		Latitude	N 44°04'49.058014"	
		Longitude	W 121°18'01.396639"	
		Scale Factor	1.000160022944	
		Convergence	-0°00'42.7115"	
		Northing(y)	393843.5969	0.015181F
		Easting (x)	3295517.5237	0.014853F
		Ellipsoid Height	3497.6613	0.016416F
		OrthoMetric Height	3562.2071	0.020314F
		Geoid Height	-64.5458	0.011965F
WB23		Latitude	N 44°02'08.475581"	
		Longitude	W 121°18'20.298696"	
		Scale Factor	1.000160039306	
		Convergence	-0°00'55.8161"	
		Northing(y)	377580.3377	0.012530F
		Easting (x)	3294133.1102	0.012511F
		Ellipsoid Height	3670.1840	0.014643F
		OrthoMetric Height	3734.3524	0.018861F
		Geoid Height	-64.1684	0.011889F
WB24		Latitude	N 44°01'46.826539"	
		Longitude	W 121°18'42.034079"	
		Scale Factor	1.000160063478	
		Convergence	-0°01'10.9168"	
		Northing(y)	375388.2473	0.012457F
		Easting (x)	3292544.2969	0.012256F
		Ellipsoid Height	3712.3323	0.014775F
		OrthoMetric Height	3776.4464	0.019307F
		Geoid Height	-64.1141	0.012428F