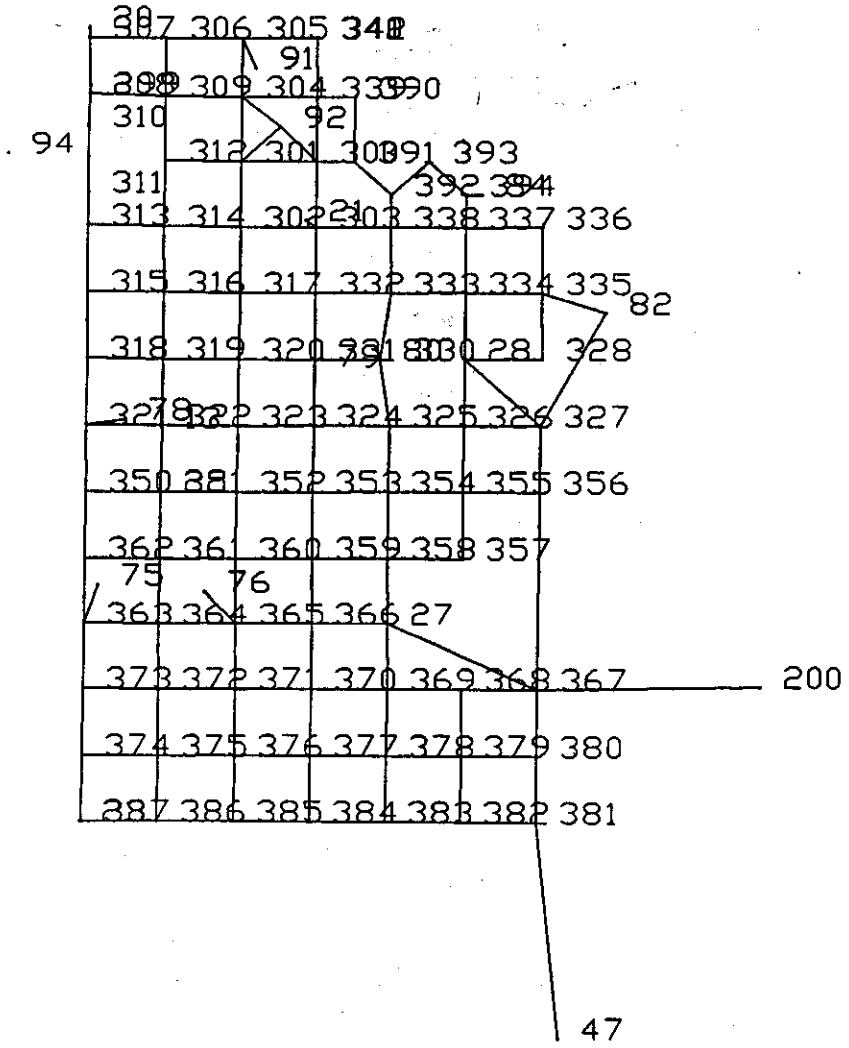
SURVEY REPORT
OF GPS MEASURMENTS
OF SECTION CORNERS
IN T.14 & 15 S., R. 13 E., W.M.
DESCHUTES COUNTY
OREGON

DGMC # 17



DESCHUTES COUNTY SURVEYOR
FILED 11/15/95 BY: V. Opie

T. 14 & 15 S.-R. 13 E
G.P.S. CONTROL SURVEY

GENERAL:

The purpose of this survey was to establish high precision mapping coordinates on government land corners, section and some quarter section corners, with G.P.S. by directly occupying the corners or a secondary monument when not possible to receive adequate gps signals. From the secondary monument a side tie was made by conventional survey methods The work was performed from 1994 to 1995 by various personal with 3 Trimble 4000 ST G.P.S. receivers in 1994 and 2 Trimble 4000 SSE G.P.S. receivers in 1995. The County Surveyors Office reduced the baseline measurements and computed geodetic coordinates on the NAD 83-91 (North American Datum of 1983, readjusted in 1991) and NAD 83-91 Central Oregon Plane Coordinates in international feet.

MEASUREMENTS:

I used GPSurvey Wave 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.

CLOSURES:

Numerous loop closures where run 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 5 ppm for lines with 3 or more independent sessions.

ADJUSTMENT:

HORIZONTAL

A minimal constrained adjustment was accomplished by holding 15131400 (GIS 27) 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 17 more control points (see section POINTS HELD FIX) 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 91 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.

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

CENTRAL OREGON COORDINATE SYSTEM:

The County Surveyors of Deschutes, Crook and Jefferson County have aggreed to rename the Deschutes County Grid to the Central Oregon Coordinate System for use in the three countys. This system is the best for the integration maps, deeds, etc., into the County GIS., County Surveyors in the process of establishing coordinates at section and 1/4 section corners on the Central Oregon Coordinate System and should be of assistance to local surveyors.

SYSTEM DATA:

DATUM = NAD 83(1991)

PROJECTION = CENTRAL OREGON LCS

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 project of this magnitude and complexity could not be accomplished without the help and cooperation of many people. To the people who worked in the field on this project, Bill Kauffman, Ronda Grediagin and Don Sweet, Deschutes Co. Surveyor's Office.

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.

GENERAL INFORMATION

ON

DATA SHEET

CORNER NUMBERING

GROUND TO GRID REDUCTION

AND

LEAST SQUARES ADJUSTMENT

GENERAL INFORMATION ABOUT MARK DATA SHEET

BOX 1

MARK NAME:	Is a name that may be stamped on the monument (FIRST) or a point identifier (17122604).
MARK SET BY:	Best information obtainable of who may have set mark.
DATE OF MARK:	Best information obtainable of date that mark was set.
LOCATION:	What section, township and range that mark is located.
REFERENCE NUMBER	The reference document and number that has important information about mark at the time the G.P.S. survey was performed. (CS # = COUNTY SURVEY NUMBER) (OCRR # = OREGON CORNER RESTORATION RECORD NUMBER, DGMC # = DESCHUTES GEODETIC MAPPING CONTROL NUMBER,DESCHUTES CO.) (MF# = MICROFILM NUMBER ,JEFFERSON CO.) (OLCM = OREGON LAND CORNER MONUMENTATION, CROOK CO.)These records are on file in the County Surveyor's Office.

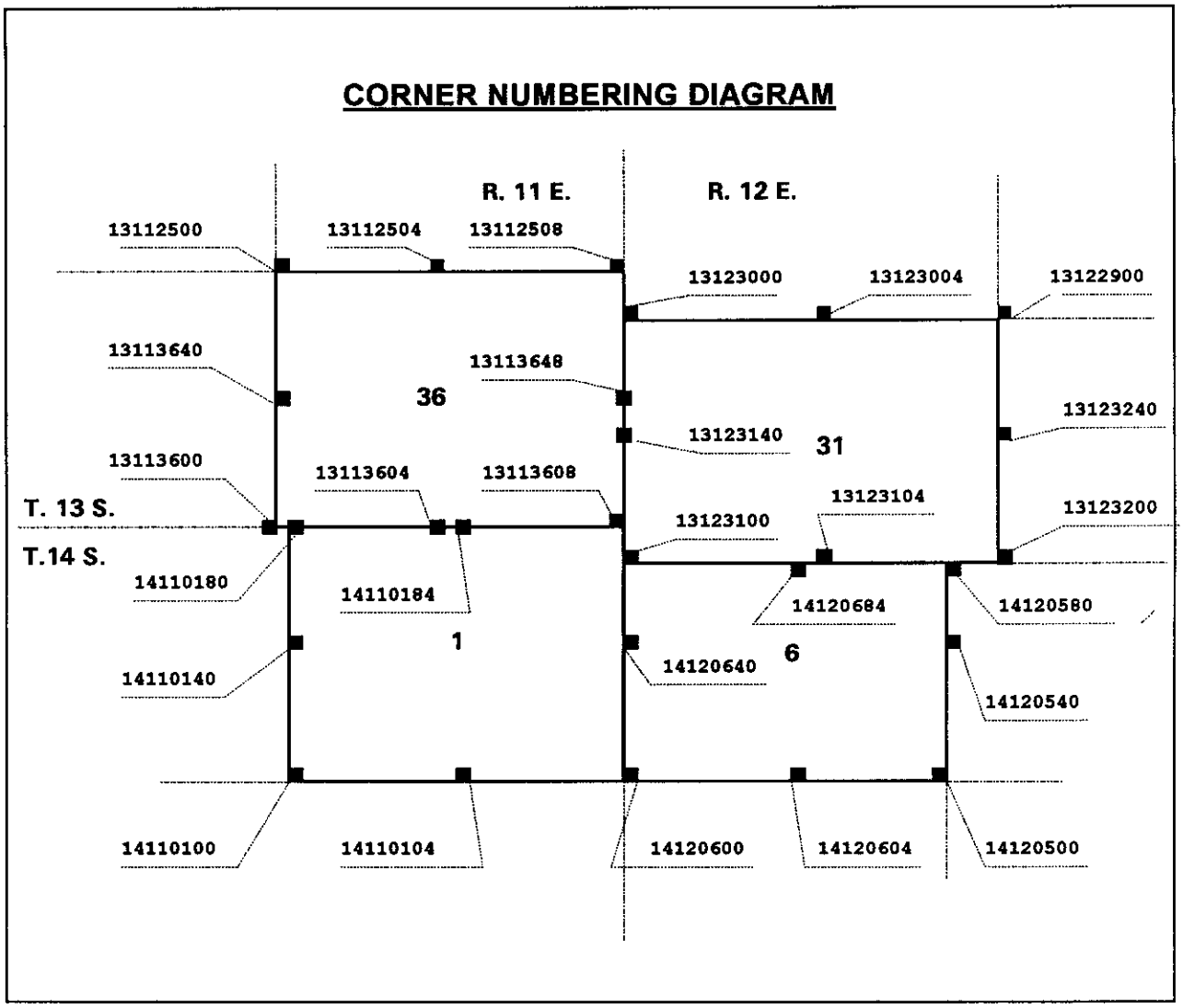
BOX 2

MARK SKETCH:	A quick free hand sketch of mark to show general location and brief description.

BOX 3

PART 1	Self-explanatory
PART 2	All the needed information about the datum's and coordinate system to use for transformations.
PART 3	Latitude and longitude of the horizontal datum used.
	Northing, easting, convergence and scale factor of the coordinate system used.
	Ellipsoid height: height of mark above the reference ellipsoid
	Orthometric height: height of mark on the vertical datum (elevation).
	Geoid height: the difference between the reference ellipsoid and zero elevation of the vertical datum.
	Combine factor: grid distance to ground distance factor.
	One sigma error: the estimated error of uncertainty at the 68% confidence region.(FGCC Standard)

CORNER NUMBERING DIAGRAM



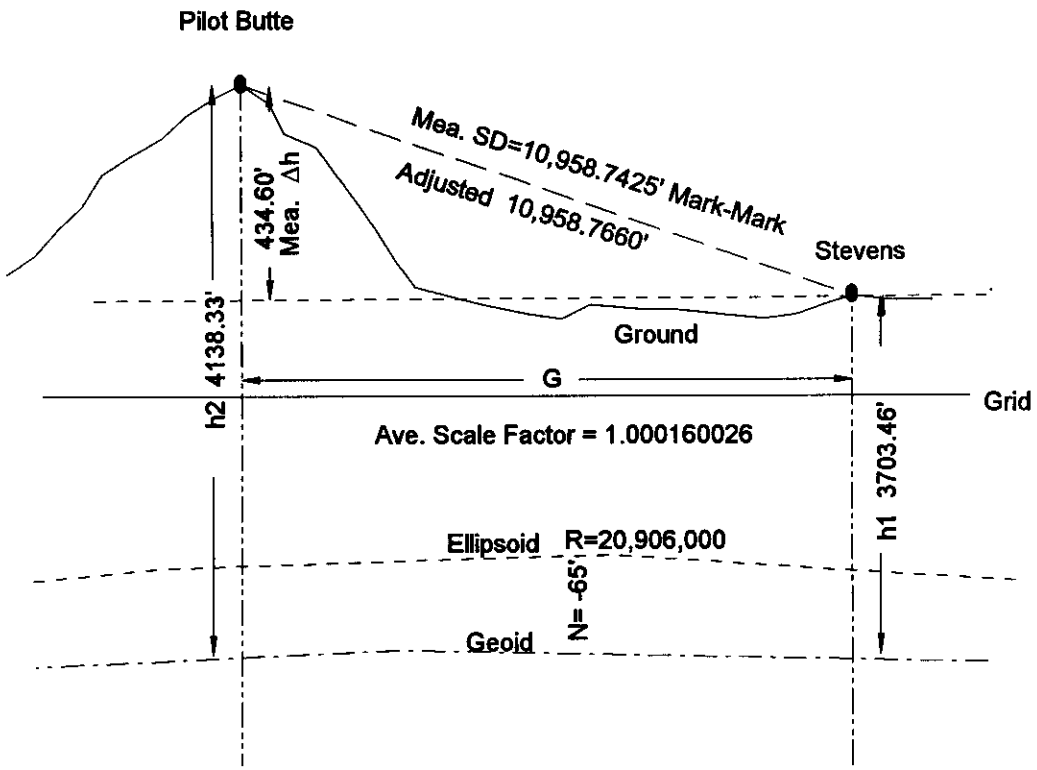
SECTION & QUARTER CORNER NAMING CONVENTION

MARK NAME: 17 12 23 4 0 A

17	Township 17 South of the Willamette Base Line
12	Range 12 East of the Willamette Principal Meridian
23	Section 23
4	4 X 10 chains North from SW. Cor. of Section 23.
0	0 X 10 chains East from SW. Cor. of Section 23.
A	More than one important corner in proximity.

Note: The 10 chains is more a fractional part than a distance.

Transformation of Mark to Mark Distance to Grid Distance



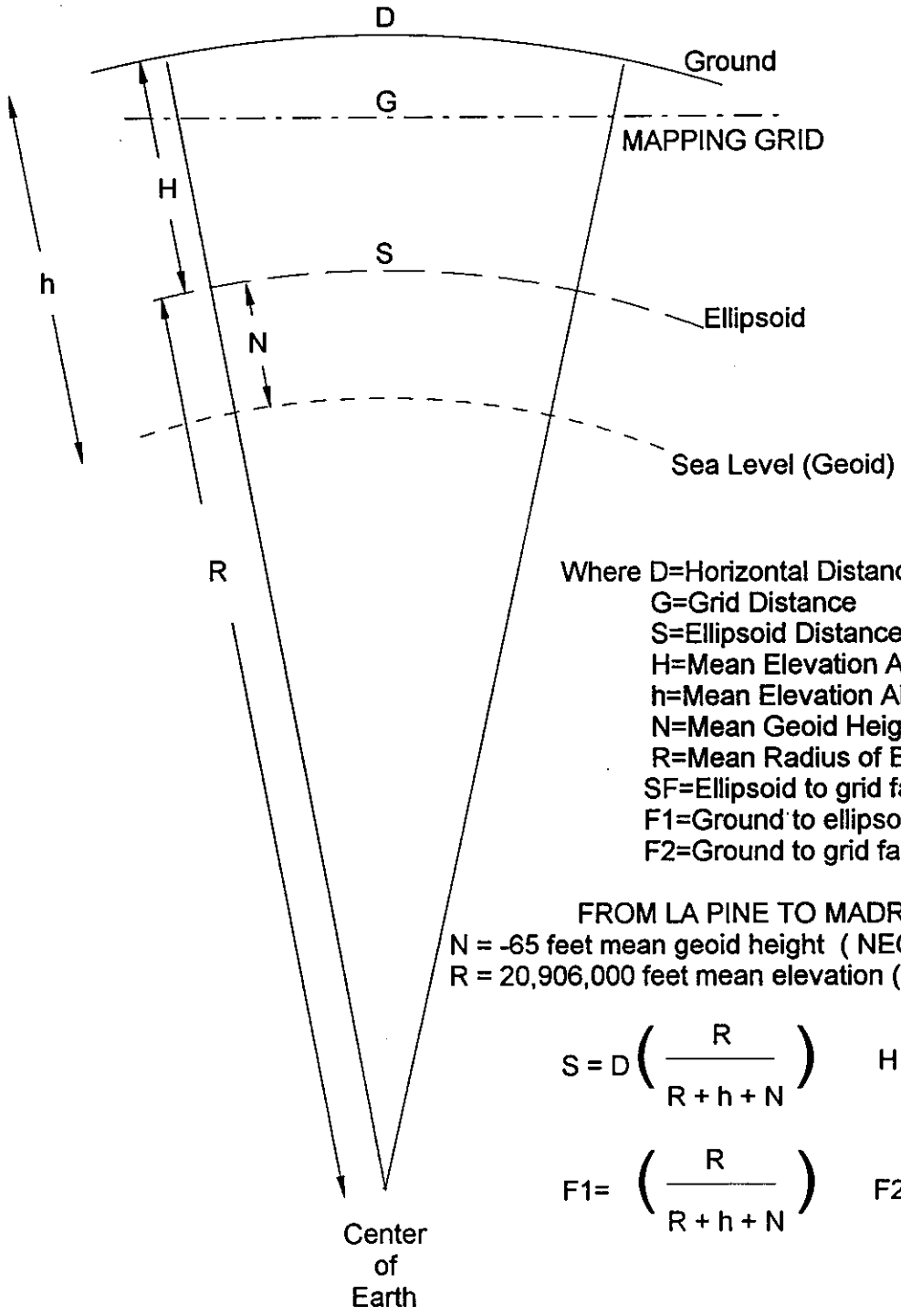
$$G = (SF)\left(\sqrt{\frac{SD^2 - \Delta h^2}{\left(1+\frac{h_1+N}{R}\right)\left(1+\frac{h_2+N}{R}\right)}}\right)$$

$$G = 1.000160026\sqrt{\frac{10{,}958.7425^2 - 434.60^2}{\left(1+\frac{3703.46+(-65)}{20906000}\right)\left(1+\frac{4138.38+(-65)}{20906000}\right)}}$$

$$G = 1.000160026\sqrt{\frac{119{,}905{,}160.0}{1.00036892}} = 1.000160026\sqrt{119860941.3}$$

$$G = 1.000160026 \cdot 10{,}948.1022 = 10{,}949.8542'$$

SATISFACTORY APPROXIMATION OF GROUND TO GRID REDUCTION



Where D=Horizontal Distance
G=Grid Distance
S=Ellipsoid Distance
H=Mean Elevation Above Ellipsoid
h=Mean Elevation Above Geoid
N=Mean Geoid Height
R=Mean Radius of Earth
SF=Ellipsoid to grid factor
F1=Ground to ellipsoid factor
F2=Ground to grid factor

FROM LA PINE TO MADRAS
N = -65 feet mean geoid height (NEGATIVE HEIGHT)
R = 20,906,000 feet mean elevation (ELLIPSOID)

$$S = D\left(\frac{R}{R + h + N}\right) \qquad H = h + N$$

$$F1 = \left(\frac{R}{R + h + N}\right) \qquad F2 = SF \times F1$$

NOTE: See NOAA Manual NOS NGS 5, State Plane Coordinate System of 1983 by James E. Stem, for more information on this subject

Below is the inverse of adjusted coordinates in our data base. As we can see that the measured slope distance from Pilot Butte to Stevens in the EC CARTESIAN column was adjusted by +0.0235 feet, when we add 0.0235 feet to the transformed distance that we computed form the measured slope distance it fits quite well with the inverse of the MAPPING PROJECTION coordinates.

In using a approximation for the radius of the ellipsoid and the geoid height with an average ground to grid factor at intervals for ever 100 feet of elevation should keep the transformation to 1 part to 200,000 or better in a local area.

For more information on this subject see NOAA Technical Memorandum NOS NGS-10 , USE OF CALIBRATION BASE LINES, by Charles J. Fronczek, Appendix I. The geometrical transformation of electronically measured distances.

```
Datum = NAD-83
Coordinate system = User-Defined Transverse Mercator
Zone = DESCHUTES COUNTY
Linear unit = Internatl Foot
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POINT	MAPPING PROJECTION	GEODETIC	EC CARTESIAN
Pt# 19 COORDINATES	N= 386640.6780	N 44°03'37.943010"	X= -7822586.5374
	E= 3300025.6995	W 121°16'59.648110"	Y=-12874379.0293
GIS 31 PILOT BUTTE		H 4073.9731F	Z= 14480943.1881
		h 4138.3327F	
	Az=141°52'23.783806"	NSFA=141°52'24.023877"	D X= +2830.3733
	=+ 0°00'00.244711"	NSBA=321°53'28.357821"	D Y= -8361.1757
	t-T Corr= +0.004639"	Ell Dist= 10948.1255F	D Z= -6494.1727
	Dist= 10949.8773F	Delta H = -434.6198F	S D= 10958.7660
	Scale=1.000160017592	Delta h = -434.8681F	
INVERSE:		Gnd Dist= 10950.1443F	
		Rad( )= 20914559.5776F	
		Skew Corr= -0.060692"	
		GsFA=141°52'24.023893"	
		Gsc Dist= 10948.1255F	
		GsBA=321°53'28.357837"	
Pt# 62 COORDINATES	N= 378026.9887	N 44°02'12.883064"	X= -7819756.1641
	E= 3306786.1854	W 121°15'27.117216"	Y=-12882740.2050
STEVENS		H 3639.3533F	Z= 14474449.0154
		h 3703.4646F	

Getting the Most Out of Least Squares

by Sean Curry and Ron Sawyer

"Least squares! I don't do that kind of survey—haven't done a large network in years. Most of our work is just *regular* survey work. Our compass rule works fine, just press a button and the whole thing's balanced. Why would we want to use something as sophisticated as least squares? Anyhow, I'm not quite sure what it does."

Does this sound familiar? Unfortunately, the least squares adjustment method seems to be a mysterious creature to most surveyors. It is frequently thought of as being difficult to learn, or not being applicable to "the type of surveys that I do." The fact is that least squares is not difficult to understand once a few basic principles are explained; more importantly, it is applicable to nearly all types of survey work, including the small "regular" job. It does not require you to make major changes in your daily practice, although certain field procedures enhance its power.

In addition to producing the best adjustment of field data, least squares provides other benefits not even possible with other adjustment methods. It helps you to locate errors in your survey data, gives you an easy way to plan surveys, and provides a statement on the amount of uncertainty for every point in your network. Our goal in this article is to remove the mystery of least squares by explaining, in nonmathematical terms, some of the basic concepts, and to illustrate its application to a number of common surveying problems.

Exactly What Is Least Squares?

A least squares adjustment is a rigorous mathematical method for adjusting survey data. It has actually been used by surveyors for a number of years, but was generally implemented only on mainframe computers and was somewhat difficult to handle for the uninitiated user. With the advent of new high-speed, inexpensive personal computers and especially modern software techniques, least squares is now readily available to every surveyor.

As surveyors we have long recognized that adding extra angle and distance observations adds strength to our surveys and allows for error checking. But we also realize that these extra measurements make the resulting survey computations more complex. What can we do to resolve these redundant observations to arrive at a single set of coordinates for all our points? Some type of adjustment must be applied. In the case of interconnecting traverse loops, arriving at the single best solution can be difficult. In fact, how can you even define a "best" solution?

Various approximate adjustment methods such as the compass rule and transit rule have traditionally been used. But how, for example, do you resolve a multiloop traverse with a compass rule adjustment? You probably attack one loop at a time, first "balancing" the angles by adding the same amount of correction to each angle, and then "correcting" the bearing and distance of each leg, based on some mechanical proportioning of the closure error. Then you move on to the next loop and repeat the process. When all the loops are adjusted, you call it quits if they all fit together pretty well. Otherwise, you might rebalance the loops in some other order to see if the fit gets better.

If this procedure sounds messy and potentially time-consuming, you are right. But even more importantly, it can be shown that the underlying logic of these approximate adjustments is wrong, even for a single traverse loop. Survey errors are random! These methods make assumptions about measurement errors accumulating in proportion to the lengths of traverse legs that just are not true—in fact, they can introduce distortions into the final coordinates that were not present in the original survey.

In addition, approximate adjustment methods provide no means of analyzing your survey. But, you ask, is not a traverse closure good enough? Not at all! It is like your accountant giving you a final bank balance for the year, but not giving you a breakdown of income and expenses by various categories. You would be hard pressed to determine exactly why you ended up where you did financially. Least squares gives you an itemized "accounting sheet" for your survey, showing exactly how each of your field observations fits into the overall survey.

What Does Least Squares Adjust And How?

As a surveyor, you know that all measurements contain errors. In fact, a measurement is only an estimate of the true value, which is never really known. The table below shows three types of errors commonly present in surveying data (although strictly speaking blunders are not errors), and three methods for handling them.

TABLE 1 - Error Types

Error Type	Method for Handling
Blunders (Mistakes, recording errors, etc.)	Eliminate
Systematic Errors (EDM calibration, etc.)	Compensate
Random Errors (Normal, unavoidable)	Adjust with Least Squares

Blunders (mistakes, recording errors, etc.) must be eliminated! No adjustment method can tolerate blunders, although least squares can help you detect and remove them from your field data. Systematic errors, such as in

Why We Use Least Squares

by Glennon J. Watson, LS

The story is all too familiar. You have the commission to survey a 150-acre farm. It is a routine job, or is it? This time there is a public highway crossing in one direction and a utility easement crossing in the other. Of course your code of practice requires you to show all the visible improvements on the property.

The solution is routine—traverse the perimeter, traverse the road, and traverse the utility line, then tie them all together. Easy, right? Easy enough in the field, but what happens when you compute and balance the control traverses? In the first loop you get 1 in 35,000 and one second per station in the angles. Great! The first cross-tie results in 1 in 15,000 and three seconds per station. OK? Probably. The second cross-tie produces 1 in 5000 and 12 seconds per station. No good! Third cross-tie? Even worse.

What happened? We measured all the angles the same way, and we measured all the distances from each end of the line. They all checked. We checked all the abstractions. Twice! We looked them over again—nothing wrong. Sure, we picked up a rounding error here and there, but basically nothing is wrong. What should we do? Unfortunately, some of our peers will make it work, but we are not among them. What would you do?

We would routinely try other solutions. Solving different loops in different orders would often help. Perhaps we lost the 1 in 35,000 loop, as fictitious as it actually was, but we would also improve the third and fourth connections—most of the time. Sometimes we would go back in the field to look for something that really was not there. More often than not we would settle. The baselines met the specification, although they could and should have been better.

Have you ever noticed that the error is not on the first loop you solve, and often it is not on the second? It is the third and fourth connections that get you. There is a reason these connections are the ones that do not work. It is because the errors balanced into the first and second loops were balanced improperly. The method used was prejudiced—it hid the errors rather than balanced them. Some balancing methods put the errors where they will not get in the way—if you are lucky.

Even those of us fortunate enough to own a true least squares adjustment program for single-loop traverses only postpone the inevitable. Simply put, a least squares adjustment places the errors where they

continued

Least Squares In Practice

by Roger A. Frank, PLS

In late 1969, I was first introduced to least squares adjustments while working with the Orange County Surveyor's Office in Santa Ana, California. At that time, most of our "regular" surveys were still being computed with rotary calculators and trig tables with the aid of the compass rule to adjust and close our traverses.

Orange County was in the process of revalidating and densifying its horizontal control network. To adjust this network, the county had obtained a least squares program called Cosmos from the Canadian equivalent of our National Geodetic Survey (NGS). Of course, the program required a computer with a large memory capacity. The county had two computers that took up about 5000 square feet of the engineering building basement. If the computers were linked together, they would have a whopping 128KB of memory. The county surveyor's office used the computers to run Cosmos at night so that we would not interfere with the more important jobs of assessing property, taxing the residents, and last but certainly not least, printing our paychecks.

Data entry was accomplished by hand-lettered, double-checked code sheets. These would be delivered to the keypunch department to be converted to punched cards. We would then manually check the punched cards for accuracy and make our own corrections on an extra keypunch machine. These trays of punched cards would be delivered to the computer services department in the late afternoon to run that night. Each morning we would pick up the results, figure out why it did not work or how the overall adjustment could be better, and after two or three weeks we would obtain a very satisfactory adjustment.

Quite a process, but when we were done we would have an adjustment where all measurements were weighted according to their strengths, along with a set of statistics showing the precision of each measurement and coordinate. This was something that we could have confidence in, and a far cry from what we could do with our rotary calculators, Peters tables, and compass rule.

In 1975, two of us left the Orange County Surveyor's Office to form our own surveying firm. Of course, we tried to keep up with the latest desktop calculators and computers, the HP 9810, (then HP 85s and HP 86s), but nothing that could perform a true least squares network adjustment. I missed the ability to use least squares to properly

continued

electronic distance meter (EDM) calibration, must be compensated for before any adjustment takes place. What is left?

Random errors! These are small unavoidable errors that are an integral part of the measuring process. They are the few seconds difference in angle readings, and the few hundredths difference in distances that you see all the time in the field. They are no cause for concern, except that they must be adjusted correctly, and that is the job least squares does right.

Least squares simultaneously adjusts all field data, even in multiloop traverses. In a least squares adjustment, the "best" solution is defined as the solution producing the smallest changes to the input field measurements. These changes between the best-fit measurements and the original field data are called residuals. Technically speaking, the least squares adjustment method minimizes the sum of the squares of the weighted residuals—hence its name.

But now we have introduced a new term—weight. The weight tells the adjustment how much influence a measurement should have. In least squares each observation (distance, angle, etc.) can be given an individual weight.

The weight you place on your measurements might be based on the type of instrument you are using, the method of observation (chained or EDM distance), and the skill of the field crew. Low weights can be given to less accurately known field data and greater weights to observations that are more accurately known. During the adjustment, larger changes will be given to the less accurate data, minimizing the changes to the more accurate data. For example, an angle with short sights can be given a low weight so that it does not influence stronger angles with longer sights. Table 2 summarizes the relationship between weights, precision, and influence on the adjustment.

TABLE 2 - Weights

	"Strong" Measurement	"Weak" Measurement
Weight	HIGH	LOW
Precision	HIGH	LOW
Influence	HIGH	LOW
Standard Error	LOW	HIGH

This ability to weight individual measurements is only available in least squares, and it gives you the extra control needed to produce the best adjustment. However, least squares does far more than compute the best adjustment. It also provides a complete analysis of the survey, including a list of residuals for all measurements, and a statement on the positional accuracy of each computed point. This analysis can assist in the detection of survey blunders and the preplanning of surveys to meet specified accuracy requirements.

What Are Its Advantages?

Least squares provides a number of advantages over other adjustment methods.

- It is mathematically correct for all types of surveys, including traverses, triangulation, trilateration, resection, and intersection in any combination.

Why We Use Least Squares *continued*

are "statistically most probable to have occurred," not where they actually happened. Unfortunately, cross-ties always seem to find the points where the errors actually occurred.

My partners and I knew that if we practiced in a specific location long enough we would eventually uncover our own errors. That thought has been in our minds since the day we began our practice. Our philosophy has been to isolate and correct those errors as they were found rather than to bury them and hope they disappeared. Over the years we have been careful enough not to have experienced many instances where we had to admit our mistakes. Nevertheless, we have had to admit a few, which is never a comfortable thing to do.

We have all heard about network adjustments. They are exotic routines that were once only used by the National Geodetic Survey. What did they do? Simply put, they considered all the measurements of a traverse network simultaneously rather than one at a time. This simultaneous approach considered the fourth loop at the same time it considered the first. Although it still put the errors where they were statistically most likely to occur, the analysis considered all the data rather than just a part of it.

As a practical matter, the least squares adjustment method was rigorous, costly, and took too long to achieve within the time and budget constraints of a particular job. The fact is, we could meet the specifications for the job using one of the less rigorous routines. So why try harder?

The effort involved in "trying harder" is not just for the individual job. It is for your practice. It is why you traverse around the entire block rather than setting out a single baseline with the hope that you will not have to shove the front corners of your rear adjoiner onto the sidewalk. It is so people believe you when you say you have better evidence and measurements now than you did five years ago.

However, something has finally made our lives easier. For the past two years we have been using STAR*NET—one of a number of available programs—a least squares solution that allows us to solve our traverses. With just a few minutes of additional time we have been able to solve our traverses as networks. I believe the network adjustment could be accomplished in less time, but we have elected to balance the individual loops of the traverses independently before performing the network adjustment. The payoff has resulted in less time spent rechecking material that was checked twice before, fewer returns to the field, and more reliable coordinate values for individual points. The proof of this is not in the abstract, but in the quality of the fourth- and fifth-generation cross-tie traverses added after the adjustment is complete and the map published.

continued

Getting the Most Out of Least Squares

- It computes a *single* solution, no matter how complex the survey.
- It does not distort field data, as do some approximate methods.
- It allows independent weighting of all field observations.
- It allows flexibility during data collection—field data can be collected in any order and configuration.
- It gives you a statement of the accuracy of each computed point.
- It helps detect blunders in field data.
- It helps with survey planning.
- It tells you a lot about the survey.

How Do You Use Least Squares?

You do not need to make major changes to your field procedures in order to use least squares. In fact, least squares adds a lot of flexibility to data collection. Distances and angles can be conveniently collected in any order without worrying about how the survey will be computed, because the adjustment handles all the data simultaneously. Traditionally, cross-ties and extra shots were used mainly to "check in." In least squares, these redundant shots actually become part of the adjustment, adding strength to the survey (more *is* better). Rather than making the survey solution more difficult, redundancies strengthen the survey, make blunder detection easier, and add more confidence that the adjustment is the "best" solution. Also, to make a surveyor's life really easy, additional field data can be added to an existing survey at any time, and the adjustment can be rerun.

```
C     1      1000.00      1000.00
C     5       427.12      3245.55
#
TB    N45-30-40W                     # Backsight to fixed bearing
T     1      123-40-28     537.52
T     2      217-11-37     719.56
T     3      113-53-15     397.66
T     4      260-19-24     996.23
TE    5      121-22-46     N70-56-55E  # End by turn to fixed bearing
#
TB    1                              # Backsight to known station
T     2      120-11-12     473.25
T     6     -101-32-30     625.76
T     7      198-13-09     533.66
T     8      172-07-27     753.22
T     9      -84-32-20     661.01
TE    5       48-20-00     N70-56-55E  # Close to fixed bearing
#
D     4-8     361.30                 # Extra distance tie
```

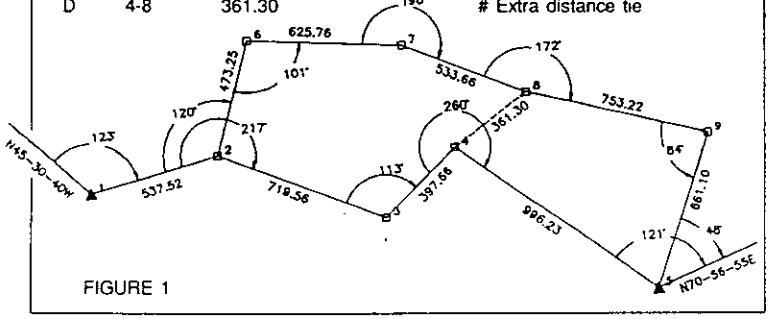


FIGURE 1

Figure 1 illustrates a small survey with two traverse loops and a distance tie between the loops. The two known points have coordinates supplied, and the rest of the field measurements are supplied as angle and distance traverse

Why We Use Least Squares *continued*

I would like to relate two specific instances where we have used a network solution to improve our database and our product.

The first involves the villages of Cold Spring and Nelsonville, New York, which are located in Philipstown where we practice. These villages have seen very little construction during the past 18 years of our practice. However, sales of various parcels have resulted in many surveys for our office. Correspondingly, we have developed a network of approximately 350 traverse points that were connected as the individual surveys were performed. The network became too dense for us to handle because the balancing was done linearly and the inevitable breakdown of the data became apparent. A traverse measured through a block connecting older points might result in a 1 in 3000 closure, but what could we do—the error of closure was only a tenth of a foot and the traverse was only 300 feet long.

During the summer of 1990 our college intern reentered and rebalanced the original field data using the least squares network program. The results are incredible. The reliability of the traverses has improved markedly. The integrity of our network has increased substantially. So far, 285 stations representing traverses around and through about 25 blocks have been entered. Because the adjustment runs so quickly we have made intermediate adjustments as each section is added to the network. With the simultaneous adjustment we have been able to strengthen every one of those weakened cross-ties. Even before the entire project was successfully completed in the fall, we knew that our control in the villages was substantially better.

The second instance concerns a surveying problem involving a 60-acre parcel that was surveyed in the late 1940s by a firm whose records we own. The original survey was bounded by three earlier surveys the older firm had done prior to surveying the 60 acres. The firm's basic traverse method involved a 30-second transit using two repetitions on string sights and single slope taping. The surveyors made all the proper corrections, but because they had committed to three sides they forced about one foot into the fourth side to make things work. Our method for this survey involved one and two full circle positions with a one-second instrument and double electronic-distance-meter (EDM) observations from each end of each line.

This particular parcel narrowed considerably near its middle so we decided to cross-tie the traverse in that area. Since we had the original notes, we were able to recover and traverse through about 60 percent of the original baseline points. Most of the points, which were on exposed ledge rock, were "4-cuts," a variation of a crosscut that the surveyor used

continued

legs. The sample data field uses a simple code to indicate coordinates (C), traverse lines (TB, TE, and T), and distances (D).

Once the field data has been prepared, you need to decide how the observations will be weighted. You do this by establishing a "standard error" for each observation. Think of the standard error as a way of expressing your confidence in your field data. For example, you might decide that your distances have standard errors of 0.02 feet ±3ppm, and your angles five seconds. These values are normally determined from instrument specifications and observation procedures. In addition, you might choose a centering error of 0.005 feet to account for imprecise instrument centering. This centering error value will increase the standard error value for angles with short sights so that they have less influence in the adjustment than those with long sights. The least squares adjustment will use these standard error values to determine weights for all the field data in order to arrive at the best solution.

Now that you have established the amount of influence that each measurement will have, you can run the adjustment and analyze the output. Although the specifics of running an adjustment depend on the package being used, some output elements are common to most least squares programs. These include:

- A brief summary of the overall strength of the adjustment. This summary often provides a useful breakdown of how individual measurement types (distances, angles, etc.) fit into the adjustment.
- A list of residuals for all input observations. This list is a valuable tool for finding blunders in the survey and for checking the weights you assigned to your input observations.
- A list of adjusted coordinates for all stations in the survey. These coordinates can be transferred to your CAD or COGO package.
- A list of the computed positional tolerances (error ellipses) for all stations in the adjustment. The ellipses (to be discussed next) show the amount of uncertainty in the computed position of each point, and can often be viewed graphically.

What Do Error Ellipses Reveal?

Error ellipses are used to indicate the amount of uncertainty in a computed point's position, sometimes called the point's positional tolerance. As one surveyor put it, "It's not that the *point* is uncertain—it's a well-established monument. It's my *idea* of where the point is (as expressed by its coordinates) that has some possible error." If you look at the northing or easting of a point by itself, you can express its error as plus or minus so many hundredths of a foot. However, to show the combined effects of the uncertainty in northing and easting requires an error ellipse.

Why does the point have this positional uncertainty anyway? Again, as the surveyor said, "Surveying is one of the few professions where you rarely get to measure what you really want. You want coordinates, but you have to settle for measuring angles and distances, and then computing coordinates." Remember that all your measurements are affected by small random errors. Therefore, you would expect any value computed from these measurements to also be affected. Least squares, as a part of the solution process, computes how much uncertainty in the coordinates results from the random errors in the field measurements. It is all there in the solution—you do not need to go to any trouble. These positional uncertainties, as represented by the error ellipses, are also affected by the geometry of the survey.

Two simple cases of error ellipses are illustrated in Figure 2. The ellipse dimensions indicate the size of the error region, and the orientation indicates the weaker and stronger directions.

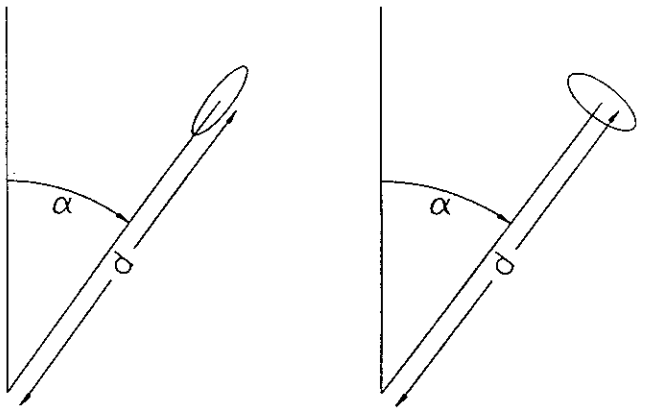
Why We Use Least Squares *continued*

to distinguish his baselines. The solution used the weighting options in the least squares network program. First, we balanced the network of our new measurements as a control. Then we added the older survey measurements, giving them considerably looser constraints, and readjusted. After all the observations were subjected to the network solution, we compared the residuals (the differences between the observed values and the adjusted values) in our angles and distances to those that were produced when our data alone was considered. There was very little change. When we compared the older data (that had been adjusted by the original surveyor) we noticed larger residuals, as might be expected with the older methods. As a result, we were able to isolate errors into specific sections of the earlier survey and replace the corners much closer to the original surveyor's positions than if we had simply translated and rotated his data to fit our new baseline.

The foregoing is not the product of a mathematician. Had it been, the reasons why the least squares network solution works would be explained in detail. Rather, it is the product of a surveyor who tries to deliver a reliable product to his client and still profit from the work. Not only has the use of least squares network solutions enhanced our ability to do both, but it has made it simple to do so. It has improved our product while decreasing the time necessary to reach a solution that meets specifications. We have concluded that a least squares network solution has brought our balancing procedures into line with improvements in our traversing procedures, which occurred when our transit and tape were retired in favor of a theodolite and EDM. ▲

Glennon J. Watson, LS, is a founding partner of Badey & Watson, a surveying and civil engineering firm located in Cold Spring, New York. He has 30 years of surveying experience. Watson is a member of the American Congress on Surveying and Mapping, New York State Association of Professional Land Surveyors, Inc., and New York State Society of Professional Engineers, Inc.

FIGURE 2

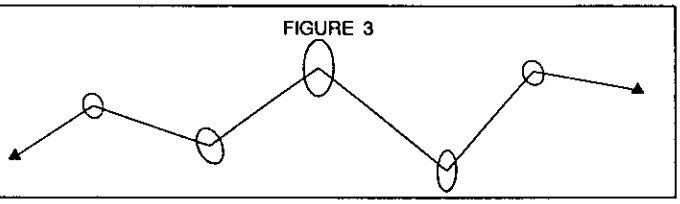


Angle measured with high precision.
Distance measured with low precision.

Angle measured with low precision.
Distance measured with high precision.

In a simple traverse between two fixed points, the error ellipses tend to increase in size according to the point's distance from a fixed station, as shown in Figure 3.

FIGURE 3



You should realize that least squares gives numerical values for the positional uncertainty of each point. For example, Figure 4 shows an actual ellipse that resulted from the adjustment of a multiloop traverse survey. Also shown are the ground dimensions of the error ellipse around the point. Even survey loops that close with very high precision may have large ellipses around the points, depending on the geometry of the survey.

Take the example of the surveyor who traversed through several miles of forest to discover that his newly located section corner was a half a foot away from a monument he found. When he traversed back, he closed to 1:55,000—so should the corner be reset? A least squares adjustment of the survey shows that the error ellipse for the new corner was over 1.5 feet long. This ellipse obviously raises some doubt about whether the new point is really any better than the existing monument. The closing

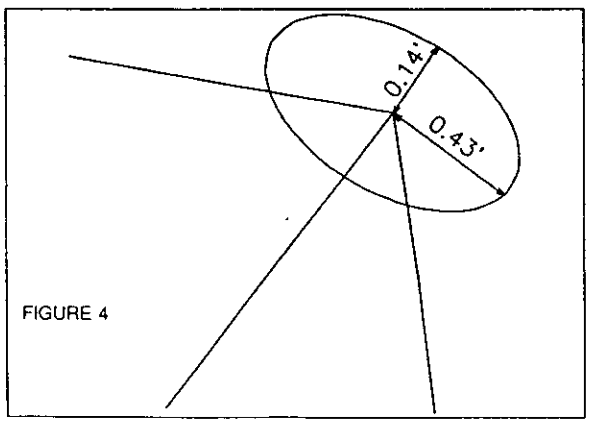


FIGURE 4

continued

weigh and adjust our surveys, which were generally multiloop traverses. While our compass rule programs worked, in order to really use all the data we had to adjust each loop several times, or adjust the big loop and hope the cross connections would fit. This was a tedious and only an approximate procedure.

On several occasions where we had large control nets for cities or a Federal agency, we did manage to coerce the county into adjusting them with Cosmos. During these years, I always had my ear to the ground trying to find a program package to do even a small amount of least squares on computers that a mid-sized surveying firm such as ours could afford.

In 1987, we started converting our office from the tried and true HP 86s to IBM PC compatibles. These newer computers had memory and capabilities rivaling or exceeding the older mainframes we previously used for least squares.

I checked with NGS, which was in the process of converting one of its programs, called Adjust, to work on a PC. We obtained a prerelease copy of this program and used it to adjust an aerial control network of about 70 stations. While the program worked, it was difficult for non-NGS-trained personnel to decipher the instructions and code the inputted data. We also had to break the project into two sections due to capacity limitations.

So we kept looking and came across another reasonably priced package. We purchased it and found data input to be quite easy. During initial testing, however, we discovered we would get different answers depending on the order in which the data was entered. In other words, it did not work.

I then acquired (for a nominal donation) a package from one of the top-rated western universities. While this one may have been effective, it had such a lack of documentation that I could never get it to function.

Undaunted by these unsuccessful ventures, in mid-1988 I obtained a commercial package that lives up to its advertisements. The package has usable documentation, easy coding of input data, and a very helpful blunder detection feature. The authors are open to suggestions and the program continues to improve due to input from users.

We can now properly adjust our normal traverses as well as complex networks and have confidence in our results. And, unlike the old days, the process of coding, checking, and adjusting is completed in two to three hours instead of two to three weeks. This tool allows us to do numerous tasks that we were unable to reasonably do before.

Our firm purchased and began using GPS (Global Positioning System) survey equipment for control at about the same time we obtained a workable least squares package. (Of course, our GPS system has its own least squares package that deals with the Earth Centered Three Dimensional Rectangular system but does not work well with conventional surveys). GPS

continued

precision resulting from a compass rule adjustment tells you nothing about the positional accuracies of individual points. Only error ellipses can do that correctly.

A Word About Finding Blunders

As you know by now, blunders cannot be part of the adjustment; they must be located and removed from your field data. Least squares provides some useful tools for locating blunders. Normally, the entire adjustment is subjected to a statistical test (called the Chi Square test for the experts in the crowd) that checks the overall validity of your data, the standard errors that you assigned, and the adjustment results. You do not have to understand statistics to know that if your adjustment fails this test, you had better start looking for the source of the problem. This test is usually a part of the adjustment program, and failing it sounds a warning bell to alert you to a potential problem.

Let us imagine that you carefully prepared your field data, assigned standard errors that really reflect the way you survey, and have run your first least squares adjustment. Unfortunately, the program has told you that your survey "Fails the Test." Should you give up and return to the compass rule, because it never gave you such discouraging news? If you have read this far, you know by now we are not going to allow that.

At this point, you need to perform some detective work, with the adjustment providing all the clues you need to find the source of your problems. There are a number of techniques for finding blunders in a least squares adjustment, including automated blunder detection routines in some software. However, one simple manual technique is to look at the resulting *residuals* on your field data after the adjustment. If everything was perfect, you would expect the residuals to be roughly equal to the standard errors that you chose for your field data. Due to random errors, there will be some variation up and down, but if a residual exceeds three times its standard error, there may be a problem.

TABLE 3 - Checking For Blunders

Residuals in Angles

At	From	To	Adj Angle	Residual	StdErr	StdRes
1	4	2	+58-15-40.22	+0-00-27.22	4.00	6.8*
3	2	4	+129-57-21.68	+0-00-32.68	4.00	8.2*
4	3	1	+99-58-37.68	+0-00-29.68	4.00	7.4*
1	2	6	+61-47-49.93	-0-00-02.07	4.00	0.5
6	1	7	+90-00-02.47	-0-00-02.53	4.00	0.6

Residuals in Distances

At	To	Adj Dist	Residual	StdErr	StdRes
1	2	973.9700	-0.0090	0.030	0.3
2	3	422.5785	0.0675	0.030	2.3
3	4	512.6738	0.0298	0.030	1.0

Table 3 shows an excerpt from an actual adjustment containing a blunder. The last column in the table, called the *standardized residual*, is the ratio of the residuals to the input standard errors. Those with values above 3.0 are flagged to draw your attention to them. You can see imme-

continued

control and conventional surveys with least squares adjustment work hand in hand. One of the great advantages of GPS is that the points do not have to be intervisible. One of the disadvantages of GPS points, when later used in conventional surveys, is that they generally are *not* intervisible, and hence, no backsight is available. Using least squares we can easily start at one known GPS point with no backsight, conventionally survey to another known point, and adjust between the two. If a third known point is included anywhere in the traverse, sufficient redundancy is introduced to allow complete confidence in this no-backsight, no-check-in-azimuth type of survey.

Given the task of locating a series of intersecting transmission lines in a refinery and determining clearances for additional construction, we measured a baseline along one side of the project, turned horizontal and vertical angles from the ends of this baseline to all the insulators at each end of the subject lines and to the low point of each line, and coded the angles into the least squares program. The software produced the horizontal locations of all the subject lines, the elevation of both ends of each line, and the low point of the catenary. Although these results could have been achieved by other methods, this procedure saved us much time in both the field and the office, and again, we have a lot of confidence in our answers.

When we were surveying the centerline of a winding mountain road with 300-plus courses, most of which were 50 to 100 feet in length but with visibility into a broad river wash on one side, we set a large sight on a known control station in the wash area about two miles away. We then turned angles to this sight at all the traverse points from which it could be seen. Using least squares, this redundant data was easily incorporated into the traverse adjustment along the road and allowed us to have a high level of confidence in our azimuths and in the entire survey. It might be worthy to note here that using this same technique, but turning to a natural sight whose position is not known from a number of points in the survey, should control azimuth nearly as well.

Somewhere in the past I have heard that the difference between a technician and a professional is that the technician uses his education, training, and the available equipment to perform his job as trained or educated, while a professional uses his education, training, and equipment to innovate new, better, or more efficient methods of performing his projects.

The least squares method is a valuable tool that is now readily available to all professional surveyors. It allows these professionals to expand their capabilities to the limits of their imaginations. ▲

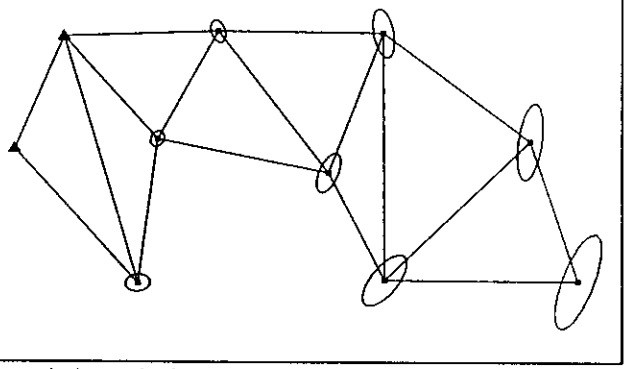
Roger A. Frank, PLS, is a principal of Johnson-Frank & Associates, Inc., a land surveying firm based in Anaheim, California. He is registered in seven western states and specializes in high-order horizontal and vertical control, aerial control, and boundary determination.

diately that there are several very large standardized residuals on the angles. A good place to start looking for blunders would be the angle with the largest standardized residual. That may not always be the one, and you may need to look at the next few angles as well, but it represents a good clue.

Using Preanalysis To Plan Surveys

Least squares can be used to compute the accuracies of survey points, and the relative accuracies between points, *before* any field observations are made. How is this possible? First you supply a list of input station names along with their approximate coordinates scaled from a map or photograph, indicating roughly where the survey points are planned. Then you enter a list of the proposed measurements, using "From and To" station names rather than actual field survey data. Finally, just as in regular data, you need to indicate standard error values for these proposed measurements so that the proper weighting can be applied.

FIGURE 5



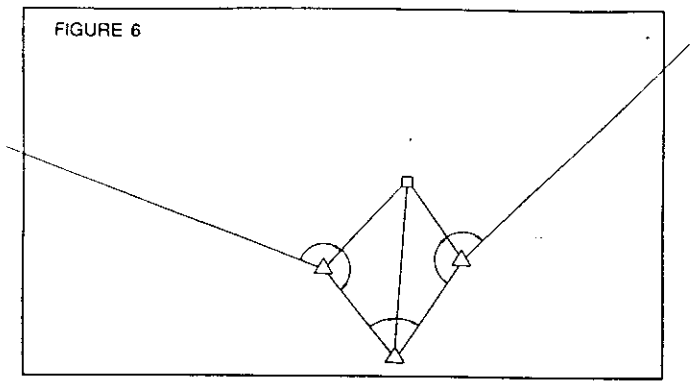
Preanalysis results for a small network. The shape and size of the error ellipses indicate increasing positional uncertainty as we move away from the fixed stations.

The least squares preanalysis will now take this proposed survey and generate computed accuracies (error ellipses) for all survey stations. You can then review the results, and add or delete measurements as needed to meet the required accuracy specifications. Even if the actual survey varies somewhat from the proposed configuration, this technique allows you to develop a general plan for each survey that will result in the most efficient use of your field time.

What Else Can I Use It For?

Because least squares allow so much flexibility in data collection, and because it provides a single "best-fit" solution no matter what kind of survey was performed, you can use it to help you in a variety of field applications. For example, imagine that you. are running a traverse and reach a point where several short legs would be required. You know that the short sights will weaken the traverse, but with least squares you can set an additional point, and observe all possible distances and angles to it. The adjustment will use all the data, and strengthen the corner considerably.

FIGURE 6



Strengthening of traverse with short traverse legs by observing a remote point.

Resections can be easily handled, with any number and combination of angle and distance observations. Least squares will automatically compute the best coordinates, plus produce an error ellipse showing how accurate the resection was. Traversing becomes much more flexible. You can begin with or without a backsight to a known bearing, and close to a known point with or without a closing angle to another known bearing. Solar azimuths, appropriately weighted, can be added wherever needed to strengthen the traverse. Additional distance and angle ties can be observed wherever possible. They will assist with blunder detection and will strengthen the traverse.

Least squares is a powerful adjustment technique that gives you a complete accounting sheet for your surveys. It gives you the best possible results while preserving your field data as much as possible. It provides you with a detailed statement of how each observation fits into the adjustment, and a statement of accuracy for each computed point. All this information allows you to make intelligent and informed decisions about the strength of any particular survey. Least squares also provides tools for locating blunders in field data, and for preplanning surveys to meet accuracy specifications. Least squares is the *only* adjustment method that does justice to your high precision equipment and your good field practice.

Several states and many Federal government agencies are now (or soon will be) requiring the use of least squares adjustments and positional tolerance statements for all surveys, rather than the more traditional traverse closing precisions. In the near future, we will probably look back and wonder how we ever managed without least squares. ▲

Sean Curry, PhD, serves as director of development at STARPLUS Software, Inc. in Oakland, California. He has graduate degrees from the University of California Berkeley in civil engineering. He taught surveying at this same university and has extensive experience in software development for the surveying and photogrammetry communities.

Ron Sawyer serves as director of sales at STARPLUS Software, Inc. He has a Master of Science degree in architectural engineering from the University of Illinois and is a registered civil engineer in the state of California. He has developed software for civil engineers and surveyors both as a private consultant and as a manager of a software service company.

CONTROL

POINTS

HELD

FIX

CONTROL MARK DATA

NAME OF MARK: 14120188 COUNTY: DESCHUTES

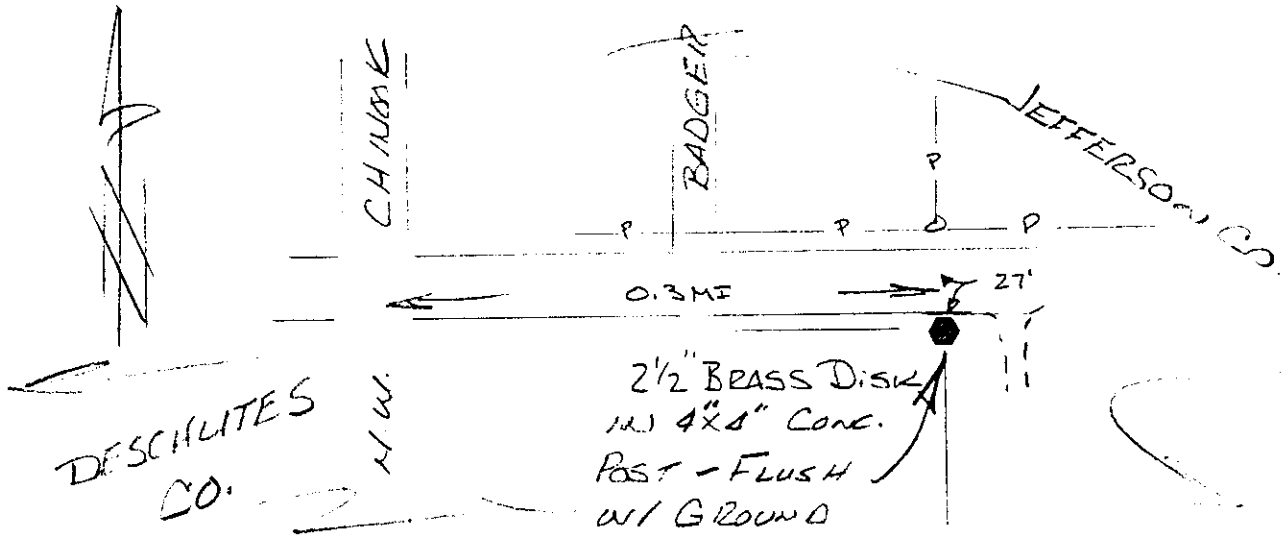
MARK SET BY: PE 5792 ARNOLD KEGEL STATE: OREGON

DATE OF MARK: 1973 COUNTRY: U.S.A.

LOCATION: SECTION 1 TOWNSHIP 14 S. RANGE 12 E. MERIDIAN: WILLAMETTE

REFERENCE NUMBER: CS 06487

MARK SKETCH:



DATA COMPUTED BY: DESCHUTES COUNTY SURVEYOR'S OFFICE DATE: 1994

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

DATUM: HOIZONTAL= NAD (83-91) CENTRAL MERIDIAN: W 121°17'00.000000"

VERTICAL= NGVD 29 LATUIDE 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

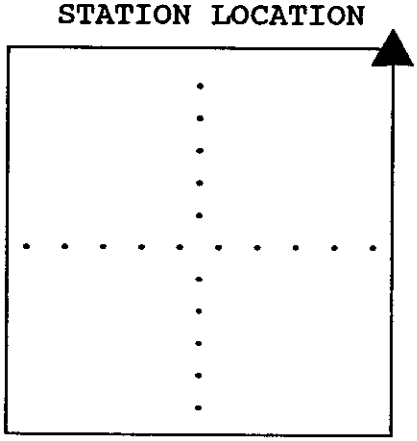
MARK: 14120188 HORIZONTAL ORDER: FIRST

		ONE SIGMA ERROR
Latitude:	44°23'34.795290"	
Longitude:	121°13'45.481150"	
Northing:	507864.6427	FIXED
Easting:	3314126.5176	FIXED
Convergence:	+ 0°02'16.0807"	
Scale Factor:	1.000160227866	
Ellipsoid Height:	2699.918	FIXED
Orthometric Height:	2765.4308	0.059
Geoid Height:	-65.5128	

DESCHUTES COUNTY PRIME CONTROL NETWORK
CONTROL STATION DESCRIPTION

NAME: 14120188
GIS # 0020
ORDER C-1st. (GPS)

STATION LOCATION



T. 14 S.- R. 12 E., SEC. 1

HORIZONTAL DATUM: NAD 83 (1991)
VERT. DATUM: NGVD 29 & NAVD 88

LATITUDE: 44° 23' 34.79529" N
LONGITUDE: 121° 13' 45.48115" W

------- EC CARTESIAN ---------
X: -2367112.424 METERS
Y: -3904060.079 METERS
Z: +4439975.503 METERS

---------- HEIGHT ----------
ELLIPSOIDAL: 822.935 METERS
NGVD 29 : 842.955 METERS
NAVD 88 : 841.044 METERS
---- SPC -- OREGON SOUTH ------
NORTH: 303127.721±.003 METERS
EAST: 1441886.632±.003 METERS

SCALE FACTOR: 1.000123715
CONVERGENCE: - 0° 29' 56.22 "

The horizontal coordinates & ellipsoidal height was determined by GPS observations constrainted 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 - T13S R12E 36/1\31 ARK 5792 RFA
AGENCY INSCRIPTION - NONE
THE STATION IS LOCATED ABOUT 3.8 MILES NORTHWEST OF TERREBONNE

TO REACH THE STATION FROM TERREBONNE,START AT THE INTERSECTION OF US HWY 97 AND SMITHROCK WAY IN TERREBONNE, PROCEED NORTH ON HWY 97 0.55 MI.,TURN LEFT ON LOWER BRIDGE COUNTY ROAD AND PROCEED NORTHWESTERLY 2.2 MI, TURN RIGHT ON N.W. 43 ST. AND PROCEED NOTRH 1.8 MI., TURN LEFT ON N.W. CHINOOK DR. AND PROCEED NORTHWESTERLY 0.9 MI., TURN RIGHT ON ANTELOPE DR. AND PROCEED EAST 0.25 MILES TO THE STATION ON THE RIGHT.

THE STATION MARK IS A 2 1/2 IN. BRASS DISK SET IN A 4 IN.X 4 IN. X 20 IN. CONCREET POST FLUSH WITH GROUND LEVEL.
18 FEET SOUTH OF A SOUTH EDGE OF ANTELOPE DR.
54 FEET SOUTH OF PP&L POWER POLE #310140.
SET BY ARNOLD KEGEL IN 1973, SE COR. SEC 36 T13S R12E WM.

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

CONTROL MARK DATA

NAME OF MARK: 14132500 COUNTY: DESCHUTES

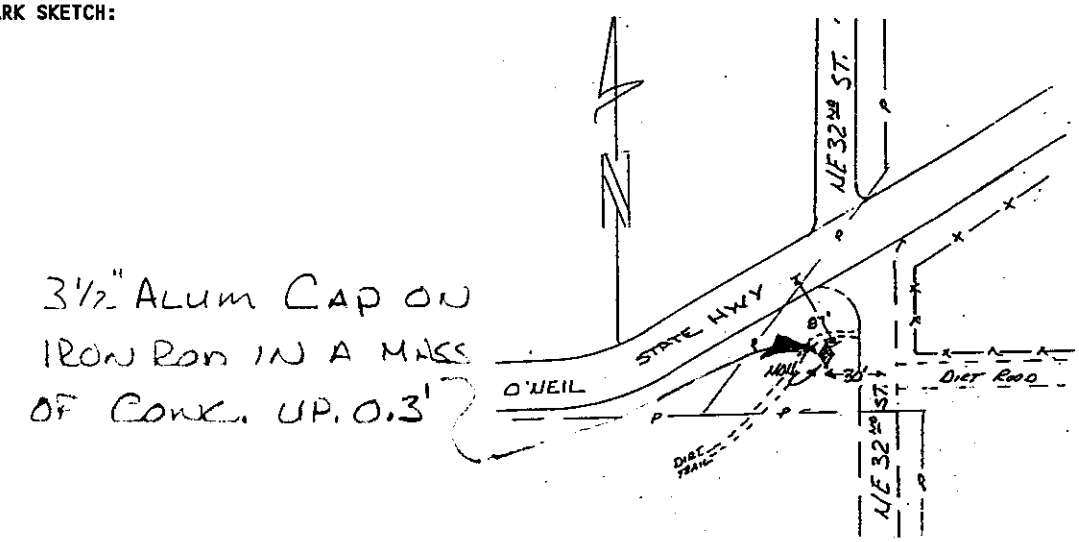
MARK SET BY: LS 0804 C. H. KETCHAM STATE: OREGON

DATE OF MARK: 1987 COUNTRY: U.S.A.

LOCATION: SECTION 25 TOWNSHIP 14 S. RANGE 13 E. MERIDIAN: WILLAMETTE

REFERENCE NUMBER: OCRR 0030

MARK SKETCH:



DATA COMPUTED BY: DESCHUTES COUNTY SURVEYOR'S OFFICE DATE: 1994

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

DATUM: HOIZONTAL= NAD (83-91) CENTRAL MERIDIAN: W 121°17'00.000000"

VERTICAL= NGVD 29 LATUIDE 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

MARK: 14132500 HORIZONTAL ORDER: FIRST

Latitude:	44°19'12.052420"	ONE SIGMA ERROR
Longitude:	121°07'42.323900"	
Northing:	481286.6151	FIXED
Easting:	3340550.3429	FIXED
Convergence:	+ 0°06'29.6294"	
Scale Factor:	1.000161877615	
Ellipsoid Height:	2890.8465	FIXED
Orthometric Height:	2955.8104	FIXED
Geoid Height:	-64.9639	

DESCHUTES COUNTY PRIME CONTROL NETWORK
CONTROL STATION DESCRIPTION

NAME: 14132500
GIS # 0028
ORDER C-1st. (GPS)

HORIZONTAL DATUM: NAD 83 (1991)
VERT. DATUM: NGVD 29 & NAVD 88

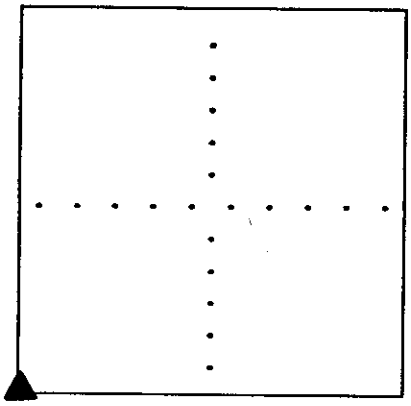
LATITUDE: 44° 19' 12.05242" N
LONGITUDE: 121° 07' 42.32390" W

------- EC CARTESIAN ---------
X: -2363188.095 METERS
Y: -3913111.349 METERS
Z: +4434216.778 METERS

---------- HEIGHT ----------
ELLIPSOIDAL: 881.130 METERS
NGVD 29 : 900.930 METERS
NAVD 88 : 902.032 METERS
---- SPC -- OREGON SOUTH ------
NORTH: 294951.958±.004 METERS
EAST: 1449863.865±.004 METERS

SCALE FACTOR: 1.000097128
CONVERGENCE: - 0° 25' 47.76 "

STATION LOCATION



T. 14 S.- R. 13 E., SEC.25

The horizontal coordinates & ellipsoidal height was determined by GPS observations constrainted 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 - T 14 S R 13 E 26|25 35|36 LS 1031 1988
AGENCY INSCRIPTION - DESCHUTES COUNTY SURVEYORS OFFICE
THE STATION IS LOCATED ABOUT 3.9 MILE NORTHEAST OF REDMOND.

TO REACH THE STATION FROM REDMOND,START AT THE INTERSECTION OF US HWY 97 (5th ST.) & OR.HWY 126 (EVERGREEN AV.), PROCEED NORTH ON HWY 97 FOR 2.77 MI., TURN RIGHT O'NEIL HWY. AND PROCEED EASTERLY FOR 2.61 MILES, TURN RIGHT ON NE 33rd STREET AND PROCEED SOUTH FOR 100 FEET TO THE STATIION ON THE RIGHT.

THE STATION MARK IS A 3 1/2 IN. STANDARD DESCHUTES COUNTY ALUMINUM DISK IN MASS OF CONCRETE 0.3 FT ABOVE GROUND LEVEL.
70 FEET SOUTH OF THE SOUTH EDGE OF O'NEIL HWY.
15 FEET WEST OF THE WEST EDGE OF NE 33rd STREETD.

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

CONTROL MARK DATA

NAME OF MARK: 15131400 COUNTY: DESCHUTES

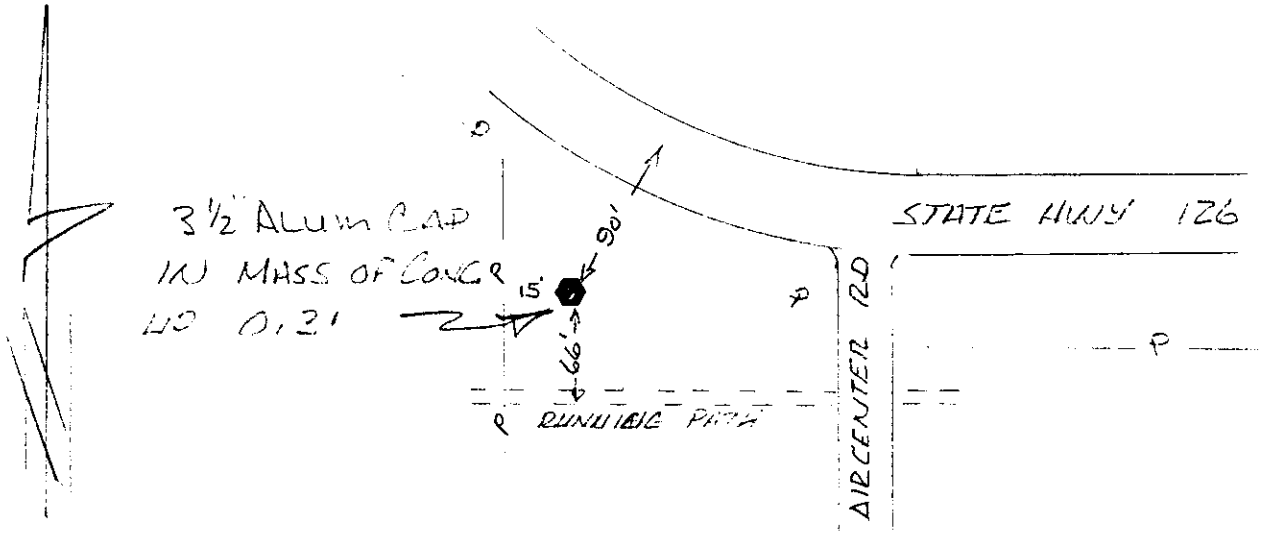
MARK SET BY: LS 1031 W. C. KAUFFMAN STATE: OREGON

DATE OF MARK: 1988 COUNTRY: U.S.A.

LOCATION: SECTION 14 TOWNSHIP 15 S. RANGE 13 E. MERIDIAN: WILLAMETTE

REFERENCE NUMBER: OCRR 1032

MARK SKETCH:



DATA COMPUTED BY: DESCHUTES COUNTY SURVEYOR'S OFFICE DATE: 1994

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

DATUM: HOIZONTAL= NAD (83-91)	CENTRAL MERIDIAN: W 121°17'00.000000"
VERTICAL= NGVD 29	LATUIDE 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

MARK: 15131400 HORIZONTAL ORDER: FIRST

		ONE SIGMA ERROR
Latitude:	44°15'43.386380"	
Longitude:	121°08'54.906150"	
Northing:	460142.9905	FIXED
Easting:	3335307.3725	FIXED
Convergence:	+ 0°05'38.5673"	
Scale Factor:	1.000161423489	
Ellipsoid Height:	2984.8917	FIXED
Orthometric Height:	3049.9081	FIXED
Geoid Height:	-65.0164	

DESCHUTES COUNTY PRIME CONTROL NETWORK
CONTROL STATION DESCRIPTION

NAME: 15131400
GIS # 0027
ORDER C-1st. (GPS)

HORIZONTAL DATUM: NAD 83 (1991)
VERT. DATUM: NGVD 29 & NAVD 88

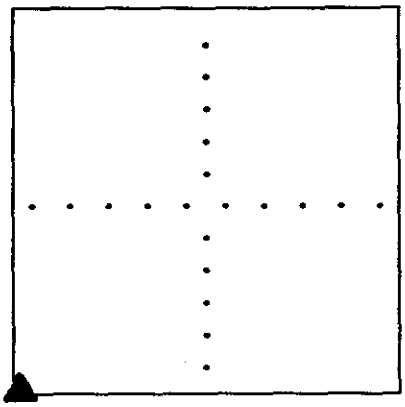
LATITUDE: 44° 15' 43.38638" N
LONGITUDE: 121° 08' 54.90615" W

------- EC CARTESIAN ---------
X: -2366902.275 METERS
Y: -3916146.775 METERS
Z: +4429625.877 METERS

---------- HEIGHT ----------
ELLIPSOIDAL: 909.795 METERS
NGVD 29 : 929.623 METERS
NAVD 88 : 930.725 METERS
---- SPC -- OREGON SOUTH ------
NORTH: 288523.149±.004 METERS
EAST: 1448205.492±.004 METERS

SCALE FACTOR: 1.000077189
CONVERGENCE: - 0° 26' 37.42 "

STATION LOCATION



T. 15 S.- R. 13 E., SEC.14

The horizontal coordinates & ellipsoidal height was determined by GPS observations constrainted 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 - T 15 S R 13 E 15|14 22|23 LS 1031 1988
AGENCY INSCRIPTION - DESCHUTES COUNTY SURVEYORS OFFICE
THE STATION IS LOCATED ABOUT 1.4 MILE EASTERLY OF REDMOND.

TO REACH THE STATION FROM REDMOND,START AT THE INTERSECTION OF US HWY 97 (5th ST.) & OR.HWY 126 (EVERGREEN AV.), PROCEED EAST ON HWY 126 FOR 1.55 MI.,TURN RIGHT AT THE ENTRANCE TO THE US FOREST REDMOND AIR CENTER & PROCEED SOUTH 85 FEET TO A 10 FOOT WIDE PATH ,,,,,,TURN RIGHT AND PROCEED WESTERLY FOR 115 FEET TO THE STATION FEET TO THE (NORTH) RIGHT.

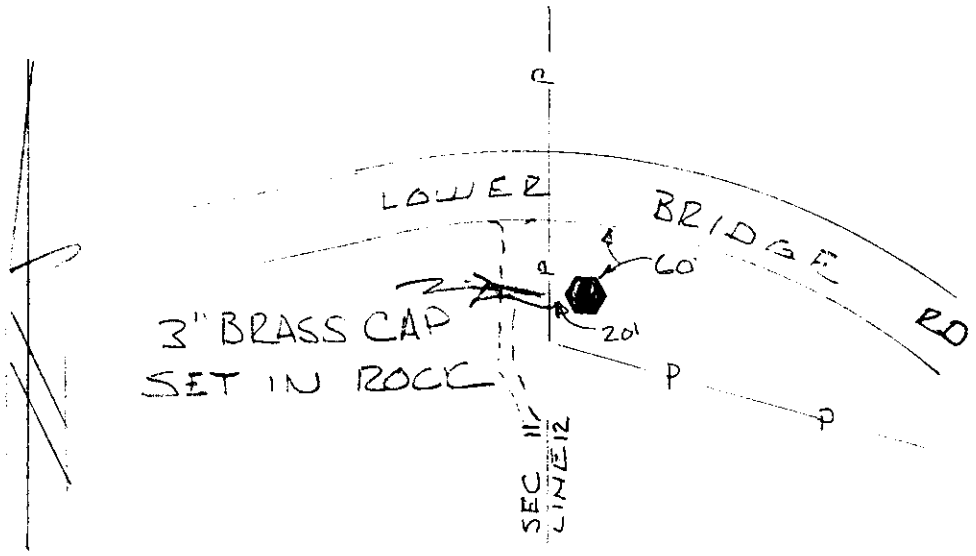
THE STATION MARK IS A 3 1/2 IN. STANDARD DESCHUTES COUNTY ALUMINUM DISK IN MASS OF CONCRETE 0.3 FT ABOVE GROUND LEVEL.
70 FEET SOUTH OF THE SOUTH EDGE OF US HWY 126.
115 FEET WEST OF A ENTRANCE ROAD TO FOREST SERVICE AIR CENTER.
75 FEET NORTH OF 10 FOOT JOGGING PATH.

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

CONTROL MARK DATA

NAME OF MARK: 2711 PP&L
COUNTY: DESCHUTES
MARK SET BY: P. P. & L.
STATE: OREGON
DATE OF MARK: 1929
COUNTRY: U.S.A.
LOCATION: SECTION 12 TOWNSHIP 14 S. RANGE 12 E. MERIDIAN: WILLAMETTE
REFERENCE NUMBER: NONE

MARK SKETCH:



DATA COMPUTED BY: DESCHUTES COUNTY SURVEYOR'S OFFICE DATE: 1994

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

DATUM: HOIZONTAL= NAD (83-91)
VERTICAL= NGVD 29
COORDINATE SYSTEM: TRANSVERSE MERCATOR
ZONE: DESCHUTES COUNTY
LINEAR UNITS: INTERNATIONAL FOOT

CENTRAL MERIDIAN: W 121°17'00.000000"
LATUIDE OF ORIGIN: N 43°00'00.000000"
ORIGIN NORTHING: 0.0000 F
ORIGIN EASTING: 3,300,000.0000 F
SCALE ALONG MERIDIAN: 1.000160000000

GEODETIC AND MAPPING COORDINATES

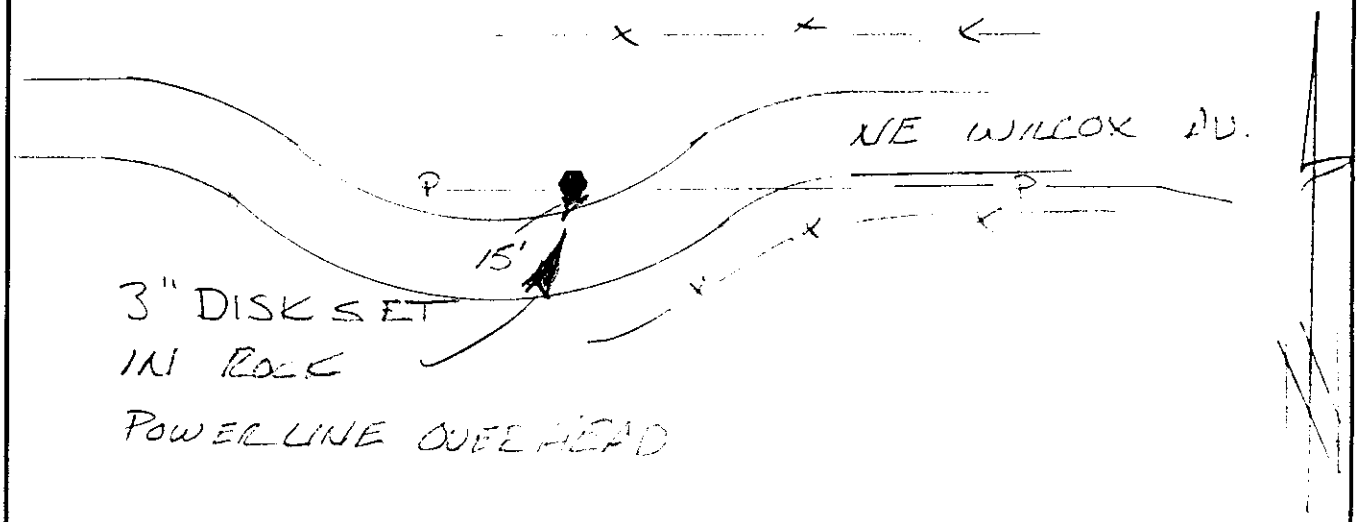
MARK: 2711 PP&L HORIZONTAL ORDER: FIRST

		ONE SIGMA ERROR
Latitude:	44°21'54.055874"	
Longitude:	121°15'02.780596"	
Northing:	497658.3367	0.008
Easting:	3308516.8653	0.008
Convergence:	+ 0°01'21.9630"	
Scale Factor:	1.000160082827	
Ellipsoid Height:	2644.3894	0.012
Orthometric Height:	2710.105	FIXED
Geoid Height:	-65.7156	

CONTROL MARK DATA

NAME OF MARK: 2906 ORE
COUNTY: DESCHUTES
MARK SET BY: GEOLOGICAL SURVEY
STATE: OREGON
DATE OF MARK: 19??
COUNTRY: U.S.A.
LOCATION: SECTION 18 TOWNSHIP 14 S. RANGE 13 E. MERIDIAN: WILLAMETTE
REFERENCE NUMBER: NONE

MARK SKETCH:



DATA COMPUTED BY: DESCHUTES COUNTY SURVEYOR'S OFFICE DATE: 1994

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

DATUM: HOIZONTAL= NAD (83-91)
VERTICAL= NGVD 29
COORDINATE SYSTEM: TRANSVERSE MERCATOR
ZONE: DESCHUTES COUNTY
LINEAR UNITS: INTERNATIONAL FOOT

CENTRAL MERIDIAN: W 121°17'00.000000"
LATUIDE OF ORIGIN: N 43°00'00.000000"
ORIGIN NORTHING: 0.0000 F
ORIGIN EASTING: 3,300,000.0000 F
SCALE ALONG MERIDIAN: 1.000160000000

GEODETIC AND MAPPING COORDINATES

MARK: 2906 ORE HORIZONTAL ORDER: FIRST

		ONE SIGMA ERROR
Latitude:	44°21'21.820622"	
Longitude:	121°07'26.761093"	
Northing:	494432.1927	0.014
Easting:	3341656.4337	0.013
Convergence:	+ 0°06'40.7606"	
Scale Factor:	1.000161981427	
Ellipsoid Height:	2840.371	0.021
Orthometric Height:	2905.2596	0.060
Geoid Height:	-64.8886	

CONTROL MARK DATA

NAME OF MARK: GIS 0021 COUNTY: DESCHUTES

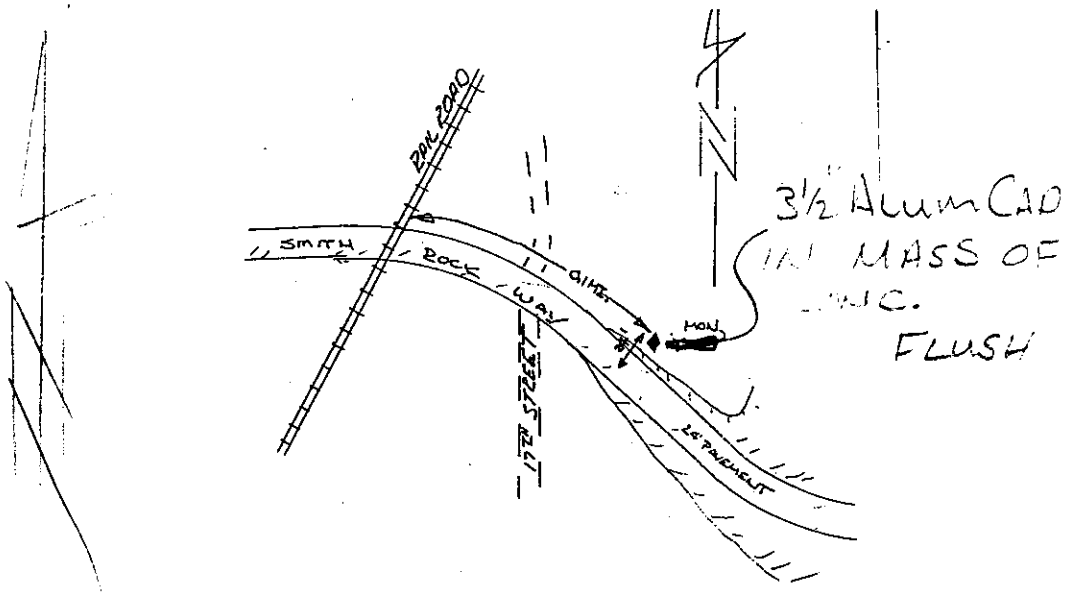
MARK SET BY: DESCHUTES CO. PUBLIC WORKS STATE: OREGON

DATE OF MARK: 1988 COUNTRY: U.S.A.

LOCATION: SECTION 16 TOWNSHIP 14 S. RANGE 13 E. MERIDIAN: WILLAMETTE

REFERENCE NUMBER: DGMC 5

MARK SKETCH:



DATA COMPUTED BY: DESCHUTES COUNTY SURVEYOR'S OFFICE DATE: 1994

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

DATUM: HOIZONTAL= NAD (83-91) CENTRAL MERIDIAN: W 121°17'00.000000"

VERTICAL= NGVD 29 LATUIDE 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

MARK: GIS 0021 HORIZONTAL ORDER: FIRST

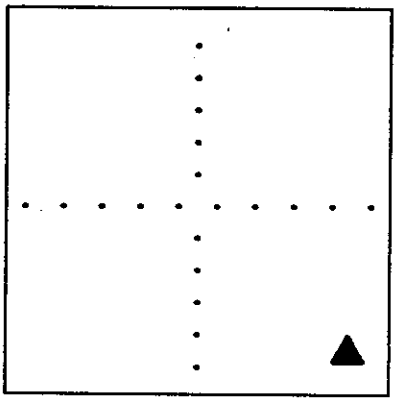
		ONE SIGMA ERROR
Latitude:	44°21'01.231340"	
Longitude:	121°10'16.763540"	
Northing:	492326.3839	FIXED
Easting:	3329305.4539	FIXED
Convergence:	+ 0°04'41.8802"	
Scale Factor:	1.000160980643	
Ellipsoid Height:	2801.893	FIXED
Orthometric Height:	2866.9948	FIXED
Geoid Height:	-65.1018	

DESCHUTES COUNTY PRIME CONTROL NETWORK
CONTROL STATION DESCRIPTION

NAME: GIS 0021
GIS # 0021
ORDER C-1st. (GPS)

HORIZONTAL DATUM: NAD 83 (1991)
VERT. DATUM: NGVD 29 & NAVD 88

STATION LOCATION



T. 14 S.- R. 13 E., SEC.16

LATITUDE: 44° 21' 01.23134" N
LONGITUDE: 121° 10' 16.76354" W

------- EC CARTESIAN ---------
X: -2364888.148 METERS
Y: -3909308.876 METERS
Z: +4436608.563 METERS

---------- HEIGHT ----------
ELLIPSOIDAL: 854.017 METERS
NGVD 29 : 873.~~934~~860 METERS
NAVD 88 : 874.9~~89~~55 METERS
---- SPC -- OREGON SOUTH ------
NORTH: 298348.707±.004 METERS
EAST: 1446468.362±.004 METERS

SCALE FACTOR: 1.000107975
CONVERGENCE: - 0° 27' 33.42 "

The horizontal coordinates & ellipsoidal height was determined by GPS observations constrainted 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 0021
AGENCY INSCRIPTION - DESCHUTES COUNTY SURVEYORS OFFICE
THE STATION IS LOCATED ABOUT 0.2 MILES EAST OF TERREBONNE

TO REACH THE STATION FROM TERREBONNE,START AT THE INTERSECTION OF US HWY 97 AND SMITH ROCK WAY, PROCEED EAST ON SMITH ROCK WAY FOR 0.38 MILES TO THE STATION ON THE LEFT.

THE STATION MARK IS A 3 1/2 IN. STANDATD DESCHUTES COUNTY ALUMINUM DISK IN A MASS OF CONCRETE 0.4 FT. ABOVE GROUND LEVEL. 17 FEET NORTH OF THE NORTH EDGE OF SMITH ROCK WAY.

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

CONTROL MARK DATA

NAME OF MARK: GIS 0022 COUNTY: DESCHUTES

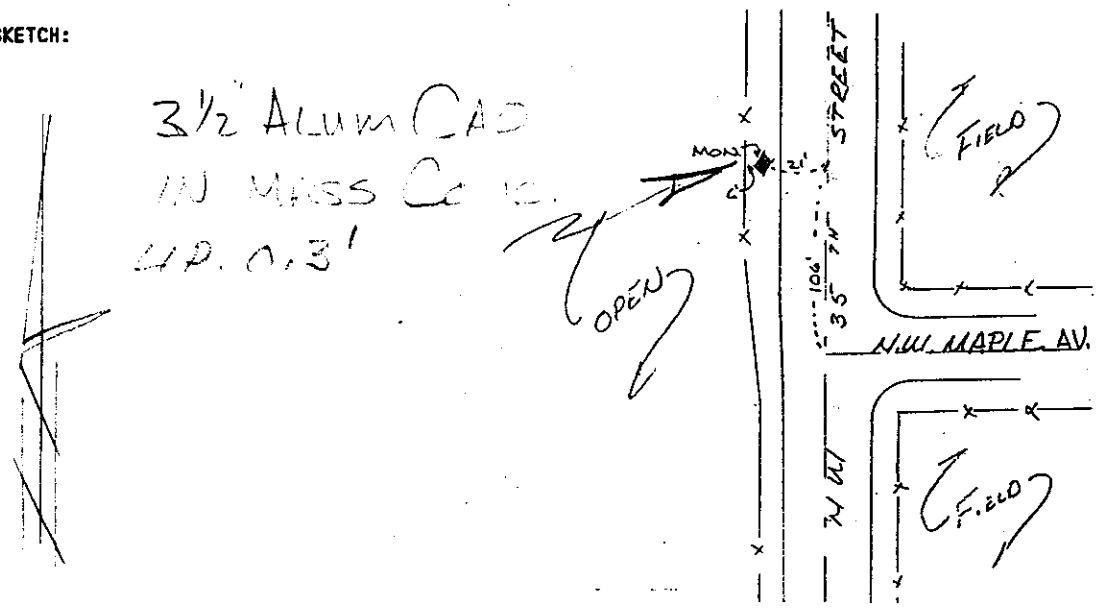
MARK SET BY: DESCHUTES CO. PUBLIC WORKS STATE: OREGON

DATE OF MARK: 1988 COUNTRY: U.S.A.

LOCATION: SECTION 6 TOWNSHIP 15 S. RANGE 13 E. MERIDIAN: WILLAMETTE

REFERENCE NUMBER: DGMC 5

MARK SKETCH:



DATA COMPUTED BY: DESCHUTES COUNTY SURVEYOR'S OFFICE DATE: 1994

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

DATUM: HOIZONTAL= NAD (83-91) CENTRAL MERIDIAN: W 121°17'00.000000"

VERTICAL= NGVD 29 LATUIDE 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

MARK: GIS 0022 HORIZONTAL ORDER: FIRST

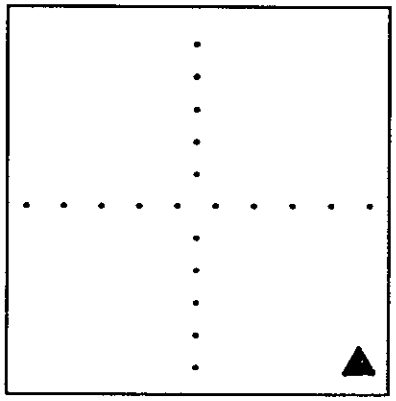
		ONE SIGMA ERROR
Latitude:	44°17'28.648220"	
Longitude:	121°12'33.565460"	
Northing:	470783.953	FIXED
Easting:	3319382.7229	FIXED
Convergence:	+ 0°03'06.0530"	
Scale Factor:	1.000160428992	
Ellipsoid Height:	2883.8517	FIXED
Orthometric Height:	2949.1783	0.044
Geoid Height:	-65.3266	

DESCHUTES COUNTY PRIME CONTROL NETWORK
CONTROL STATION DESCRIPTION

NAME: GIS 0022
GIS # 0022
ORDER C-1st. (GPS)

HORIZONTAL DATUM: NAD 83 (1991)
VERT. DATUM: NGVD 29 & NAVD 88

STATION LOCATION



T. 15 S.- R. 13 E., SEC. 6

LATITUDE: 44° 17' 28.64822" N
LONGITUDE: 121° 12' 33.56546" W

------- EC CARTESIAN ---------
X: -2369865.511 METERS
Y: -3911676.356 METERS
Z: +4431930.922 METERS

---------- HEIGHT ----------
ELLIPSOIDAL: 878.998 METERS
NGVD 29 : 898.961 METERS
NAVD 88 : 900.012 METERS
---- SPC -- OREGON SOUTH ------
NORTH: 291811.636±.003 METERS
EAST: 1443382.671±.003 METERS

SCALE FACTOR: 1.000087117
CONVERGENCE: - 0° 29' 07.02 "

The horizontal coordinates & ellipsoidal height was determined by GPS observations constrainted 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 0022
AGENCY INSCRIPTION - DESCHUTES COUNTY SURVEYORS OFFICE
THE STATION IS LOCATED ABOUT 2.2 MILE NORTHWEST OF REDMOND.

TO REACH THE STATION FROM REDMOND,START AT THE INTERSECTION OF US HWY 97 (5th ST.) & OR.HWY 126, PROCEED WEST ON HWY 126 FOR 0.85 ,,,,MI.,TURN RIGHT ON RIM ROCK WAY & PROCEED NORTH FOR 0.55 MILES TURN LEFT ON WEST ANTLER AVE. & PROCEED WEST FOR 1.00 MILES, TURN RIGHT ON NW 35th ST. & PROCEED NORTH 1.00 MI. TO THE INTERSECTION WITH NW MAPLE AV., CONTINUE NORTH ON 35th ST. FOR 112 FEET TO THE STATION ON THE LEFT.

THE STATION MARK IS A 3 1/2 IN. STANDARD DESCHUTES COUNTY ALUMINUM DISK IN MASS OF CONCRETE 0.3 FT ABOVE GROUND LEVEL.
9.6 FEET WEST OF THE WEST EDGE OF 35th ST.
7.9 FEET EAST OF AN OLD BOARD FENCE

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

CONTROL MARK DATA

NAME OF MARK: GIS 0023 COUNTY: DESCHUTES

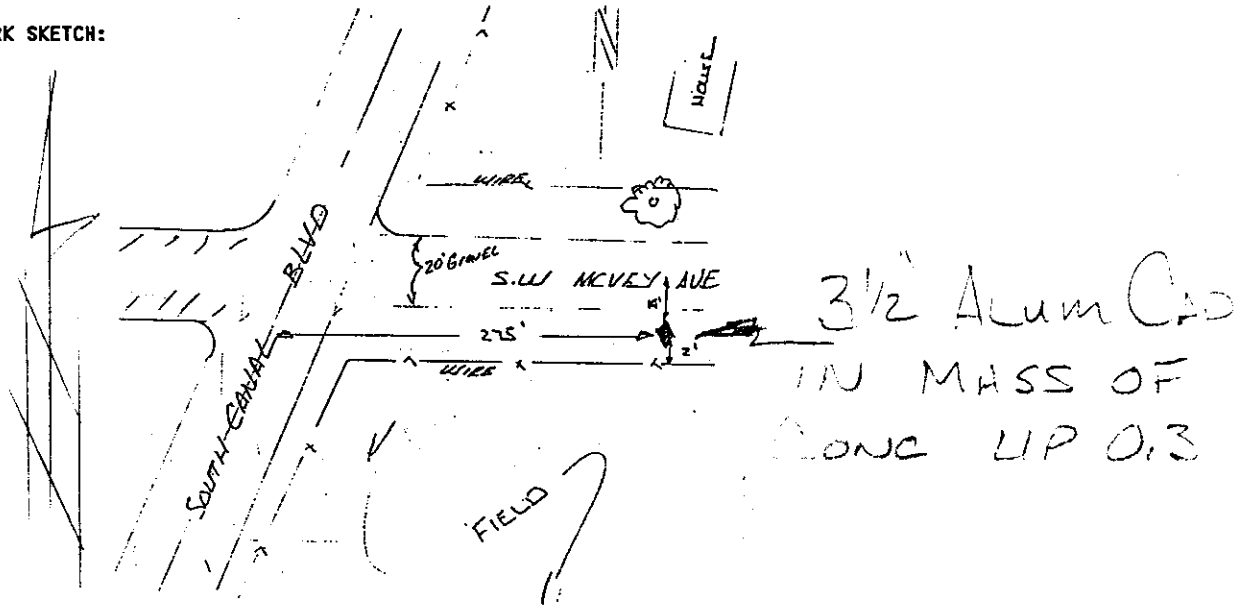
MARK SET BY: DESCHUTES CO. PUBLIC WORKS STATE: OREGON

DATE OF MARK: 1988 COUNTRY: U.S.A.

LOCATION: SECTION 36 TOWNSHIP 15 S. RANGE 12 E. MERIDIAN: WILLAMETTE

REFERENCE NUMBER: DGMC 5

MARK SKETCH:



DATA COMPUTED BY: DESCHUTES COUNTY SURVEYOR'S OFFICE DATE: 1994

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

DATUM: HOIZONTAL= NAD (83-91)	CENTRAL MERIDIAN: W 121°17'00.000000"
VERTICAL= NGVD 29	LATUIDE 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

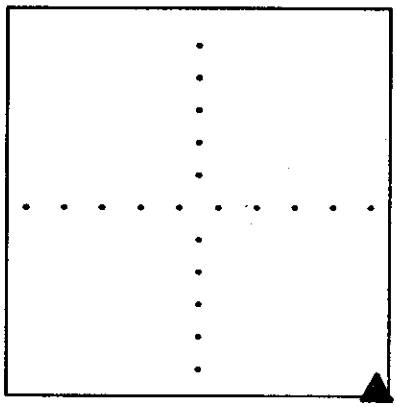
MARK: GIS 0023 HORIZONTAL ORDER: FIRST

		ONE SIGMA ERROR
Latitude:	44°13'06.655070"	
Longitude:	121°13'48.386980"	
Northing:	444244.4739	FIXED
Easting:	3313956.7691	FIXED
Convergence:	+ 0°02'13.6303"	
Scale Factor:	1.000160222432	
Ellipsoid Height:	3060.3018	FIXED
Orthometric Height:	3125.5971	FIXED
Geoid Height:	-65.2953	

DESCHUTES COUNTY PRIME CONTROL NETWORK
CONTROL STATION DESCRIPTION

NAME: GIS 0023
GIS # 0023
ORDER C-1st. (GPS)

STATION LOCATION



T. 15 S.- R. 12 E., SEC.36

HORIZONTAL DATUM: NAD 83 (1991)
VERT. DATUM: NGVD 29 & NAVD 88

LATITUDE: 44° 13' 06.65507" N
LONGITUDE: 121° 13' 48.38698" W

------- EC CARTESIAN ---------
X: -2374230.595 METERS
Y: -3915675.594 METERS
Z: +4426175.628 METERS

---------- HEIGHT ----------
ELLIPSOIDAL: 932.780 METERS
NGVD 29 : 952.682 METERS
NAVD 88 : 953.780 METERS
---- SPC -- OREGON SOUTH ------
NORTH: 283738.942±.003 METERS
EAST: 1441653.276±.003 METERS

SCALE FACTOR: 1.000062896
CONVERGENCE: - 0° 29' 58.20 "

The horizontal coordinates & ellipsoidal height was determined by GPS observations constrainted 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 0023
AGENCY INSCRIPTION - DESCHUTES COUNTY SURVEYORS OFFICE
THE STATION IS LOCATED ABOUT 4.4 MILE SOUTHWEST OF REDMOND.

TO REACH THE STATION FROM REDMOND,START AT THE INTERSECTION OF US HWY 97 (6th ST.) & OR.HWY 126, PROCEED SOUTH ON HWY 97 FOR 0.16 MI., TURN RIGHT SOUTH CANAL ACCESS RD. & PROCEED WESTERLY 0.08 MI., TURN LEFT ON SOUTH CANAL BLVD. & PROCEED SOUTH FOR 4.45 MI., TURN LEFT ON S.W. McVEY. & PROCEED EAST 300 FEET TO THE STATION ON THE RIGHT.

THE STATION MARK IS A 3 1/2 IN. STANDARD DESCHUTES COUNTY ALUMINUM DISK IN MASS OF CONCRETE 0.3 FT ABOVE GROUND LEVEL.
6.0 FEET SOUTH OF THE SOUTH EDGE OF S.W.McVEY.
2.0 FEET NORTH OF A WIRE FENCE.

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

CONTROL MARK DATA

NAME OF MARK: B-366 COUNTY: DESCHUTES

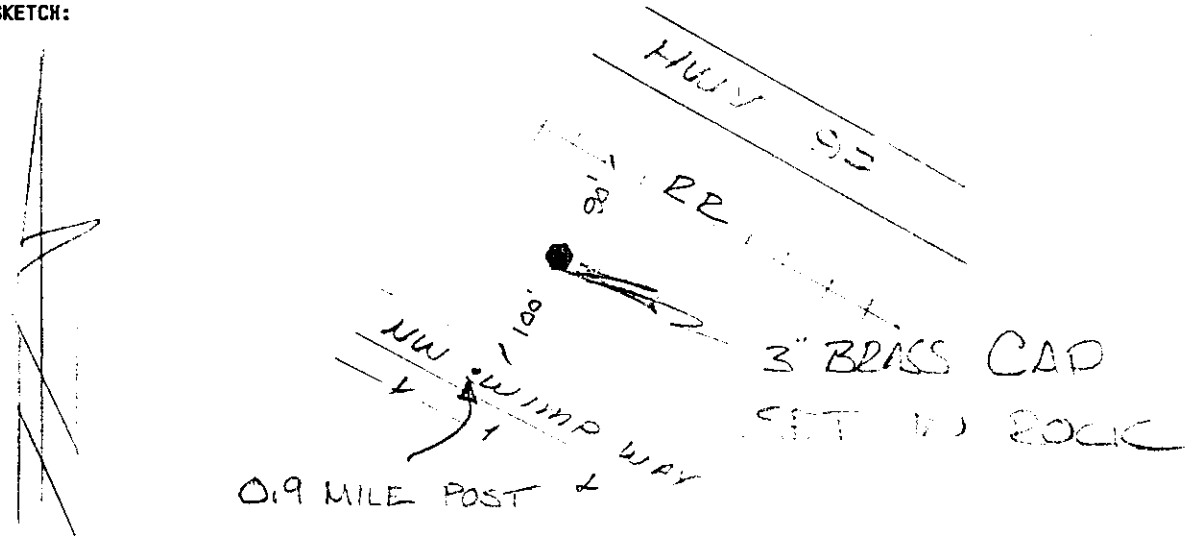
MARK SET BY: U.S. C. & G.S. STATE: OREGON

DATE OF MARK: 1942 COUNTRY: U.S.A.

LOCATION: SECTION 4 TOWNSHIP 14 S. RANGE 13 E. MERIDIAN: WILLAMETTE

REFERENCE NUMBER: NONE

MARK SKETCH:



DATA COMPUTED BY: DESCHUTES COUNTY SURVEYOR'S OFFICE DATE: 1994

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

DATUM: HOIZONTAL= NAD (83-91)	CENTRAL MERIDIAN: W 121°17'00.000000"
VERTICAL= NGVD 29	LATUIDE 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

MARK: B-366 HORIZONTAL ORDER: FIRST

		ONE SIGMA ERROR
Latitude:	44°23'02.731187"	
Longitude:	121°11'05.834702"	
Northing:	504627.8293	0.010
Easting:	3325724.4021	0.010
Convergence:	+ 0°04'07.7263"	
Scale Factor:	1.000160755616	
Ellipsoid Height:	2694.0661	0.014
Orthometric Height:	2759.229	FIXED
Geoid Height:	-65.1629	

CONTROL MARK DATA

NAME OF MARK: E-735 COUNTY: DESCHUTES

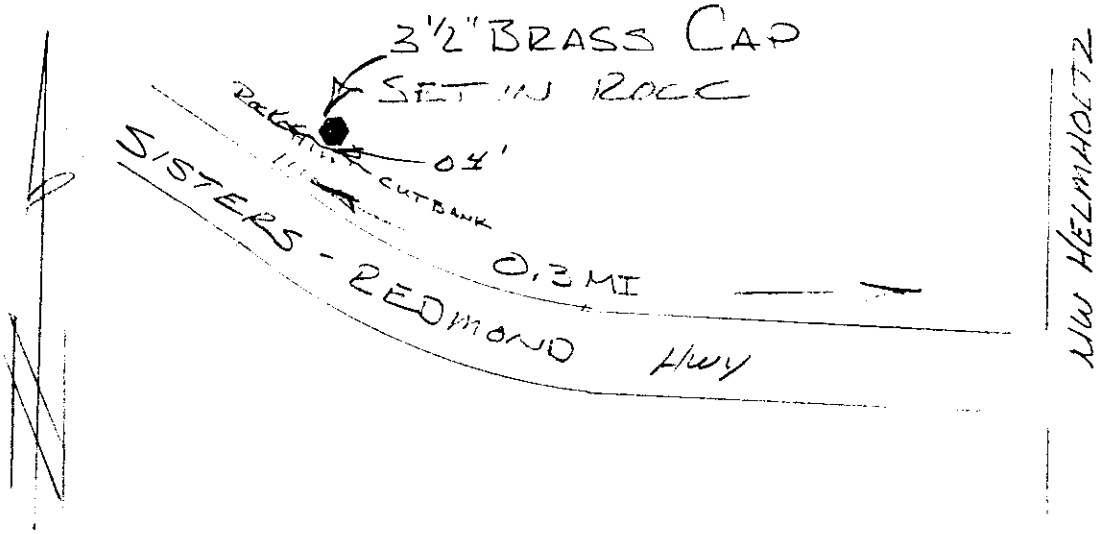
MARK SET BY: U.S. C. & G.S. STATE: OREGON

DATE OF MARK: 1987 COUNTRY: U.S.A.

LOCATION: SECTION 18 TOWNSHIP 15 S. RANGE 13 E. MERIDIAN: WILLAMETTE

REFERENCE NUMBER: NONE

MARK SKETCH:



DATA COMPUTED BY: DESCHUTES COUNTY SURVEYOR'S OFFICE DATE: 1994

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

DATUM: HOIZONTAL= NAD (83-91) CENTRAL MERIDIAN: W 121°17'00.000000"

VERTICAL= NGVD 29 LATUIDE 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

MARK: E-735 HORIZONTAL ORDER: FIRST

		ONE SIGMA ERROR
Latitude:	44°16'13.809676"	
Longitude:	121°13'32.888235"	
Northing:	463200.642	0.013
Easting:	3315072.3916	0.013
Convergence:	+ 0°02'24.5737"	
Scale Factor:	1.000160259410	
Ellipsoid Height:	2939.4872	0.017
Orthometric Height:	3004.8556	FIXED
Geoid Height:	-65.3684	

CONTROL MARK DATA

NAME OF MARK: F-735 COUNTY: DESCHUTES

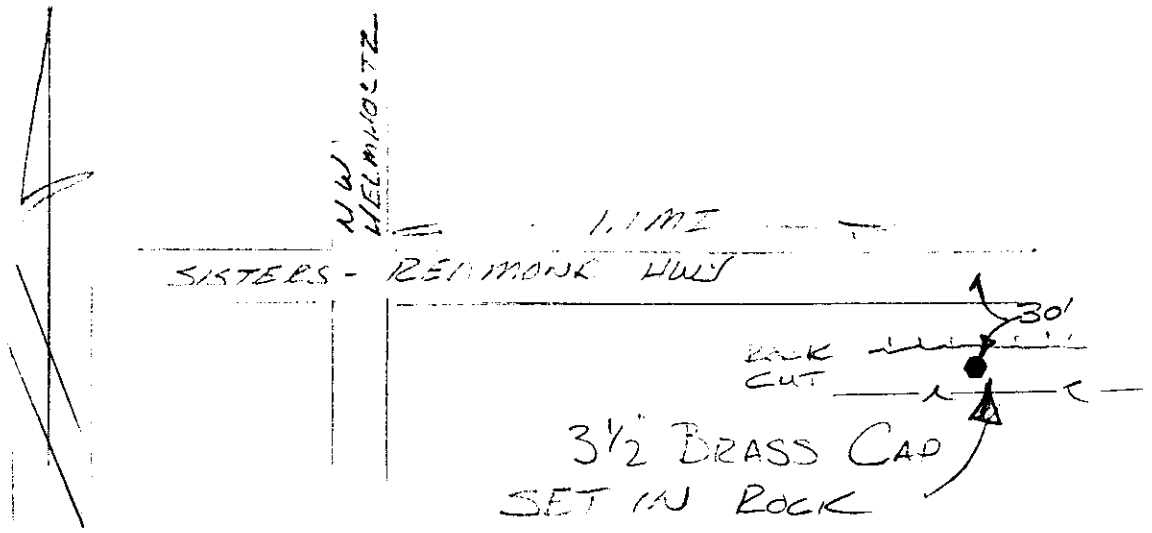
MARK SET BY: U.S. C. & G.S. STATE: OREGON

DATE OF MARK: 1987 COUNTRY: U.S.A.

LOCATION: SECTION 17 TOWNSHIP 15 S. RANGE 13 E. MERIDIAN: WILLAMETTE

REFERENCE NUMBER: NONE

MARK SKETCH:



DATA COMPUTED BY: DESCHUTES COUNTY SURVEYOR'S OFFICE DATE: 1994

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

DATUM: HOIZONTAL= NAD (83-91) CENTRAL MERIDIAN: W 121°17'00.000000"

VERTICAL= NGVD 29 LATUIDE 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

MARK: F-735 HORIZONTAL ORDER: FIRST

		ONE SIGMA ERROR
Latitude:	44°16'08.890129"	
Longitude:	121°11'50.760859"	
Northing:	462708.8715	0.011
Easting:	3322505.1506	0.011
Convergence:	+ 0°03'35.8582"	
Scale Factor:	1.000160578344	
Ellipsoid Height:	2939.91	0.015
Orthometric Height:	3005.1444	FIXED
Geoid Height:	-65.2344	

CONTROL MARK DATA

NAME OF MARK: G-111 COUNTY: DESCHUTES

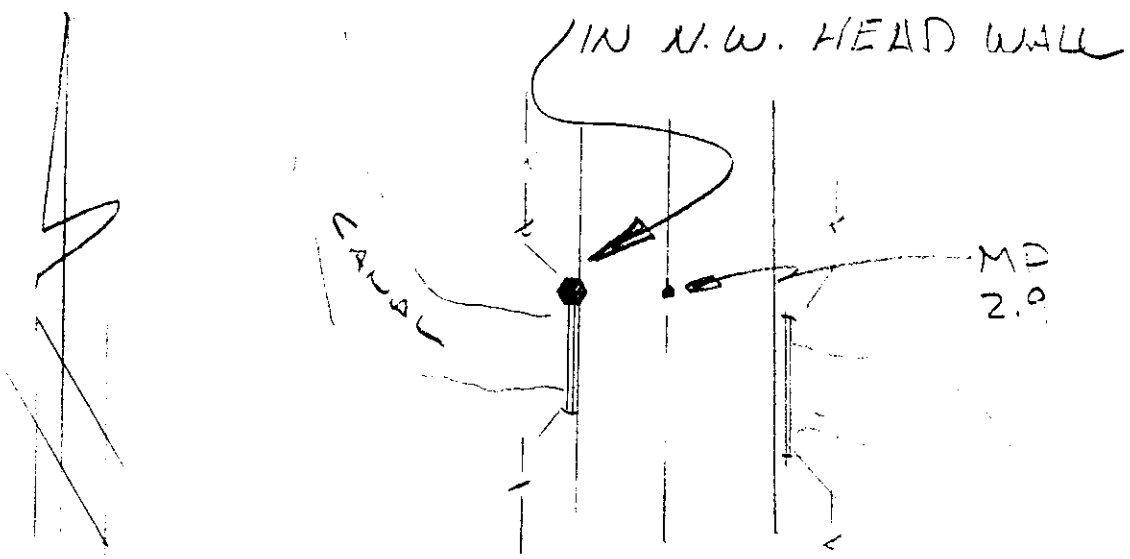
MARK SET BY: OREGON STATE HIGHWAY STATE: OREGON

DATE OF MARK: 1926 COUNTRY: U.S.A.

LOCATION: SECTION 33 TOWNSHIP 14 S. RANGE 13 E. MERIDIAN: WILLAMETTE

REFERENCE NUMBER: NONE

MARK SKETCH:



DATA COMPUTED BY: DESCHUTES COUNTY SURVEYOR'S OFFICE DATE: 1994

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

DATUM: HOIZONTAL= NAD (83-91)
VERTICAL= NGVD 29
COORDINATE SYSTEM: TRANSVERSE MERCATOR
ZONE: DESCHUTES COUNTY
LINEAR UNITS: INTERNATIONAL FOOT

CENTRAL MERIDIAN: W 121°17'00.000000"
LATUIDE OF ORIGIN: N 43°00'00.000000"
ORIGIN NORTHING: 0.0000 F
ORIGIN EASTING: 3,300,000.0000 F
SCALE ALONG MERIDIAN: 1.000160000000

GEODETIC AND MAPPING COORDINATES

MARK: G-111 HORIZONTAL ORDER: FIRST

		ONE SIGMA ERROR
Latitude:	44°19'06.724701"	
Longitude:	121°10'07.475841"	
Northing:	480729.6631	0.010
Easting:	3329996.6528	0.010
Convergence:	+ 0°04'48.2089"	
Scale Factor:	1.000161027455	
Ellipsoid Height:	2887.0139	0.013
Orthometric Height:	2952.1522	FIXED
Geoid Height:	-65.1383	

CONTROL MARK DATA

NAME OF MARK: H-478 COUNTY: DESCHUTES

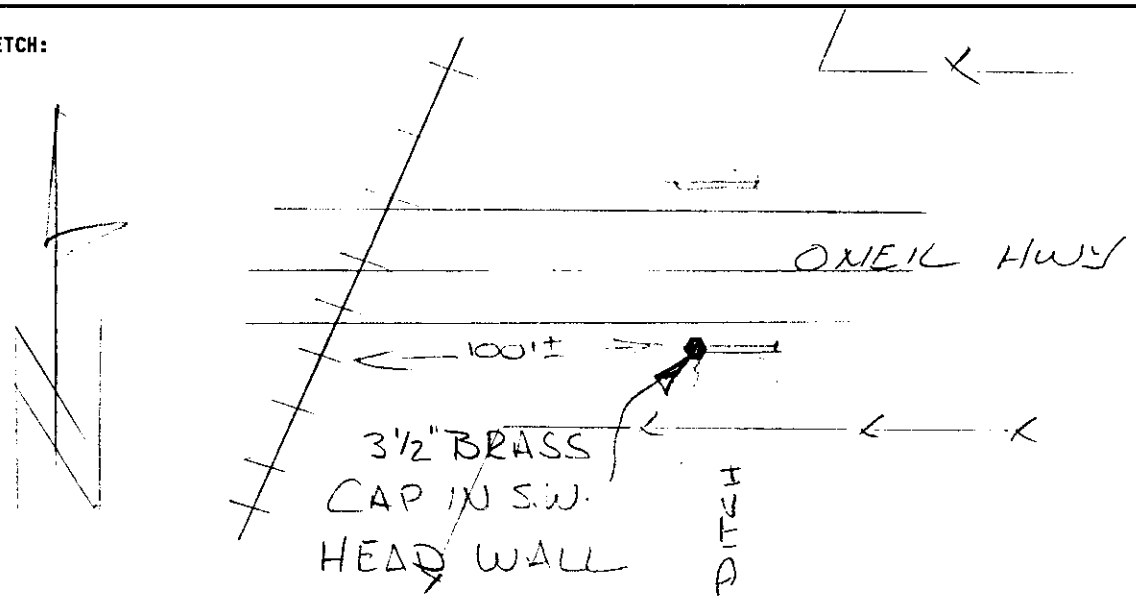
MARK SET BY: U.S. C. & G.S. STATE: OREGON

DATE OF MARK: 1941 COUNTRY: U.S.A.

LOCATION: SECTION 34 TOWNSHIP 14 S. RANGE 13 E. MERIDIAN: WILLAMETTE

REFERENCE NUMBER: NONE

MARK SKETCH:



DATA COMPUTED BY: DESCHUTES COUNTY SURVEYOR'S OFFICE DATE: 1994

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

DATUM: HOIZONTAL= NAD (83-91)
VERTICAL= NGVD 29

COORDINATE SYSTEM: TRANSVERSE MERCATOR

ZONE: DESCHUTES COUNTY

LINEAR UNITS: INTERNATIONAL FOOT

CENTRAL MERIDIAN: W 121°17'00.000000"

LATUIDE OF ORIGIN: N 43°00'00.000000"

ORIGIN NORTHING: 0.0000 F

ORIGIN EASTING: 3,300,000.0000 F

SCALE ALONG MERIDIAN: 1.000160000000

GEODETIC AND MAPPING COORDINATES

MARK: H-478 HORIZONTAL ORDER: FIRST

		ONE SIGMA ERROR
Latitude:	44°19'11.650410"	
Longitude:	121°09'04.752914"	
Northing:	481235.413	0.013
Easting:	3334556.7412	0.012
Convergence:	+ 0°05'32.0383"	
Scale Factor:	1.000161363587	
Ellipsoid Height:	2879.052	0.017
Orthometric Height:	2944.1109	FIXED
Geoid Height:	-65.0589	

CONTROL MARK DATA

NAME OF MARK: K-752 COUNTY: CROOK

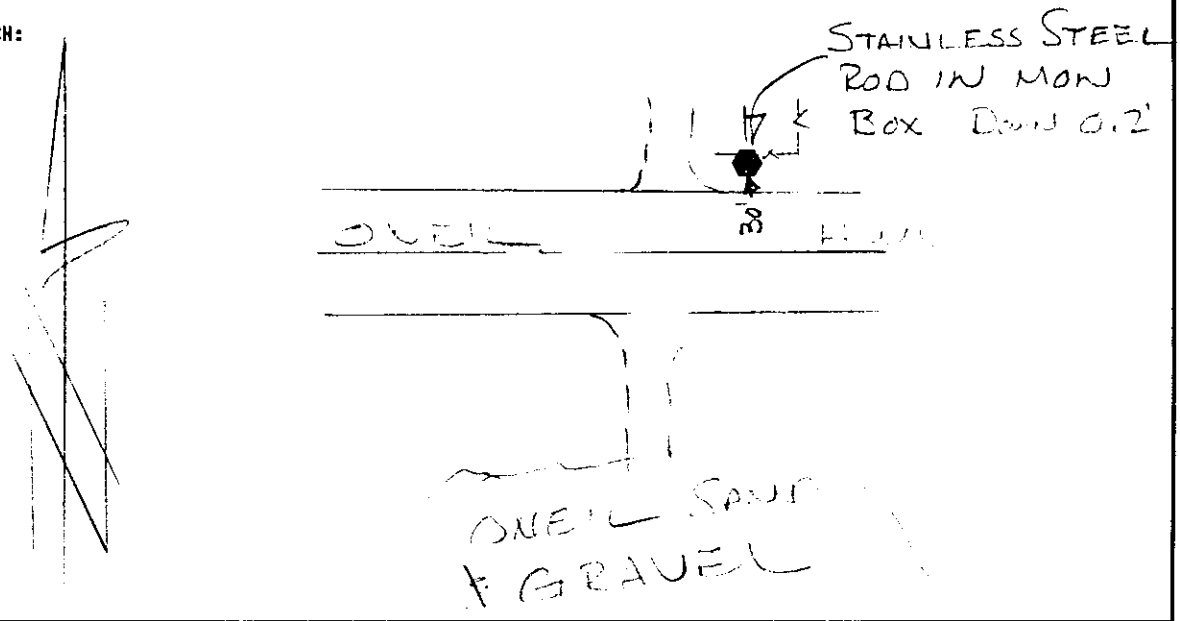
MARK SET BY: U.S. C. & G.S. STATE: OREGON

DATE OF MARK: 1958 COUNTRY: U.S.A.

LOCATION: SECTION 30 TOWNSHIP 14 S. RANGE 14 E. MERIDIAN: WILLAMETTE

REFERENCE NUMBER: NONE

MARK SKETCH:



DATA COMPUTED BY: DESCHUTES COUNTY SURVEYOR'S OFFICE DATE: 1994

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

DATUM: HOIZONTAL= NAD (83-91) CENTRAL MERIDIAN: W 121°17'00.000000"

VERTICAL= NGVD 29 LATUIDE 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

MARK: K-752 HORIZONTAL ORDER: FIRST

		ONE SIGMA ERROR
Latitude:	44°19'48.334073"	
Longitude:	121°05'27.688621"	
Northing:	484982.0737	0.012
Easting:	3350331.4704	0.012
Convergence:	+ 0°08'03.7820"	
Scale Factor:	1.000162892651	
Ellipsoid Height:	2737.5465	0.017
Orthometric Height:	2802.3753	FIXED
Geoid Height:	-64.8288	

CONTROL MARK DATA

NAME OF MARK: Q-419 COUNTY: DESCHUTES

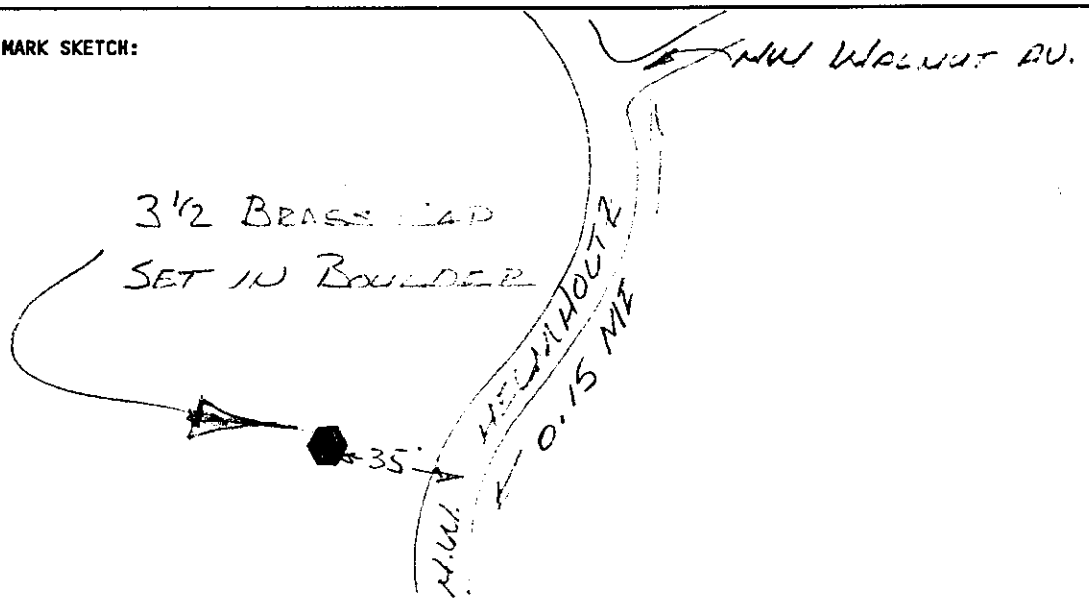
MARK SET BY: U.S. C. & G.S. STATE: OREGON

DATE OF MARK: 1946 COUNTRY: U.S.A.

LOCATION: SECTION 31 TOWNSHIP 14 S. RANGE 13 E. MERIDIAN: WILLAMETTE

REFERENCE NUMBER: NONE

MARK SKETCH:



DATA COMPUTED BY: DESCHUTES COUNTY SURVEYOR'S OFFICE DATE: 1994

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

DATUM: HOIZONTAL= NAD (83-91)	CENTRAL MERIDIAN: W 121°17'00.000000"
VERTICAL= NGVD 29	LATUIDE 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

MARK: Q-419 HORIZONTAL ORDER: FIRST

		ONE SIGMA ERROR
Latitude:	44°18'24.818991"	
Longitude:	121°13'07.666356"	
Northing:	476471.0055	0.011
Easting:	3316897.4571	0.010
Convergence:	+ 0°02'42.2854"	
Scale Factor:	1.000160326033	
Ellipsoid Height:	2756.1253	0.014
Orthometric Height:	2821.5223	FIXED
Geoid Height:	-65.397	

CONTROL MARK DATA

NAME OF MARK: Q-463 COUNTY: CROOK

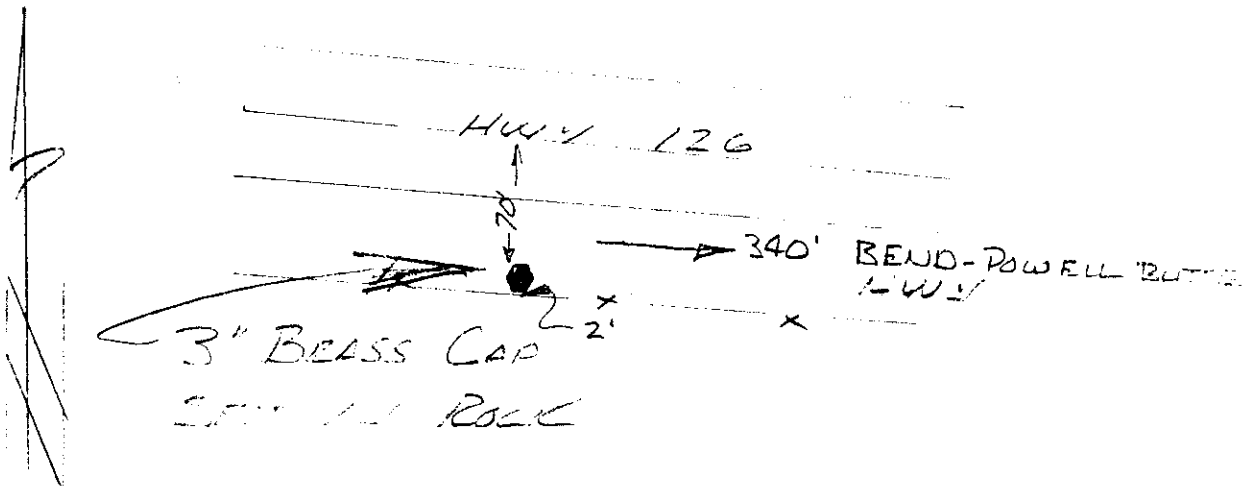
MARK SET BY: U.S. C. & G.S. STATE: OREGON

DATE OF MARK: 1936 COUNTRY: U.S.A.

LOCATION: SECTION 21 TOWNSHIP 15 S. RANGE 14 E. MERIDIAN: WILLAMETTE

REFERENCE NUMBER: NONE

MARK SKETCH:



DATA COMPUTED BY: DESCHUTES COUNTY SURVEYOR'S OFFICE DATE: 1994

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

DATUM: HOIZONTAL= NAD (83-91) CENTRAL MERIDIAN: W 121°17'00.000000"

VERTICAL= NGVD 29 LATUIDE 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

MARK: Q-463 HORIZONTAL ORDER: FIRST

		ONE SIGMA ERROR
Latitude:	44°14'53.908563"	
Longitude:	121°02'58.126861"	
Northing:	455190.0634	0.010
Easting:	3361289.6948	0.009
Convergence:	+ 0°09'47.4349"	
Scale Factor:	1.000164289438	
Ellipsoid Height:	3003.7224	0.014
Orthometric Height:	3068.0906	FIXED
Geoid Height:	-64.3682	

CONTROL MARK DATA

NAME OF MARK: RED 13 (DEA) COUNTY: DESCHUTES

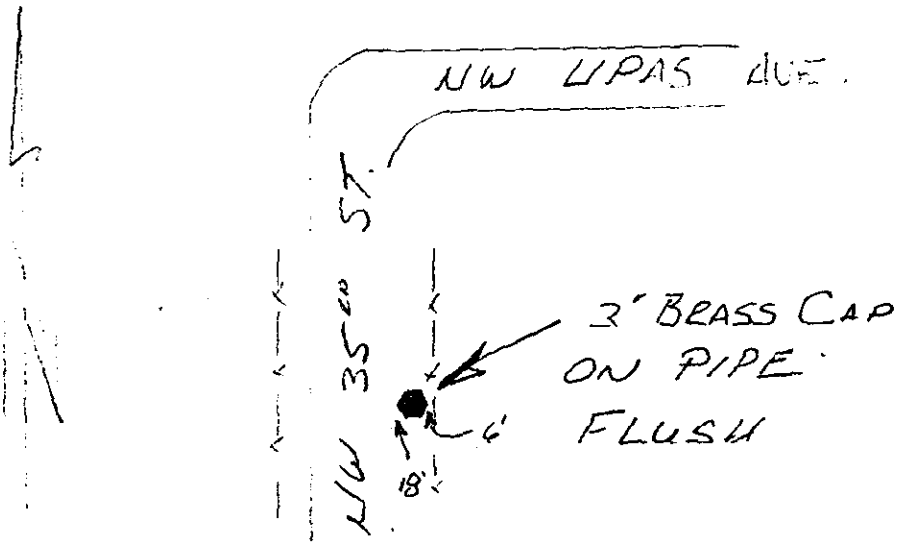
MARK SET BY: D. E. A. STATE: OREGON

DATE OF MARK: 1993 COUNTRY: U.S.A.

LOCATION: SECTION 5 TOWNSHIP 15 S. RANGE 13 E. MERIDIAN: WILLAMETTE

REFERENCE NUMBER: DGMC 12

MARK SKETCH:



DATA COMPUTED BY: DESCHUTES COUNTY SURVEYOR'S OFFICE DATE: 1994

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

DATUM: HOIZONTAL= NAD (83-91) CENTRAL MERIDIAN: W 121°17'00.000000"

VERTICAL= NGVD 29 LATUIDE 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

MARK: RED 13 (DEA) HORIZONTAL ORDER: FIRST

		ONE SIGMA ERROR
Latitude:	44°18'18.081553"	
Longitude:	121°12'32.608699"	
Northing:	475790.7738	0.012
Easting:	3319447.7929	0.012
Convergence:	+ 0°03'06.7670"	
Scale Factor:	1.000160431876	
Ellipsoid Height:	2827.7381	0.018
Orthometric Height:	2893.0792	0.041
Geoid Height:	-65.3411	

CONTROL MARK DATA

NAME OF MARK: T 463 1936 COUNTY: DESCHUTES

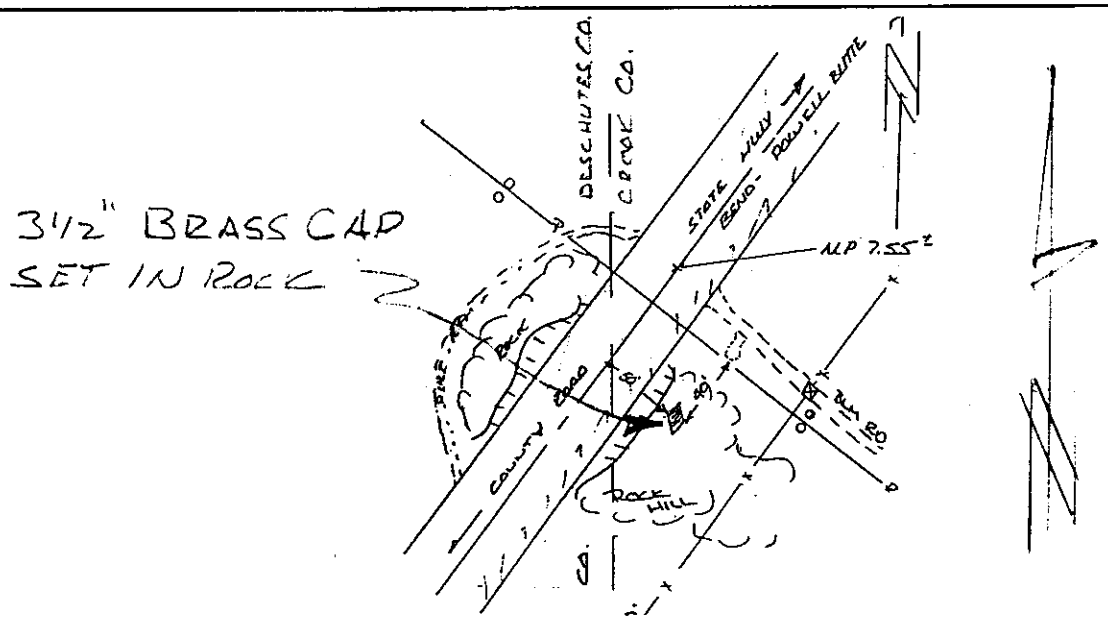
MARK SET BY: U.S. C. & G.S. STATE: OREGON

DATE OF MARK: 1936 COUNTRY: U.S.A.

LOCATION: SECTION 24 TOWNSHIP 16 S. RANGE 13 E. MERIDIAN: WILLAMETTE

REFERENCE NUMBER: DGMC 5

MARK SKETCH:



DATA COMPUTED BY: DESCHUTES COUNTY SURVEYOR'S OFFICE DATE: 1994

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

DATUM: HOIZONTAL= NAD (83-91)
VERTICAL= NGVD 29
COORDINATE SYSTEM: TRANSVERSE MERCATOR
ZONE: DESCHUTES COUNTY
LINEAR UNITS: INTERNATIONAL FOOT

CENTRAL MERIDIAN: W 121°17'00.000000"
LATUIDE OF ORIGIN: N 43°00'00.000000"
ORIGIN NORTHING: 0.0000 F
ORIGIN EASTING: 3,300,000.0000 F
SCALE ALONG MERIDIAN: 1.000160000000

GEODETIC AND MAPPING COORDINATES

MARK: T 463 1936 HORIZONTAL ORDER: FIRST

Latitude:	44°10'17.524830"	ONE SIGMA ERROR
Longitude:	121°06'08.355789"	
Northing:	427162.5262	FIXED
Easting:	3347502.3923	FIXED
Convergence:	+ 0°07'34.0722"	
Scale Factor:	1.000162576699	
Ellipsoid Height:	3177.9265	FIXED
Orthometric Height:	3242.2277	FIXED
Geoid Height:	-64.3012	

DESCHUTES COUNTY PRIME CONTROL NETWORK
CONTROL STATION DESCRIPTION

NAME: T 463 1936
GIS # 0047
ORDER C-1st. (GPS)

HORIZONTAL DATUM: NAD 83 (1991)
VERT. DATUM: NGVD 29 & NAVD 88

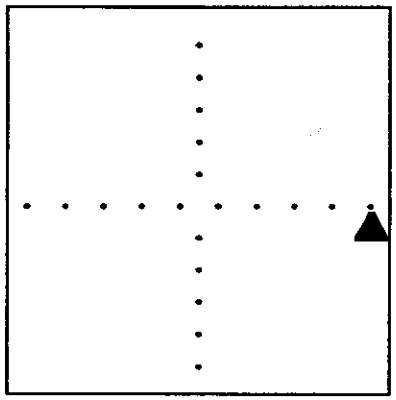
LATITUDE: 44° 10' 17.52483" N
LONGITUDE: 121° 06' 08.35579" W

------- EC CARTESIAN ---------
X: -2367384.984 METERS
Y: -3924099.513 METERS
Z: +4422457.257 METERS

---------- HEIGHT ----------
ELLIPSOIDAL: 963.632 METERS
NGVD 29 : 988.231 METERS
NAVD 88 : 989.356 METERS
---- SPC -- OREGON SOUTH ------
NORTH: 278437.248±.004 METERS
EAST: 1451827.620±.004 METERS

SCALE FACTOR: 1.000048129
CONVERGENCE: - 0° 24' 43.47 "

STATION LOCATION



T. 16 S.- R. 13 E., SEC.24

The horizontal coordinates & ellipsoidal height was determined by GPS observations constrainted 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 - T 463 1936
AGENCY INSCRIPTION - U S C & G S
THE STATION IS LOCATED ABOUT 12.5 MILES NORTHEASTERLY 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 4.35 MI. TO THE JUNCTION WITH THE POWELL BUTTE COUNTY HWY., TURN LEFT AND PROCEED ON SAID HWY FOR 10.50 MILES TO THE STATION ON THE RIGHT, 8 FEET ABOVE ROADWAY IN ROCK OUTCROP.

THE STATION MARK IS A 3 1/2 IN. BRASS CAP GROUTED IN ROCK AT GROUND LEVEL.
61 FEET EAST OF A WIRE FENCE
20 FEET WEST OF THE ROCK CUT.
1 FEET SOUTH OF A WITNES POST
100 FEET SOUTH OF A BPA POWERLINE.

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

CONTROL MARK DATA

NAME OF MARK: V-456 COUNTY: DESCHUTES

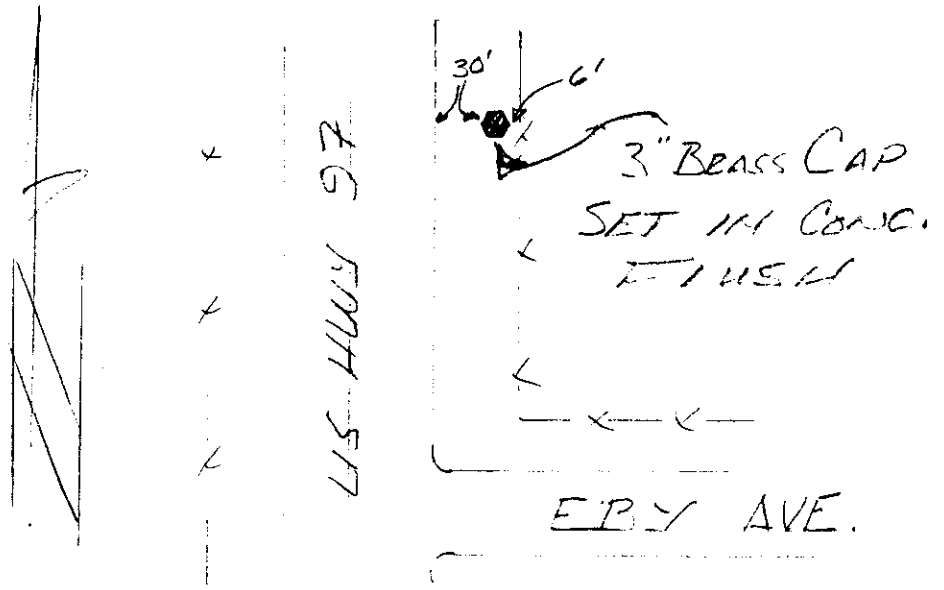
MARK SET BY: OREGON STATE HIGHWAY STATE: OREGON

DATE OF MARK: 1954 COUNTRY: U.S.A.

LOCATION: SECTION 9 TOWNSHIP 14 S. RANGE 13 E. MERIDIAN: WILLAMETTE

REFERENCE NUMBER: NONE

MARK SKETCH:



DATA COMPUTED BY: DESCHUTES COUNTY SURVEYOR'S OFFICE DATE: 1994

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

DATUM: HOIZONTAL= NAD (83-91) CENTRAL MERIDIAN: W 121°17'00.000000"

VERTICAL= NGVD 29 LATUIDE 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

MARK: V-456 HORIZONTAL ORDER: FIRST

		ONE SIGMA ERROR
Latitude:	44°22'15.800387"	
Longitude:	121°10'41.683663"	
Northing:	499876.6478	0.009
Easting:	3327484.6835	0.009
Convergence:	+ 0°04'24.5576"	
Scale Factor:	1.000160862568	
Ellipsoid Height:	2758.299	0.012
Orthometric Height:	2823.435	FIXED
Geoid Height:	-65.136	

NEW SURVEY POINTS

ADJUSTED

IN

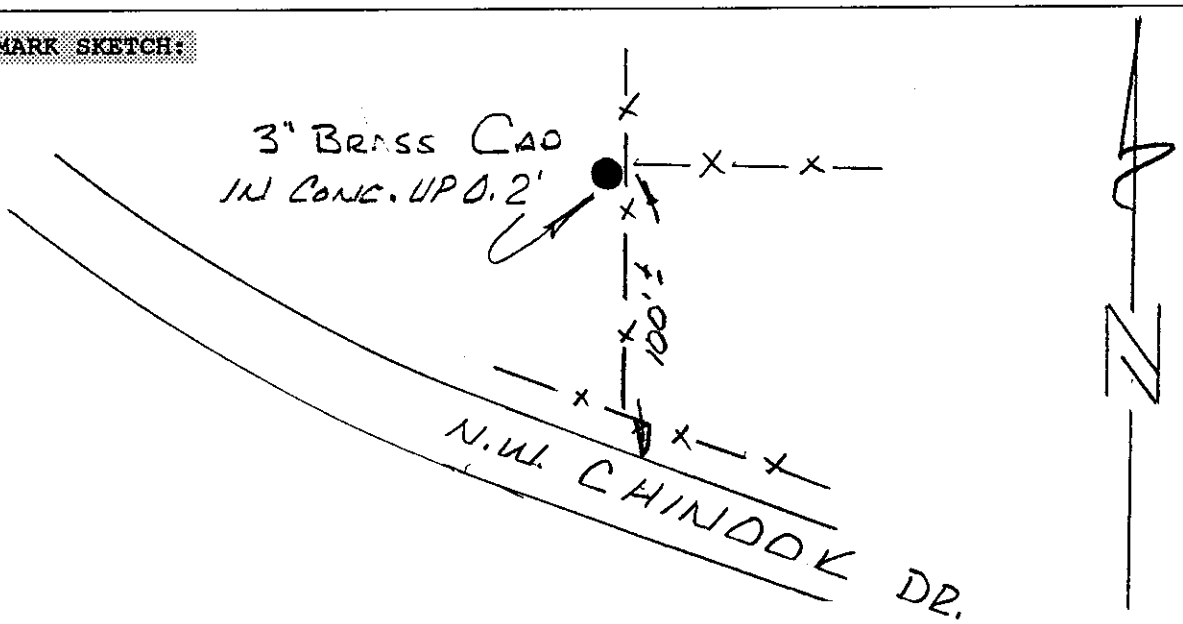
CENTRAL OREGON

COORDINATES

MARK DATA SHEET

NAME OF MARK:	13133100	COUNTY:	JEFFERSON
MARK SET BY:	PE 5792 ARNOLD KEGEL	STATE:	OREGON
DATE OF MARK:	1973	COUNTRY:	U.S.A.
LOCATION:	SECTION 31 TOWNSHIP 13 S RANGE 13 E		
REFERENCE:	CS 6487		

MARK SKETCH:



DATA CUMPUTED BY:	DESCHUTES COUNTY SURVEYOR'S OFFICE	DATE:	1995
METHOD-EQUIPMENT:	GPS-TRIMBLE 4000SSE GEODETIC	ADJUSTED WITH:	TRIMNET

HOIZONTAL DATUM:	NAD 83 (91)	VERTICAL DATUM:	NAVD 29
PROJECTION:	TRANSVERSE MERCATOR	ZONE:	CENTRAL OREGON LCS
CENTRAL MERIDIAN:	W 121° 17'00.00"	ORIGIN NORTHING:	0.00F
LATITUDE OF ORIGIN:	N 43° 00'00.00"	ORIGIN EASTING:	3,300,000.00F
LINEAR UNITS:	INTERNATIONAL FOOT	SCALE ALONG MERIDIAN:	1.0001600

GEODETIC AND MAPPING COORDINATES

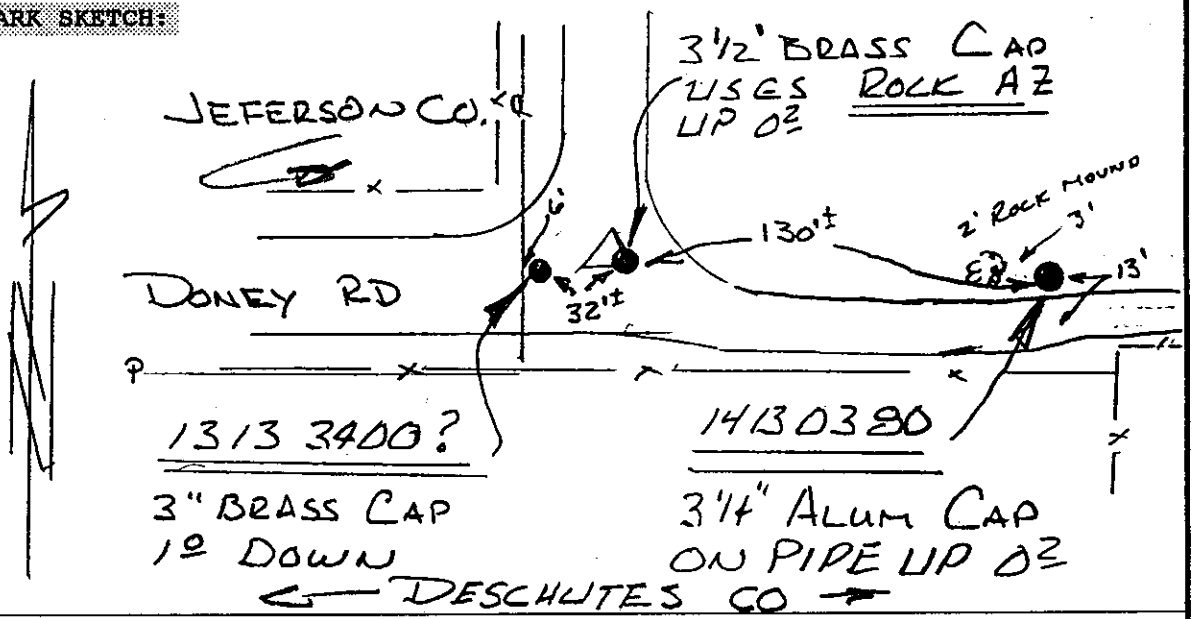
MARK: 13133100 HORIZONTAL ORDER: FIRST

				ONE SIGMA ERROR
Latitude:	44°23'26.316179"	Northing:	507005.841	0.011
Longitude:	121°13'45.436410"	Easting:	3314130.333	0.010
Convergence:	+0°02'16.1063"	Ell Height:	2670.83	0.023
Scale Factor:	1.000160227989	Ortho Height:	2736.34	0.037
Combined Factor:	1.00003258	Geoid Height:	-65.51	

MARK DATA SHEET

NAME OF MARK:	131334007	COUNTY:	JEFFERSON
MARK SET BY:	N/A	STATE:	OREGON
DATE OF MARK:	N/A	COUNTRY:	U.S.A.
LOCATION:	SECTION 34	TOWNSHIP 13 S	RANGE 13 E
REFERENCE:	DCMC	17	

MARK SKETCH:



DATA CUMPUTED BY:	DESCHUTES COUNTY SURVEYOR'S OFFICE	DATE:	1995
METHOD-EQUIPMENT:	GPS-TRIMBLE 4000SSE GEODETIC	ADJUSTED WITH:	TRIMNET

HOIZONTAL DATUM:	NAD 83 (91)	VERTICAL DATUM:	NAVD 29
PROJECTION:	TRANSVERSE MERCATOR	ZONE:	CENTRAL OREGON LCS
CENTRAL MERIDIAN:	W 121° 17'00.00"	ORIGIN NORTHING:	0.00F
LATITUDE OF ORIGIN:	N 43° 00'00.00"	ORIGIN EASTING:	3,300,000.00F
LINEAR UNITS:	INTERNATIONAL FOOT	SCALE ALONG MERIDIAN:	1.0001600

GEODETIC AND MAPPING COORDINATES

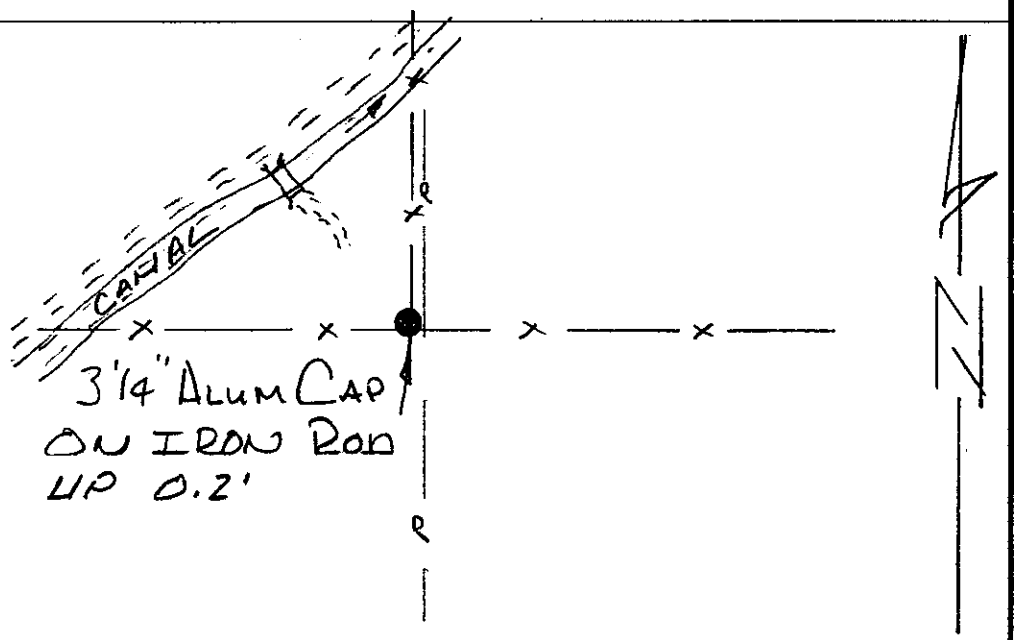
MARK: 131334007 HORIZONTAL ORDER: SECOND

				ONE SIGMA ERROR
Latitude:	44°23'26.239509"	Northing:	507014.311	0.029
Longitude:	121°10'08.067456"	Easting:	3329916.936	0.025
Convergence:	+0°04'48.1661"	Ell Height:	2688.28	0.066
Scale Factor:	1.000161021984	Ortho Height:	2753.27	0.072
Combined Factor:	1.00003254	Geoid Height:	-65.00	

MARK DATA SHEET

NAME OF MARK:	14130300	COUNTY:	DESCHUTES
MARK SET BY:	LS 0980 ED GRAVES	STATE:	OREGON
DATE OF MARK:	1980	COUNTRY:	U.S.A.
LOCATION:	SECTION 3	TOWNSHIP 14 S	RANGE 13 E
REFERENCE:	CS	00228	

MARK SKETCH:



DATA CUMPUTED BY:	DESCHUTES COUNTY SURVEYOR'S OFFICE	DATE:	1995
METHOD-EQUIPMENT:	GPS-TRIMBLE 4000SSE GEODETIC	ADJUSTED WITH:	TRIMNET

HOIZONTAL DATUM:	NAD 83 (91)	VERTICAL DATUM:	NAVD 29
PROJECTION:	TRANSVERSE MERCATOR	ZONE:	CENTRAL OREGON LCS
CENTRAL MERIDIAN:	W 121° 17'00.00"	ORIGIN NORTHING:	0.00F
LATITUDE OF ORIGIN:	N 43° 00'00.00"	ORIGIN EASTING:	3,300,000.00F
LINEAR UNITS:	INTERNATIONAL FOOT	SCALE ALONG MERIDIAN:	1.0001600

GEODETIC AND MAPPING COORDINATES

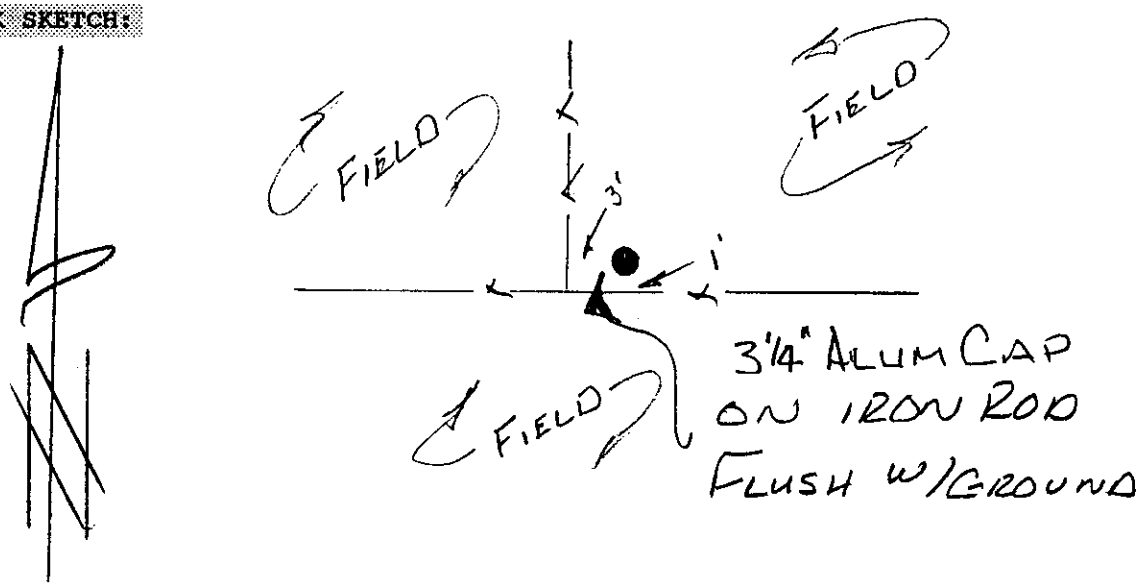
MARK: 14130300 HORIZONTAL ORDER: FIRST

				ONE SIGMA ERROR
Latitude:	44°22'39.549108"	Northing:	502285.436	0.012
Longitude:	121°10'06.674514"	Easting:	3330024.728	0.011
Convergence:	+0°04'49.0737"	Ell Height:	2706.79	0.027
Scale Factor:	1.000161029365	Ortho Height:	2771.82	0.039
Combined Factor:	1.00003166	Geoid Height:	-65.03	

MARK DATA SHEET

NAME OF MARK:	14130304	COUNTY:	DESCHUTES
MARK SET BY:	LS 0804 C. H. KETCHAM	STATE:	OREGON
DATE OF MARK:	1988	COUNTRY:	U.S.A.
LOCATION:	SECTION 3	TOWNSHIP 14 S	RANGE 13 E
REFERENCE:	OCRR 793		

MARK SKETCH:



DATA CUMPUTED BY:	DESCHUTES COUNTY SURVEYOR'S OFFICE	DATE:	1995
METHOD-EQUIPMENT:	GPS-TRIMBLE 4000SSE GEODETIC	ADJUSTED WITH:	TRIMNET

HOIZONTAL DATUM:	NAD 83 (91)	VERTICAL DATUM:	NAVD 29
PROJECTION:	TRANSVERSE MERCATOR	ZONE:	CENTRAL OREGON LCS
CENTRAL MERIDIAN:	W 121° 17'00.00"	ORIGIN NORTHING:	0.00F
LATITUDE OF ORIGIN:	N 43° 00'00.00"	ORIGIN EASTING:	3,300,000.00F
LINEAR UNITS:	INTERNATIONAL FOOT	SCALE ALONG MERIDIAN:	1.0001600

GEODETIC AND MAPPING COORDINATES

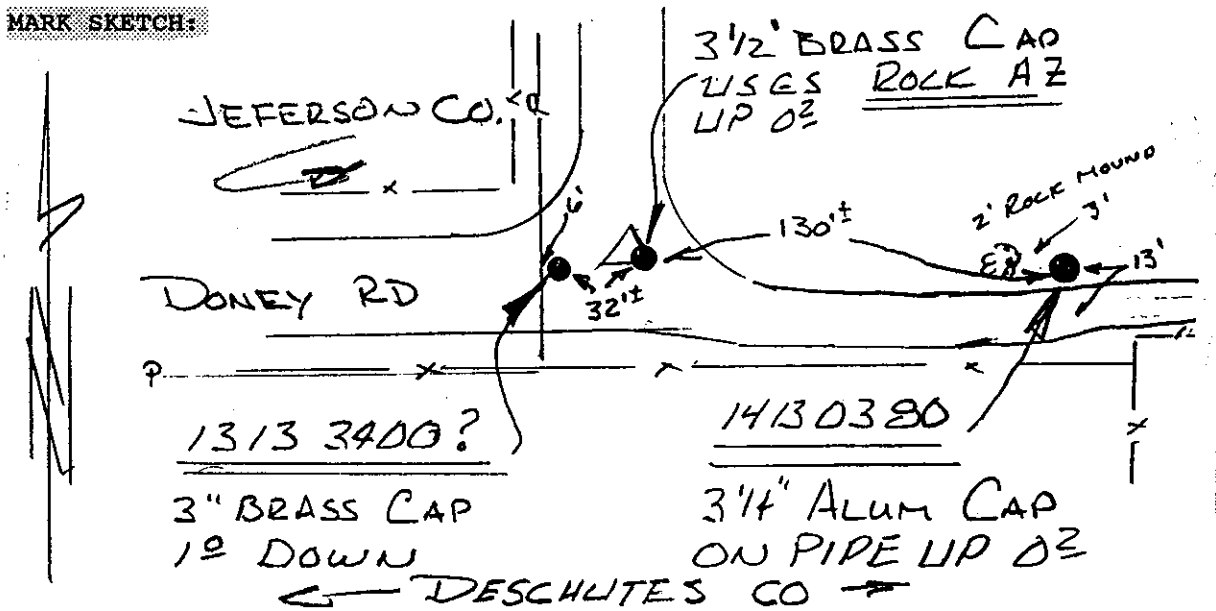
MARK: 14130304 HORIZONTAL ORDER: FIRST

				ONE SIGMA ERROR
Latitude:	44°22'39.505396"	Northing:	502284.878	0.022
Longitude:	121°09'30.269839"	Easting:	3332669.237	0.019
Convergence:	+0°05'14.5345"	Ell Height:	2695.90	0.044
Scale Factor:	1.000161218679	Ortho Height:	2760.86	0.052
Combined Factor:	1.00003237	Geoid Height:	-64.96	

MARK DATA SHEET

NAME OF MARK:	14130380	COUNTY:	DESCHUTES
MARK SET BY:	LS 0980 ED GRAVES	STATE:	OREGON
DATE OF MARK:	1980	COUNTRY:	U.S.A.
LOCATION:	SECTION 3	TOWNSHIP 14 S	RANGE 13 E
REFERENCE:	CS	00228	

MARK SKETCH:



DATA CUMPUTED BY:	DESCHUTES COUNTY SURVEYOR'S OFFICE	DATE:	1995
METHOD-EQUIPMENT:	GPS-TRIMBLE 4000SSE GEODETIC	ADJUSTED WITH:	TRIMNET

HOIZONTAL DATUM:	NAD 83 (91)	VERTICAL DATUM:	NAVD 29
PROJECTION:	TRANSVERSE MERCATOR	ZONE:	CENTRAL OREGON LCS
CENTRAL MERIDIAN:	W 121° 17'00.00"	ORIGIN NORTHING:	0.00F
LATITUDE OF ORIGIN:	N 43° 00'00.00"	ORIGIN EASTING:	3,300,000.00F
LINEAR UNITS:	INTERNATIONAL FOOT	SCALE ALONG MERIDIAN:	1.0001600

GEODETIC AND MAPPING COORDINATES

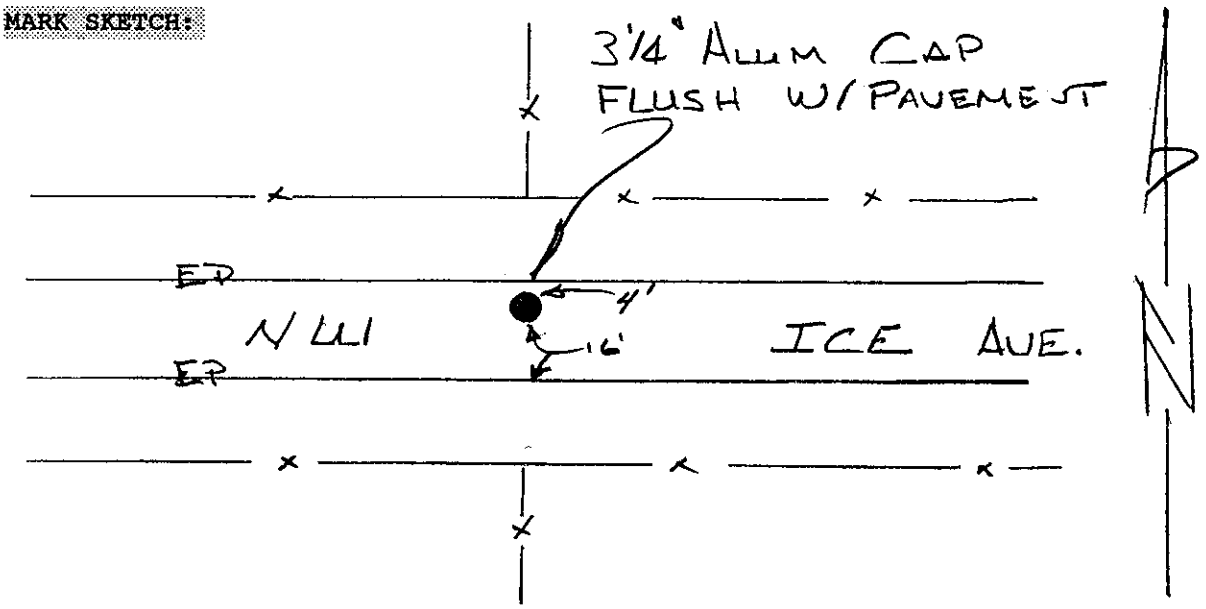
MARK: 14130380 HORIZONTAL ORDER: SECOND

				ONE SIGMA ERROR
Latitude:	44°23'26.218470"	Northing:	507012.417	0.040
Longitude:	121°10'05.745368"	Easting:	3330085.582	0.032
Convergence:	+0°04'49.7905"	Ell Height:	2693.65	0.102
Scale Factor:	1.000161033539	Ortho Height:	2758.64	0.106
Combined Factor:	1.00003229	Geoid Height:	-64.99	

MARK DATA SHEET

NAME OF MARK:	14130400	COUNTY:	DESCHUTES
MARK SET BY:	LS 0804 C. H. KETCHAM	STATE:	OREGON
DATE OF MARK:	1988	COUNTRY:	U.S.A.
LOCATION:	SECTION 4	TOWNSHIP 14 S	RANGE 13 E
REFERENCE:	OCRR	795	

MARK SKETCH:



DATA CUMPUTED BY:	DESCHUTES COUNTY SURVEYOR'S OFFICE	DATE:	1995
METHOD-EQUIPMENT:	GPS-TRIMBLE 4000SSE GEODETIC	ADJUSTED WITH:	TRIMNET

HOIZONTAL DATUM:	NAD 83 (91)	VERTICAL DATUM:	NAVD 29
PROJECTION:	TRANSVERSE MERCATOR	ZONE:	CENTRAL OREGON LCS
CENTRAL MERIDIAN:	W 121° 17'00.00"	ORIGIN NORTHING:	0.00F
LATITUDE OF ORIGIN:	N 43° 00'00.00"	ORIGIN EASTING:	3,300,000.00F
LINEAR UNITS:	INTERNATIONAL FOOT	SCALE ALONG MERIDIAN:	1.0001600

GEODETIC AND MAPPING COORDINATES

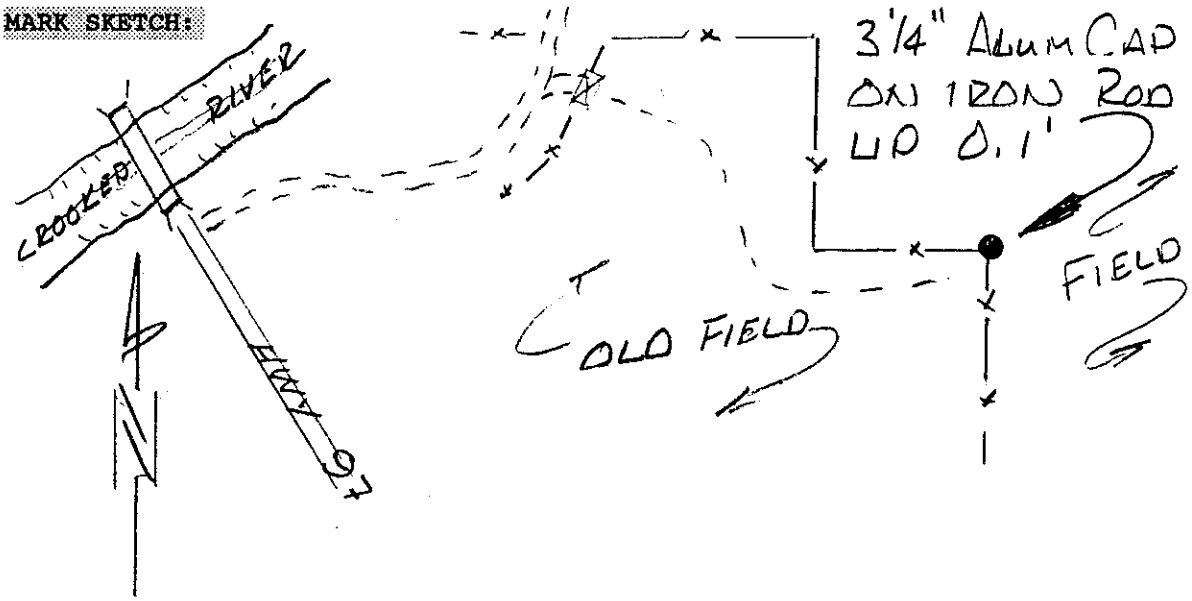
MARK: 14130400 HORIZONTAL ORDER: FIRST

				ONE SIGMA ERROR
Latitude:	44°22'39.740717"	Northing:	502298.145	0.008
Longitude:	121°11'18.746115"	Easting:	3324789.291	0.008
Convergence:	+0°03'58.6681"	Ell Height:	2762.68	0.018
Scale Factor:	1.000160701681	Ortho Height:	2827.88	0.033
Combined Factor:	1.00002866	Geoid Height:	-65.20	

MARK DATA SHEET

NAME OF MARK:	14130480	COUNTY:	DESCHUTES
MARK SET BY:	LS 0804 C. H. KETCHAM	STATE:	OREGON
DATE OF MARK:	1972	COUNTRY:	U.S.A.
LOCATION:	SECTION 4	TOWNSHIP 14 S	RANGE 13 E
REFERENCE:	OCRR	781	

MARK SKETCH:



DATA CUMPUTED BY:	DESCHUTES COUNTY SURVEYOR'S OFFICE	DATE:	1995
METHOD-EQUIPMENT:	GPS-TRIMBLE 4000SSE GEODETIC	ADJUSTED WITH:	TRIMNET

HOIZONTAL DATUM:	NAD 83 (91)	VERTICAL DATUM:	NAVD 29
PROJECTION:	TRANSVERSE MERCATOR	ZONE:	CENTRAL OREGON LCS
CENTRAL MERIDIAN:	W 121° 17'00.00"	ORIGIN NORTHING:	0.00F
LATITUDE OF ORIGIN:	N 43° 00'00.00"	ORIGIN EASTING:	3,300,000.00F
LINEAR UNITS:	INTERNATIONAL FOOT	SCALE ALONG MERIDIAN:	1.0001600

GEODETIC AND MAPPING COORDINATES

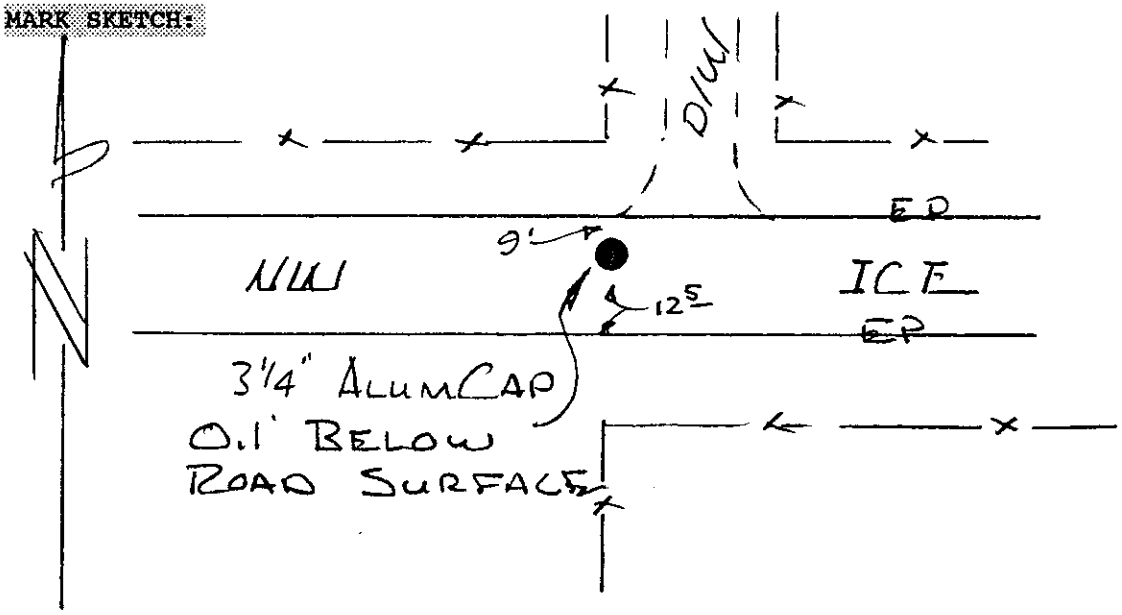
MARK: 14130480 HORIZONTAL ORDER: FIRST

				ONE SIGMA ERROR
Latitude:	44°23'26.233919"	Northing:	507007.190	0.010
Longitude:	121°11'18.735212"	Easting:	3324784.633	0.010
Convergence:	+0°03'58.7307"	Ell Height:	2678.15	0.022
Scale Factor:	1.000160701415	Ortho Height:	2743.32	0.036
Combined Factor:	1.0000327	Geoid Height:	-65.17	

MARK DATA SHEET

NAME OF MARK:	14130500	COUNTY:	DESCHUTES
MARK SET BY:	LS 0804 C. H. KETCHAM	STATE:	OREGON
DATE OF MARK:	1988	COUNTRY:	U.S.A.
LOCATION:	SECTION 5 TOWNSHIP 14 S RANGE 13 E		
REFERENCE:	OCRR 819		

MARK SKETCH:



DATA CUMPUTED BY:	DESCHUTES COUNTY SURVEYOR'S OFFICE	DATE:	1995
METHOD-EQUIPMENT:	GPS-TRIMBLE 4000SSE GEODETIC	ADJUSTED WITH:	TRIMNET

HOIZONTAL DATUM:	NAD 83 (91)	VERTICAL DATUM:	NAVD 29
PROJECTION:	TRANSVERSE MERCATOR	ZONE:	CENTRAL OREGON LCS
CENTRAL MERIDIAN:	W 121° 17'00.00"	ORIGIN NORTHING:	0.00F
LATITUDE OF ORIGIN:	N 43° 00'00.00"	ORIGIN EASTING:	3,300,000.00F
LINEAR UNITS:	INTERNATIONAL FOOT	SCALE ALONG MERIDIAN:	1.0001600

GEODETIC AND MAPPING COORDINATES

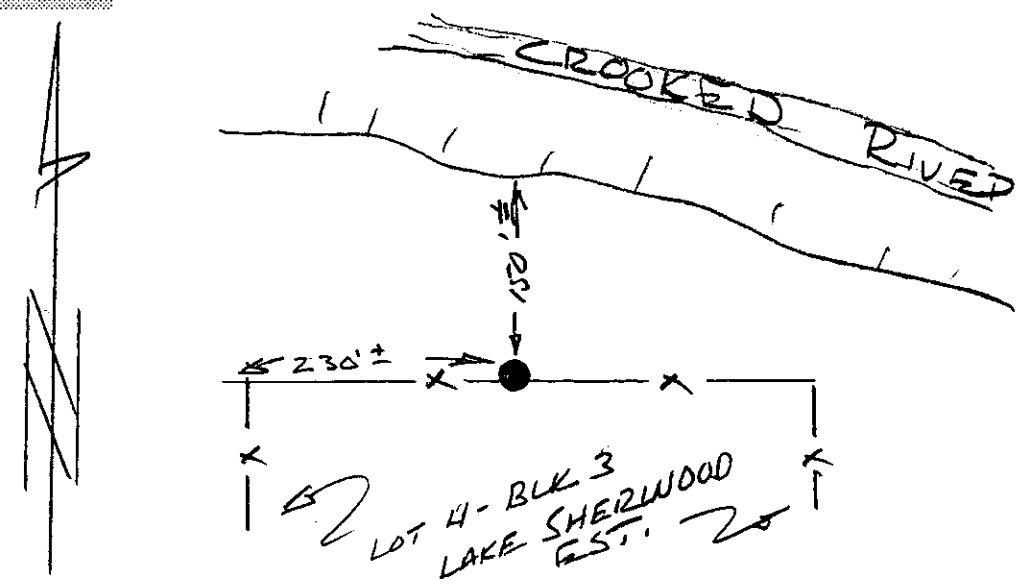
MARK: 14130500 HORIZONTAL ORDER: FIRST

				ONE SIGMA ERROR
Latitude:	44°22'40.111031"	Northing:	502330.171	0.011
Longitude:	121°12'31.774307"	Easting:	3319484.358	0.010
Convergence:	+0°03'07.5935"	Ell Height:	2711.46	0.024
Scale Factor:	1.000160433494	Ortho Height:	2776.81	0.037
Combined Factor:	1.00003274	Geoid Height:	-65.35	

MARK DATA SHEET

NAME OF MARK:	14130580	COUNTY:	DESCHUTES
MARK SET BY:	LS 1632 RICHARD CLARK	STATE:	OREGON
DATE OF MARK:	1980	COUNTRY:	U.S.A.
LOCATION:	SECTION 5	TOWNSHIP 14 S	RANGE 13 E
REFERENCE:	CS	01632	

MARK SKETCH:



DATA CUMPUTED BY:	DESCHUTES COUNTY SURVEYOR'S OFFICE	DATE:	1995
METHOD-EQUIPMENT:	GPS-TRIMBLE 4000SSE GEODETIC	ADJUSTED WITH:	TRIMNET

HOIZONTAL DATUM:	NAD 83 (91)	VERTICAL DATUM:	NAVD 29
PROJECTION:	TRANSVERSE MERCATOR	ZONE:	CENTRAL OREGON LCS
CENTRAL MERIDIAN:	W 121° 17'00.00"	ORIGIN NORTHING:	0.00F
LATITUDE OF ORIGIN:	N 43° 00'00.00"	ORIGIN EASTING:	3,300,000.00F
LINEAR UNITS:	INTERNATIONAL FOOT	SCALE ALONG MERIDIAN:	1.0001600

GEODETIC AND MAPPING COORDINATES

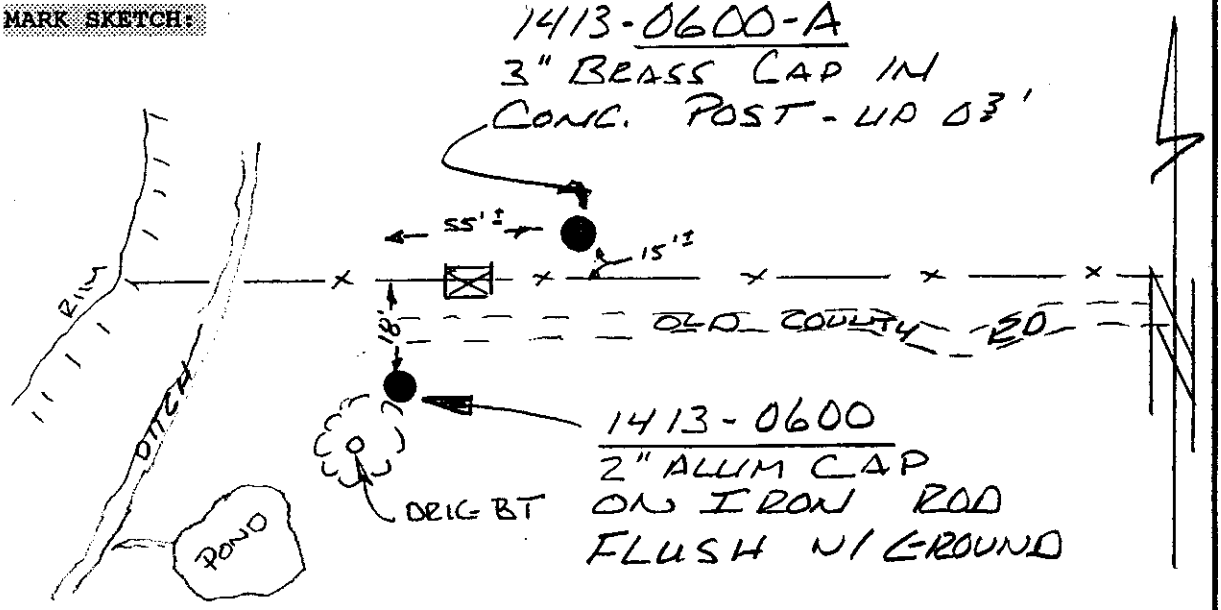
MARK: 14130580 HORIZONTAL ORDER: FIRST

				ONE SIGMA ERROR
Latitude:	44°23'26.303358"	Northing:	507008.742	0.011
Longitude:	121°12'31.749476"	Easting:	3319481.906	0.011
Convergence:	+0°03'07.6538"	Ell Height:	2667.43	0.024
Scale Factor:	1.000160433384	Ortho Height:	2732.77	0.038
Combined Factor:	1.00003295	Geoid Height:	-65.34	

MARK DATA SHEET

NAME OF MARK:	14130600	COUNTY:	DESCHUTES
MARK SET BY:	LS 1031 W. C. KAUFFMAN	STATE:	OREGON
DATE OF MARK:	1990	COUNTRY:	U.S.A.
LOCATION:	SECTION 6	TOWNSHIP 14 S	RANGE 13 E
REFERENCE:	OCRR	1028	

MARK SKETCH:



DATA CUMPUTED BY:	DESCHUTES COUNTY SURVEYOR'S OFFICE	DATE:	1995
METHOD-EQUIPMENT:	GPS-TRIMBLE 4000SSE GEODETIC	ADJUSTED WITH:	TRIMNET

HOIZONTAL DATUM:	NAD 83 (91)	VERTICAL DATUM:	NAVD 29
PROJECTION:	TRANSVERSE MERCATOR	ZONE:	CENTRAL OREGON LCS
CENTRAL MERIDIAN:	W 121° 17'00.00"	ORIGIN NORTHING:	0.00F
LATITUDE OF ORIGIN:	N 43° 00'00.00"	ORIGIN EASTING:	3,300,000.00F
LINEAR UNITS:	INTERNATIONAL FOOT	SCALE ALONG MERIDIAN:	1.0001600

GEODETIC AND MAPPING COORDINATES

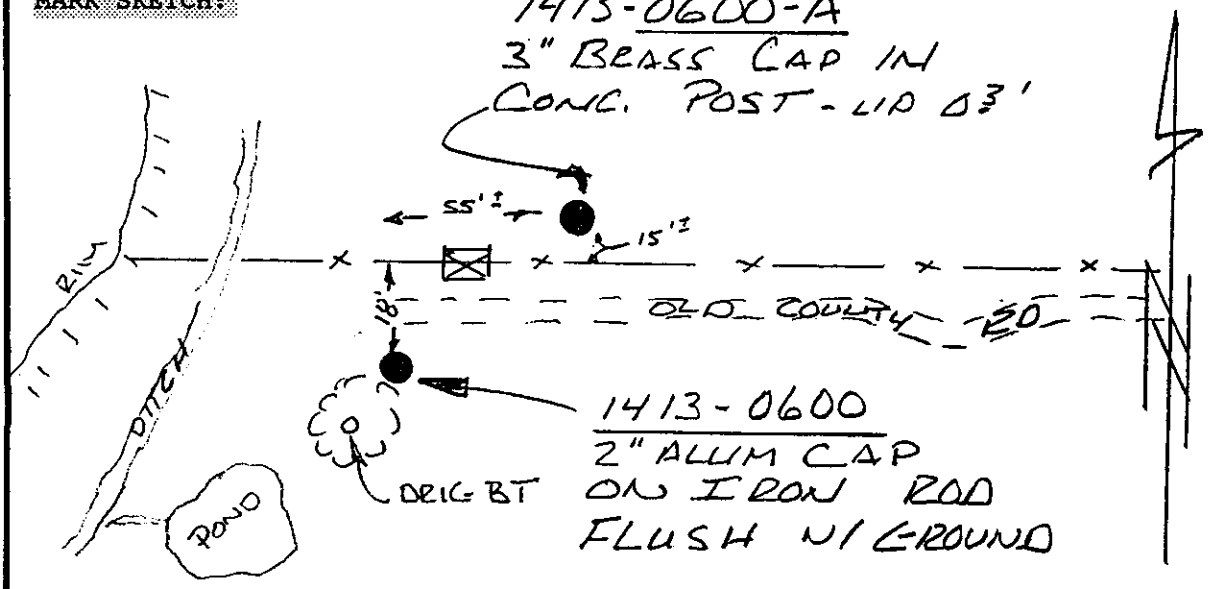
MARK: 14130600 HORIZONTAL ORDER: SECOND

				ONE SIGMA ERROR
Latitude:	44°22'42.196006"	Northing:	502537.171	0.03
Longitude:	121°13'44.959153"	Easting:	3314167.950	0.03
Convergence:	0°02'16.9463"	Ell Height:	2660.20	0.03
Scale Factor:	1.000160230117	Ortho Height:	2725.72	0.04
Combined Factor:	1.00003082	Geoid Height:	-65.52	

MARK DATA SHEET

NAME OF MARK:	14130600A	COUNTY:	DESCHUTES
MARK SET BY:	PE 5792 ARNOLD KEGEL	STATE:	OREGON
DATE OF MARK:	1973	COUNTRY:	U.S.A.
LOCATION:	SECTION 6	TOWNSHIP 14 S	RANGE 13 E
REFERENCE:	CS	6487	

MARK SKETCH:



DATA CUMPUTED BY:	DESCHUTES COUNTY SURVEYOR'S OFFICE	DATE:	1995
METHOD-EQUIPMENT:	GPS-TRIMBLE 4000SSE GEODETIC	ADJUSTED WITH:	TRIMNET

HOIZONTAL DATUM:	NAD 83 (91)	VERTICAL DATUM:	NAVD 29
PROJECTION:	TRANSVERSE MERCATOR	ZONE:	CENTRAL OREGON LCS
CENTRAL MERIDIAN:	W 121° 17'00.00"	ORIGIN NORTHING:	0.00F
LATITUDE OF ORIGIN:	N 43° 00'00.00"	ORIGIN EASTING:	3,300,000.00F
LINEAR UNITS:	INTERNATIONAL FOOT	SCALE ALONG MERIDIAN:	1.0001600

GEODETIC AND MAPPING COORDINATES

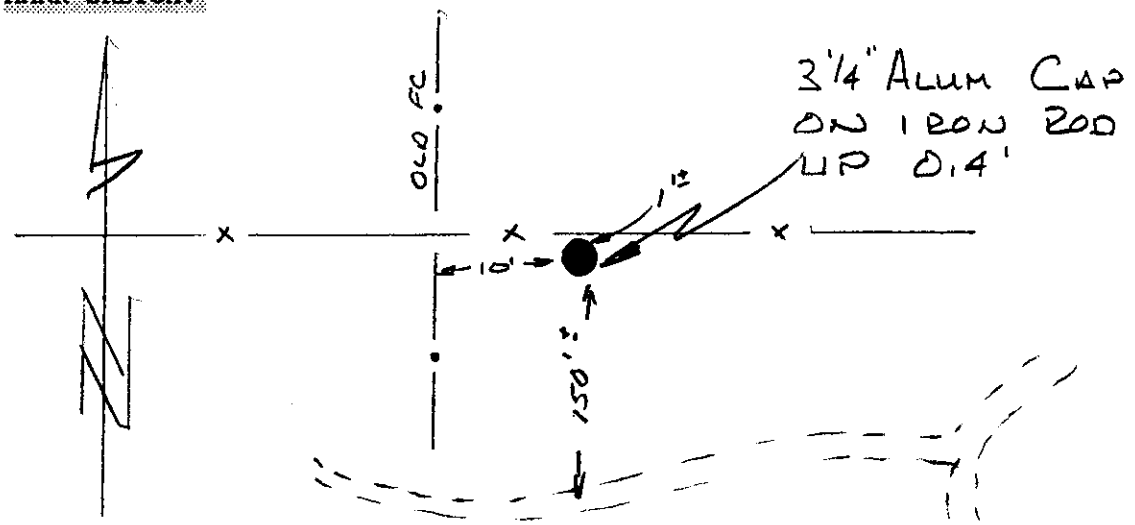
MARK: 14130600A HORIZONTAL ORDER: FIRST

				ONE SIGMA ERROR
Latitude:	44°22'42.379280"	Northing:	502555.771	0.015
Longitude:	121°13'44.193080"	Easting:	3314223.586	0.011
Convergence:	+0°02'16.9463"	Ell Height:	2660.00	0.029
Scale Factor:	1.000160231009	Ortho Height:	2725.52	0.041
Combined Factor:	1.0000331	Geoid Height:	-65.52	

MARK DATA SHEET

NAME OF MARK:	14130740	COUNTY:	DESCHUTES
MARK SET BY:	LS 0804 C. H. KETCHAM	STATE:	OREGON
DATE OF MARK:	1988	COUNTRY:	U.S.A.
LOCATION:	SECTION 7	TOWNSHIP 14 S	RANGE 13 E
REFERENCE:	OCRR	807	

MARK SKETCH:



DATA CUMPUTED BY:	DESCHUTES COUNTY SURVEYOR'S OFFICE	DATE:	1995
METHOD-EQUIPMENT:	GPS-TRIMBLE 4000SSE GEODETIC	ADJUSTED WITH:	TRIMNET

HOIZONTAL DATUM:	NAD 83 (91)	VERTICAL DATUM:	NAVD 29
PROJECTION:	TRANSVERSE MERCATOR	ZONE:	CENTRAL OREGON LCS
CENTRAL MERIDIAN:	W 121° 17'00.00"	ORIGIN NORTHING:	0.00F
LATITUDE OF ORIGIN:	N 43° 00'00.00"	ORIGIN EASTING:	3,300,000.00F
LINEAR UNITS:	INTERNATIONAL FOOT	SCALE ALONG MERIDIAN:	1.0001600

GEODETIC AND MAPPING COORDINATES

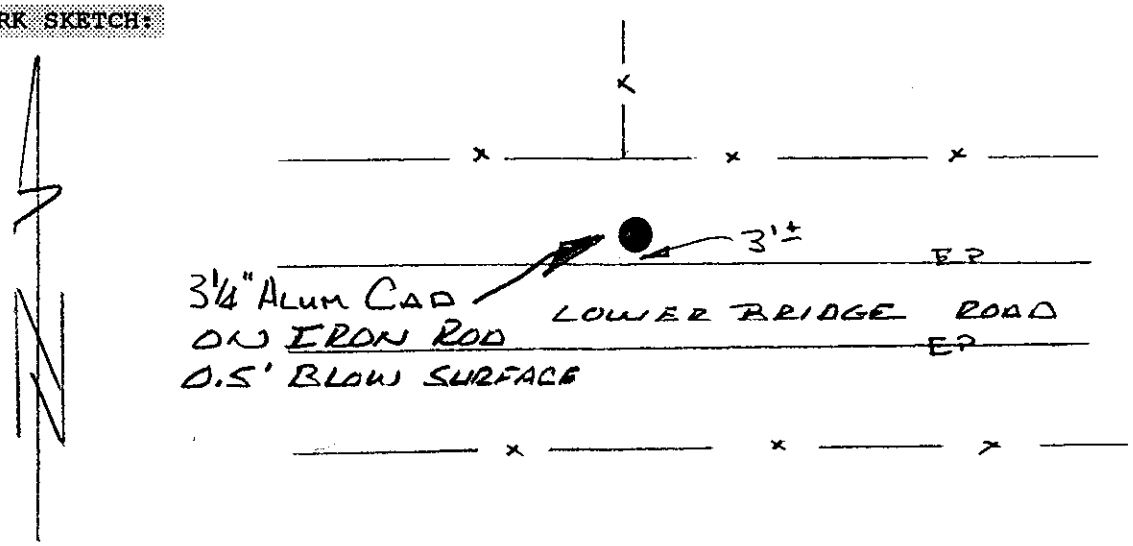
MARK: 14130740 HORIZONTAL ORDER: FIRST

				ONE SIGMA ERROR
Latitude:	44°22'15.966145"	Northing:	499880.488	0.021
Longitude:	121°13'45.114952"	Easting:	3314158.388	0.015
Convergence:	+0°02'16.2837"	Ell Height:	2657.29	0.040
Scale Factor:	1.000160228897	Ortho Height:	2722.85	0.049
Combined Factor:	1.00003084	Geoid Height:	-65.56	

MARK DATA SHEET

NAME OF MARK:	14130800	COUNTY:	DESCHUTES
MARK SET BY:	LS 0804 C. H. KETCHAM	STATE:	OREGON
DATE OF MARK:	1988	COUNTRY:	U.S.A.
LOCATION:	SECTION 8 TOWNSHIP 14 S RANGE 13 E		
REFERENCE:	OCRR 818		

MARK SKETCH:



DATA CUMPUTED BY:	DESCHUTES COUNTY SURVEYOR'S OFFICE	DATE:	1995
METHOD-EQUIPMENT:	GPS-TRIMBLE 4000SSE GEODETIC	ADJUSTED WITH:	TRIMNET

HOIZONTAL DATUM:	NAD 83 (91)	VERTICAL DATUM:	NAVD 29
PROJECTION:	TRANSVERSE MERCATOR	ZONE:	CENTRAL OREGON LCS
CENTRAL MERIDIAN:	W 121° 17'00.00"	ORIGIN NORTHING:	0.00F
LATITUDE OF ORIGIN:	N 43° 00'00.00"	ORIGIN EASTING:	3,300,000.00F
LINEAR UNITS:	INTERNATIONAL FOOT	SCALE ALONG MERIDIAN:	1.0001600

GEODETIC AND MAPPING COORDINATES

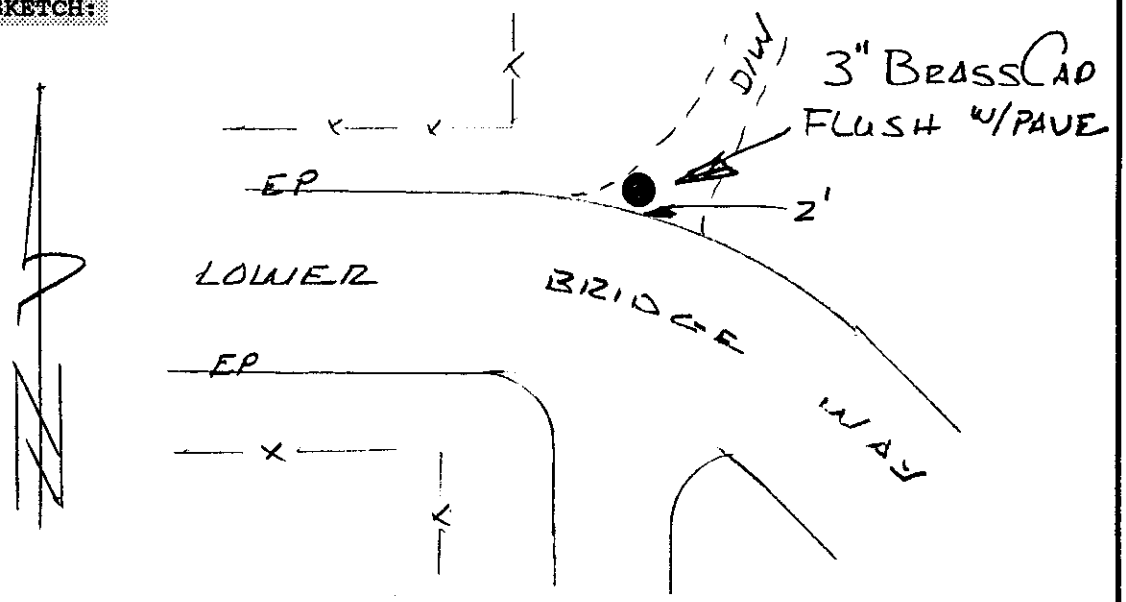
MARK: 14130800 HORIZONTAL ORDER: FIRST

				ONE SIGMA ERROR
Latitude:	44°21'48.391652"	Northing:	497091.804	0.011
Longitude:	121°12'31.848841"	Easting:	3319483.706	0.011
Convergence:	+0°03'07.4933"	Ell Height:	2648.75	0.025
Scale Factor:	1.000160433467	Ortho Height:	2714.13	0.037
Combined Factor:	1.00003186	Geoid Height:	-65.38	

MARK DATA SHEET

NAME OF MARK:	14130900	COUNTY:	DESCHUTES
MARK SET BY:	LS 1652 ROBERT POVEY	STATE:	OREGON
DATE OF MARK:	1986	COUNTRY:	U.S.A.
LOCATION:	SECTION 9	TOWNSHIP 14 S	RANGE 13 E
REFERENCE:	OCRR	744	

MARK SKETCH:



DATA CUMPUTED BY:	DESCHUTES COUNTY SURVEYOR'S OFFICE	DATE:	1995
METHOD-EQUIPMENT:	GPS-TRIMBLE 4000SSE GEODETIC	ADJUSTED WITH:	TRIMNET

HOIZONTAL DATUM:	NAD 83 (91)	VERTICAL DATUM:	NAVD 29
PROJECTION:	TRANSVERSE MERCATOR	ZONE:	CENTRAL OREGON LCS
CENTRAL MERIDIAN:	W 121° 17'00.00"	ORIGIN NORTHING:	0.00F
LATITUDE OF ORIGIN:	N 43° 00'00.00"	ORIGIN EASTING:	3,300,000.00F
LINEAR UNITS:	INTERNATIONAL FOOT	SCALE ALONG MERIDIAN:	1.0001600

GEODETIC AND MAPPING COORDINATES

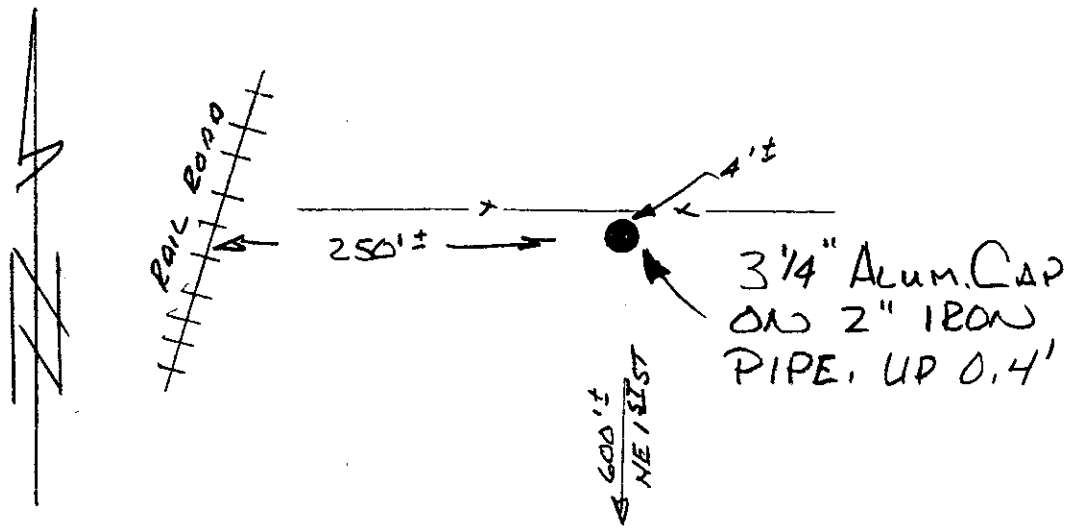
MARK: 14130900 HORIZONTAL ORDER: FIRST

				ONE SIGMA ERROR
Latitude:	44°21'47.812301"	Northing:	497038.575	0.007
Longitude:	121°11'19.174920"	Easting:	3324764.219	0.007
Convergence:	+0°03'58.3068"	Ell Height:	2695.97	0.015
Scale Factor:	1.000160700264	Ortho Height:	2761.20	0.032
Combined Factor:	1.00003185	Geoid Height:	-65.23	

MARK DATA SHEET

NAME OF MARK:	14131000	COUNTY:	DESCHUTES
MARK SET BY:	LS 0804 C. H. KETCHAM	STATE:	OREGON
DATE OF MARK:	1988	COUNTRY:	U.S.A.
LOCATION:	SECTION 10 TOWNSHIP 14 S RANGE 13 E		
REFERENCE:	OCRR 800		

MARK SKETCH:



DATA CUMPUTED BY:	DESCHUTES COUNTY SURVEYOR'S OFFICE	DATE:	1995
METHOD-EQUIPMENT:	GPS-TRIMBLE 4000SSE GEODETIC	ADJUSTED WITH:	TRIMNET

HOIZONTAL DATUM:	NAD 83 (91)	VERTICAL DATUM:	NAVD 29
PROJECTION:	TRANSVERSE MERCATOR	ZONE:	CENTRAL OREGON LCS
CENTRAL MERIDIAN:	W 121° 17'00.00"	ORIGIN NORTHING:	0.00F
LATITUDE OF ORIGIN:	N 43° 00'00.00"	ORIGIN EASTING:	3,300,000.00F
LINEAR UNITS:	INTERNATIONAL FOOT	SCALE ALONG MERIDIAN:	1.0001600

GEODETIC AND MAPPING COORDINATES

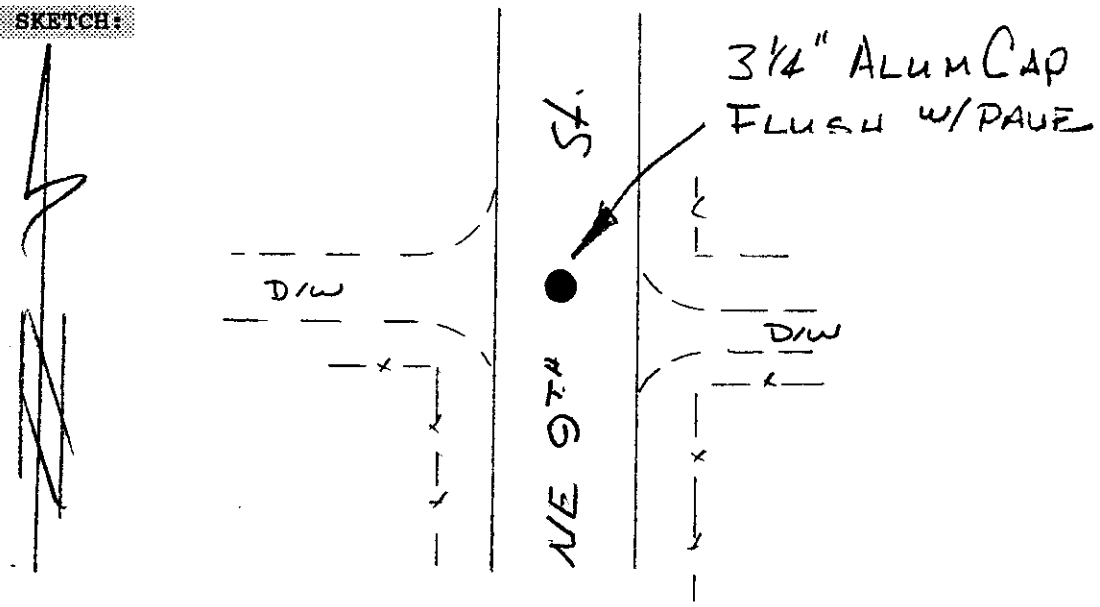
MARK: 14131000 HORIZONTAL ORDER: FIRST

				ONE SIGMA ERROR
Latitude:	44°21'47.693877"	Northing:	497033.297	0.009
Longitude:	121°10'06.840372"	Easting:	3330020.036	0.009
Convergence:	+0°04'48.8834"	Ell Height:	2783.52	0.019
Scale Factor:	1.000161029047	Ortho Height:	2848.62	0.034
Combined Factor:	1.00002799	Geoid Height:	-65.10	

MARK DATA SHEET

NAME OF MARK:	14131004	COUNTY:	DESCHUTES
MARK SET BY:	LS 0804 C. H. KETCHAM	STATE:	OREGON
DATE OF MARK:	1988	COUNTRY:	U.S.A.
LOCATION:	SECTION 10	TOWNSHIP 14 S	RANGE 13 E
REFERENCE:	OCRR	814	

MARK SKETCH:



DATA CUMPUTED BY:	DESCHUTES COUNTY SURVEYOR'S OFFICE	DATE:	1995
METHOD-EQUIPMENT:	GPS-TRIMBLE 4000SSE GEODETIC	ADJUSTED WITH:	TRIMNET

HOIZONTAL DATUM:	NAD 83 (91)	VERTICAL DATUM:	NAVD 29
PROJECTION:	TRANSVERSE MERCATOR	ZONE:	CENTRAL OREGON LCS
CENTRAL MERIDIAN:	W 121° 17'00.00"	ORIGIN NORTHING:	0.00F
LATITUDE OF ORIGIN:	N 43° 00'00.00"	ORIGIN EASTING:	3,300,000.00F
LINEAR UNITS:	INTERNATIONAL FOOT	SCALE ALONG MERIDIAN:	1.0001600

GEODETIC AND MAPPING COORDINATES

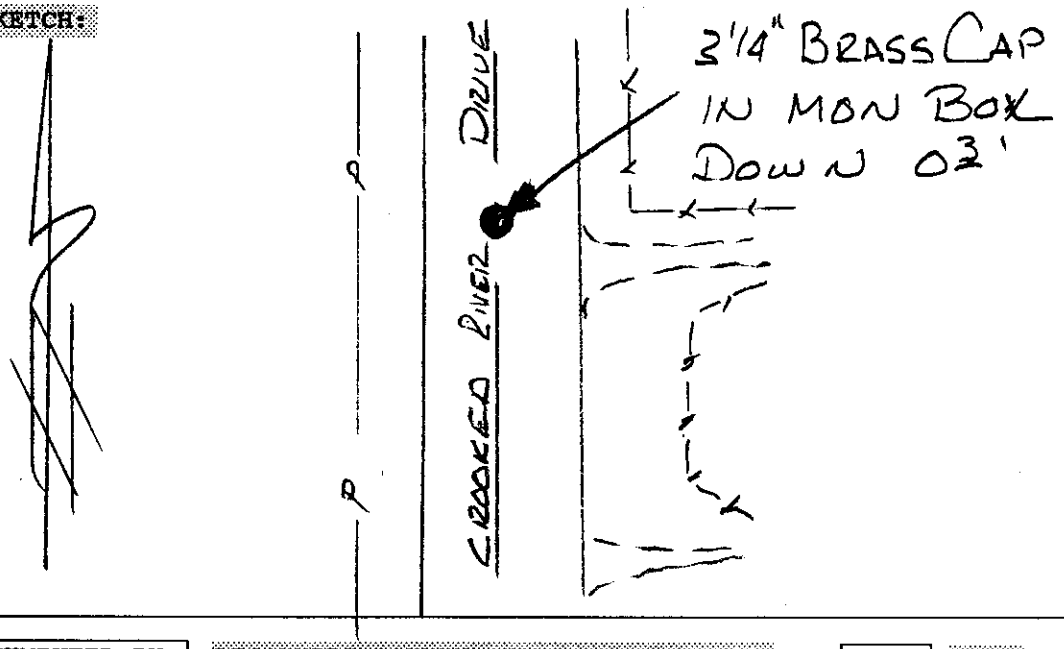
MARK: 14131004 HORIZONTAL ORDER: FIRST

				ONE SIGMA ERROR
Latitude:	44°21'47.779398"	Northing:	497045.784	0.029
Longitude:	121°09'30.818851"	Easting:	3332637.334	0.019
Convergence:	+0°05'14.0701"	Ell Height:	2711.92	0.047
Scale Factor:	1.000161216304	Ortho Height:	2776.96	0.055
Combined Factor:	1.0000316	Geoid Height:	-65.04	

MARK DATA SHEET

NAME OF MARK:	14131104	COUNTY:	DESCHUTES
MARK SET BY:	LS 1081 JEFFREY KERN	STATE:	OREGON
DATE OF MARK:	1991	COUNTRY:	U.S.A.
LOCATION:	SECTION 11 TOWNSHIP 14 S RANGE 13 E		
REFERENCE:	OCRR 1084		

MARK SKETCH:



DATA CUMPUTED BY:	DESCHUTES COUNTY SURVEYOR'S OFFICE	DATE:	1995
METHOD-EQUIPMENT:	GPS-TRIMBLE 4000SSE GEODETIC	ADJUSTED WITH:	TRIMNET

HOIZONTAL DATUM:	NAD 83 (91)	VERTICAL DATUM:	NAVD 29
PROJECTION:	TRANSVERSE MERCATOR	ZONE:	CENTRAL OREGON LCS
CENTRAL MERIDIAN:	W 121° 17'00.00"	ORIGIN NORTHING:	0.00F
LATITUDE OF ORIGIN:	N 43° 00'00.00"	ORIGIN EASTING:	3,300,000.00F
LINEAR UNITS:	INTERNATIONAL FOOT	SCALE ALONG MERIDIAN:	1.0001600

GEODETIC AND MAPPING COORDINATES

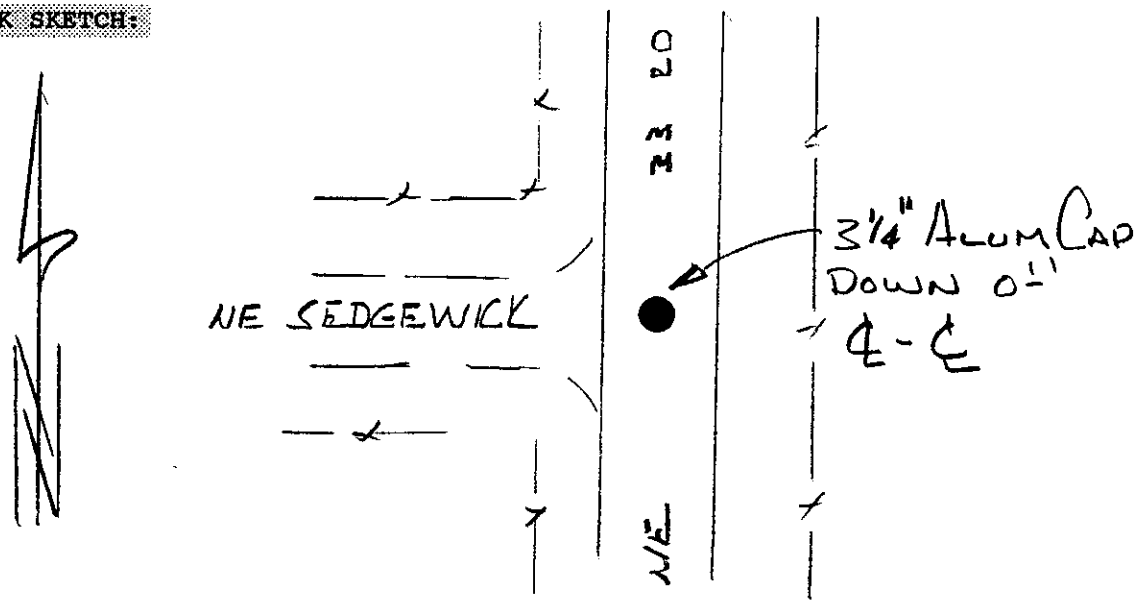
MARK: 14131104 HORIZONTAL ORDER: FIRST

				ONE SIGMA ERROR
Latitude:	44°21'47.934588"	Northing:	497070.204	0.041
Longitude:	121°08'18.064963"	Easting:	3337923.577	0.031
Convergence:	+0°06'04.9404"	Ell Height:	2778.35	0.086
Scale Factor:	1.000161642221	Ortho Height:	2843.27	0.091
Combined Factor:	1.00002886	Geoid Height:	-64.92	

MARK DATA SHEET

NAME OF MARK:	14131300	COUNTY:	DESCHUTES
MARK SET BY:	LS 0804 C. H. KETCHAM	STATE:	OREGON
DATE OF MARK:	1988	COUNTRY:	U.S.A.
LOCATION:	SECTION 13 TOWNSHIP 14 S RANGE 13 E		
REFERENCE:	OCRR 822		

MARK SKETCH:



DATA CUMPUTED BY:	DESCHUTES COUNTY SURVEYOR'S OFFICE	DATE:	1995
METHOD-EQUIPMENT:	GPS-TRIMBLE 4000SSE GEODETIC	ADJUSTED WITH:	TRIMNET

HOIZONTAL DATUM:	NAD 83 (91)	VERTICAL DATUM:	NAVD 29
PROJECTION:	TRANSVERSE MERCATOR	ZONE:	CENTRAL OREGON LCS
CENTRAL MERIDIAN:	W 121° 17'00.00"	ORIGIN NORTHING:	0.00F
LATITUDE OF ORIGIN:	N 43° 00'00.00"	ORIGIN EASTING:	3,300,000.00F
LINEAR UNITS:	INTERNATIONAL FOOT	SCALE ALONG MERIDIAN:	1.0001600

GEODETIC AND MAPPING COORDINATES

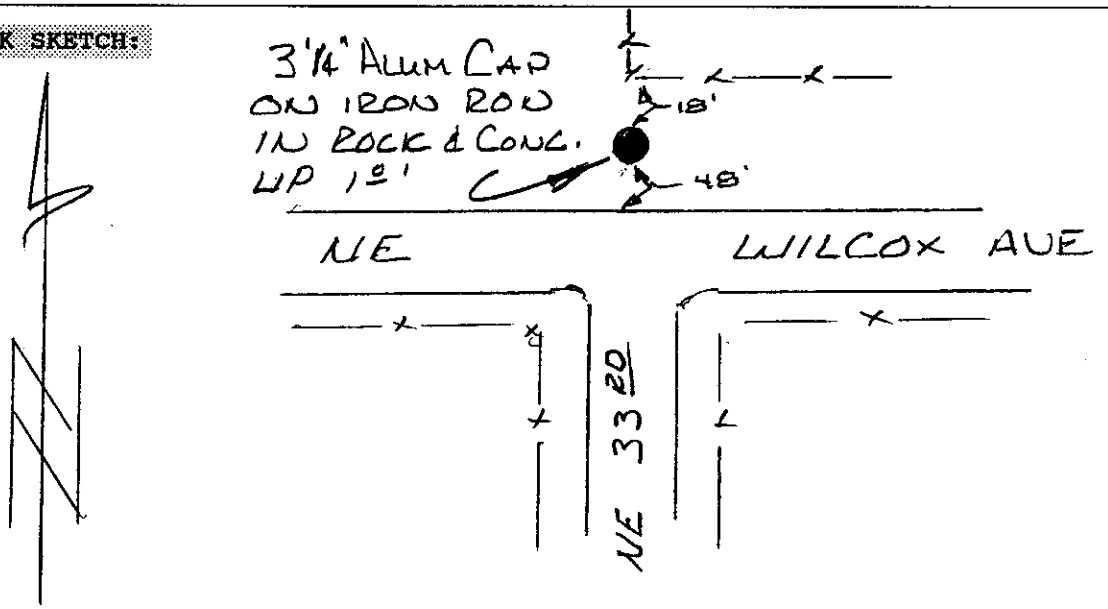
MARK: 14131300 HORIZONTAL ORDER: FIRST

				ONE SIGMA ERROR
Latitude:	44°20'55.679277"	Northing:	491782.342	0.020
Longitude:	121°07'42.202194"	Easting:	3340539.357	0.016
Convergence:	+0°06'29.9149"	Ell Height:	2876.30	0.042
Scale Factor:	1.000161876585	Ortho Height:	2941.21	0.051
Combined Factor:	1.00002441	Geoid Height:	-64.92	

MARK DATA SHEET

NAME OF MARK:	14131340	COUNTY:	DESCHUTES
MARK SET BY:	LS 0804 C. H. KETCHAM	STATE:	OREGON
DATE OF MARK:	1988	COUNTRY:	U.S.A.
LOCATION:	SECTION 13 TOWNSHIP 14 S RANGE 13 E		
REFERENCE:	OCRR 805		

MARK SKETCH:



DATA CUMPUTED BY:	DESCHUTES COUNTY SURVEYOR'S OFFICE	DATE:	1995
METHOD-EQUIPMENT:	GPS-TRIMBLE 4000SSE GEODETIC	ADJUSTED WITH:	TRIMNET

HOIZONTAL DATUM:	NAD 83 (91)	VERTICAL DATUM:	NAVD 29
PROJECTION:	TRANSVERSE MERCATOR	ZONE:	CENTRAL OREGON LCS
CENTRAL MERIDIAN:	W 121° 17'00.00"	ORIGIN NORTHING:	0.00F
LATITUDE OF ORIGIN:	N 43° 00'00.00"	ORIGIN EASTING:	3,300,000.00F
LINEAR UNITS:	INTERNATIONAL FOOT	SCALE ALONG MERIDIAN:	1.0001600

GEODETIC AND MAPPING COORDINATES

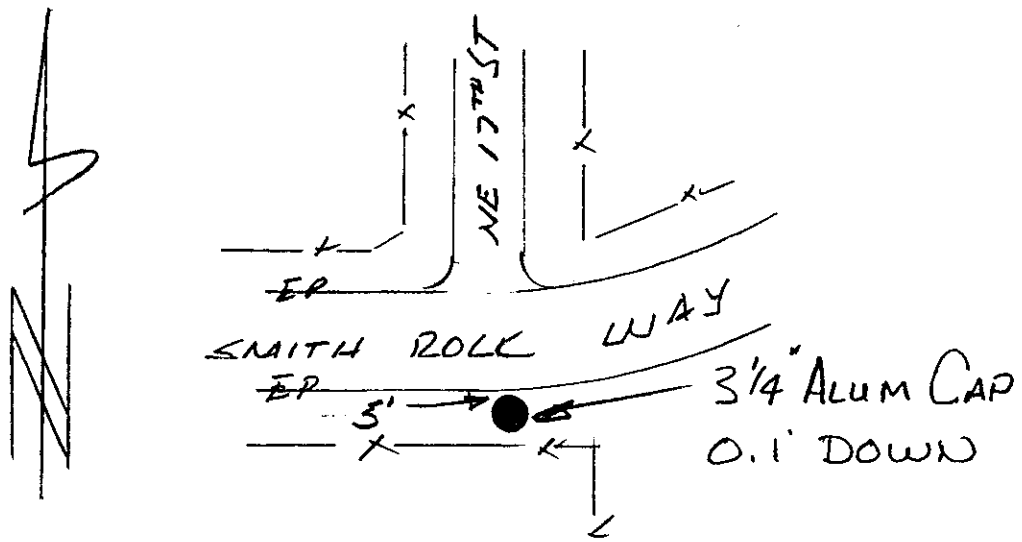
MARK: 14131340 HORIZONTAL ORDER: FIRST

				ONE SIGMA ERROR
Latitude:	44°21'21.760417"	Northing:	494423.959	0.025
Longitude:	121°07'42.092959"	Easting:	3340542.301	0.020
Convergence:	+0°06'30.0417"	Ell Height:	2834.60	0.058
Scale Factor:	1.000161876854	Ortho Height:	2899.50	0.065
Combined Factor:	1.0000264	Geoid Height:	-64.89	

MARK DATA SHEET

NAME OF MARK:	14131400	COUNTY:	DESCHUTES
MARK SET BY:	LS 0804 C. H. KETCHAM	STATE:	OREGON
DATE OF MARK:	1988	COUNTRY:	U.S.A.
LOCATION:	SECTION 14 TOWNSHIP 14 S RANGE 13 E		
REFERENCE:	OCRR 820		

MARK SKETCH:



DATA CUMPUTED BY:	DESCHUTES COUNTY SURVEYOR'S OFFICE	DATE:	1995
METHOD-EQUIPMENT:	GPS-TRIMBLE 4000SSE GEODETIC	ADJUSTED WITH:	TRIMNET

HOIZONTAL DATUM:	NAD 83 (91)	VERTICAL DATUM:	NAVD 29
PROJECTION:	TRANSVERSE MERCATOR	ZONE:	CENTRAL OREGON LCS
CENTRAL MERIDIAN:	W 121° 17'00.00"	ORIGIN NORTHING:	0.00F
LATITUDE OF ORIGIN:	N 43° 00'00.00"	ORIGIN EASTING:	3,300,000.00F
LINEAR UNITS:	INTERNATIONAL FOOT	SCALE ALONG MERIDIAN:	1.0001600

GEODETIC AND MAPPING COORDINATES

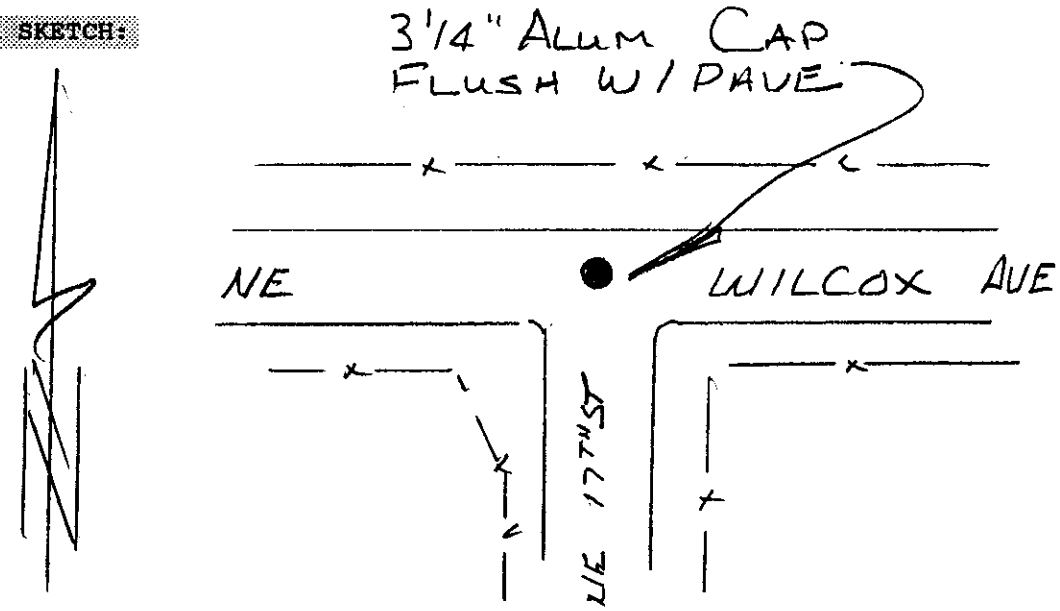
MARK: 14131400 HORIZONTAL ORDER: FIRST

				ONE SIGMA ERROR
Latitude:	44°20'55.812427"	Northing:	491786.483	0.021
Longitude:	121°08'54.967749"	Easting:	3335250.915	0.014
Convergence:	+0°05'39.0500"	Ell Height:	2754.45	0.040
Scale Factor:	1.000161418911	Ortho Height:	2819.47	0.049
Combined Factor:	1.00002977	Geoid Height:	-65.02	

MARK DATA SHEET

NAME OF MARK:	14131440	COUNTY:	DESCHUTES
MARK SET BY:	LS 0804 C. H. KETCHAM	STATE:	OREGON
DATE OF MARK:	1988	COUNTRY:	U.S.A.
LOCATION:	SECTION 14 TOWNSHIP 14 S	RANGE	13 E
REFERENCE:	OCRR	825	

MARK SKETCH:



DATA CUMPUTED BY:	DESCHUTES COUNTY SURVEYOR'S OFFICE	DATE:	1995
METHOD-EQUIPMENT:	GPS-TRIMBLE 4000SSE GEODETIC	ADJUSTED WITH:	TRIMNET

HOIZONTAL DATUM:	NAD 83 (91)	VERTICAL DATUM:	NAVD 29
PROJECTION:	TRANSVERSE MERCATOR	ZONE:	CENTRAL OREGON LCS
CENTRAL MERIDIAN:	W 121° 17'00.00"	ORIGIN NORTHING:	0.00F
LATITUDE OF ORIGIN:	N 43° 00'00.00"	ORIGIN EASTING:	3,300,000.00F
LINEAR UNITS:	INTERNATIONAL FOOT	SCALE ALONG MERIDIAN:	1.0001600

GEODETIC AND MAPPING COORDINATES

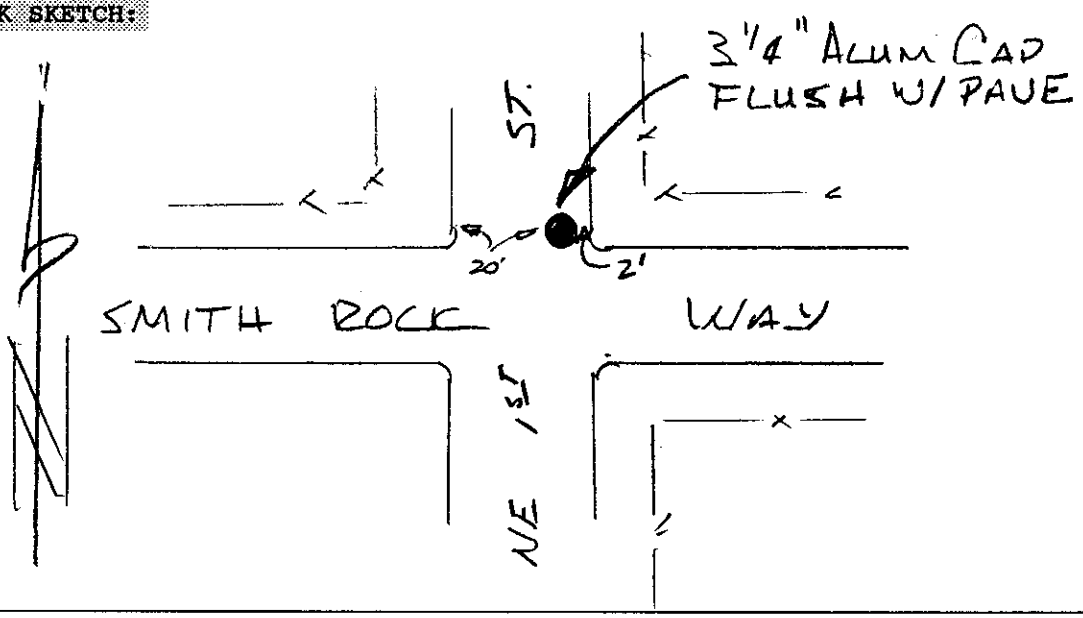
MARK: 14131440 HORIZONTAL ORDER: FIRST

				ONE SIGMA ERROR
Latitude:	44°21'21.842105"	Northing:	494422.884	0.039
Longitude:	121°08'54.876652"	Easting:	3335253.201	0.026
Convergence:	+0°05'39.1575"	Ell Height:	2752.99	0.067
Scale Factor:	1.000161419093	Ortho Height:	2817.99	0.073
Combined Factor:	1.00002984	Geoid Height:	-65.00	

MARK DATA SHEET

NAME OF MARK:	14131500	COUNTY:	DESCHUTES
MARK SET BY:	LS 0804 C. H. KETCHAM	STATE:	OREGON
DATE OF MARK:	1988	COUNTRY:	U.S.A.
LOCATION:	SECTION 15 TOWNSHIP 14 S RANGE 13 E		
REFERENCE:	OCRR 827		

MARK SKETCH:



DATA CUMPUTED BY:	DESCHUTES COUNTY SURVEYOR'S OFFICE	DATE:	1995
METHOD-EQUIPMENT:	GPS-TRIMBLE 4000SSE GEODETIC	ADJUSTED WITH:	TRIMNET

HOIZONTAL DATUM:	NAD 83 (91)	VERTICAL DATUM:	NAVD 29
PROJECTION:	TRANSVERSE MERCATOR	ZONE:	CENTRAL OREGON LCS
CENTRAL MERIDIAN:	W 121° 17'00.00"	ORIGIN NORTHING:	0.00F
LATITUDE OF ORIGIN:	N 43° 00'00.00"	ORIGIN EASTING:	3,300,000.00F
LINEAR UNITS:	INTERNATIONAL FOOT	SCALE ALONG MERIDIAN:	1.0001600

GEODETIC AND MAPPING COORDINATES

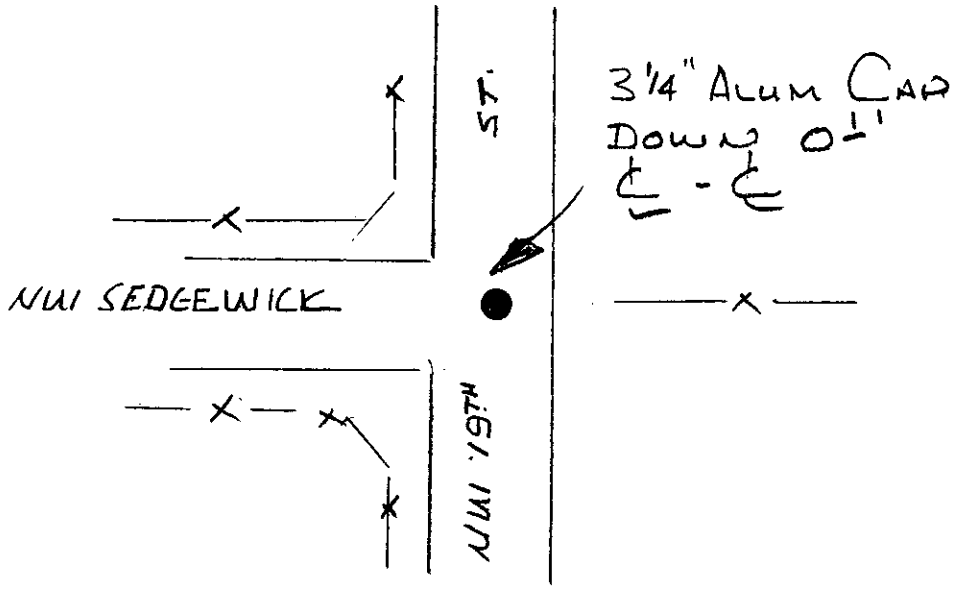
MARK: 14131500 HORIZONTAL ORDER: FIRST

				ONE SIGMA ERROR
Latitude:	44°20'55.820494"	Northing:	491779.306	0.009
Longitude:	121°10'07.272090"	Easting:	3329996.017	0.008
Convergence:	+0°04'48.5074"	Ell Height:	2734.21	0.018
Scale Factor:	1.000161027404	Ortho Height:	2799.34	0.033
Combined Factor:	1.00003035	Geoid Height:	-65.13	

MARK DATA SHEET

NAME OF MARK:	14131600	COUNTY:	DESCHUTES
MARK SET BY:	LS 0804 C. H. KETCHAM	STATE:	OREGON
DATE OF MARK:	1988	COUNTRY:	U.S.A.
LOCATION:	SECTION 16 TOWNSHIP 14 S RANGE 13 E		
REFERENCE:	OCRR 832		

MARK SKETCH:



DATA CUMPUTED BY:	DESCHUTES COUNTY SURVEYOR'S OFFICE	DATE:	1995
METHOD-EQUIPMENT:	GPS-TRIMBLE 4000SSE GEODETIC	ADJUSTED WITH:	TRIMNET

HOIZONTAL DATUM:	NAD 83 (91)	VERTICAL DATUM:	NAVD 29
PROJECTION:	TRANSVERSE MERCATOR	ZONE:	CENTRAL OREGON LCS
CENTRAL MERIDIAN:	W 121° 17'00.00"	ORIGIN NORTHING:	0.00F
LATITUDE OF ORIGIN:	N 43° 00'00.00"	ORIGIN EASTING:	3,300,000.00F
LINEAR UNITS:	INTERNATIONAL FOOT	SCALE ALONG MERIDIAN:	1.0001600

GEODETIC AND MAPPING COORDINATES

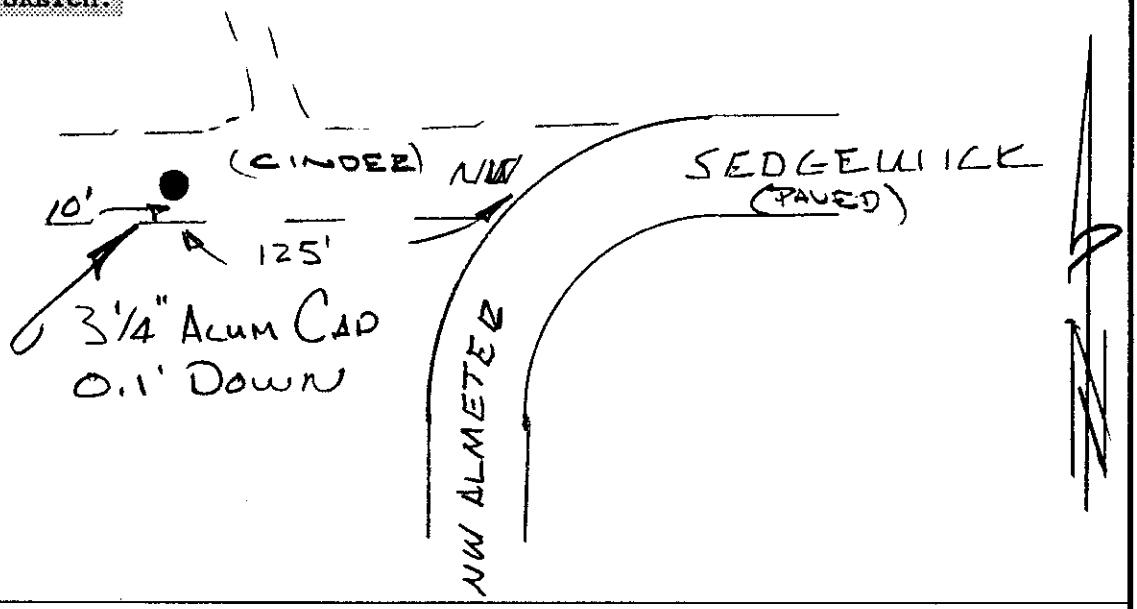
MARK: 14131600 HORIZONTAL ORDER: FIRST

				ONE SIGMA ERROR
Latitude:	44°20'55.982906"	Northing:	491789.068	0.010
Longitude:	121°11'19.349724"	Easting:	3324757.579	0.009
Convergence:	+0°03'58.1234"	Ell Height:	2688.01	0.020
Scale Factor:	1.000160699891	Ortho Height:	2753.26	0.034
Combined Factor:	1.00003223	Geoid Height:	-65.25	

MARK DATA SHEET

NAME OF MARK:	14131700	COUNTY:	DESCHUTES
MARK SET BY:	LS 0804 C. H. KETCHAM	STATE:	OREGON
DATE OF MARK:	1988	COUNTRY:	U.S.A.
LOCATION:	SECTION 17 TOWNSHIP 14 S RANGE 13 E		
REFERENCE:	OCRR 815		

MARK SKETCH:



DATA CUMPUTED BY:	DESCHUTES COUNTY SURVEYOR'S OFFICE	DATE:	1995
METHOD-EQUIPMENT:	GPS-TRIMBLE 4000SSE GEODETIC	ADJUSTED WITH:	TRIMNET

HOIZONTAL DATUM:	NAD 83 (91)	VERTICAL DATUM:	NAVD 29
PROJECTION:	TRANSVERSE MERCATOR	ZONE:	CENTRAL OREGON LCS
CENTRAL MERIDIAN:	W 121° 17'00.00"	ORIGIN NORTHING:	0.00F
LATITUDE OF ORIGIN:	N 43° 00'00.00"	ORIGIN EASTING:	3,300,000.00F
LINEAR UNITS:	INTERNATIONAL FOOT	SCALE ALONG MERIDIAN:	1.0001600

GEODETIC AND MAPPING COORDINATES

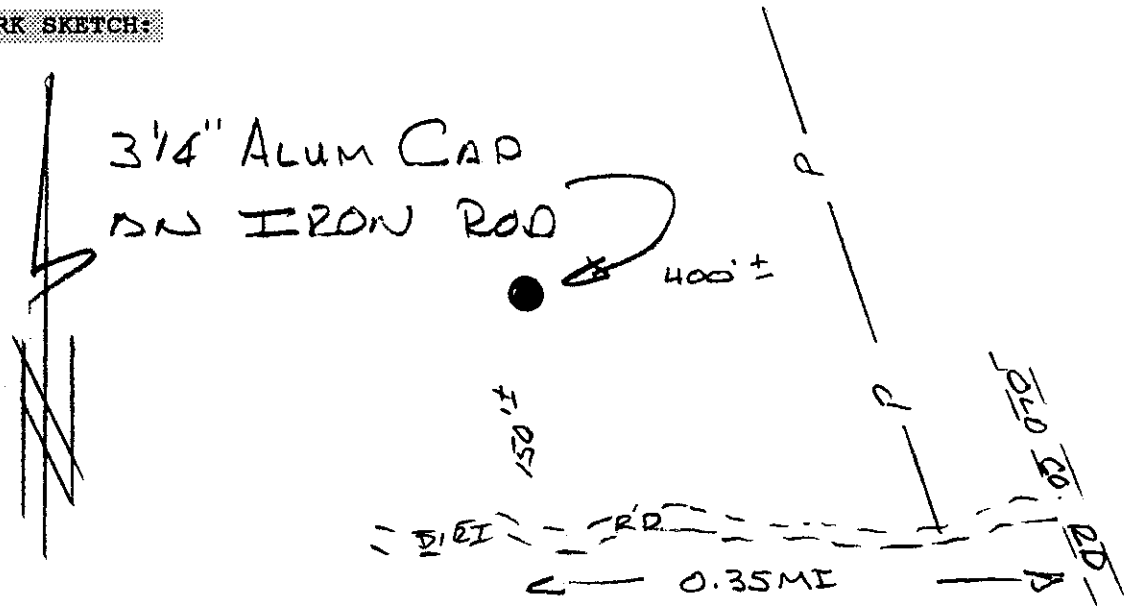
MARK: 14131700 HORIZONTAL ORDER: FIRST

				ONE SIGMA ERROR
Latitude:	44°20'56.269649"	Northing:	491812.628	0.012
Longitude:	121°12'32.558343"	Easting:	3319436.940	0.011
Convergence:	+0°03'06.9489"	Ell Height:	2671.61	0.026
Scale Factor:	1.000160431390	Ortho Height:	2736.99	0.038
Combined Factor:	1.00003164	Geoid Height:	-65.38	

MARK DATA SHEET

NAME OF MARK:	14131800	COUNTY:	DESCHUTES
MARK SET BY:	LS 0804 C. H. KETCHAM	STATE:	OREGON
DATE OF MARK:	1988	COUNTRY:	U.S.A.
LOCATION:	SECTION 18 TOWNSHIP 14 S RANGE 13 E		
REFERENCE:	OCRR 786		

MARK SKETCH:



DATA CUMPUTED BY:	DESCHUTES COUNTY SURVEYOR'S OFFICE	DATE:	1995
METHOD-EQUIPMENT:	GPS-TRIMBLE 4000SSE GEODETIC	ADJUSTED WITH:	TRIMNET

HOIZONTAL DATUM:	NAD 83 (91)	VERTICAL DATUM:	NAVD 29
PROJECTION:	TRANSVERSE MERCATOR	ZONE:	CENTRAL OREGON LCS
CENTRAL MERIDIAN:	W 121° 17'00.00"	ORIGIN NORTHING:	0.00F
LATITUDE OF ORIGIN:	N 43° 00'00.00"	ORIGIN EASTING:	3,300,000.00F
LINEAR UNITS:	INTERNATIONAL FOOT	SCALE ALONG MERIDIAN:	1.0001600

GEODETIC AND MAPPING COORDINATES

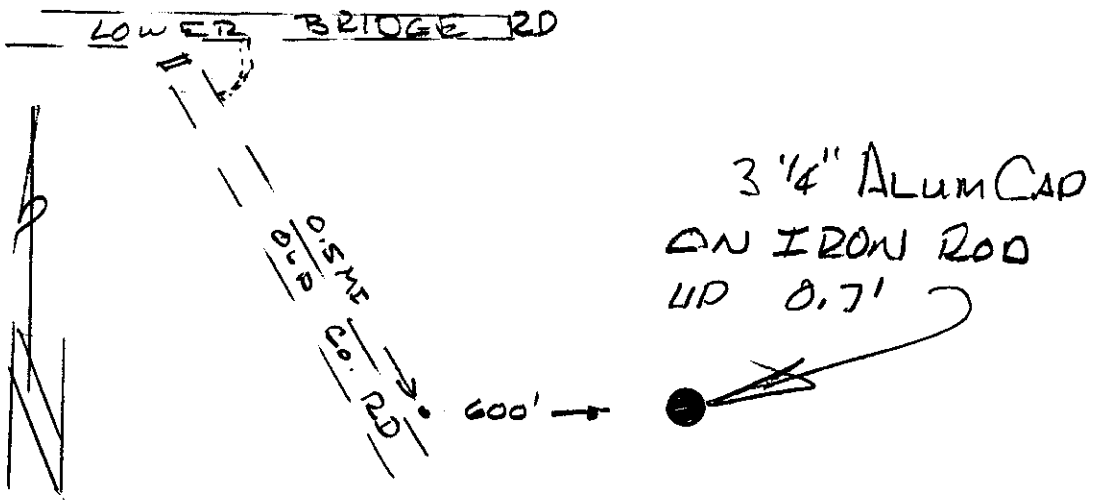
MARK: 14131800 HORIZONTAL ORDER: FIRST

				ONE SIGMA ERROR
Latitude:	44°20'57.404313"	Northing:	491923.419	0.016
Longitude:	121°13'45.154515"	Easting:	3314160.769	0.014
Convergence:	+0°02'16.2030"	Ell Height:	2690.43	0.033
Scale Factor:	1.000160228975	Ortho Height:	2756.00	0.044
Combined Factor:	1.00003384	Geoid Height:	-65.57	

MARK DATA SHEET

NAME OF MARK:	14131840	COUNTY:	DESCHUTES
MARK SET BY:	LS 0804 C. H. KETCHAM	STATE:	OREGON
DATE OF MARK:	1988	COUNTRY:	U.S.A.
LOCATION:	SECTION 18	TOWNSHIP 14 S	RANGE 13 E
REFERENCE:	OCRR 785		

MARK SKETCH:



DATA CUMPUTED BY:	DESCHUTES COUNTY SURVEYOR'S OFFICE	DATE:	1995
METHOD-EQUIPMENT:	GPS-TRIMBLE 4000SSE GEODETIC	ADJUSTED WITH:	TRIMNET

HOIZONTAL DATUM:	NAD 83 (91)	VERTICAL DATUM:	NAVD 29
PROJECTION:	TRANSVERSE MERCATOR	ZONE:	CENTRAL OREGON LCS
CENTRAL MERIDIAN:	W 121° 17'00.00"	ORIGIN NORTHING:	0.00F
LATITUDE OF ORIGIN:	N 43° 00'00.00"	ORIGIN EASTING:	3,300,000.00F
LINEAR UNITS:	INTERNATIONAL FOOT	SCALE ALONG MERIDIAN:	1.0001600

GEODETIC AND MAPPING COORDINATES

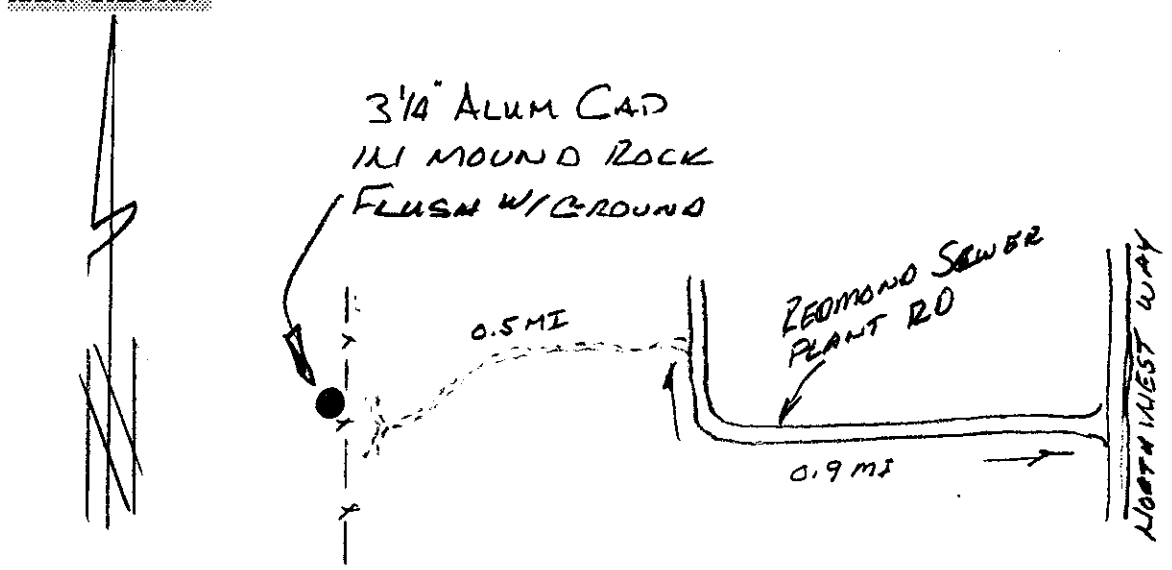
MARK: 14131840 HORIZONTAL ORDER: FIRST

				ONE SIGMA ERROR
Latitude:	44°21'23.598152"	Northing:	494576.437	0.019
Longitude:	121°13'45.119910"	Easting:	3314161.532	0.016
Convergence:	+0°02'16.2449"	Ell Height:	2685.83	0.039
Scale Factor:	1.000160228999	Ortho Height:	2751.40	0.048
Combined Factor:	1.00003323	Geoid Height:	-65.57	

MARK DATA SHEET

NAME OF MARK:	14131900	COUNTY:	DESCHUTES
MARK SET BY:	LS 0804 C. H. KETCHAM	STATE:	OREGON
DATE OF MARK:	1987	COUNTRY:	U.S.A.
LOCATION:	SECTION 19	TOWNSHIP 14 S	RANGE 13 E
REFERENCE:	OCRR	014	

MARK SKETCH:



DATA CUMPUTED BY:	DESCHUTES COUNTY SURVEYOR'S OFFICE	DATE:	1995
METHOD-EQUIPMENT:	GPS-TRIMBLE 4000SSE GEODETIC	ADJUSTED WITH:	TRIMNET

HOIZONTAL DATUM:	NAD 83 (91)	VERTICAL DATUM:	NAVD 29
PROJECTION:	TRANSVERSE MERCATOR	ZONE:	CENTRAL OREGON LCS
CENTRAL MERIDIAN:	W 121° 17'00.00"	ORIGIN NORTHING:	0.00F
LATITUDE OF ORIGIN:	N 43° 00'00.00"	ORIGIN EASTING:	3,300,000.00F
LINEAR UNITS:	INTERNATIONAL FOOT	SCALE ALONG MERIDIAN:	1.0001600

GEODETIC AND MAPPING COORDINATES

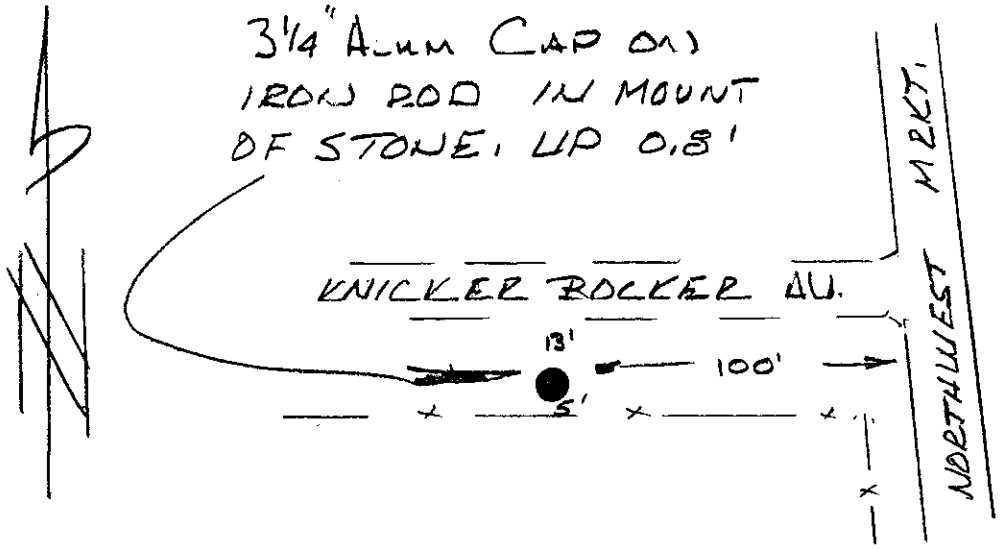
MARK: 14131900 HORIZONTAL ORDER: FIRST

				ONE SIGMA ERROR
Latitude:	44°20'05.009795"	Northing:	486616.695	0.017
Longitude:	121°13'45.302263"	Easting:	3314153.533	0.015
Convergence:	+0°02'16.0643"	Ell Height:	2697.80	0.037
Scale Factor:	1.000160228742	Ortho Height:	2763.36	0.046
Combined Factor:	1.00003274	Geoid Height:	-65.55	

MARK DATA SHEET

NAME OF MARK:	14132000	COUNTY:	DESCHUTES
MARK SET BY:	LS 0804 C. H. KETCHAM	STATE:	OREGON
DATE OF MARK:	1987	COUNTRY:	U.S.A.
LOCATION:	SECTION 20	TOWNSHIP 14 S	RANGE 13 E
REFERENCE:	OCRR	020	

MARK SKETCH:



DATA CUMPUTED BY:	DESCHUTES COUNTY SURVEYOR'S OFFICE	DATE:	1995
METHOD-EQUIPMENT:	GPS-TRIMBLE 4000SSE GEODETIC	ADJUSTED WITH:	TRIMNET

HOIZONTAL DATUM:	NAD 83 (91)	VERTICAL DATUM:	NAVD 29
PROJECTION:	TRANSVERSE MERCATOR	ZONE:	CENTRAL OREGON LCS
CENTRAL MERIDIAN:	W 121° 17'00.00"	ORIGIN NORTHING:	0.00F
LATITUDE OF ORIGIN:	N 43° 00'00.00"	ORIGIN EASTING:	3,300,000.00F
LINEAR UNITS:	INTERNATIONAL FOOT	SCALE ALONG MERIDIAN:	1.0001600

GEODETIC AND MAPPING COORDINATES

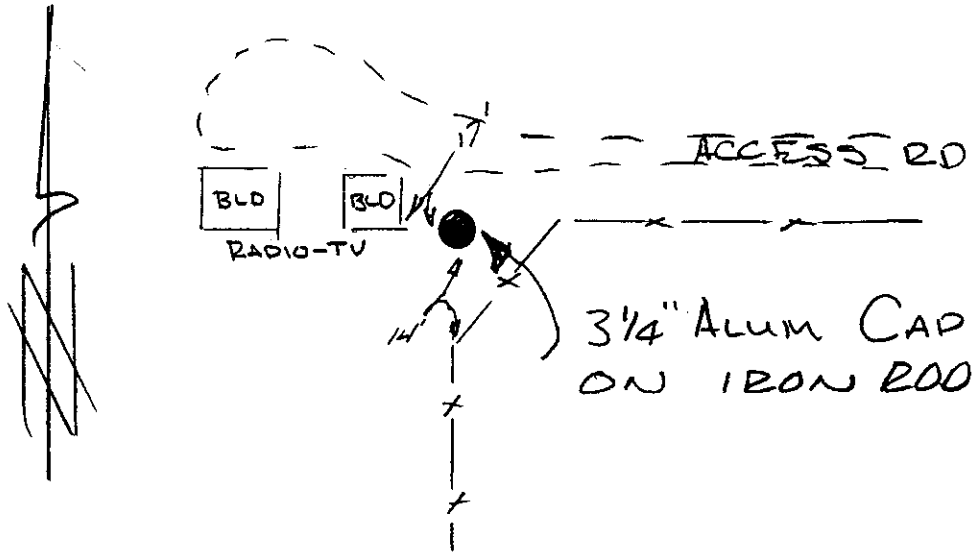
MARK: 14132000 HORIZONTAL ORDER: FIRST

				ONE SIGMA ERROR
Latitude:	44°20'04.137079"	Northing:	486532.491	0.013
Longitude:	121°12'31.830200"	Easting:	3319494.657	0.012
Convergence:	+0°03'07.4094"	Ell Height:	2717.57	0.028
Scale Factor:	1.000160433957	Ortho Height:	2782.95	0.039
Combined Factor:	1.00003129	Geoid Height:	-65.38	

MARK DATA SHEET

NAME OF MARK:	14132100	COUNTY:	DESCHUTES
MARK SET BY:	LS 0804 C. H. KETCHAM	STATE:	OREGON
DATE OF MARK:	1987	COUNTRY:	U.S.A.
LOCATION:	SECTION 21	TOWNSHIP 14 S	RANGE 13 E
REFERENCE:	OCRR	005	

MARK SKETCH:



DATA CUMPUTED BY:	DESCHUTES COUNTY SURVEYOR'S OFFICE	DATE:	1995
METHOD-EQUIPMENT:	GPS-TRIMBLE 4000SSE GEODETIC	ADJUSTED WITH:	TRIMNET

HOIZONTAL DATUM:	NAD 83 (91)	VERTICAL DATUM:	NAVD 29
PROJECTION:	TRANSVERSE MERCATOR	ZONE:	CENTRAL OREGON LCS
CENTRAL MERIDIAN:	W 121° 17'00.00"	ORIGIN NORTHING:	0.00F
LATITUDE OF ORIGIN:	N 43° 00'00.00"	ORIGIN EASTING:	3,300,000.00F
LINEAR UNITS:	INTERNATIONAL FOOT	SCALE ALONG MERIDIAN:	1.0001600

GEODETIC AND MAPPING COORDINATES

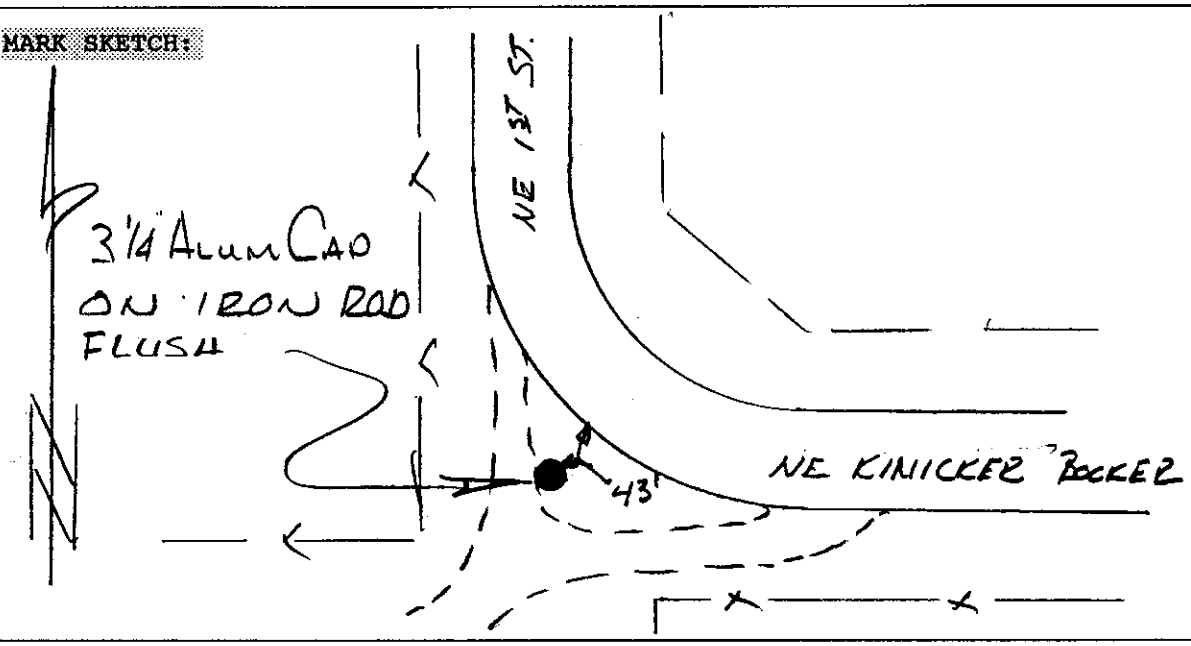
MARK: 14132100 HORIZONTAL ORDER: FIRST

				ONE SIGMA ERROR
Latitude:	44°20'03.622096"	Northing:	486485.772	0.012
Longitude:	121°11'19.284060"	Easting:	3324768.474	0.011
Convergence:	+0°03'58.1074"	Ell Height:	2968.32	0.023
Scale Factor:	1.000160700510	Ortho Height:	3033.57	0.036
Combined Factor:	1.00003055	Geoid Height:	-65.25	

MARK DATA SHEET

NAME OF MARK:	14132200	COUNTY:	DESCHUTES
MARK SET BY:	LS 0804 C. H. KETCHAM	STATE:	OREGON
DATE OF MARK:	1987	COUNTRY:	U.S.A.
LOCATION:	SECTION 22	TOWNSHIP 14 S	RANGE 13 E
REFERENCE:	OCRR	028	

MARK SKETCH:



DATA CUMPUTED BY:	DESCHUTES COUNTY SURVEYOR'S OFFICE	DATE:	1995
METHOD-EQUIPMENT:	GPS-TRIMBLE 4000SSE GEODETIC	ADJUSTED WITH:	TRIMNET

HOIZONTAL DATUM:	NAD 83 (91)	VERTICAL DATUM:	NAVD 29
PROJECTION:	TRANSVERSE MERCATOR	ZONE:	CENTRAL OREGON LCS
CENTRAL MERIDIAN:	W 121° 17'00.00"	ORIGIN NORTHING:	0.00F
LATITUDE OF ORIGIN:	N 43° 00'00.00"	ORIGIN EASTING:	3,300,000.00F
LINEAR UNITS:	INTERNATIONAL FOOT	SCALE ALONG MERIDIAN:	1.0001600

GEODETIC AND MAPPING COORDINATES

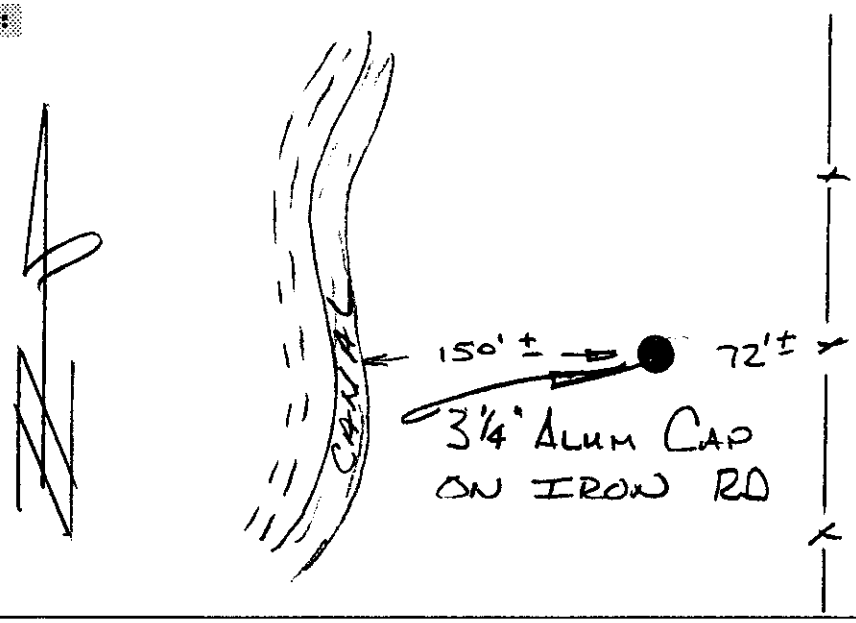
MARK: 14132200 HORIZONTAL ORDER: FIRST

				ONE SIGMA ERROR
Latitude:	44°20'03.683704"	Northing:	486498.733	0.011
Longitude:	121°10'06.880561"	Easting:	3330031.865	0.010
Convergence:	+0°04'48.7064"	Ell Height:	2832.51	0.023
Scale Factor:	1.000161029865	Ortho Height:	2897.65	0.036
Combined Factor:	1.00002565	Geoid Height:	-65.15	

MARK DATA SHEET

NAME OF MARK:	14132300	COUNTY:	DESCHUTES
MARK SET BY:	LS 0804 C. H. KETCHAM	STATE:	OREGON
DATE OF MARK:	1987	COUNTRY:	U.S.A.
LOCATION:	SECTION 23 TOWNSHIP 14 S RANGE 13 E		
REFERENCE:	OCRR 018		

MARK SKETCH:



DATA CUMPUTED BY:	DESCHUTES COUNTY SURVEYOR'S OFFICE	DATE:	1995
METHOD-EQUIPMENT:	GPS-TRIMBLE 4000SSE GEODETIC	ADJUSTED WITH:	TRIMNET

HOIZONTAL DATUM:	NAD 83 (91)	VERTICAL DATUM:	NAVD 29
PROJECTION:	TRANSVERSE MERCATOR	ZONE:	CENTRAL OREGON LCS
CENTRAL MERIDIAN:	W 121° 17'00.00"	ORIGIN NORTHING:	0.00F
LATITUDE OF ORIGIN:	N 43° 00'00.00"	ORIGIN EASTING:	3,300,000.00F
LINEAR UNITS:	INTERNATIONAL FOOT	SCALE ALONG MERIDIAN:	1.0001600

GEODETIC AND MAPPING COORDINATES

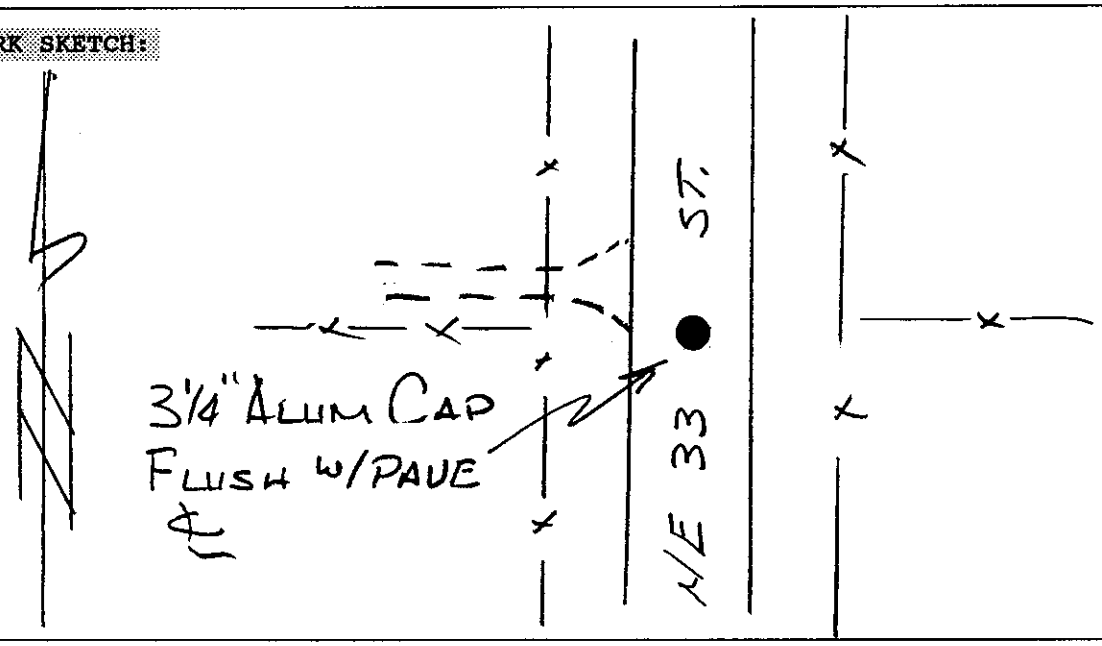
MARK: 14132300 HORIZONTAL ORDER: FIRST

				ONE SIGMA ERROR
Latitude:	44°20'03.736195"	Northing:	486512.070	0.016
Longitude:	121°08'54.412364"	Easting:	3335299.958	0.012
Convergence:	+0°05'39.3506"	Ell Height:	2877.51	0.037
Scale Factor:	1.000161422867	Ortho Height:	2942.55	0.046
Combined Factor:	1.0000239	Geoid Height:	-65.05	

MARK DATA SHEET

NAME OF MARK:	14132400	COUNTY:	DESCHUTES
MARK SET BY:	LS 0804 C. H. KETCHAM	STATE:	OREGON
DATE OF MARK:	1987	COUNTRY:	U.S.A.
LOCATION:	SECTION 24 TOWNSHIP 14 S	RANGE	13 E
REFERENCE:	OCRR	016	

MARK SKETCH:



DATA CUMPUTED BY:	DESCHUTES COUNTY SURVEYOR'S OFFICE	DATE:	1995
METHOD-EQUIPMENT:	GPS-TRIMBLE 4000SSE GEODETIC	ADJUSTED WITH:	TRIMNET

HOIZONTAL DATUM:	NAD 83 (91)	VERTICAL DATUM:	NAVD 29
PROJECTION:	TRANSVERSE MERCATOR	ZONE:	CENTRAL OREGON LCS
CENTRAL MERIDIAN:	W 121° 17'00.00"	ORIGIN NORTHING:	0.00F
LATITUDE OF ORIGIN:	N 43° 00'00.00"	ORIGIN EASTING:	3,300,000.00F
LINEAR UNITS:	INTERNATIONAL FOOT	SCALE ALONG MERIDIAN:	1.0001600

GEODETIC AND MAPPING COORDINATES

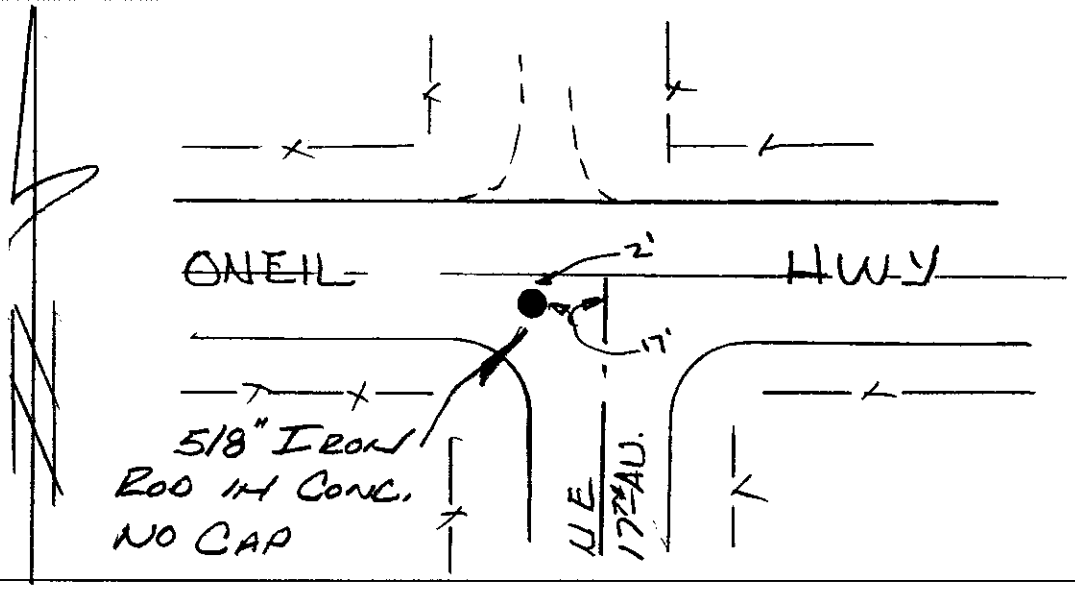
MARK: 14132400 HORIZONTAL ORDER: FIRST

				ONE SIGMA ERROR
Latitude:	44°20'04.181252"	Northing:	486566.432	0.019
Longitude:	121°07'42.152907"	Easting:	3340552.799	0.014
Convergence:	+0°06'29.8497"	Ell Height:	2873.19	0.041
Scale Factor:	1.000161877836	Ortho Height:	2938.14	0.049
Combined Factor:	1.00002456	Geoid Height:	-64.95	

MARK DATA SHEET

NAME OF MARK:	14132600	COUNTY:	DESCHUTES
MARK SET BY:	LS 0804 C. H. KETCHAM	STATE:	OREGON
DATE OF MARK:	1987	COUNTRY:	U.S.A.
LOCATION:	SECTION 26 TOWNSHIP 14 S RANGE 13 E		
REFERENCE:	OCRR 039		

MARK SKETCH:



DATA CUMPUTED BY:	DESCHUTES COUNTY SURVEYOR'S OFFICE	DATE:	1995
METHOD-EQUIPMENT:	GPS-TRIMBLE 4000SSE GEODETIC	ADJUSTED WITH:	TRIMNET

HOIZONTAL DATUM:	NAD 83 (91)	VERTICAL DATUM:	NAVD 29
PROJECTION:	TRANSVERSE MERCATOR	ZONE:	CENTRAL OREGON LCS
CENTRAL MERIDIAN:	W 121° 17'00.00"	ORIGIN NORTHING:	0.00F
LATITUDE OF ORIGIN:	N 43° 00'00.00"	ORIGIN EASTING:	3,300,000.00F
LINEAR UNITS:	INTERNATIONAL FOOT	SCALE ALONG MERIDIAN:	1.0001600

GEODETIC AND MAPPING COORDINATES

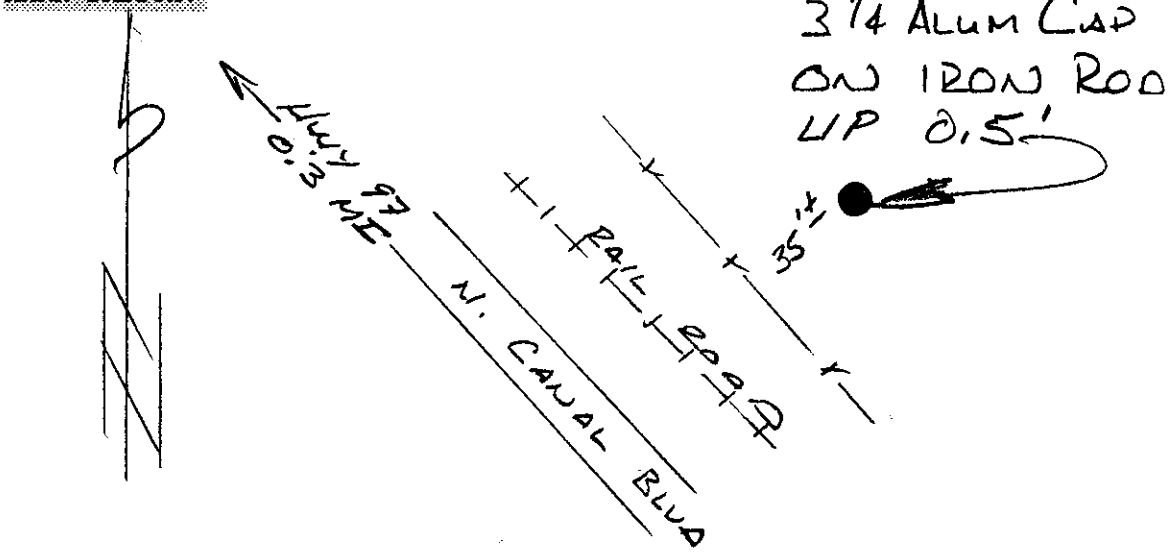
MARK: 14132600 HORIZONTAL ORDER: SECOND

				ONE SIGMA ERROR
Latitude:	44°19'11.758627"	Northing:	481247.577	0.007
Longitude:	121°08'54.579623"	Easting:	3335296.456	0.007
Convergence:	+0°05'39.1462"	Ell Height:	2883.88	0.015
Scale Factor:	1.000161422589	Ortho Height:	2948.92	0.031
Combined Factor:	1.00002359	Geoid Height:	-65.05	

MARK DATA SHEET

NAME OF MARK:	14132700	COUNTY:	DESCHUTES
MARK SET BY:	LS 0804 C. H. KETCHAM	STATE:	OREGON
DATE OF MARK:	1987	COUNTRY:	U.S.A.
LOCATION:	SECTION 27	TOWNSHIP 14 S	RANGE 13 E
REFERENCE:	OCRR	027	

MARK SKETCH:



DATA CUMPUTED BY:	DESCHUTES COUNTY SURVEYOR'S OFFICE	DATE:	1995
METHOD-EQUIPMENT:	GPS-TRIMBLE 4000SSE GEODETIC	ADJUSTED WITH:	TRIMNET

HOIZONTAL DATUM:	NAD 83 (91)	VERTICAL DATUM:	NAVD 29
PROJECTION:	TRANSVERSE MERCATOR	ZONE:	CENTRAL OREGON LCS
CENTRAL MERIDIAN:	W 121° 17'00.00"	ORIGIN NORTHING:	0.00F
LATITUDE OF ORIGIN:	N 43° 00'00.00"	ORIGIN EASTING:	3,300,000.00F
LINEAR UNITS:	INTERNATIONAL FOOT	SCALE ALONG MERIDIAN:	1.0001600

GEODETIC AND MAPPING COORDINATES

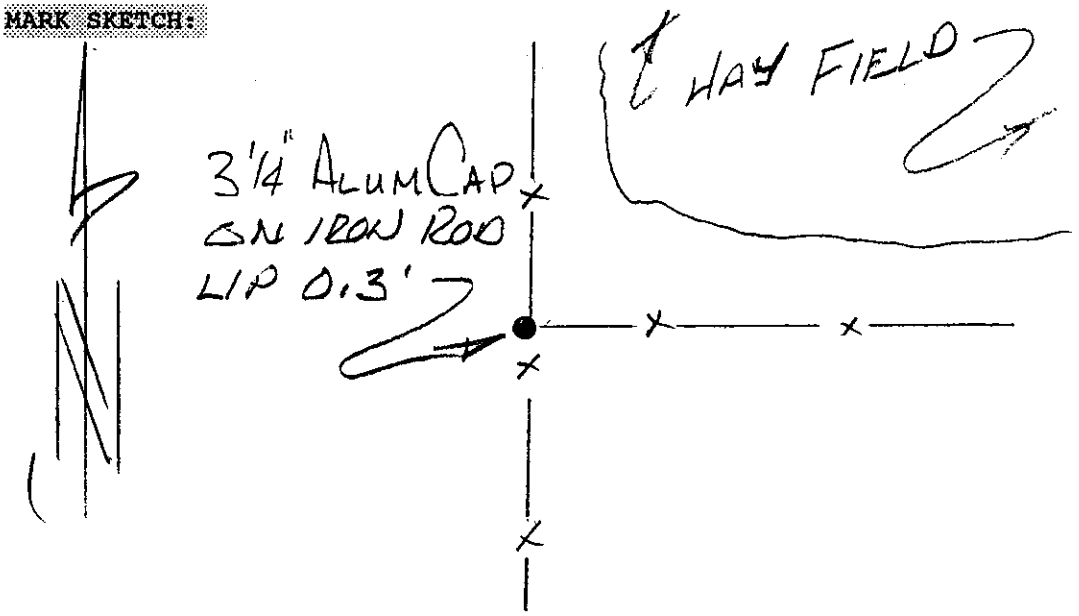
MARK: 14132700 HORIZONTAL ORDER: FIRST

				ONE SIGMA ERROR
Latitude:	44°19'11.589739"	Northing:	481222.456	0.012
Longitude:	121°10'07.027528"	Easting:	3330028.563	0.011
Convergence:	+0°04'48.5291"	Ell Height:	2871.46	FIXED
Scale Factor:	1.000161029642	Ortho Height:	2936.61	0.027
Combined Factor:	1.00002379	Geoid Height:	-65.15	

MARK DATA SHEET

NAME OF MARK:	14132800	COUNTY:	DESCHUTES
MARK SET BY:	LS 0804 C. H. KETCHAM	STATE:	OREGON
DATE OF MARK:	1987	COUNTRY:	U.S.A.
LOCATION:	SECTION 28 TOWNSHIP 14 S RANGE 13 E		
REFERENCE:	OCRR 042		

MARK SKETCH:



DATA CUMPUTED BY:	DESCHUTES COUNTY SURVEYOR'S OFFICE	DATE:	1995
METHOD-EQUIPMENT:	GPS-TRIMBLE 4000SSE GEODETIC	ADJUSTED WITH:	TRIMNET

HOIZONTAL DATUM:	NAD 83 (91)	VERTICAL DATUM:	NAVD 29
PROJECTION:	TRANSVERSE MERCATOR	ZONE:	CENTRAL OREGON LCS
CENTRAL MERIDIAN:	W 121° 17'00.00"	ORIGIN NORTHING:	0.00F
LATITUDE OF ORIGIN:	N 43° 00'00.00"	ORIGIN EASTING:	3,300,000.00F
LINEAR UNITS:	INTERNATIONAL FOOT	SCALE ALONG MERIDIAN:	1.0001600

GEODETIC AND MAPPING COORDINATES

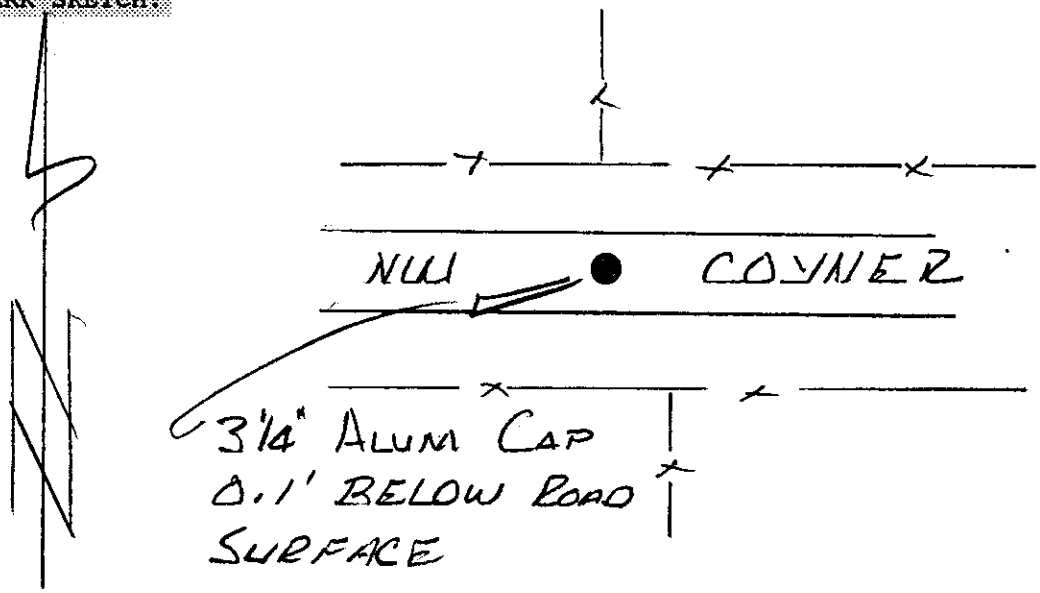
MARK: 14132800 HORIZONTAL ORDER: FIRST

				ONE SIGMA ERROR
Latitude:	44°19'11.538294"	Northing:	481210.496	0.013
Longitude:	121°11'19.802461"	Easting:	3324736.868	0.012
Convergence:	+0°03'57.6837"	Ell Height:	2886.36	0.025
Scale Factor:	1.000160698725	Ortho Height:	2951.61	0.037
Combined Factor:	1.00002275	Geoid Height:	-65.25	

MARK DATA SHEET

NAME OF MARK:	14132900	COUNTY:	DESCHUTES
MARK SET BY:	LS 0804 C. H. KETCHAM	STATE:	OREGON
DATE OF MARK:	1987	COUNTRY:	U.S.A.
LOCATION:	SECTION 29	TOWNSHIP 14 S	RANGE 13 E
REFERENCE:	OCRR	001	

MARK SKETCH:



DATA CUMPUTED BY:	DESCHUTES COUNTY SURVEYOR'S OFFICE	DATE:	1995
METHOD-EQUIPMENT:	GPS-TRIMBLE 4000SSE GEODETIC	ADJUSTED WITH:	TRIMNET

HOIZONTAL DATUM:	NAD 83 (91)	VERTICAL DATUM:	NAVD 29
PROJECTION:	TRANSVERSE MERCATOR	ZONE:	CENTRAL OREGON LCS
CENTRAL MERIDIAN:	W 121° 17'00.00"	ORIGIN NORTHING:	0.00F
LATITUDE OF ORIGIN:	N 43° 00'00.00"	ORIGIN EASTING:	3,300,000.00F
LINEAR UNITS:	INTERNATIONAL FOOT	SCALE ALONG MERIDIAN:	1.0001600

GEODETIC AND MAPPING COORDINATES

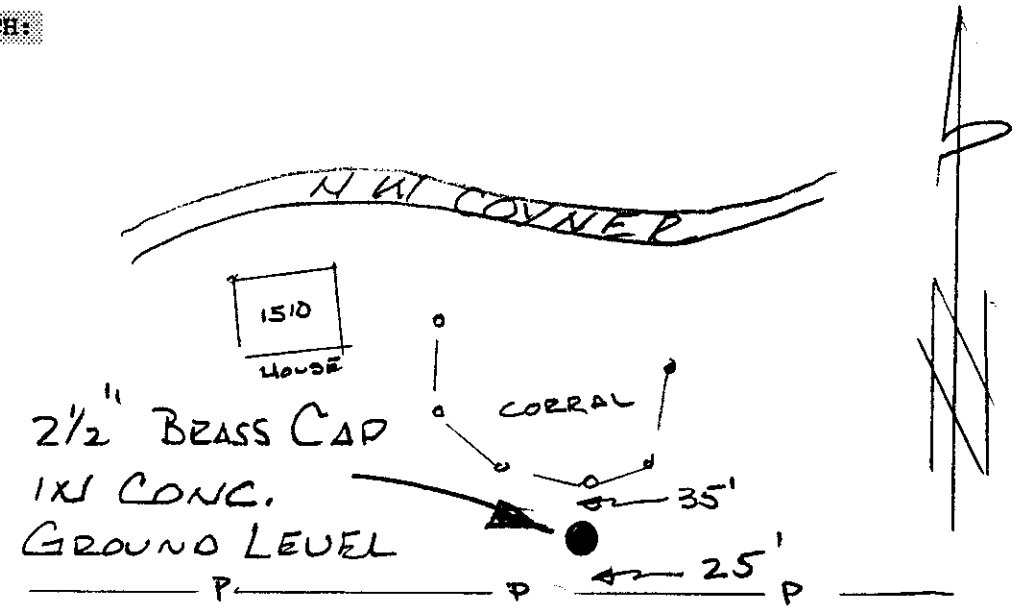
MARK: 14132900 HORIZONTAL ORDER: FIRST

				ONE SIGMA ERROR
Latitude:	44°19'11.937950"	Northing:	481245.555	0.013
Longitude:	121°12'32.175282"	Easting:	3319474.368	0.012
Convergence:	+0°03'07.1198"	Ell Height:	2766.69	0.024
Scale Factor:	1.000160433056	Ortho Height:	2832.06	0.037
Combined Factor:	1.0000282	Geoid Height:	-65.36	

MARK DATA SHEET

NAME OF MARK:	14133000	COUNTY:	DESCHUTES
MARK SET BY:	LS 0971 ROBERT DAVENPORT	STATE:	OREGON
DATE OF MARK:	1974	COUNTRY:	U.S.A.
LOCATION:	SECTION 30 TOWNSHIP 14 S RANGE 13 E		
REFERENCE:	OCRR 037		

MARK SKETCH:



DATA CUMPUTED BY:	DESCHUTES COUNTY SURVEYOR'S OFFICE	DATE:	1995
METHOD-EQUIPMENT:	GPS-TRIMBLE 4000SSE GEODETIC	ADJUSTED WITH:	TRIMNET

HOIZONTAL DATUM:	NAD 83 (91)	VERTICAL DATUM:	NAVD 29
PROJECTION:	TRANSVERSE MERCATOR	ZONE:	CENTRAL OREGON LCS
CENTRAL MERIDIAN:	W 121° 17'00.00"	ORIGIN NORTHING:	0.00F
LATITUDE OF ORIGIN:	N 43° 00'00.00"	ORIGIN EASTING:	3,300,000.00F
LINEAR UNITS:	INTERNATIONAL FOOT	SCALE ALONG MERIDIAN:	1.0001600

GEODETIC AND MAPPING COORDINATES

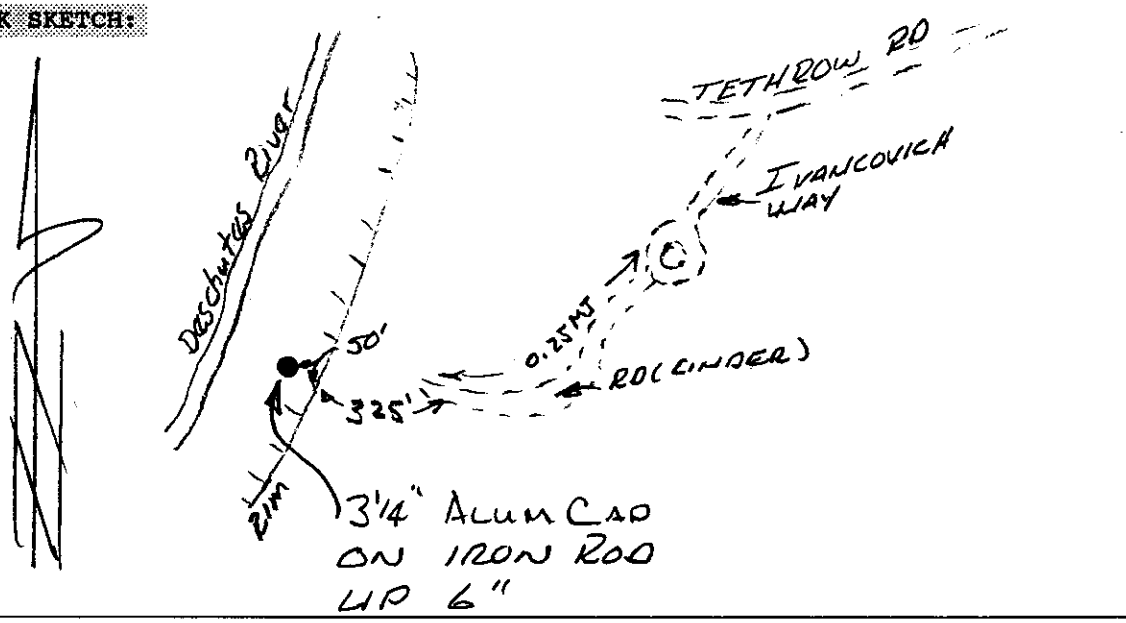
MARK: 14133000 HORIZONTAL ORDER: FIRST

				ONE SIGMA ERROR
Latitude:	44°19'12.701228"	Northing:	481318.706	0.016
Longitude:	121°13'45.130256"	Easting:	3314169.534	0.014
Convergence:	+0°02'16.1492"	Ell Height:	2707.65	0.031
Scale Factor:	1.000160229260	Ortho Height:	2773.15	0.042
Combined Factor:	1.00001884	Geoid Height:	-65.50	

MARK DATA SHEET

NAME OF MARK:	14133100	COUNTY:	DESCHUTES
MARK SET BY:	LS 0804 C. H. KETCHAM	STATE:	OREGON
DATE OF MARK:		COUNTRY:	U.S.A.
LOCATION:	SECTION 31	TOWNSHIP 14 S	RANGE 13 E
REFERENCE:	OCRR	044	

MARK SKETCH:



DATA CUMPUTED BY:	DESCHUTES COUNTY SURVEYOR'S OFFICE	DATE:	1995
METHOD-EQUIPMENT:	GPS-TRIMBLE 4000SSE GEODETIC	ADJUSTED WITH:	TRIMNET

HOIZONTAL DATUM:	NAD 83 (91)	VERTICAL DATUM:	NAVD 29
PROJECTION:	TRANSVERSE MERCATOR	ZONE:	CENTRAL OREGON LCS
CENTRAL MERIDIAN:	W 121° 17'00.00"	ORIGIN NORTHING:	0.00F
LATITUDE OF ORIGIN:	N 43° 00'00.00"	ORIGIN EASTING:	3,300,000.00F
LINEAR UNITS:	INTERNATIONAL FOOT	SCALE ALONG MERIDIAN:	1.0001600

GEODETIC AND MAPPING COORDINATES

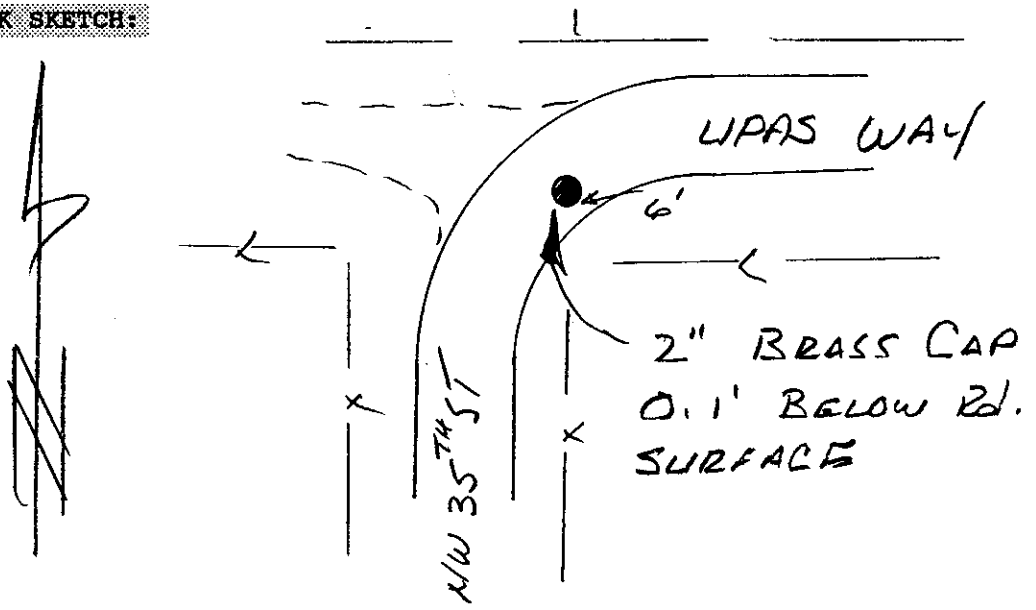
MARK: 14133100 HORIZONTAL ORDER: FIRST

				ONE SIGMA ERROR
Latitude:	44°18'20.167035"	Northing:	475997.863	0.016
Longitude:	121°13'45.266457"	Easting:	3314163.140	0.015
Convergence:	+0°02'16.0185"	Ell Height:	2763.81	0.029
Scale Factor:	1.000160229054	Ortho Height:	2829.27	0.040
Combined Factor:	1.00002814	Geoid Height:	-65.46	

MARK DATA SHEET

NAME OF MARK:	14133200	COUNTY:	DESCHUTES
MARK SET BY:	LS 0010 AL MANSFIELD	STATE:	OREGON
DATE OF MARK:	1975	COUNTRY:	U.S.A.
LOCATION:	SECTION 32	TOWNSHIP 14 S	RANGE 13 E
REFERENCE:	OCRR	035	

MARK SKETCH:



DATA CUMPUTED BY:	DESCHUTES COUNTY SURVEYOR'S OFFICE	DATE:	1995
METHOD-EQUIPMENT:	GPS-TRIMBLE 4000SSE GEODETIC	ADJUSTED WITH:	TRIMNET

HOIZONTAL DATUM:	NAD 83 (91)	VERTICAL DATUM:	NAVD 29
PROJECTION:	TRANSVERSE MERCATOR	ZONE:	CENTRAL OREGON LCS
CENTRAL MERIDIAN:	W 121° 17'00.00"	ORIGIN NORTHING:	0.00F
LATITUDE OF ORIGIN:	N 43° 00'00.00"	ORIGIN EASTING:	3,300,000.00F
LINEAR UNITS:	INTERNATIONAL FOOT	SCALE ALONG MERIDIAN:	1.0001600

GEODETIC AND MAPPING COORDINATES

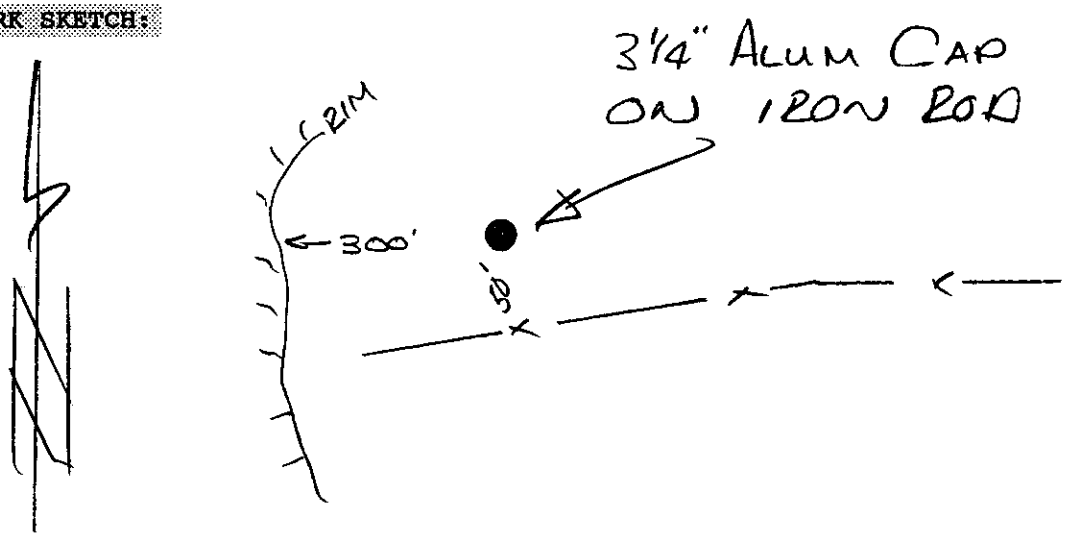
MARK: 14133200 HORIZONTAL ORDER: FIRST

				ONE SIGMA ERROR
Latitude:	44°18'19.993872"	Northing:	475984.465	0.012
Longitude:	121°12'32.521605"	Easting:	3319453.952	0.011
Convergence:	+0°03'06.8296"	Ell Height:	2825.18	FIXED
Scale Factor:	1.000160432150	Ortho Height:	2890.52	0.027
Combined Factor:	1.00002541	Geoid Height:	-65.35	

MARK DATA SHEET

NAME OF MARK:	14133300	COUNTY:	DESCHUTES
MARK SET BY:	LS 0804 C. H. KETCHAM	STATE:	OREGON
DATE OF MARK:	1987	COUNTRY:	U.S.A.
LOCATION:	SECTION 33 TOWNSHIP 14 S RANGE 13 E		
REFERENCE:	OCRR 048		

MARK SKETCH:



DATA CUMPUTED BY:	DESCHUTES COUNTY SURVEYOR'S OFFICE	DATE:	1995
METHOD-EQUIPMENT:	GPS-TRIMBLE 4000SSE GEODETIC	ADJUSTED WITH:	TRIMNET

HOIZONTAL DATUM:	NAD 83 (91)	VERTICAL DATUM:	NAVD 29
PROJECTION:	TRANSVERSE MERCATOR	ZONE:	CENTRAL OREGON LCS
CENTRAL MERIDIAN:	W 121° 17'00.00"	ORIGIN NORTHING:	0.00F
LATITUDE OF ORIGIN:	N 43° 00'00.00"	ORIGIN EASTING:	3,300,000.00F
LINEAR UNITS:	INTERNATIONAL FOOT	SCALE ALONG MERIDIAN:	1.0001600

GEODETIC AND MAPPING COORDINATES

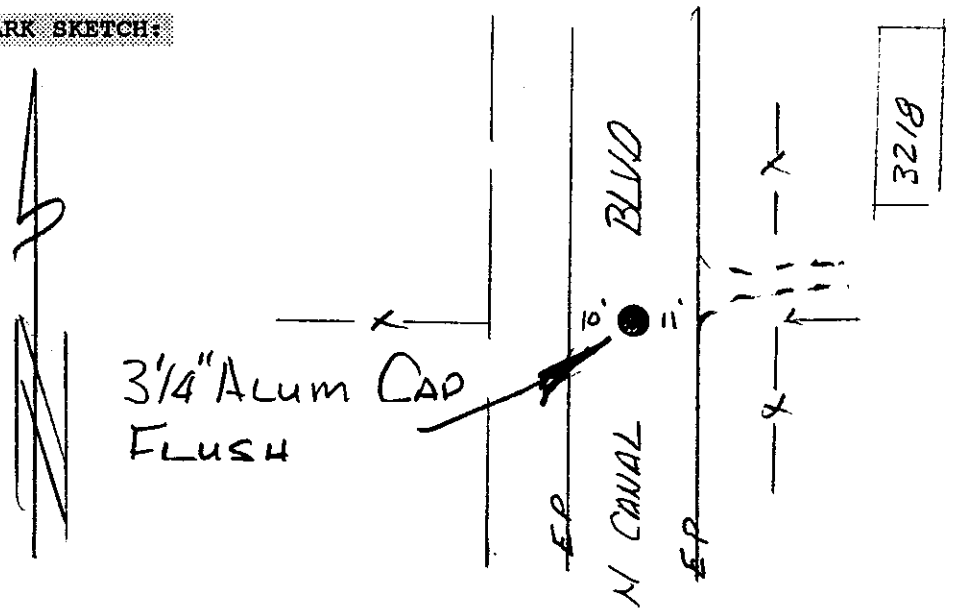
MARK: 14133300 HORIZONTAL ORDER: FIRST

				ONE SIGMA ERROR
Latitude:	44°18'19.689384"	Northing:	475959.053	0.013
Longitude:	121°11'19.970799"	Easting:	3324730.675	0.012
Convergence:	+0°03'57.5049"	Ell Height:	2881.19	0.024
Scale Factor:	1.000160698378	Ortho Height:	2946.43	0.036
Combined Factor:	1.000023	Geoid Height:	-65.25	

MARK DATA SHEET

NAME OF MARK:	14133400	COUNTY:	DESCHUTES
MARK SET BY:	LS 0804 C. H. KETCHAM	STATE:	OREGON
DATE OF MARK:	1987	COUNTRY:	U.S.A.
LOCATION:	SECTION 34 TOWNSHIP 14 S RANGE 13 E		
REFERENCE:	OCRR 019		

MARK SKETCH:



DATA CUMPUTED BY:	DESCHUTES COUNTY SURVEYOR'S OFFICE	DATE:	1995
METHOD-EQUIPMENT:	GPS-TRIMBLE 4000SSE GEODETIC	ADJUSTED WITH:	TRIMNET

HOIZONTAL DATUM:	NAD 83 (91)	VERTICAL DATUM:	NAVD 29
PROJECTION:	TRANSVERSE MERCATOR	ZONE:	CENTRAL OREGON LCS
CENTRAL MERIDIAN:	W 121° 17'00.00"	ORIGIN NORTHING:	0.00F
LATITUDE OF ORIGIN:	N 43° 00'00.00"	ORIGIN EASTING:	3,300,000.00F
LINEAR UNITS:	INTERNATIONAL FOOT	SCALE ALONG MERIDIAN:	1.0001600

GEODETIC AND MAPPING COORDINATES

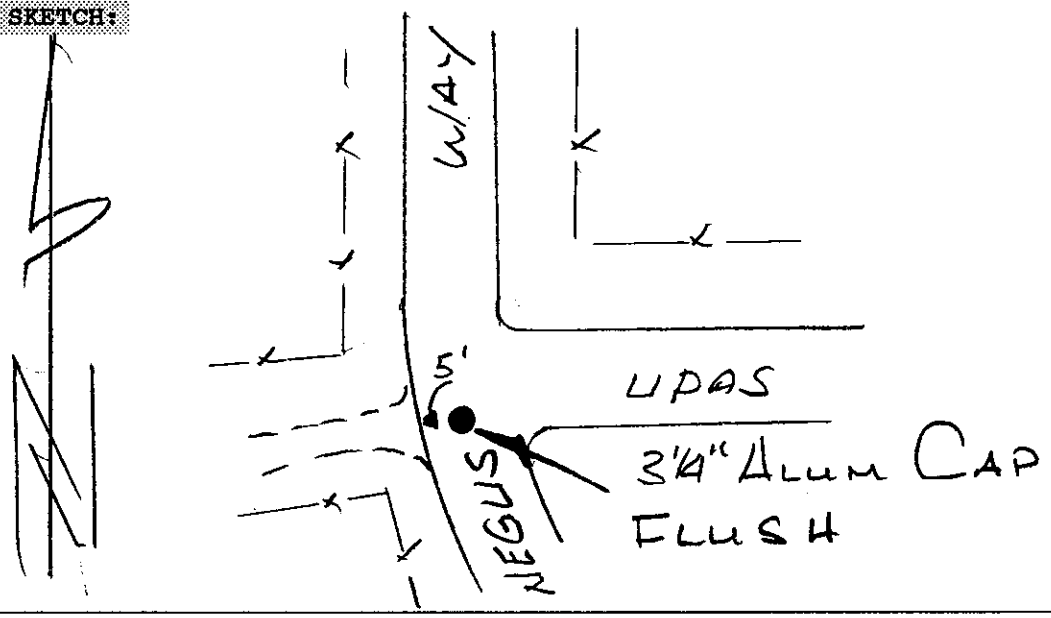
MARK: 14133400 HORIZONTAL ORDER: FIRST

				ONE SIGMA ERROR
Latitude:	44°18'19.852809"	Northing:	475982.328	0.014
Longitude:	121°10'07.433084"	Easting:	3330006.395	0.012
Convergence:	+0°04'48.1717"	Ell Height:	2904.92	0.026
Scale Factor:	1.000161028126	Ortho Height:	2970.06	0.038
Combined Factor:	1.00002219	Geoid Height:	-65.14	

MARK DATA SHEET

NAME OF MARK:	14133500	COUNTY:	DESCHUTES
MARK SET BY:	LS 0804 C. H. KETCHAM	STATE:	OREGON
DATE OF MARK:	1987	COUNTRY:	U.S.A.
LOCATION:	SECTION 35	TOWNSHIP 14 S	RANGE 13 E
REFERENCE:	OCRR	034	

MARK SKETCH:



DATA CUMPUTED BY:	DESCHUTES COUNTY SURVEYOR'S OFFICE	DATE:	1995
METHOD-EQUIPMENT:	GPS-TRIMBLE 4000SSE GEODETIC	ADJUSTED WITH:	TRIMNET

HOIZONTAL DATUM:	NAD 83 (91)	VERTICAL DATUM:	NAVD 29
PROJECTION:	TRANSVERSE MERCATOR	ZONE:	CENTRAL OREGON LCS
CENTRAL MERIDIAN:	W 121° 17'00.00"	ORIGIN NORTHING:	0.00F
LATITUDE OF ORIGIN:	N 43° 00'00.00"	ORIGIN EASTING:	3,300,000.00F
LINEAR UNITS:	INTERNATIONAL FOOT	SCALE ALONG MERIDIAN:	1.0001600

GEODETIC AND MAPPING COORDINATES

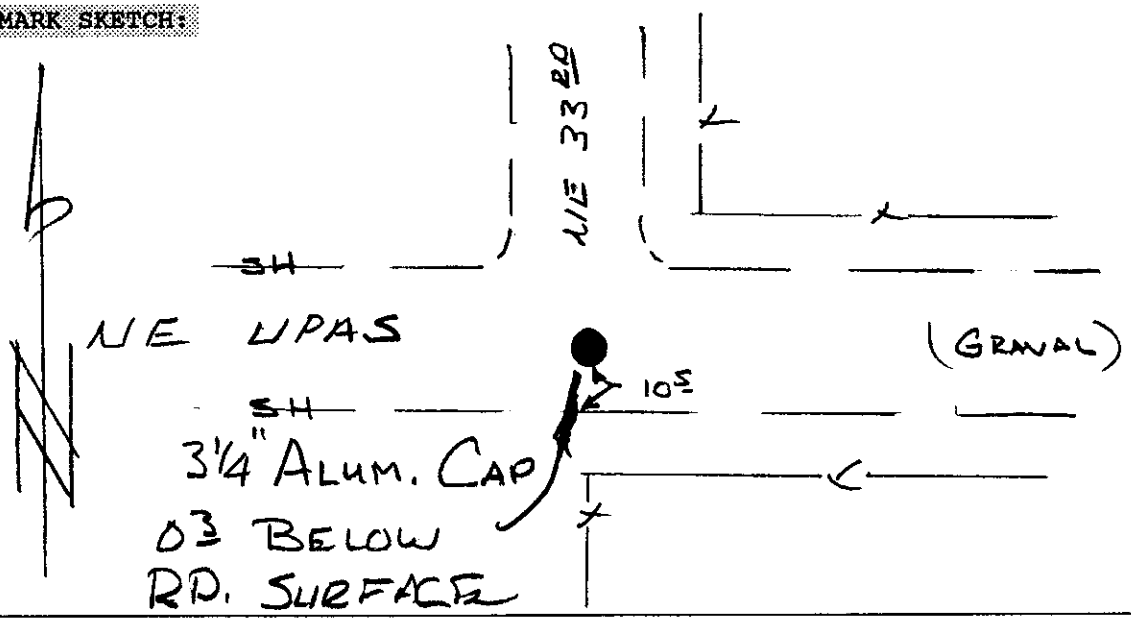
MARK: 14133500 HORIZONTAL ORDER: FIRST

				ONE SIGMA ERROR
Latitude:	44°18'19.877461"	Northing:	475992.847	0.016
Longitude:	121°08'54.867959"	Easting:	3335284.124	0.013
Convergence:	+0°05'38.8574"	Ell Height:	2917.62	0.034
Scale Factor:	1.000161421600	Ortho Height:	2982.67	0.043
Combined Factor:	1.00002198	Geoid Height:	-65.05	

MARK DATA SHEET

NAME OF MARK:	14133600	COUNTY:	DESCHUTES
MARK SET BY:	LS 0804 C. H. KETCHAM	STATE:	OREGON
DATE OF MARK:	1987	COUNTRY:	U.S.A.
LOCATION:	SECTION 36	TOWNSHIP 14 S	RANGE 13 E
REFERENCE:	OCRR	004	

MARK SKETCH:



DATA CUMPUTED BY:	DESCHUTES COUNTY SURVEYOR'S OFFICE	DATE:	1995
METHOD-EQUIPMENT:	GPS-TRIMBLE 4000SSE GEODETIC	ADJUSTED WITH:	TRIMNET

HOIZONTAL DATUM:	NAD 83 (91)	VERTICAL DATUM:	NAVD 29
PROJECTION:	TRANSVERSE MERCATOR	ZONE:	CENTRAL OREGON LCS
CENTRAL MERIDIAN:	W 121° 17'00.00"	ORIGIN NORTHING:	0.00F
LATITUDE OF ORIGIN:	N 43° 00'00.00"	ORIGIN EASTING:	3,300,000.00F
LINEAR UNITS:	INTERNATIONAL FOOT	SCALE ALONG MERIDIAN:	1.0001600

GEODETIC AND MAPPING COORDINATES

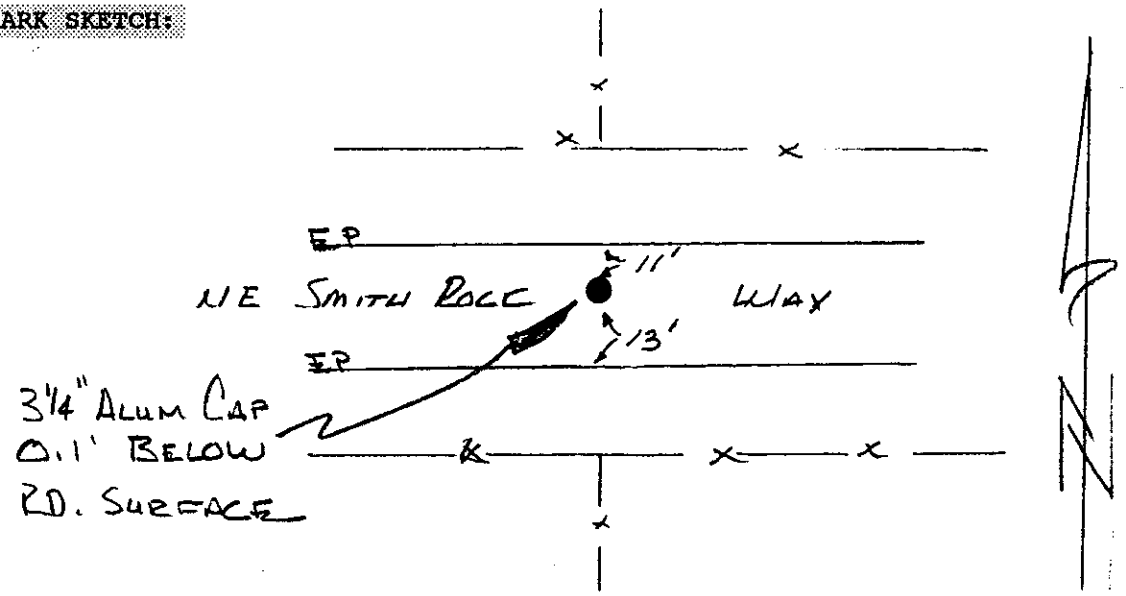
MARK: 14133600 HORIZONTAL ORDER: FIRST

				ONE SIGMA ERROR
Latitude:	44°18'19.926908"	Northing:	476007.154	0.018
Longitude:	121°07'42.448113"	Easting:	3340551.280	0.013
Convergence:	+0°06'29.4418"	Ell Height:	2940.10	0.036
Scale Factor:	1.000161877708	Ortho Height:	3005.06	0.045
Combined Factor:	1.00002136	Geoid Height:	-64.95	

MARK DATA SHEET

NAME OF MARK:	14141800	COUNTY:	CROOK
MARK SET BY:	LS 0804 C. H. KETCHAM	STATE:	OREGON
DATE OF MARK:	1988	COUNTRY:	U.S.A.
LOCATION:	SECTION 18 TOWNSHIP 14 S RANGE 13 E		
REFERENCE:	OCRR 796		

MARK SKETCH:



DATA CUMPUTED BY:	DESCHUTES COUNTY SURVEYOR'S OFFICE	DATE:	1995
METHOD-EQUIPMENT:	GPS-TRIMBLE 4000SSE GEODETIC	ADJUSTED WITH:	TRIMNET

HOIZONTAL DATUM:	NAD 83 (91)	VERTICAL DATUM:	NAVD 29
PROJECTION:	TRANSVERSE MERCATOR	ZONE:	CENTRAL OREGON LCS
CENTRAL MERIDIAN:	W 121° 17'00.00"	ORIGIN NORTHING:	0.00F
LATITUDE OF ORIGIN:	N 43° 00'00.00"	ORIGIN EASTING:	3,300,000.00F
LINEAR UNITS:	INTERNATIONAL FOOT	SCALE ALONG MERIDIAN:	1.0001600

GEODETIC AND MAPPING COORDINATES

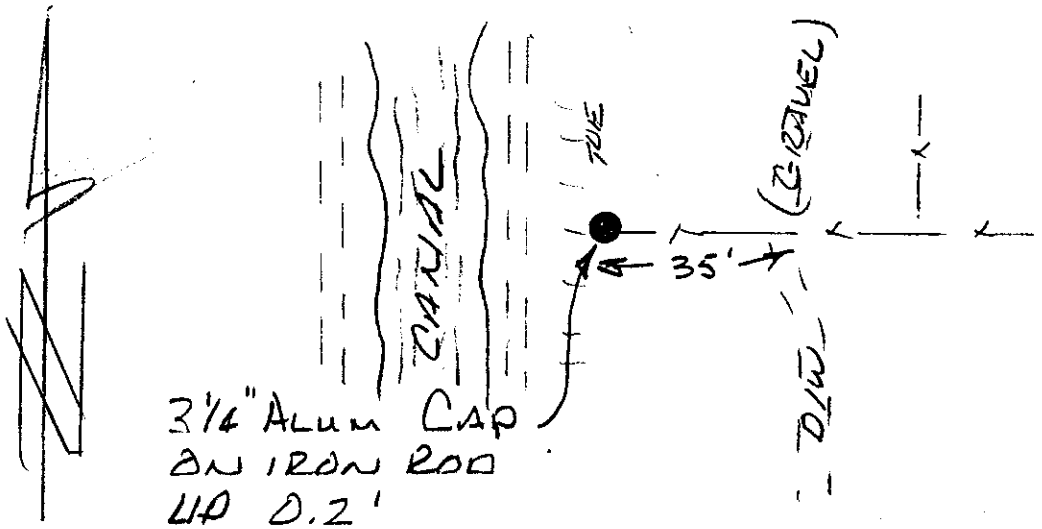
MARK: 14141800 HORIZONTAL ORDER: FIRST

				ONE SIGMA ERROR
Latitude:	44°20'56.062822"	Northing:	491831.956	0.024
Longitude:	121°06'28.674990"	Easting:	3345883.048	0.020
Convergence:	+0°07'21.3133"	Ell Height:	2845.56	0.052
Scale Factor:	1.000162403915	Ortho Height:	2910.38	0.059
Combined Factor:	1.0000264	Geoid Height:	-64.83	

MARK DATA SHEET

NAME OF MARK:	14141900	COUNTY:	CROOK
MARK SET BY:	LS 0804 C. H. KETCHAM	STATE:	OREGON
DATE OF MARK:	1987	COUNTRY:	U.S.A.
LOCATION:	SECTION 19	TOWNSHIP 14 S	RANGE 13 E
REFERENCE:	OCRR	023	

MARK SKETCH:



DATA CUMPUTED BY:	DESCHUTES COUNTY SURVEYOR'S OFFICE	DATE:	1995
METHOD-EQUIPMENT:	GPS-TRIMBLE 4000SSE GEODETIC	ADJUSTED WITH:	TRIMNET

HOIZONTAL DATUM:	NAD 83 (91)	VERTICAL DATUM:	NAVD 29
PROJECTION:	TRANSVERSE MERCATOR	ZONE:	CENTRAL OREGON LCS
CENTRAL MERIDIAN:	W 121° 17'00.00"	ORIGIN NORTHING:	0.00F
LATITUDE OF ORIGIN:	N 43° 00'00.00"	ORIGIN EASTING:	3,300,000.00F
LINEAR UNITS:	INTERNATIONAL FOOT	SCALE ALONG MERIDIAN:	1.0001600

GEODETIC AND MAPPING COORDINATES

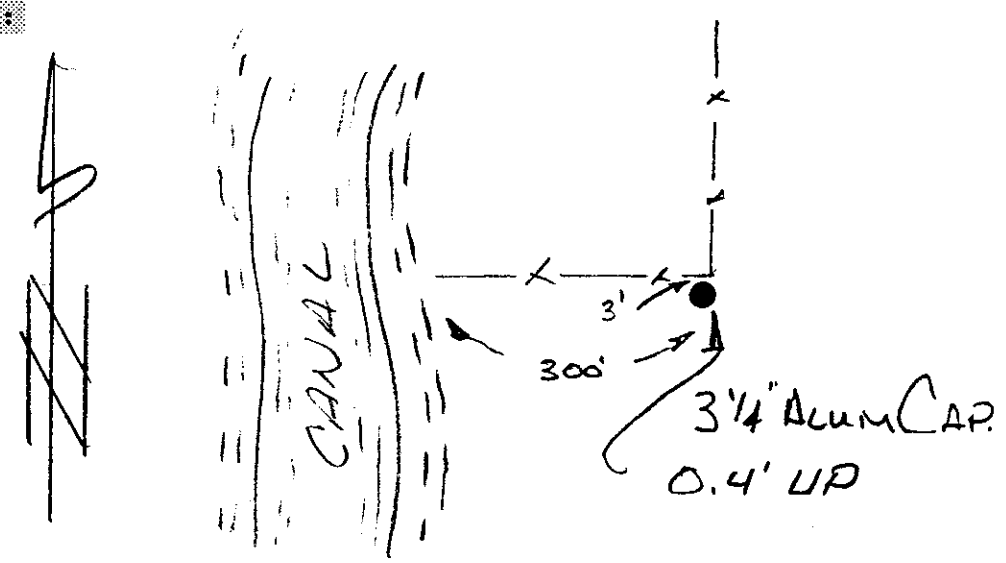
MARK: 14141900 HORIZONTAL ORDER: FIRST

				ONE SIGMA ERROR
Latitude:	44°20'04.017394"	Northing:	486560.606	0.020
Longitude:	121°06'28.613840"	Easting:	3345898.771	0.016
Convergence:	+0°07'21.2421"	Ell Height:	2865.77	0.048
Scale Factor:	1.000162405571	Ortho Height:	2930.63	0.056
Combined Factor:	1.00002544	Geoid Height:	-64.87	

MARK DATA SHEET

NAME OF MARK:	14143000	COUNTY:	CROOK
MARK SET BY:	LS 0804 C. H. KETCHAM	STATE:	OREGON
DATE OF MARK:	1987	COUNTRY:	U.S.A.
LOCATION:	SECTION 30	TOWNSHIP 14 S	RANGE 13 E
REFERENCE:	OCRR 026		

MARK SKETCH:



DATA CUMPUTED BY:	DESCHUTES COUNTY SURVEYOR'S OFFICE	DATE:	1995
METHOD-EQUIPMENT:	GPS-TRIMBLE 4000SSE GEODETIC	ADJUSTED WITH:	TRIMNET

HOIZONTAL DATUM:	NAD 83 (91)	VERTICAL DATUM:	NAVD 29
PROJECTION:	TRANSVERSE MERCATOR	ZONE:	CENTRAL OREGON LCS
CENTRAL MERIDIAN:	W 121° 17'00.00"	ORIGIN NORTHING:	0.00F
LATITUDE OF ORIGIN:	N 43° 00'00.00"	ORIGIN EASTING:	3,300,000.00F
LINEAR UNITS:	INTERNATIONAL FOOT	SCALE ALONG MERIDIAN:	1.0001600

GEODETIC AND MAPPING COORDINATES

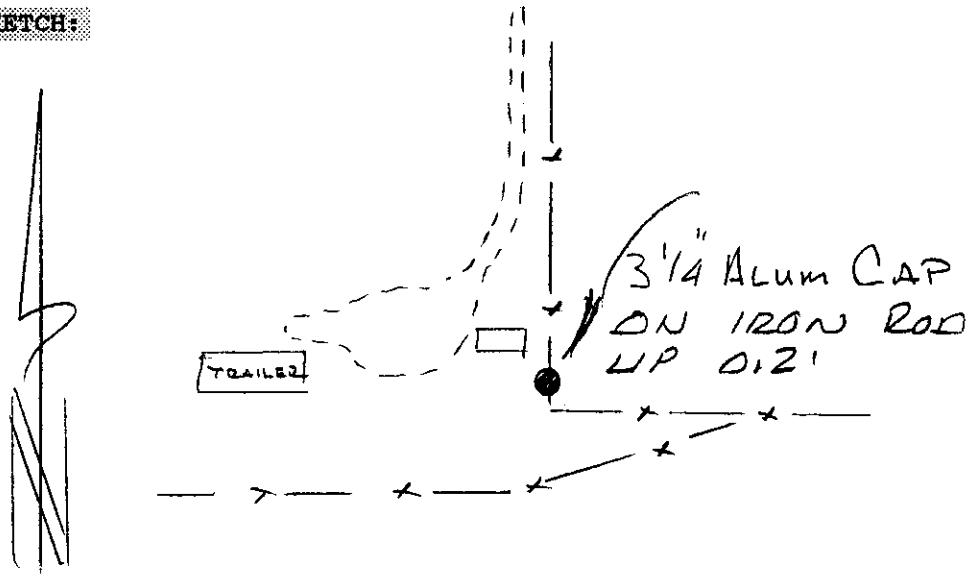
MARK: 14143000 HORIZONTAL ORDER: SECOND

				ONE SIGMA ERROR
Latitude:	44°19'12.135097"	Northing:	481305.821	0.044
Longitude:	121°06'28.365908"	Easting:	3345928.038	0.032
Convergence:	+0°07'21.3017"	Ell Height:	2882.00	0.091
Scale Factor:	1.000162408648	Ortho Height:	2946.87	0.095
Combined Factor:	1.00002467	Geoid Height:	-64.87	

MARK DATA SHEET

NAME OF MARK:	14143100	COUNTY:	CROOK
MARK SET BY:	LS 0804 C. H. KETCHAM	STATE:	OREGON
DATE OF MARK:	1987	COUNTRY:	U.S.A.
LOCATION:	SECTION 31	TOWNSHIP 14 S	RANGE 13 E
REFERENCE:	OCRR	010	

MARK SKETCH:



DATA CUMPUTED BY:	DESCHUTES COUNTY SURVEYOR'S OFFICE	DATE:	1995
METHOD-EQUIPMENT:	GPS-TRIMBLE 4000SSE GEODETIC	ADJUSTED WITH:	TRIMNET

HOIZONTAL DATUM:	NAD 83 (91)	VERTICAL DATUM:	NAVD 29
PROJECTION:	TRANSVERSE MERCATOR	ZONE:	CENTRAL OREGON LCS
CENTRAL MERIDIAN:	W 121° 17'00.00"	ORIGIN NORTHING:	0.00F
LATITUDE OF ORIGIN:	N 43° 00'00.00"	ORIGIN EASTING:	3,300,000.00F
LINEAR UNITS:	INTERNATIONAL FOOT	SCALE ALONG MERIDIAN:	1.0001600

GEODETIC AND MAPPING COORDINATES

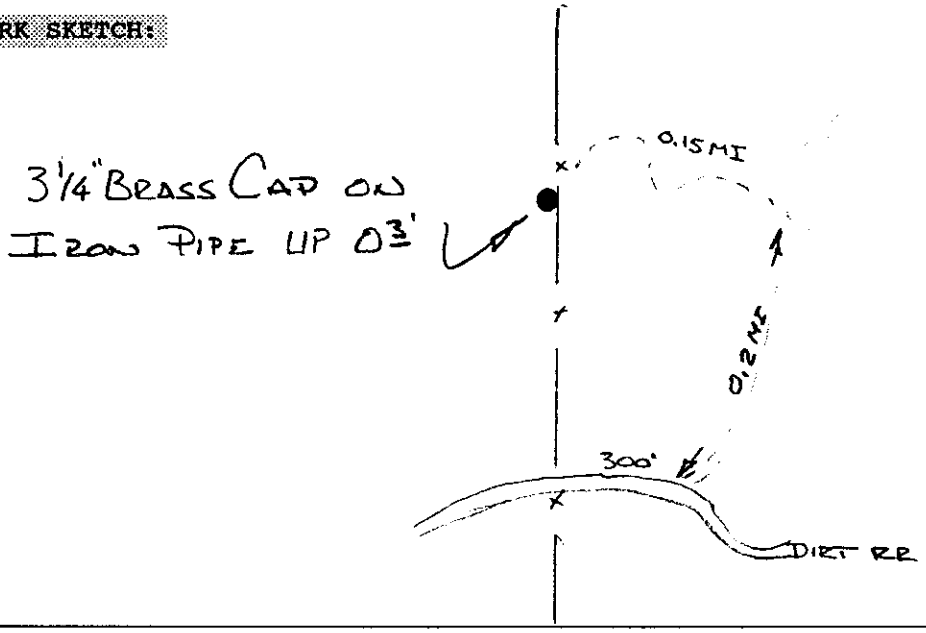
MARK: 14143100 HORIZONTAL ORDER: FIRST

				ONE SIGMA ERROR
Latitude:	44°18'20.117146"	Northing:	476037.121	0.015
Longitude:	121°06'29.333668"	Easting:	3345868.923	0.012
Convergence:	+0°07'20.5117"	Ell Height:	2900.95	0.035
Scale Factor:	1.000162402460	Ortho Height:	2965.82	0.045
Combined Factor:	1.00002376	Geoid Height:	-64.87	

MARK DATA SHEET

NAME OF MARK:	15130100	COUNTY:	DESCHUTES
MARK SET BY:	LS 1031 W. C. KAUFFMAN	STATE:	OREGON
DATE OF MARK:	1994	COUNTRY:	U.S.A.
LOCATION:	SECTION 1 TOWNSHIP 15 S RANGE 13 E		
REFERENCE:	OCRR 1269		

MARK SKETCH:



DATA CUMPUTED BY:	DESCHUTES COUNTY SURVEYOR'S OFFICE	DATE:	1995
METHOD-EQUIPMENT:	GPS-TRIMBLE 4000SSE GEODETIC	ADJUSTED WITH:	TRIMNET

HOIZONTAL DATUM:	NAD 83 (91)	VERTICAL DATUM:	NAVD 29
PROJECTION:	TRANSVERSE MERCATOR	ZONE:	CENTRAL OREGON LCS
CENTRAL MERIDIAN:	W 121° 17'00.00"	ORIGIN NORTHING:	0.00F
LATITUDE OF ORIGIN:	N 43° 00'00.00"	ORIGIN EASTING:	3,300,000.00F
LINEAR UNITS:	INTERNATIONAL FOOT	SCALE ALONG MERIDIAN:	1.0001600

GEODETIC AND MAPPING COORDINATES

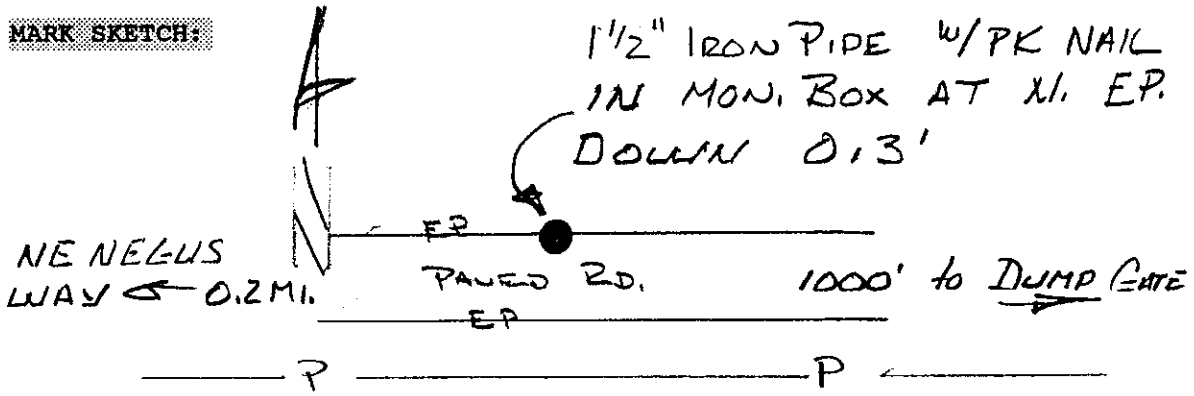
MARK: 15130100 HORIZONTAL ORDER: FIRST

				ONE SIGMA ERROR
Latitude:	44°17'27.594124"	Northing:	470706.618	0.021
Longitude:	121°07'43.266687"	Easting:	3340501.736	0.016
Convergence:	+0°06'28.7689"	Ell Height:	2941.01	0.040
Scale Factor:	1.000161873129	Ortho Height:	3005.96	0.048
Combined Factor:	1.00002131	Geoid Height:	-64.95	

MARK DATA SHEET

NAME OF MARK:	15130200	COUNTY:	DESCHUTES
MARK SET BY:	LS 0454 JENE HAWTHORNE	STATE:	OREGON
DATE OF MARK:	1966	COUNTRY:	U.S.A.
LOCATION:	SECTION 2	TOWNSHIP 15 S	RANGE 13 E
REFERENCE:	OCRR	1272	

MARK SKETCH:



DATA CUMPUTED BY:	DESCHUTES COUNTY SURVEYOR'S OFFICE	DATE:	1995
METHOD-EQUIPMENT:	GPS-TRIMBLE 4000SSE GEODETIC	ADJUSTED WITH:	TRIMNET

HOIZONTAL DATUM:	NAD 83 (91)	VERTICAL DATUM:	NAVD 29
PROJECTION:	TRANSVERSE MERCATOR	ZONE:	CENTRAL OREGON LCS
CENTRAL MERIDIAN:	W 121° 17'00.00"	ORIGIN NORTHING:	0.00F
LATITUDE OF ORIGIN:	N 43° 00'00.00"	ORIGIN EASTING:	3,300,000.00F
LINEAR UNITS:	INTERNATIONAL FOOT	SCALE ALONG MERIDIAN:	1.0001600

GEODETIC AND MAPPING COORDINATES

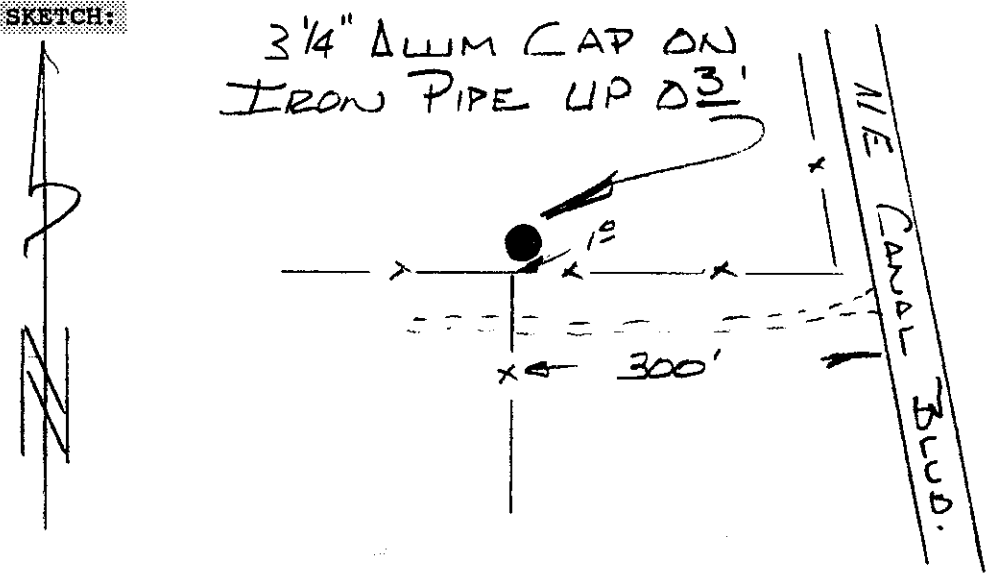
MARK: 15130200 HORIZONTAL ORDER: FIRST

				ONE SIGMA ERROR
Latitude:	44°17'27.745546"	Northing:	470712.685	0.019
Longitude:	121°08'55.570366"	Easting:	3335241.698	0.015
Convergence:	+0°05'38.2792"	Ell Height:	2943.27	0.038
Scale Factor:	1.000161418188	Ortho Height:	3008.31	0.047
Combined Factor:	1.00002075	Geoid Height:	-65.04	

MARK DATA SHEET

NAME OF MARK:	15130300	COUNTY:	DESCHUTES
MARK SET BY:	LS 2282 KENNETH L. GRANTHAM	STATE:	OREGON
DATE OF MARK:	1995	COUNTRY:	U.S.A.
LOCATION:	SECTION 3 TOWNSHIP 15 S	RANGE	13 E
REFERENCE:	OCRR	1292	

MARK SKETCH:



DATA CUMPUTED BY:	DESCHUTES COUNTY SURVEYOR'S OFFICE	DATE:	1995
METHOD-EQUIPMENT:	GPS-TRIMBLE 4000SSE GEODETIC	ADJUSTED WITH:	TRIMNET

HOIZONTAL DATUM:	NAD 83 (91)	VERTICAL DATUM:	NAVD 29
PROJECTION:	TRANSVERSE MERCATOR	ZONE:	CENTRAL OREGON LCS
CENTRAL MERIDIAN:	W 121° 17'00.00"	ORIGIN NORTHING:	0.00F
LATITUDE OF ORIGIN:	N 43° 00'00.00"	ORIGIN EASTING:	3,300,000.00F
LINEAR UNITS:	INTERNATIONAL FOOT	SCALE ALONG MERIDIAN:	1.0001600

GEODETIC AND MAPPING COORDINATES

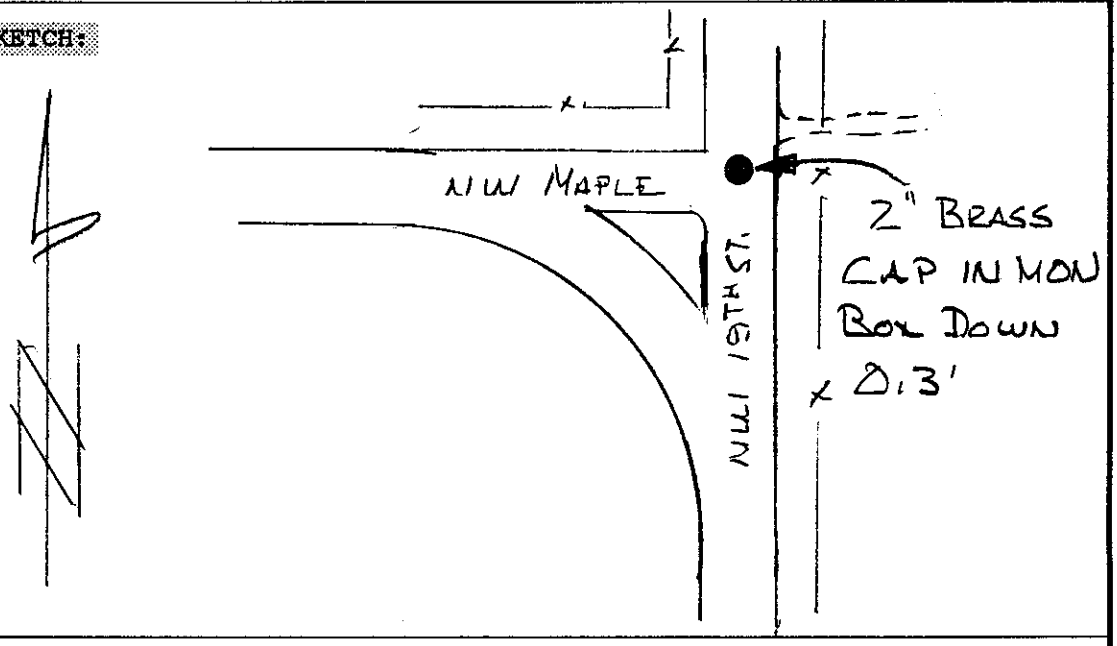
MARK: 15130300 HORIZONTAL ORDER: FIRST

				ONE SIGMA ERROR
Latitude:	44°17'27.594126"	Northing:	470689.330	0.018
Longitude:	121°10'08.225188"	Easting:	3329956.164	0.014
Convergence:	+0°04'47.5437"	Ell Height:	2914.05	0.036
Scale Factor:	1.000161024690	Ortho Height:	2979.19	0.045
Combined Factor:	1.00002175	Geoid Height:	-65.14	

MARK DATA SHEET

NAME OF MARK:	15130400	COUNTY:	DESCHUTES
MARK SET BY:	DESCHUTES CO. PUBLIC WORKS	STATE:	OREGON
DATE OF MARK:	1997	COUNTRY:	U.S.A.
LOCATION:	SECTION 4	TOWNSHIP 15 S	RANGE 13 E
REFERENCE:	OCRR	1280	

MARK SKETCH:



DATA CUMPUTED BY:	DESCHUTES COUNTY SURVEYOR'S OFFICE	DATE:	1995
METHOD-EQUIPMENT:	GPS-TRIMBLE 4000SSE GEODETIC	ADJUSTED WITH:	TRIMNET

HOIZONTAL DATUM:	NAD 83 (91)	VERTICAL DATUM:	NAVD 29
PROJECTION:	TRANSVERSE MERCATOR	ZONE:	CENTRAL OREGON LCS
CENTRAL MERIDIAN:	W 121° 17'00.00"	ORIGIN NORTHING:	0.00F
LATITUDE OF ORIGIN:	N 43° 00'00.00"	ORIGIN EASTING:	3,300,000.00F
LINEAR UNITS:	INTERNATIONAL FOOT	SCALE ALONG MERIDIAN:	1.0001600

GEODETIC AND MAPPING COORDINATES

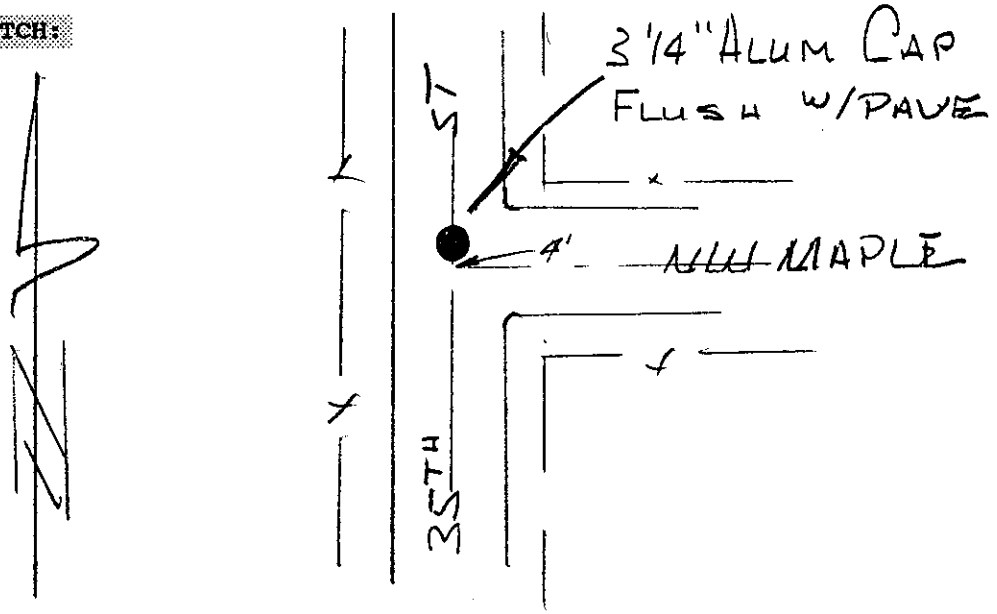
MARK: 15130400 HORIZONTAL ORDER: FIRST

				ONE SIGMA ERROR
Latitude:	44°17'27.444112"	Northing:	470667.423	0.022
Longitude:	121°11'20.819693"	Easting:	3324675.011	0.016
Convergence:	+0°03'56.8505"	Ell Height:	2897.73	0.039
Scale Factor:	1.000160695240	Ortho Height:	2962.96	0.047
Combined Factor:	1.0000222	Geoid Height:	-65.23	

MARK DATA SHEET

NAME OF MARK:	15130500	COUNTY:	DESCHUTES
MARK SET BY:	LS 2033 MICHAEL TOMPKINS	STATE:	OREGON
DATE OF MARK:	1988	COUNTRY:	U.S.A.
LOCATION:	SECTION 5	TOWNSHIP 15 S	RANGE 13 E
REFERENCE:	OCRR	953	

MARK SKETCH:



DATA CUMPUTED BY:	DESCHUTES COUNTY SURVEYOR'S OFFICE	DATE:	1995
METHOD-EQUIPMENT:	GPS-TRIMBLE 4000SSE GEODETIC	ADJUSTED WITH:	TRIMNET

HOIZONTAL DATUM:	NAD 83 (91)	VERTICAL DATUM:	NAVD 29
PROJECTION:	TRANSVERSE MERCATOR	ZONE:	CENTRAL OREGON LCS
CENTRAL MERIDIAN:	W 121° 17'00.00"	ORIGIN NORTHING:	0.00F
LATITUDE OF ORIGIN:	N 43° 00'00.00"	ORIGIN EASTING:	3,300,000.00F
LINEAR UNITS:	INTERNATIONAL FOOT	SCALE ALONG MERIDIAN:	1.0001600

GEODETIC AND MAPPING COORDINATES

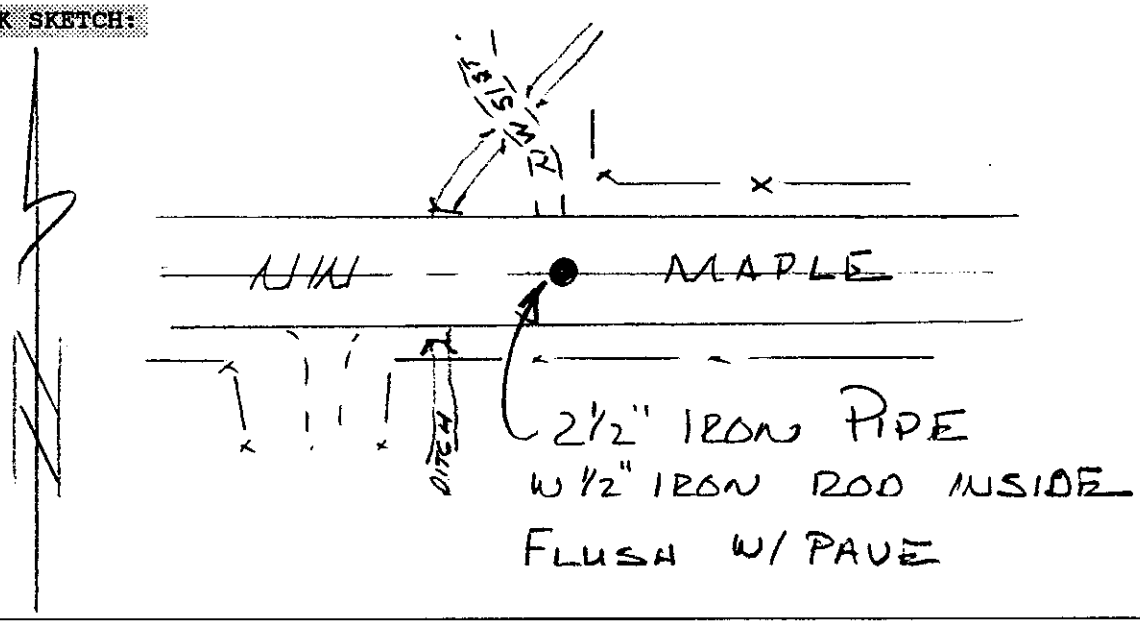
MARK: 15130500 HORIZONTAL ORDER: FIRST

				ONE SIGMA ERROR
Latitude:	44°17'27.574361"	Northing:	470675.208	0.018
Longitude:	121°12'33.281894"	Easting:	3319403.450	0.014
Convergence:	+0°03'06.2500"	Ell Height:	2885.16	FIXED
Scale Factor:	1.000160429910	Ortho Height:	2950.49	0.027
Combined Factor:	1.00002254	Geoid Height:	-65.33	

MARK DATA SHEET

NAME OF MARK:	15130600	COUNTY:	DESCHUTES
MARK SET BY:	LS 0010 AL MANSFIELD	STATE:	OREGON
DATE OF MARK:	1971	COUNTRY:	U.S.A.
LOCATION:	SECTION 6 TOWNSHIP 15 S	RANGE	13 E
REFERENCE:	OCRR 1281		

MARK SKETCH:



DATA CUMPUTED BY:	DESCHUTES COUNTY SURVEYOR'S OFFICE	DATE:	1995
METHOD-EQUIPMENT:	GPS-TRIMBLE 4000SSE GEODETIC	ADJUSTED WITH:	TRIMNET

HOIZONTAL DATUM:	NAD 83 (91)	VERTICAL DATUM:	NAVD 29
PROJECTION:	TRANSVERSE MERCATOR	ZONE:	CENTRAL OREGON LCS
CENTRAL MERIDIAN:	W 121° 17'00.00"	ORIGIN NORTHING:	0.00F
LATITUDE OF ORIGIN:	N 43° 00'00.00"	ORIGIN EASTING:	3,300,000.00F
LINEAR UNITS:	INTERNATIONAL FOOT	SCALE ALONG MERIDIAN:	1.0001600

GEODETIC AND MAPPING COORDINATES

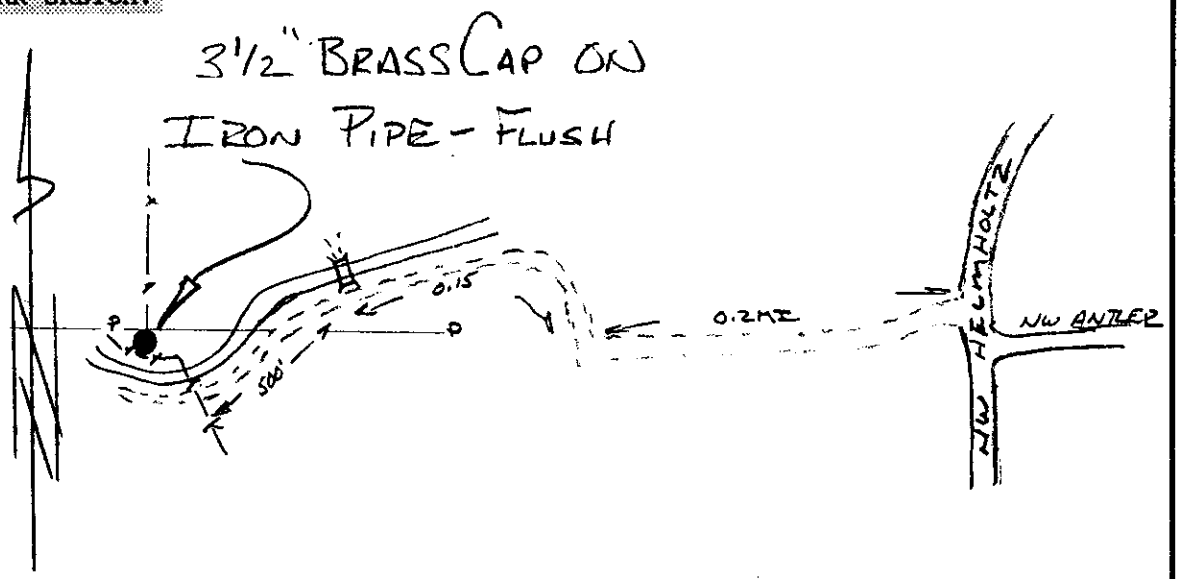
MARK: 15130600 HORIZONTAL ORDER: FIRST

				ONE SIGMA ERROR
Latitude:	44°17'27.854391"	Northing:	470699.493	0.025
Longitude:	121°13'45.000733"	Easting:	3314185.964	0.019
Convergence:	+0°02'16.1687"	Ell Height:	2861.18	0.052
Scale Factor:	1.000160229793	Ortho Height:	2926.61	0.059
Combined Factor:	1.00002348	Geoid Height:	-65.43	

MARK DATA SHEET

NAME OF MARK:	15130700	COUNTY:	DESCHUTES
MARK SET BY:	LS 2282 KENNETH L. GRANTHAM	STATE:	OREGON
DATE OF MARK:	1993	COUNTRY:	U.S.A.
LOCATION:	SECTION 7 TOWNSHIP 15 S RANGE 13 E		
REFERENCE:	OCRR 1243		

MARK SKETCH:



DATA CUMPUTED BY:	DESCHUTES COUNTY SURVEYOR'S OFFICE	DATE:	1995
METHOD-EQUIPMENT:	GPS-TRIMBLE 4000SSE GEODETIC	ADJUSTED WITH:	TRIMNET

HOIZONTAL DATUM:	NAD 83 (91)	VERTICAL DATUM:	NAVD 29
PROJECTION:	TRANSVERSE MERCATOR	ZONE:	CENTRAL OREGON LCS
CENTRAL MERIDIAN:	W 121° 17'00.00"	ORIGIN NORTHING:	0.00F
LATITUDE OF ORIGIN:	N 43° 00'00.00"	ORIGIN EASTING:	3,300,000.00F
LINEAR UNITS:	INTERNATIONAL FOOT	SCALE ALONG MERIDIAN:	1.0001600

GEODETIC AND MAPPING COORDINATES

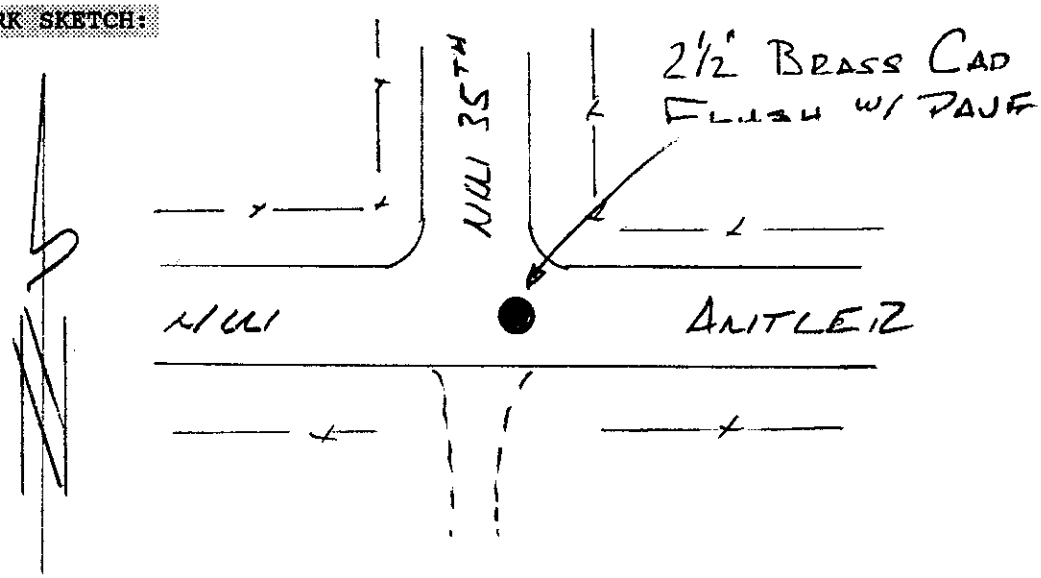
MARK: 15130700 HORIZONTAL ORDER: FIRST

				ONE SIGMA ERROR
Latitude:	44°16'35.608953"	Northing:	465407.904	0.032
Longitude:	121°13'45.532501"	Easting:	3314150.762	0.020
Convergence:	+0°02'15.7621"	Ell Height:	2894.40	0.062
Scale Factor:	1.000160228655	Ortho Height:	2959.80	0.068
Combined Factor:	1.00002189	Geoid Height:	-65.39	

MARK DATA SHEET

NAME OF MARK:	15130800	COUNTY:	DESCHUTES
MARK SET BY:	LS 0010 AL MANSFIELD	STATE:	OREGON
DATE OF MARK:	1973	COUNTRY:	U.S.A.
LOCATION:	SECTION 8 TOWNSHIP 15 S RANGE 13 E		
REFERENCE:	OCRR 1282		

MARK SKETCH:



DATA CUMPUTED BY:	DESCHUTES COUNTY SURVEYOR'S OFFICE	DATE:	1995
METHOD-EQUIPMENT:	GPS-TRIMBLE 4000SSE GEODETIC	ADJUSTED WITH:	TRIMNET

HOIZONTAL DATUM:	NAD 83 (91)	VERTICAL DATUM:	NAVD 29
PROJECTION:	TRANSVERSE MERCATOR	ZONE:	CENTRAL OREGON LCS
CENTRAL MERIDIAN:	W 121° 17'00.00"	ORIGIN NORTHING:	0.00F
LATITUDE OF ORIGIN:	N 43° 00'00.00"	ORIGIN EASTING:	3,300,000.00F
LINEAR UNITS:	INTERNATIONAL FOOT	SCALE ALONG MERIDIAN:	1.0001600

GEODETIC AND MAPPING COORDINATES

MARK: 15130800 HORIZONTAL ORDER: FIRST

				ONE SIGMA ERROR
Latitude:	44°16'35.116589"	Northing:	465362.106	0.020
Longitude:	121°12'33.787800"	Easting:	3319371.434	0.016
Convergence:	+0°03'05.8483"	Ell Height:	2905.58	0.042
Scale Factor:	1.000160428494	Ortho Height:	2970.89	0.050
Combined Factor:	1.00002156	Geoid Height:	-65.31	

MARK DATA SHEET

NAME OF MARK: 15130900 COUNTY: DESCHUTES

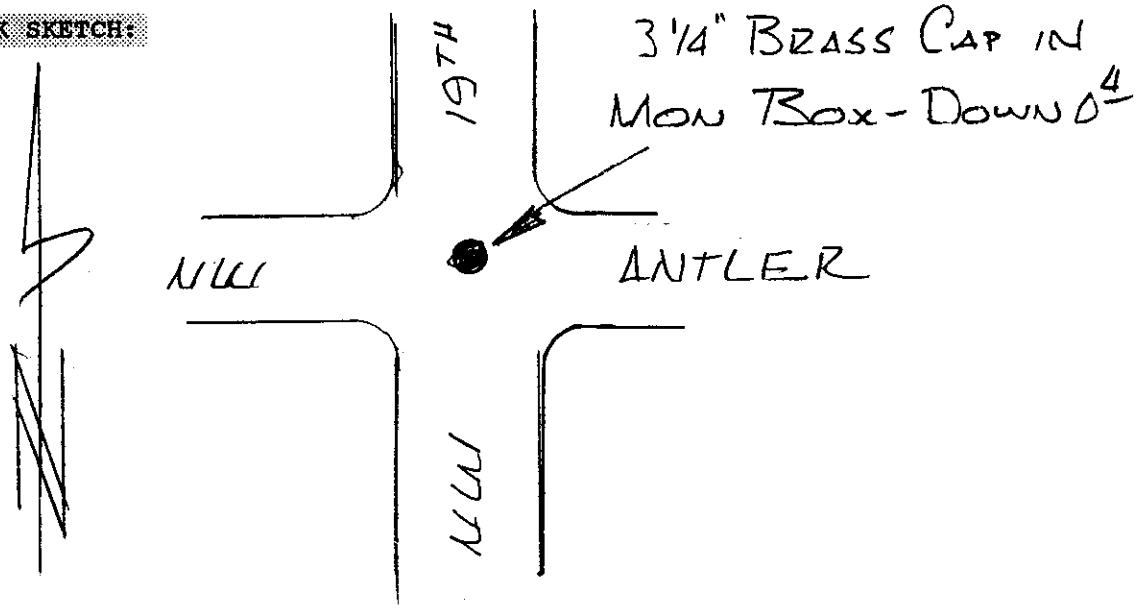
MARK SET BY: LS 2335 LYNN BRUNO STATE: OREGON

DATE OF MARK: 1994 COUNTRY: U.S.A.

LOCATION: SECTION 9 TOWNSHIP 15 S RANGE 13 E

REFERENCE: OCRR 1270

MARK SKETCH:



DATA CUMPUTED BY: DESCHUTES COUNTY SURVEYOR'S OFFICE DATE: 1995

METHOD-EQUIPMENT: GPS-TRIMBLE 4000SSE GEODETIC ADJUSTED WITH: TRIMNET

HOIZONTAL DATUM: NAD 83 (91) VERTICAL DATUM: NAVD 29

PROJECTION: TRANSVERSE MERCATOR ZONE: CENTRAL OREGON LCS

CENTRAL MERIDIAN: W 121° 17'00.00" ORIGIN NORTHING: 0.00F

LATITUDE OF ORIGIN: N 43° 00'00.00" ORIGIN EASTING: 3,300,000.00F

LINEAR UNITS: INTERNATIONAL FOOT SCALE ALONG MERIDIAN: 1.0001600

GEODETIC AND MAPPING COORDINATES

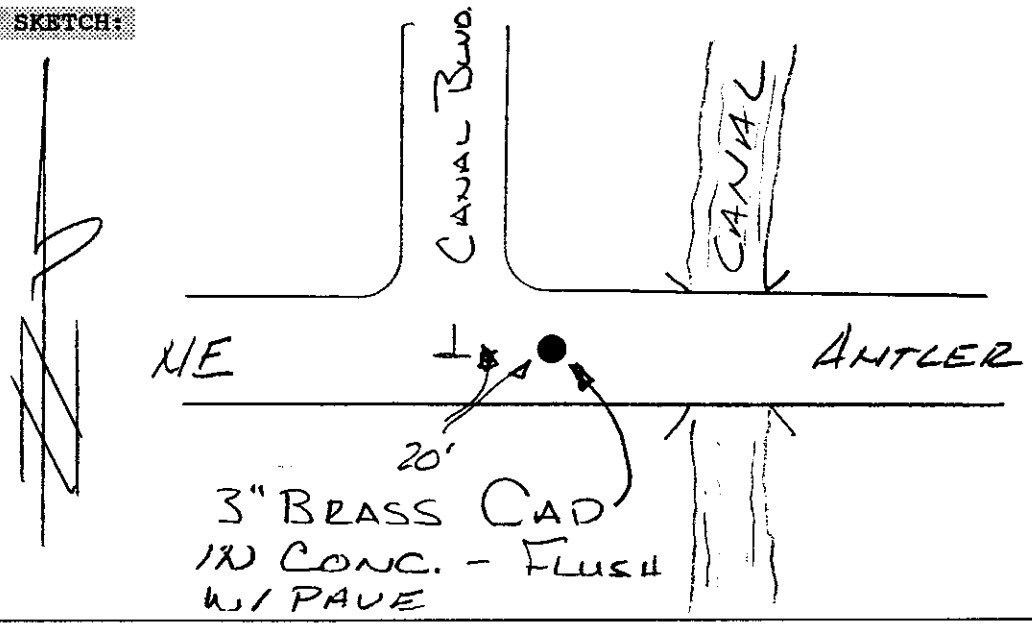
MARK: 15130900 HORIZONTAL ORDER: FIRST

				ONE SIGMA ERROR
Latitude:	44°16'35.229509"	Northing:	465378.943	0.020
Longitude:	121°11'21.297694"	Easting:	3324646.300	0.015
Convergence:	+0°03'56.4553"	Ell Height:	2920.90	0.042
Scale Factor:	1.000160693625	Ortho Height:	2986.11	0.050
Combined Factor:	1.00002109	Geoid Height:	-65.21	

MARK DATA SHEET

NAME OF MARK:	15131000	COUNTY:	DESCHUTES
MARK SET BY:	OREGON STATE HIGHWAY	STATE:	OREGON
DATE OF MARK:	1974	COUNTRY:	U.S.A.
LOCATION:	SECTION 10	TOWNSHIP 15 S	RANGE 13 E
REFERENCE:	OCRR	1273	

MARK SKETCH:



DATA CUMPUTED BY:	DESCHUTES COUNTY SURVEYOR'S OFFICE	DATE:	1995
METHOD-EQUIPMENT:	GPS-TRIMBLE 4000SSE GEODETIC	ADJUSTED WITH:	TRIMNET

HOIZONTAL DATUM:	NAD 83 (91)	VERTICAL DATUM:	NAVD 29
PROJECTION:	TRANSVERSE MERCATOR	ZONE:	CENTRAL OREGON LCS
CENTRAL MERIDIAN:	W 121° 17'00.00"	ORIGIN NORTHING:	0.00F
LATITUDE OF ORIGIN:	N 43° 00'00.00"	ORIGIN EASTING:	3,300,000.00F
LINEAR UNITS:	INTERNATIONAL FOOT	SCALE ALONG MERIDIAN:	1.0001600

GEODETIC AND MAPPING COORDINATES

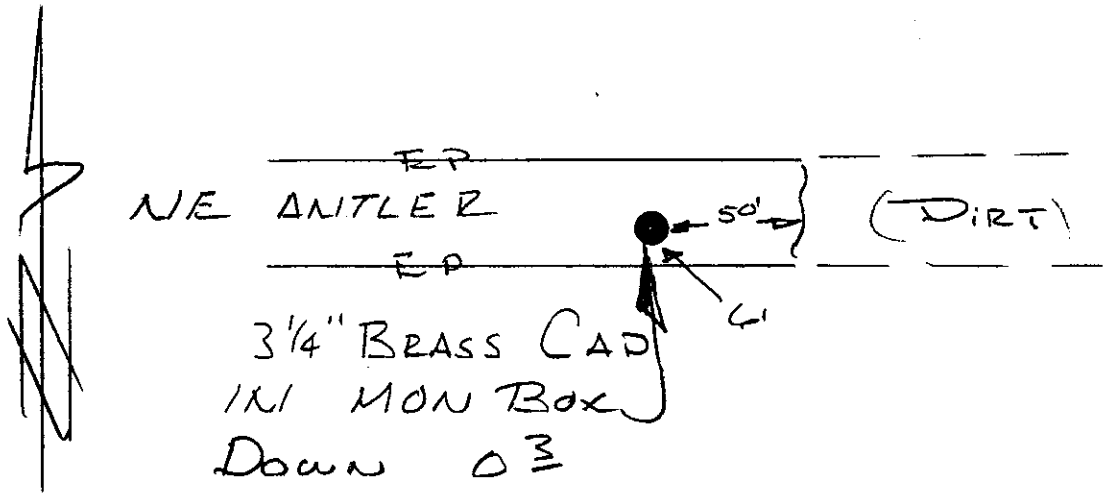
MARK: 15131000 HORIZONTAL ORDER: FIRST

				ONE SIGMA ERROR
Latitude:	44°16'35.486925"	Northing:	465411.778	0.021
Longitude:	121°10'08.127138"	Easting:	3329970.655	0.016
Convergence:	+0°04'47.5377"	Ell Height:	2929.68	0.042
Scale Factor:	1.000161025685	Ortho Height:	2994.80	0.050
Combined Factor:	1.00002101	Geoid Height:	-65.12	

MARK DATA SHEET

NAME OF MARK:	15131100	COUNTY:	DESCHUTES
MARK SET BY:	LS 1031 W. C. KAUFFMAN	STATE:	OREGON
DATE OF MARK:	1994	COUNTRY:	U.S.A.
LOCATION:	SECTION 11 TOWNSHIP 15 S RANGE 13 E		
REFERENCE:	OCRR 1268		

MARK SKETCH:



DATA CUMPUTED BY:	DESCHUTES COUNTY SURVEYOR'S OFFICE	DATE:	1995
METHOD-EQUIPMENT:	GPS-TRIMBLE 4000SSE GEODETIC	ADJUSTED WITH:	TRIMNET

HOIZONTAL DATUM:	NAD 83 (91)	VERTICAL DATUM:	NAVD 29
PROJECTION:	TRANSVERSE MERCATOR	ZONE:	CENTRAL OREGON LCS
CENTRAL MERIDIAN:	W 121° 17'00.00"	ORIGIN NORTHING:	0.00F
LATITUDE OF ORIGIN:	N 43° 00'00.00"	ORIGIN EASTING:	3,300,000.00F
LINEAR UNITS:	INTERNATIONAL FOOT	SCALE ALONG MERIDIAN:	1.0001600

GEODETIC AND MAPPING COORDINATES

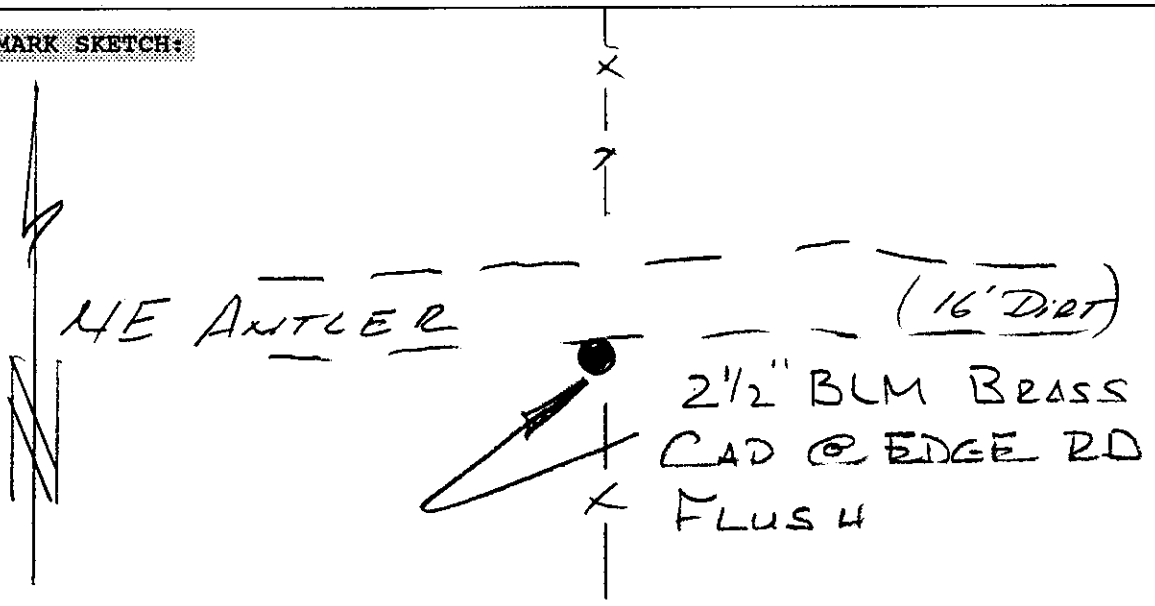
MARK: 15131100 HORIZONTAL ORDER: FIRST

				ONE SIGMA ERROR
Latitude:	44°16'35.625312"	Northing:	465433.835	0.024
Longitude:	121°08'55.297375"	Easting:	3335270.219	0.017
Convergence:	+0°05'38.3821"	Ell Height:	2976.79	0.043
Scale Factor:	1.000161420490	Ortho Height:	3041.81	0.051
Combined Factor:	1.00001915	Geoid Height:	-65.02	

MARK DATA SHEET

NAME OF MARK:	15131200	COUNTY:	DESCHUTES
MARK SET BY:	U.S. DEPT. INT. (B L M)	STATE:	OREGON
DATE OF MARK:	1949	COUNTRY:	U.S.A.
LOCATION:	SECTION 12	TOWNSHIP 15 S	RANGE 13 E
REFERENCE:	OCRR	1265	

MARK SKETCH:



DATA CUMPUTED BY:	DESCHUTES COUNTY SURVEYOR'S OFFICE	DATE:	1995
METHOD-EQUIPMENT:	GPS-TRIMBLE 4000SSE GEODETIC	ADJUSTED WITH:	TRIMNET

HOIZONTAL DATUM:	NAD 83 (91)	VERTICAL DATUM:	NAVD 29
PROJECTION:	TRANSVERSE MERCATOR	ZONE:	CENTRAL OREGON LCS
CENTRAL MERIDIAN:	W 121° 17'00.00"	ORIGIN NORTHING:	0.00F
LATITUDE OF ORIGIN:	N 43° 00'00.00"	ORIGIN EASTING:	3,300,000.00F
LINEAR UNITS:	INTERNATIONAL FOOT	SCALE ALONG MERIDIAN:	1.0001600

GEODETIC AND MAPPING COORDINATES

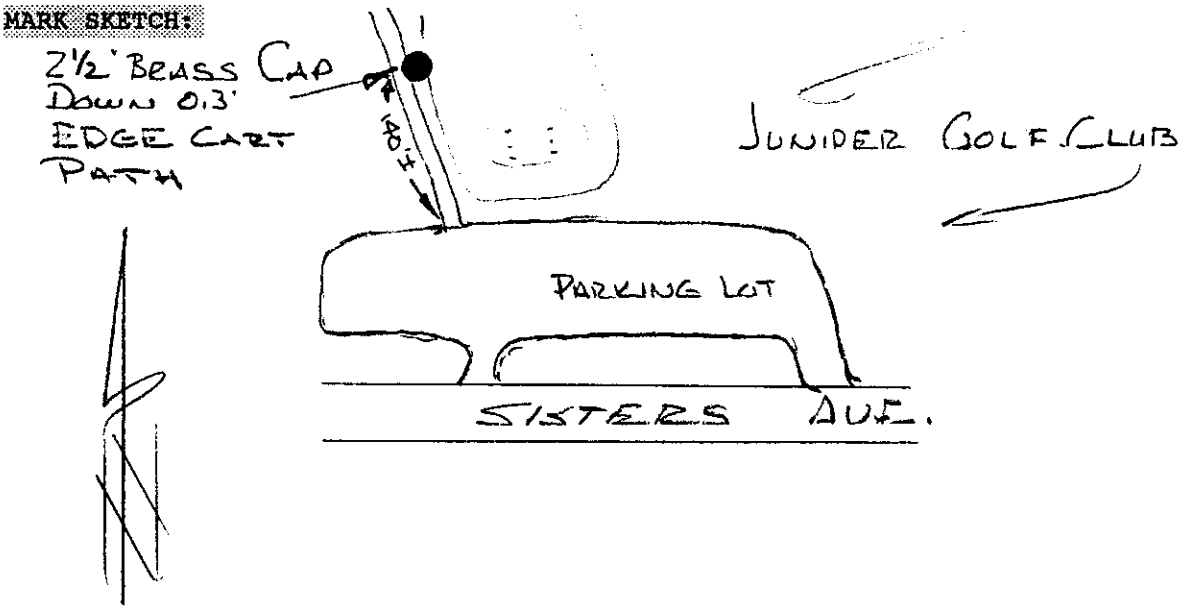
MARK: 15131200 HORIZONTAL ORDER: FIRST

				ONE SIGMA ERROR
Latitude:	44°16'35.403932"	Northing:	465420.684	0.029
Longitude:	121°07'43.021954"	Easting:	3340529.506	0.020
Convergence:	+0°06'28.8389"	Ell Height:	2961.89	0.053
Scale Factor:	1.000161875705	Ortho Height:	3026.81	0.060
Combined Factor:	1.00002032	Geoid Height:	-64.92	

MARK DATA SHEET

NAME OF MARK:	15131500	COUNTY:	DESCHUTES
MARK SET BY:	U.S. DEPT. INT. (B L M)	STATE:	OREGON
DATE OF MARK:	1949	COUNTRY:	U.S.A.
LOCATION:	SECTION 15	TOWNSHIP 15 S	RANGE 13 E
REFERENCE:	OCRR	1274	

MARK SKETCH:



DATA CUMPUTED BY:	DESCHUTES COUNTY SURVEYOR'S OFFICE	DATE:	1995
METHOD-EQUIPMENT:	GPS-TRIMBLE 4000SSE GEODETIC	ADJUSTED WITH:	TRIMNET

HOIZONTAL DATUM:	NAD 83 (91)	VERTICAL DATUM:	NAVD 29
PROJECTION:	TRANSVERSE MERCATOR	ZONE:	CENTRAL OREGON LCS
CENTRAL MERIDIAN:	W 121° 17'00.00"	ORIGIN NORTHING:	0.00F
LATITUDE OF ORIGIN:	N 43° 00'00.00"	ORIGIN EASTING:	3,300,000.00F
LINEAR UNITS:	INTERNATIONAL FOOT	SCALE ALONG MERIDIAN:	1.0001600

GEODETIC AND MAPPING COORDINATES

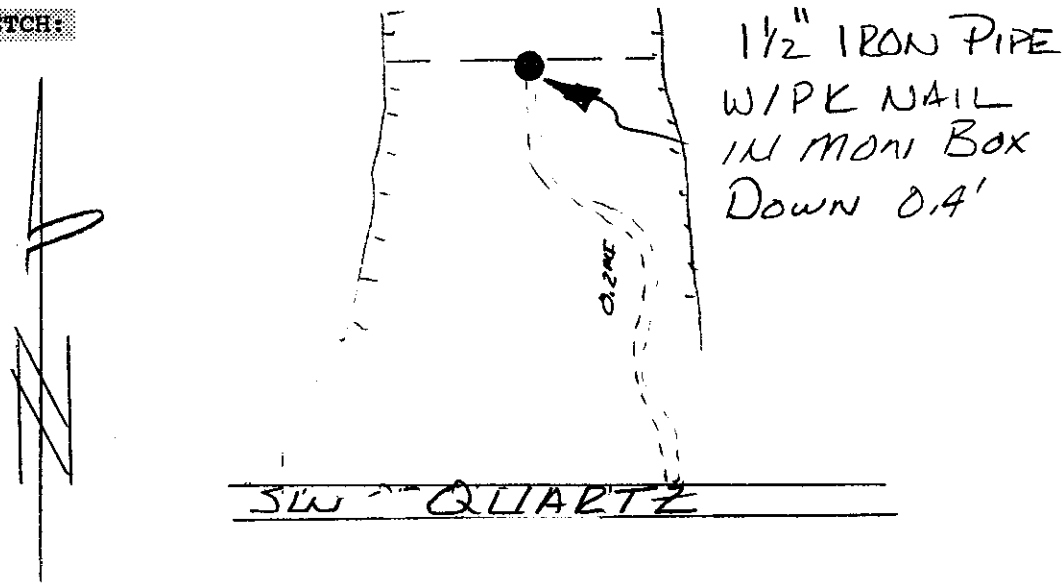
MARK: 15131500 HORIZONTAL ORDER: FIRST

				ONE SIGMA ERROR
Latitude:	44°15'43.429855"	Northing:	460139.320	0.020
Longitude:	121°10'07.987323"	Easting:	3329988.181	0.013
Convergence:	+0°04'47.5608"	Ell Height:	2949.44	0.036
Scale Factor:	1.000161026889	Ortho Height:	3014.53	0.046
Combined Factor:	1.00002006	Geoid Height:	-65.09	

MARK DATA SHEET

NAME OF MARK:	15131600	COUNTY:	DESCHUTES
MARK SET BY:	PE 4840 R S ALLMAN	STATE:	OREGON
DATE OF MARK:	1971	COUNTRY:	U.S.A.
LOCATION:	SECTION 16	TOWNSHIP 15 S	RANGE 13 E
REFERENCE:	OCRR	1279	

MARK SKETCH:



DATA CUMPUTED BY:	DESCHUTES COUNTY SURVEYOR'S OFFICE	DATE:	1995
METHOD-EQUIPMENT:	GPS-TRIMBLE 4000SSE GEODETIC	ADJUSTED WITH:	TRIMNET

HOIZONTAL DATUM:	NAD 83 (91)	VERTICAL DATUM:	NAVD 29
PROJECTION:	TRANSVERSE MERCATOR	ZONE:	CENTRAL OREGON LCS
CENTRAL MERIDIAN:	W 121° 17'00.00"	ORIGIN NORTHING:	0.00F
LATITUDE OF ORIGIN:	N 43° 00'00.00"	ORIGIN EASTING:	3,300,000.00F
LINEAR UNITS:	INTERNATIONAL FOOT	SCALE ALONG MERIDIAN:	1.0001600

GEODETIC AND MAPPING COORDINATES

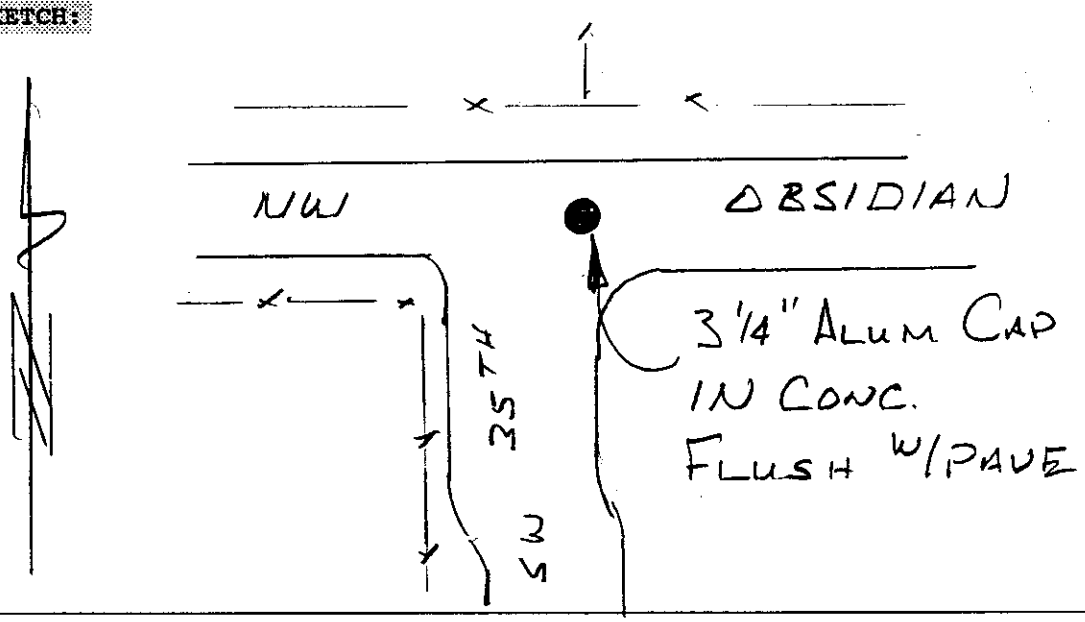
MARK: 15131600 HORIZONTAL ORDER: FIRST

				ONE SIGMA ERROR
Latitude:	44°15'43.310262"	Northing:	460120.483	0.015
Longitude:	121°11'20.676778"	Easting:	3324697.521	0.013
Convergence:	+0°03'56.8276"	Ell Height:	2909.12	0.033
Scale Factor:	1.000160696514	Ortho Height:	2974.30	0.043
Combined Factor:	1.00002166	Geoid Height:	-65.19	

MARK DATA SHEET

NAME OF MARK:	15131700	COUNTY:	DESCHUTES
MARK SET BY:	LS 1652 ROBERT POVEY	STATE:	OREGON
DATE OF MARK:	1990	COUNTRY:	U.S.A.
LOCATION:	SECTION 17	TOWNSHIP 15 S	RANGE 13 E
REFERENCE:	OCRR 1277		

MARK SKETCH:



DATA CUMPUTED BY:	DESCHUTES COUNTY SURVEYOR'S OFFICE	DATE:	1995
METHOD-EQUIPMENT:	GPS-TRIMBLE 4000SSE GEODETIC	ADJUSTED WITH:	TRIMNET

HOIZONTAL DATUM:	NAD 83 (91)	VERTICAL DATUM:	NAVD 29
PROJECTION:	TRANSVERSE MERCATOR	ZONE:	CENTRAL OREGON LCS
CENTRAL MERIDIAN:	W 121° 17'00.00"	ORIGIN NORTHING:	0.00F
LATITUDE OF ORIGIN:	N 43° 00'00.00"	ORIGIN EASTING:	3,300,000.00F
LINEAR UNITS:	INTERNATIONAL FOOT	SCALE ALONG MERIDIAN:	1.0001600

GEODETIC AND MAPPING COORDINATES

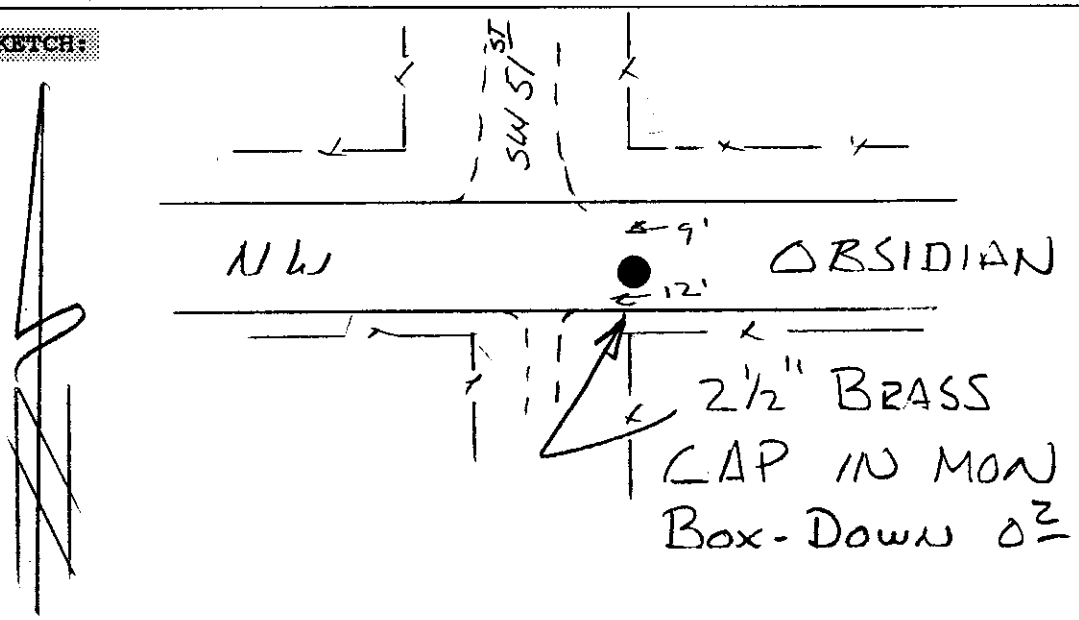
MARK: 15131700 HORIZONTAL ORDER: FIRST

				ONE SIGMA ERROR
Latitude:	44°15'42.995001"	Northing:	460083.075	0.021
Longitude:	121°12'34.172864"	Easting:	3319348.163	0.016
Convergence:	+0°03'05.5314"	Ell Height:	2945.59	0.043
Scale Factor:	1.000160427467	Ortho Height:	3010.87	0.051
Combined Factor:	1.00001965	Geoid Height:	-65.28	

MARK DATA SHEET

NAME OF MARK:	15131800	COUNTY:	DESCHUTES
MARK SET BY:	LS 0971 ROBERT DAVENPORT	STATE:	OREGON
DATE OF MARK:	1974	COUNTRY:	U.S.A.
LOCATION:	SECTION 18	TOWNSHIP 15 S	RANGE 13 E
REFERENCE:	OCRR	1278	

MARK SKETCH:



DATA CUMPUTED BY:	DESCHUTES COUNTY SURVEYOR'S OFFICE	DATE:	1995
METHOD-EQUIPMENT:	GPS-TRIMBLE 4000SSE GEODETIC	ADJUSTED WITH:	TRIMNET

HOIZONTAL DATUM:	NAD 83 (91)	VERTICAL DATUM:	NAVD 29
PROJECTION:	TRANSVERSE MERCATOR	ZONE:	CENTRAL OREGON LCS
CENTRAL MERIDIAN:	W 121° 17'00.00"	ORIGIN NORTHING:	0.00F
LATITUDE OF ORIGIN:	N 43° 00'00.00"	ORIGIN EASTING:	3,300,000.00F
LINEAR UNITS:	INTERNATIONAL FOOT	SCALE ALONG MERIDIAN:	1.0001600

GEODETIC AND MAPPING COORDINATES

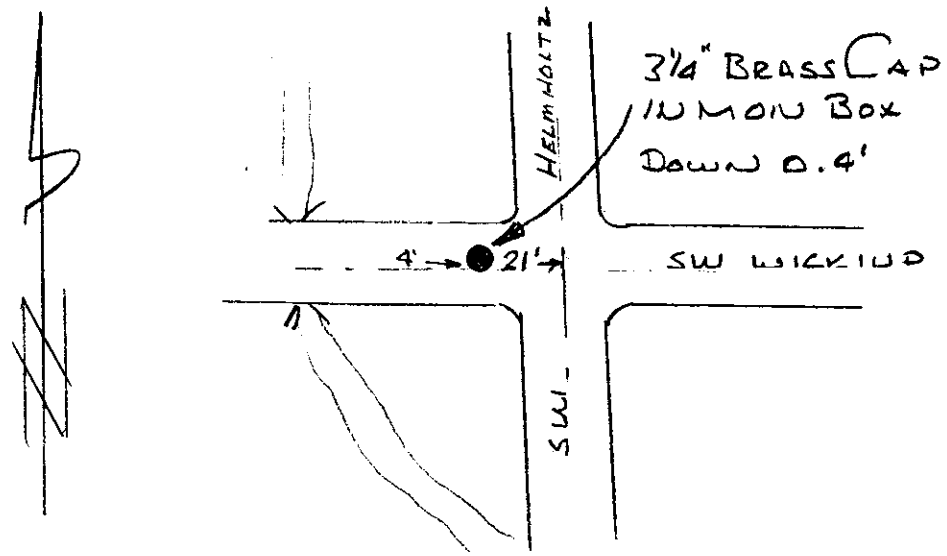
MARK: 15131800 HORIZONTAL ORDER: FIRST

				ONE SIGMA ERROR
Latitude:	44°15'43.385654"	Northing:	460118.582	0.016
Longitude:	121°13'45.852688"	Easting:	3314130.939	0.014
Convergence:	+0°02'15.5034"	Ell Height:	2941.46	0.034
Scale Factor:	1.000160228016	Ortho Height:	3006.83	0.045
Combined Factor:	1.00001964	Geoid Height:	-65.37	

MARK DATA SHEET

NAME OF MARK:	15131900	COUNTY:	DESCHUTES
MARK SET BY:	LS 1031 W. C. KAUFFMAN	STATE:	OREGON
DATE OF MARK:	1995	COUNTRY:	U.S.A.
LOCATION:	SECTION 19	TOWNSHIP 15 S	RANGE 13 E
REFERENCE:	OCRR	1312	

MARK SKETCH:



DATA CUMPUTED BY:	DESCHUTES COUNTY SURVEYOR'S OFFICE	DATE:	1995
METHOD-EQUIPMENT:	GPS-TRIMBLE 4000SSE GEODETIC	ADJUSTED WITH:	TRIMNET

HOIZONTAL DATUM:	NAD 83 (91)	VERTICAL DATUM:	NAVD 29
PROJECTION:	TRANSVERSE MERCATOR	ZONE:	CENTRAL OREGON LCS
CENTRAL MERIDIAN:	W 121° 17'00.00"	ORIGIN NORTHING:	0.00F
LATITUDE OF ORIGIN:	N 43° 00'00.00"	ORIGIN EASTING:	3,300,000.00F
LINEAR UNITS:	INTERNATIONAL FOOT	SCALE ALONG MERIDIAN:	1.0001600

GEODETIC AND MAPPING COORDINATES

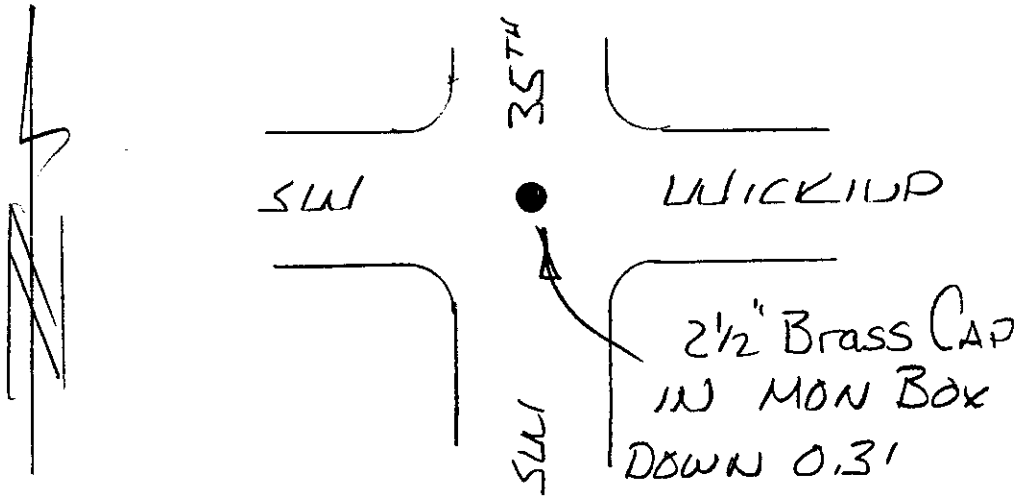
MARK: 15131900 HORIZONTAL ORDER: FIRST

				ONE SIGMA ERROR
Latitude:	44°14'51.164681"	Northing:	454829.512	0.021
Longitude:	121°13'46.100238"	Easting:	3314116.390	0.019
Convergence:	+0°02'15.2955"	Ell Height:	2992.63	0.051
Scale Factor:	1.000160227547	Ortho Height:	3057.96	0.059
Combined Factor:	1.0000172	Geoid Height:	-65.33	

MARK DATA SHEET

NAME OF MARK:	15132000	COUNTY:	DESCHUTES
MARK SET BY:	LS 2355 JOEL SMITH	STATE:	OREGON
DATE OF MARK:	1994	COUNTRY:	U.S.A.
LOCATION:	SECTION 20 TOWNSHIP 15 S RANGE 13 E		
REFERENCE:	OCRR 1287		

MARK SKETCH:



DATA CUMPUTED BY:	DESCHUTES COUNTY SURVEYOR'S OFFICE	DATE:	1995
METHOD-EQUIPMENT:	GPS-TRIMBLE 4000SSE GEODETIC	ADJUSTED WITH:	TRIMNET

HOIZONTAL DATUM:	NAD 83 (91)	VERTICAL DATUM:	NAVD 29
PROJECTION:	TRANSVERSE MERCATOR	ZONE:	CENTRAL OREGON LCS
CENTRAL MERIDIAN:	W 121° 17'00.00"	ORIGIN NORTHING:	0.00F
LATITUDE OF ORIGIN:	N 43° 00'00.00"	ORIGIN EASTING:	3,300,000.00F
LINEAR UNITS:	INTERNATIONAL FOOT	SCALE ALONG MERIDIAN:	1.0001600

GEODETIC AND MAPPING COORDINATES

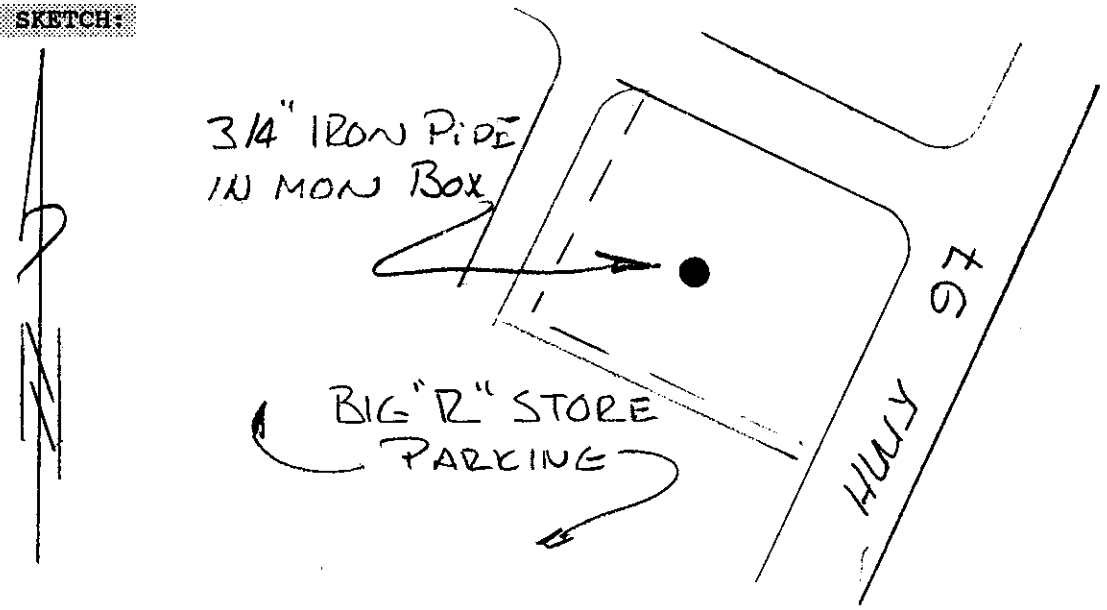
MARK: 15132000 HORIZONTAL ORDER: FIRST

				ONE SIGMA ERROR
Latitude:	44°14'50.867771"	Northing:	454803.543	0.020
Longitude:	121°12'33.695394"	Easting:	3319387.672	0.016
Convergence:	+0°03'05.8164"	Ell Height:	3131.22	0.043
Scale Factor:	1.000160429216	Ortho Height:	3196.46	0.051
Combined Factor:	1.00001078	Geoid Height:	-65.25	

MARK DATA SHEET

NAME OF MARK:	15132100	COUNTY:	DESCHUTES
MARK SET BY:	LS 1652 ROBERT POVEY	STATE:	OREGON
DATE OF MARK:	1986	COUNTRY:	U.S.A.
LOCATION:	SECTION 21 TOWNSHIP 15 S RANGE 13 E		
REFERENCE:	OCRR 1288		

MARK SKETCH:



DATA CUMPUTED BY:	DESCHUTES COUNTY SURVEYOR'S OFFICE	DATE:	1995
METHOD-EQUIPMENT:	GPS-TRIMBLE 4000SSE GEODETIC	ADJUSTED WITH:	TRIMNET

HOIZONTAL DATUM:	NAD 83 (91)	VERTICAL DATUM:	NAVD 29
PROJECTION:	TRANSVERSE MERCATOR	ZONE:	CENTRAL OREGON LCS
CENTRAL MERIDIAN:	W 121° 17'00.00"	ORIGIN NORTHING:	0.00F
LATITUDE OF ORIGIN:	N 43° 00'00.00"	ORIGIN EASTING:	3,300,000.00F
LINEAR UNITS:	INTERNATIONAL FOOT	SCALE ALONG MERIDIAN:	1.0001600

GEODETIC AND MAPPING COORDINATES

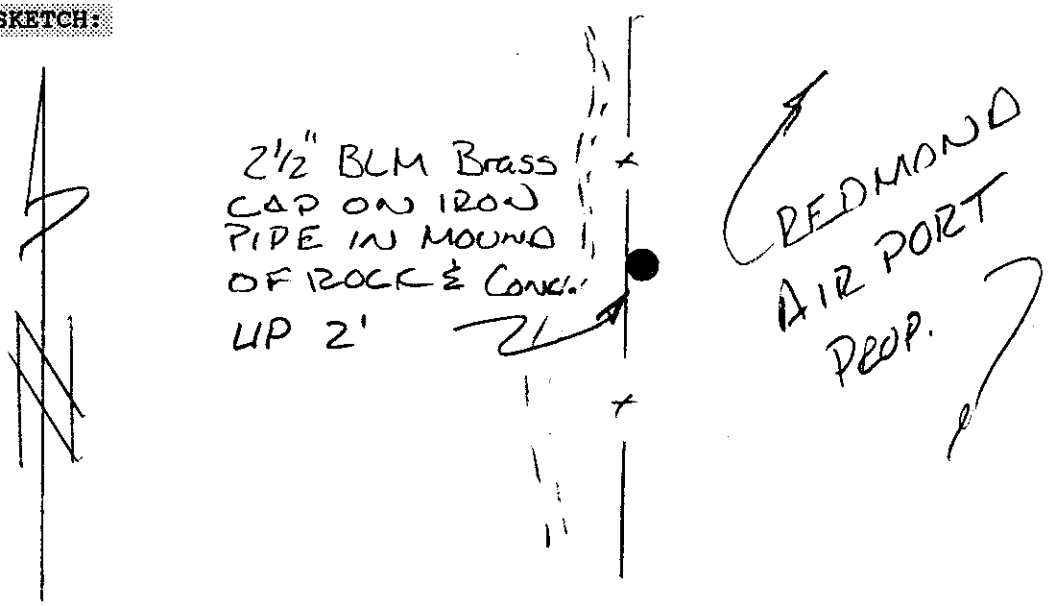
MARK: 15132100 HORIZONTAL ORDER: FIRST

				ONE SIGMA ERROR
Latitude:	44°14'51.157748"	Northing:	454838.373	0.019
Longitude:	121°11'20.492770"	Easting:	3324716.981	0.016
Convergence:	+0°03'56.8946"	Ell Height:	2969.65	0.039
Scale Factor:	1.000160697614	Ortho Height:	3034.80	0.048
Combined Factor:	1.00001877	Geoid Height:	-65.16	

MARK DATA SHEET

NAME OF MARK:	15132200	COUNTY:	DESCHUTES
MARK SET BY:	LS 1031 W. C. KAUFFMAN	STATE:	OREGON
DATE OF MARK:	1994	COUNTRY:	U.S.A.
LOCATION:	SECTION 22	TOWNSHIP 15 S	RANGE 13 E
REFERENCE:	OCRR 1275		

MARK SKETCH:



DATA CUMPUTED BY:	DESCHUTES COUNTY SURVEYOR'S OFFICE	DATE:	1995
METHOD-EQUIPMENT:	GPS-TRIMBLE 4000SSE GEODETIC	ADJUSTED WITH:	TRIMNET

HOIZONTAL DATUM:	NAD 83 (91)	VERTICAL DATUM:	NAVD 29
PROJECTION:	TRANSVERSE MERCATOR	ZONE:	CENTRAL OREGON LCS
CENTRAL MERIDIAN:	W 121° 17'00.00"	ORIGIN NORTHING:	0.00F
LATITUDE OF ORIGIN:	N 43° 00'00.00"	ORIGIN EASTING:	3,300,000.00F
LINEAR UNITS:	INTERNATIONAL FOOT	SCALE ALONG MERIDIAN:	1.0001600

GEODETIC AND MAPPING COORDINATES

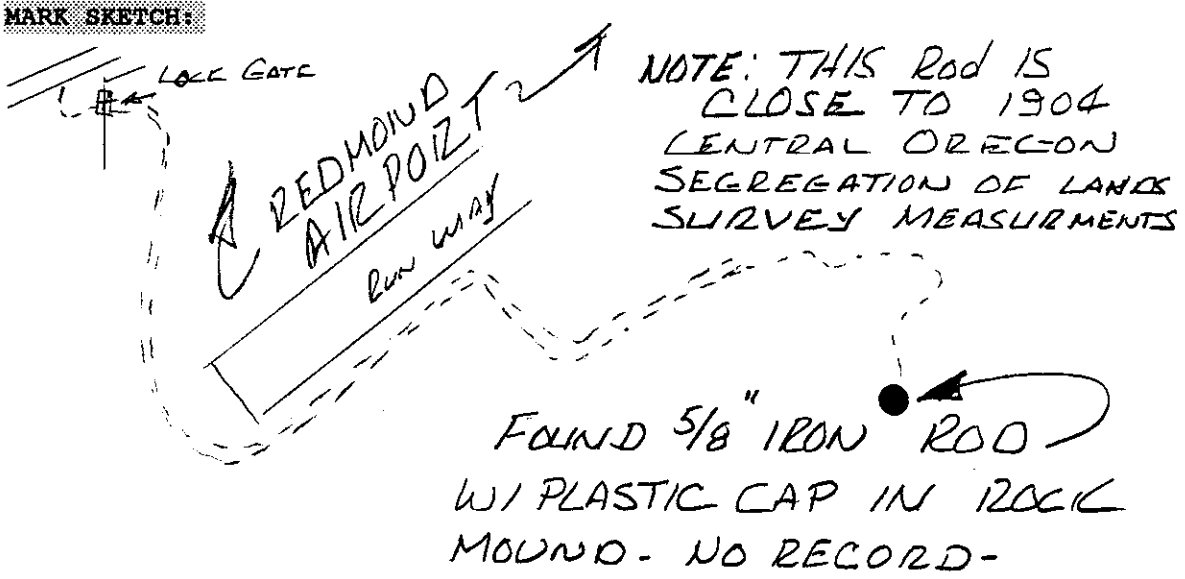
MARK: 15132200 HORIZONTAL ORDER: FIRST

				ONE SIGMA ERROR
Latitude:	44°14'51.049667"	Northing:	454834.146	0.018
Longitude:	121°10'07.892557"	Easting:	3330002.475	0.014
Convergence:	+0°04'47.5520"	Ell Height:	3001.86	0.036
Scale Factor:	1.000161027871	Ortho Height:	3066.91	0.046
Combined Factor:	1.00001756	Geoid Height:	-65.06	

MARK DATA SHEET

NAME OF MARK:	151323007	COUNTY:	DESCHUTES
MARK SET BY:	N/A	STATE:	OREGON
DATE OF MARK:	N/A	COUNTRY:	U.S.A.
LOCATION:	SECTION 23	TOWNSHIP 15 S	RANGE 13 E
REFERENCE:	DGMC	17	

MARK SKETCH:



DATA CUMPUTED BY:	DESCHUTES COUNTY SURVEYOR'S OFFICE	DATE:	1995
METHOD-EQUIPMENT:	GPS-TRIMBLE 4000SSE GEODETIC	ADJUSTED WITH:	TRIMNET

HOIZONTAL DATUM:	NAD 83 (91)	VERTICAL DATUM:	NAVD 29
PROJECTION:	TRANSVERSE MERCATOR	ZONE:	CENTRAL OREGON LCS
CENTRAL MERIDIAN:	W 121° 17'00.00"	ORIGIN NORTHING:	0.00F
LATITUDE OF ORIGIN:	N 43° 00'00.00"	ORIGIN EASTING:	3,300,000.00F
LINEAR UNITS:	INTERNATIONAL FOOT	SCALE ALONG MERIDIAN:	1.0001600

GEODETIC AND MAPPING COORDINATES

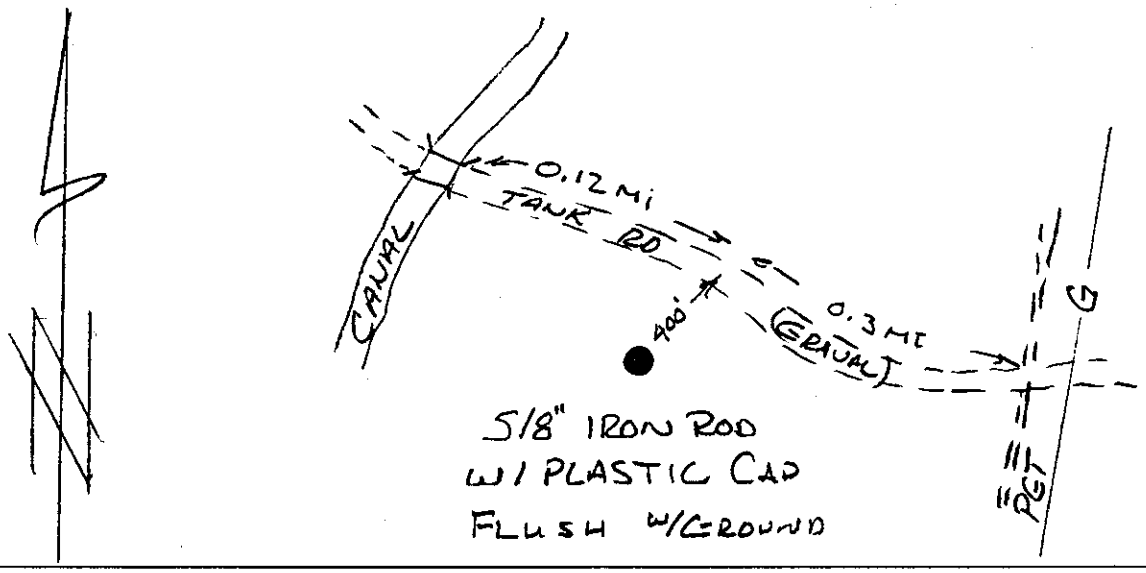
MARK: 151323007 HORIZONTAL ORDER: FIRST

				ONE SIGMA ERROR
Latitude:	44°14'50.841227"	Northing:	454821.121	0.017
Longitude:	121°08'54.721577"	Easting:	3335329.544	0.012
Convergence:	+0°05'38.6075"	Ell Height:	3021.07	0.032
Scale Factor:	1.000161425282	Ortho Height:	3086.02	0.043
Combined Factor:	1.00001704	Geoid Height:	-64.96	

MARK DATA SHEET

NAME OF MARK:	15132400	COUNTY:	DESCHUTES
MARK SET BY:	LS 2527 JERRY STICHLER	STATE:	OREGON
DATE OF MARK:	1994	COUNTRY:	U.S.A.
LOCATION:	SECTION 24 TOWNSHIP 15 S RANGE 13 E		
REFERENCE:	OCRR 1285		

MARK SKETCH:



DATA CUMPUTED BY:	DESCHUTES COUNTY SURVEYOR'S OFFICE	DATE:	1995
METHOD-EQUIPMENT:	GPS-TRIMBLE 4000SSE GEODETIC	ADJUSTED WITH:	TRIMNET

HOIZONTAL DATUM:	NAD 83 (91)	VERTICAL DATUM:	NAVD 29
PROJECTION:	TRANSVERSE MERCATOR	ZONE:	CENTRAL OREGON LCS
CENTRAL MERIDIAN:	W 121° 17'00.00"	ORIGIN NORTHING:	0.00F
LATITUDE OF ORIGIN:	N 43° 00'00.00"	ORIGIN EASTING:	3,300,000.00F
LINEAR UNITS:	INTERNATIONAL FOOT	SCALE ALONG MERIDIAN:	1.0001600

GEODETIC AND MAPPING COORDINATES

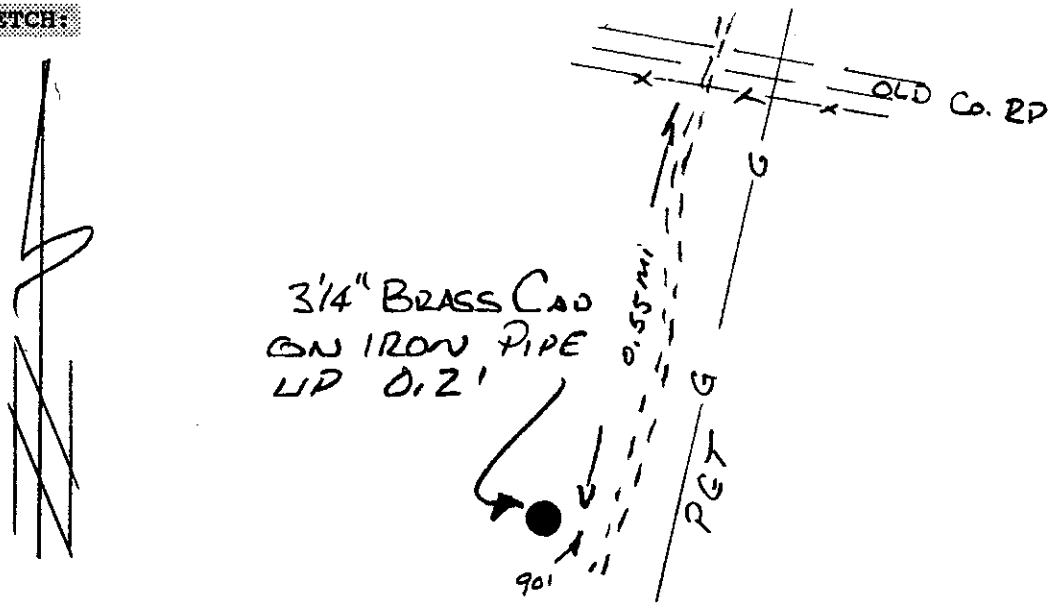
MARK: 15132400 HORIZONTAL ORDER: FIRST

				ONE SIGMA ERROR
Latitude:	44°14'51.210750"	Northing:	454867.781	0.022
Longitude:	121°07'42.790248"	Easting:	3340566.264	0.016
Convergence:	+0°06'28.7991"	Ell Height:	3004.93	0.041
Scale Factor:	1.000161879121	Ortho Height:	3069.78	0.050
Combined Factor:	1.00001826	Geoid Height:	-64.85	

MARK DATA SHEET

NAME OF MARK:	15132500	COUNTY:	DESCHUTES
MARK SET BY:	LS 2282 KENNETH L. GRANTHAM	STATE:	OREGON
DATE OF MARK:	1993	COUNTRY:	U.S.A.
LOCATION:	SECTION 25 TOWNSHIP 15 S RANGE 13 E		
REFERENCE:	OCRR 1215		

MARK SKETCH:



DATA CUMPUTED BY:	DESCHUTES COUNTY SURVEYOR'S OFFICE	DATE:	1995
METHOD-EQUIPMENT:	GPS-TRIMBLE 4000SSE GEODETIC	ADJUSTED WITH:	TRIMNET

HOIZONTAL DATUM:	NAD 83 (91)	VERTICAL DATUM:	NAVD 29
PROJECTION:	TRANSVERSE MERCATOR	ZONE:	CENTRAL OREGON LCS
CENTRAL MERIDIAN:	W 121° 17'00.00"	ORIGIN NORTHING:	0.00F
LATITUDE OF ORIGIN:	N 43° 00'00.00"	ORIGIN EASTING:	3,300,000.00F
LINEAR UNITS:	INTERNATIONAL FOOT	SCALE ALONG MERIDIAN:	1.0001600

GEODETIC AND MAPPING COORDINATES

MARK: 15132500 HORIZONTAL ORDER: FIRST

				ONE SIGMA ERROR
Latitude:	44°13'58.992773"	Northing:	449579.039	0.022
Longitude:	121°07'42.786836"	Easting:	3340576.480	0.016
Convergence:	+0°06'28.7005"	Ell Height:	3030.31	0.043
Scale Factor:	1.000161880074	Ortho Height:	3095.12	0.052
Combined Factor:	1.00001705	Geoid Height:	-64.80	

MARK DATA SHEET

NAME OF MARK:	15132600	COUNTY:	DESCHUTES
MARK SET BY:	LS 1031 W. C. KAUFFMAN	STATE:	OREGON
DATE OF MARK:	1994	COUNTRY:	U.S.A.
LOCATION:	SECTION 26 TOWNSHIP 15 S RANGE 13 E		
REFERENCE:	OCRR 1264		

MARK SKETCH:

DATA CUMPUTED BY:	DESCHUTES COUNTY SURVEYOR'S OFFICE	DATE:	1995
METHOD-EQUIPMENT:	GPS-TRIMBLE 4000SSE GEODETIC	ADJUSTED WITH:	TRIMNET

HOIZONTAL DATUM:	NAD 83 (91)	VERTICAL DATUM:	NAVD 29
PROJECTION:	TRANSVERSE MERCATOR	ZONE:	CENTRAL OREGON LCS
CENTRAL MERIDIAN:	W 121° 17'00.00"	ORIGIN NORTHING:	0.00F
LATITUDE OF ORIGIN:	N 43° 00'00.00"	ORIGIN EASTING:	3,300,000.00F
LINEAR UNITS:	INTERNATIONAL FOOT	SCALE ALONG MERIDIAN:	1.0001600

GEODETIC AND MAPPING COORDINATES

MARK: 15132600 HORIZONTAL ORDER: FIRST

				ONE SIGMA ERROR
Latitude:	44°13'58.759750"	Northing:	449546.141	0.021
Longitude:	121°08'55.250476"	Easting:	3335299.688	0.015
Convergence:	+0°05'38.1508"	Ell Height:	3037.53	0.040
Scale Factor:	1.000161422879	Ortho Height:	3102.44	0.049
Combined Factor:	1.00001625	Geoid Height:	-64.91	

MARK DATA SHEET

NAME OF MARK:	15132700	COUNTY:	DESCHUTES
MARK SET BY:	U.S. DEPT. INT. (B L M)	STATE:	OREGON
DATE OF MARK:	1953	COUNTRY:	U.S.A.
LOCATION:	SECTION 27	TOWNSHIP 15 S	RANGE 13 E
REFERENCE:	OCRR	1266	

MARK SKETCH:

DATA CUMPUTED BY:	DESCHUTES COUNTY SURVEYOR'S OFFICE	DATE:	1995
METHOD-EQUIPMENT:	GPS-TRIMBLE 4000SSE GEODETIC	ADJUSTED WITH:	TRIMNET

HOIZONTAL DATUM:	NAD 83 (91)	VERTICAL DATUM:	NAVD 29
PROJECTION:	TRANSVERSE MERCATOR	ZONE:	CENTRAL OREGON LCS
CENTRAL MERIDIAN:	W 121° 17'00.00"	ORIGIN NORTHING:	0.00F
LATITUDE OF ORIGIN:	N 43° 00'00.00"	ORIGIN EASTING:	3,300,000.00F
LINEAR UNITS:	INTERNATIONAL FOOT	SCALE ALONG MERIDIAN:	1.0001600

GEODETIC AND MAPPING COORDINATES

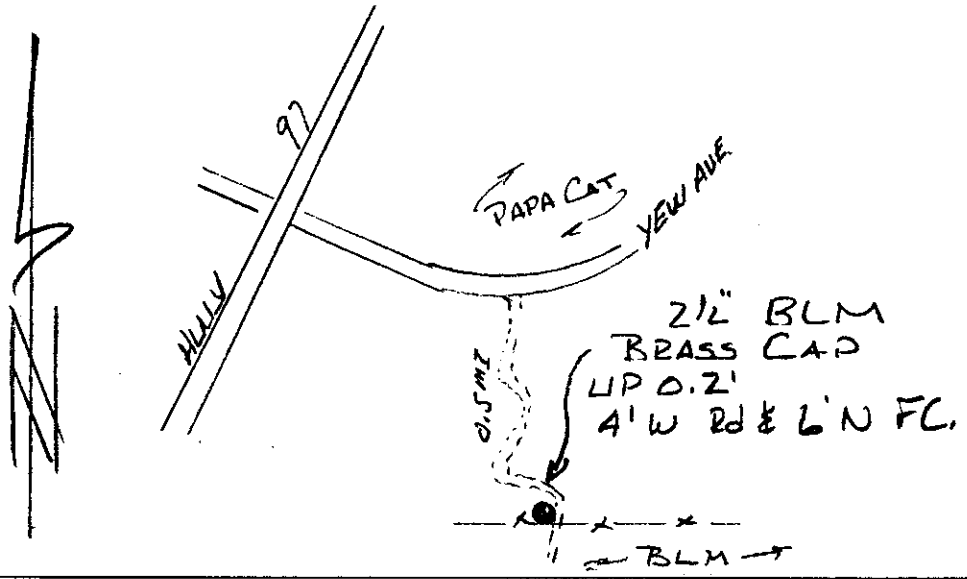
MARK: 15132700 HORIZONTAL ORDER: FIRST

				ONE SIGMA ERROR
Latitude:	44°13'58.999686"	Northing:	449562.385	0.020
Longitude:	121°10'08.229102"	Easting:	3329985.316	0.016
Convergence:	+0°04'47.2428"	Ell Height:	3014.50	0.041
Scale Factor:	1.000161026699	Ortho Height:	3079.51	0.050
Combined Factor:	1.00001695	Geoid Height:	-65.02	

MARK DATA SHEET

NAME OF MARK:	15132800	COUNTY:	DESCHUTES
MARK SET BY:	U.S. DEPT. INT. (B L M)	STATE:	OREGON
DATE OF MARK:	1953	COUNTRY:	U.S.A.
LOCATION:	SECTION 28	TOWNSHIP 15 S	RANGE 13 E
REFERENCE:	OCRR	1276	

MARK SKETCH:



DATA CUMPUTED BY:	DESCHUTES COUNTY SURVEYOR'S OFFICE	DATE:	1995
METHOD-EQUIPMENT:	GPS-TRIMBLE 4000SSE GEODETIC	ADJUSTED WITH:	TRIMNET

HOIZONTAL DATUM:	NAD 83 (91)	VERTICAL DATUM:	NAVD 29
PROJECTION:	TRANSVERSE MERCATOR	ZONE:	CENTRAL OREGON LCS
CENTRAL MERIDIAN:	W 121° 17'00.00"	ORIGIN NORTHING:	0.00F
LATITUDE OF ORIGIN:	N 43° 00'00.00"	ORIGIN EASTING:	3,300,000.00F
LINEAR UNITS:	INTERNATIONAL FOOT	SCALE ALONG MERIDIAN:	1.0001600

GEODETIC AND MAPPING COORDINATES

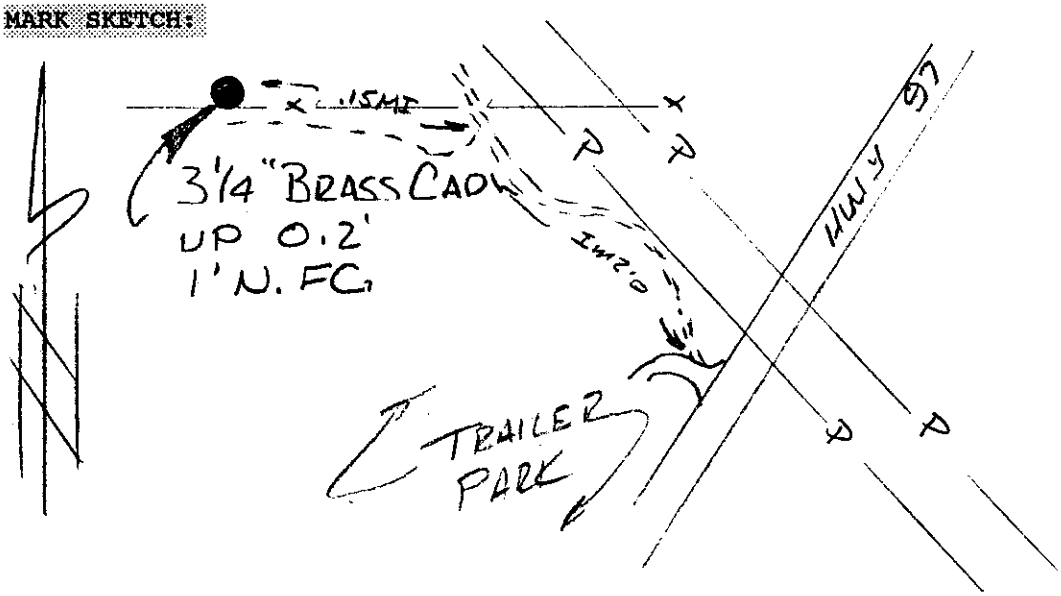
MARK: 15132800 HORIZONTAL ORDER: FIRST

				ONE SIGMA ERROR
Latitude:	44°13'59.057101"	Northing:	449561.488	0.021
Longitude:	121°11'20.822253"	Easting:	3324699.048	0.017
Convergence:	+0°03'56.6033"	Ell Height:	3013.85	0.043
Scale Factor:	1.000160696605	Ortho Height:	3078.96	0.052
Combined Factor:	1.00001665	Geoid Height:	-65.12	

MARK DATA SHEET

NAME OF MARK:	15132900	COUNTY:	DESCHUTES
MARK SET BY:	LS 1031 W. C. KAUFFMAN	STATE:	OREGON
DATE OF MARK:	1995	COUNTRY:	U.S.A.
LOCATION:	SECTION 29	TOWNSHIP 15 S	RANGE 13 E
REFERENCE:	OCRR	1299	

MARK SKETCH:



DATA CUMPUTED BY:	DESCHUTES COUNTY SURVEYOR'S OFFICE	DATE:	1995
METHOD-EQUIPMENT:	GPS-TRIMBLE 4000SSE GEODETIC	ADJUSTED WITH:	TRIMNET

HOIZONTAL DATUM:	NAD 83 (91)	VERTICAL DATUM:	NAVD 29
PROJECTION:	TRANSVERSE MERCATOR	ZONE:	CENTRAL OREGON LCS
CENTRAL MERIDIAN:	W 121° 17'00.00"	ORIGIN NORTHING:	0.00F
LATITUDE OF ORIGIN:	N 43° 00'00.00"	ORIGIN EASTING:	3,300,000.00F
LINEAR UNITS:	INTERNATIONAL FOOT	SCALE ALONG MERIDIAN:	1.0001600

GEODETIC AND MAPPING COORDINATES

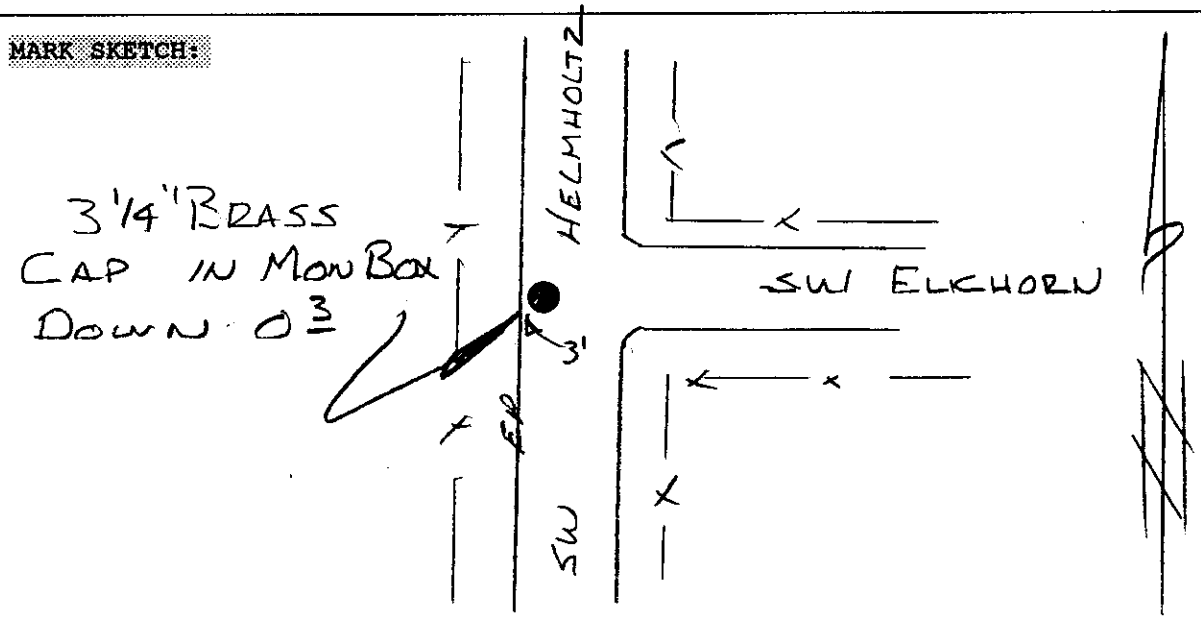
MARK: 15132900 HORIZONTAL ORDER: FIRST

				ONE SIGMA ERROR
Latitude:	44°13'58.721237"	Northing:	449522.047	0.024
Longitude:	121°12'33.549012"	Easting:	3319403.089	0.018
Convergence:	+0°03'05.8703"	Ell Height:	3038.21	0.047
Scale Factor:	1.000160429900	Ortho Height:	3103.42	0.055
Combined Factor:	1.00001522	Geoid Height:	-65.21	

MARK DATA SHEET

NAME OF MARK:	15133000	COUNTY:	DESCHUTES
MARK SET BY:	LS 2282 KENNETH L. GRANTHAM	STATE:	OREGON
DATE OF MARK:	1993	COUNTRY:	U.S.A.
LOCATION:	SECTION 30 TOWNSHIP 15 S RANGE 13 E		
REFERENCE:	OCRR 1213		

MARK SKETCH:



DATA CUMPUTED BY:	DESCHUTES COUNTY SURVEYOR'S OFFICE	DATE:	1995
METHOD-EQUIPMENT:	GPS-TRIMBLE 4000SSE GEODETIC	ADJUSTED WITH:	TRIMNET

HOIZONTAL DATUM:	NAD 83 (91)	VERTICAL DATUM:	NAVD 29
PROJECTION:	TRANSVERSE MERCATOR	ZONE:	CENTRAL OREGON LCS
CENTRAL MERIDIAN:	W 121° 17'00.00"	ORIGIN NORTHING:	0.00F
LATITUDE OF ORIGIN:	N 43° 00'00.00"	ORIGIN EASTING:	3,300,000.00F
LINEAR UNITS:	INTERNATIONAL FOOT	SCALE ALONG MERIDIAN:	1.0001600

GEODETIC AND MAPPING COORDINATES

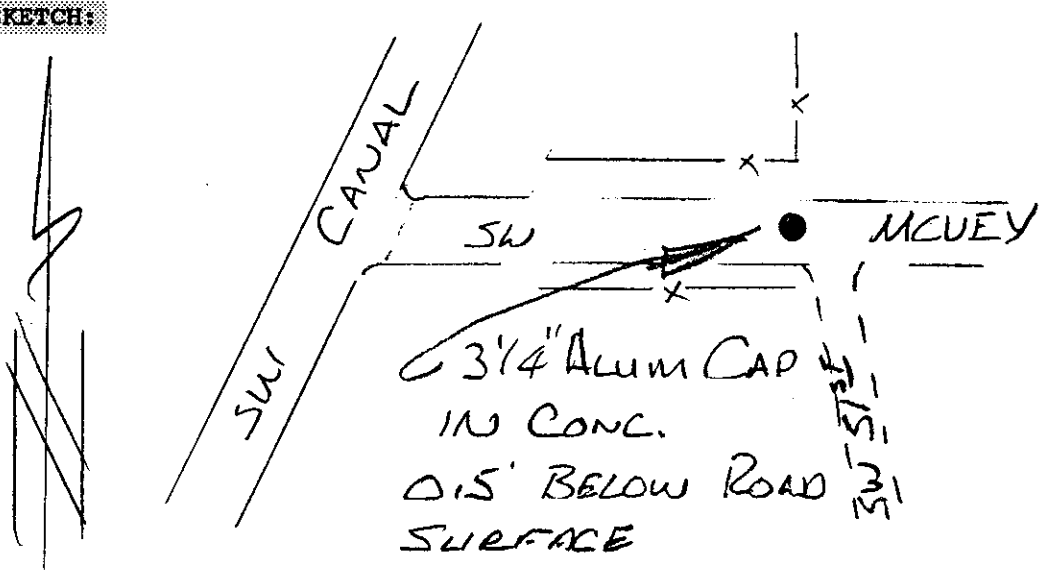
MARK: 15133000 HORIZONTAL ORDER: FIRST

				ONE SIGMA ERROR
Latitude:	44°13'58.847693"	Northing:	449530.716	0.023
Longitude:	121°13'46.640810"	Easting:	3314080.501	0.020
Convergence:	+0°02'14.8831"	Ell Height:	3010.29	0.052
Scale Factor:	1.000160226392	Ortho Height:	3075.58	0.060
Combined Factor:	1.00001635	Geoid Height:	-65.29	

MARK DATA SHEET

NAME OF MARK:	15133100	COUNTY:	DESCHUTES
MARK SET BY:	LS 2262 KENNETH L. GRANTHAM	STATE:	OREGON
DATE OF MARK:	1995	COUNTRY:	U.S.A.
LOCATION:	SECTION 31 TOWNSHIP 15 S RANGE 13 E		
REFERENCE:	OCRR 1313		

MARK SKETCH:



DATA CUMPUTED BY:	DESCHUTES COUNTY SURVEYOR'S OFFICE	DATE:	1995
METHOD-EQUIPMENT:	GPS-TRIMBLE 4000SSE GEODETIC	ADJUSTED WITH:	TRIMNET

HOIZONTAL DATUM:	NAD 83 (91)	VERTICAL DATUM:	NAVD 29
PROJECTION:	TRANSVERSE MERCATOR	ZONE:	CENTRAL OREGON LCS
CENTRAL MERIDIAN:	W 121° 17'00.00"	ORIGIN NORTHING:	0.00F
LATITUDE OF ORIGIN:	N 43° 00'00.00"	ORIGIN EASTING:	3,300,000.00F
LINEAR UNITS:	INTERNATIONAL FOOT	SCALE ALONG MERIDIAN:	1.0001600

GEODETIC AND MAPPING COORDINATES

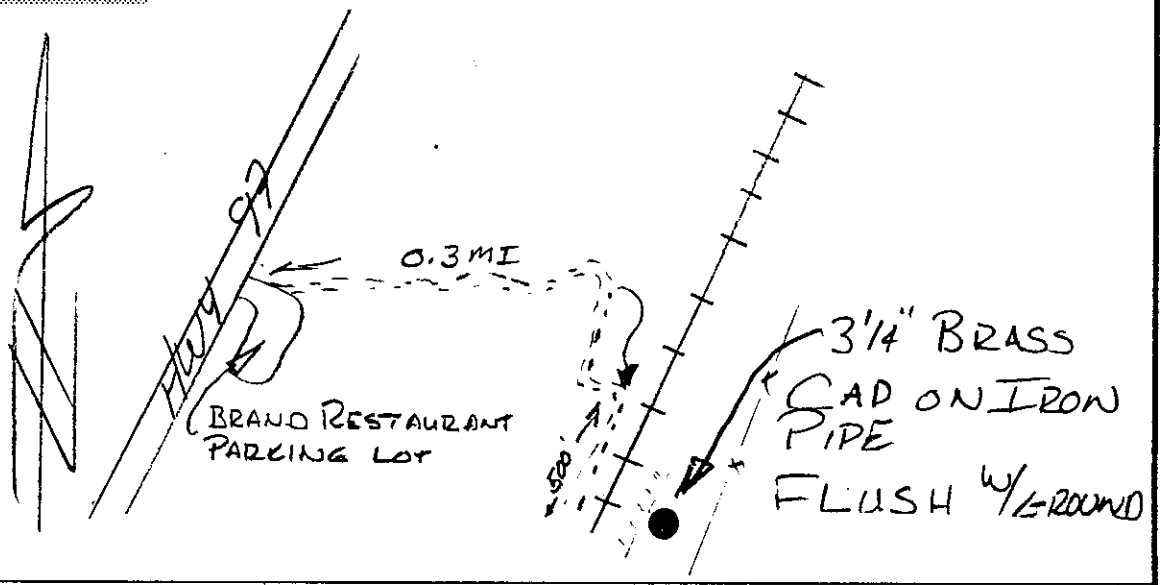
MARK: 15133100 HORIZONTAL ORDER: FIRST

				ONE SIGMA ERROR
Latitude:	44°13'06.807200"	Northing:	444259.957	0.019
Longitude:	121°13'46.808021"	Easting:	3314071.768	0.015
Convergence:	+0°02'14.7316"	Ell Height:	3060.50 (932.84)	0.049
Scale Factor:	1.000160226113	Ortho Height:	3125.76	0.058
Combined Factor:	1.00001395	Geoid Height:	-65.25	

MARK DATA SHEET

NAME OF MARK:	15133200	COUNTY:	DESCHUTES
MARK SET BY:	LS 1031 W. C. KAUFFMAN	STATE:	OREGON
DATE OF MARK:	1995	COUNTRY:	U.S.A.
LOCATION:	SECTION 32	TOWNSHIP 15 S	RANGE 13 E
REFERENCE:	OCRR 1311		

MARK SKETCH:



DATA CUMPUTED BY:	DESCHUTES COUNTY SURVEYOR'S OFFICE	DATE:	1995
METHOD-EQUIPMENT:	GPS-TRIMBLE 4000SSE GEODETIC	ADJUSTED WITH:	TRIMNET

HOIZONTAL DATUM:	NAD 83 (91)	VERTICAL DATUM:	NAVD 29
PROJECTION:	TRANSVERSE MERCATOR	ZONE:	CENTRAL OREGON LCS
CENTRAL MERIDIAN:	W 121° 17'00.00"	ORIGIN NORTHING:	0.00F
LATITUDE OF ORIGIN:	N 43° 00'00.00"	ORIGIN EASTING:	3,300,000.00F
LINEAR UNITS:	INTERNATIONAL FOOT	SCALE ALONG MERIDIAN:	1.0001600

GEODETIC AND MAPPING COORDINATES

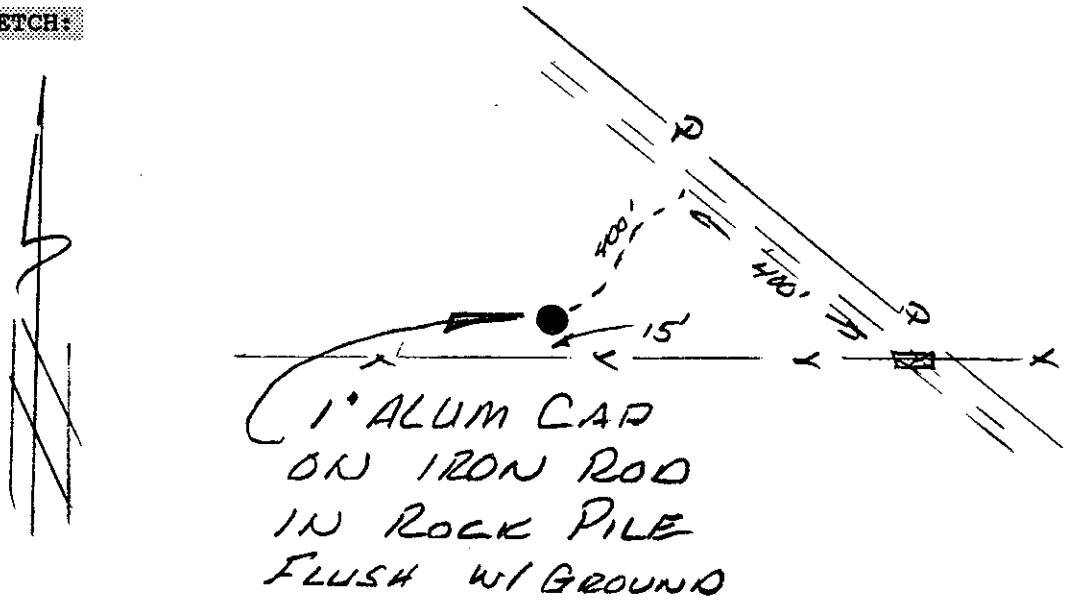
MARK: 15133200 HORIZONTAL ORDER: FIRST

				ONE SIGMA ERROR
Latitude:	44°13'06.822194"	Northing:	444265.575	0.024
Longitude:	121°12'34.261302"	Easting:	3319355.943	0.020
Convergence:	+0°03'05.3255"	Ell Height:	3060.81 (932.94)	0.057
Scale Factor:	1.000160427815	Ortho Height:	3125.98	0.064
Combined Factor:	1.00001414	Geoid Height:	-65.16	

MARK DATA SHEET

NAME OF MARK:	15133300	COUNTY:	DESCHUTES
MARK SET BY:	LS 1081 JEFFREY KERN	STATE:	OREGON
DATE OF MARK:	1979	COUNTRY:	U.S.A.
LOCATION:	SECTION 33 TOWNSHIP 15 S RANGE 13 E		
REFERENCE:	CS 1431		

MARK SKETCH:



DATA CUMPUTED BY:	DESCHUTES COUNTY SURVEYOR'S OFFICE	DATE:	1995
METHOD-EQUIPMENT:	GPS-TRIMBLE 4000SSE GEODETIC	ADJUSTED WITH:	TRIMNET

HOIZONTAL DATUM:	NAD 83 (91)	VERTICAL DATUM:	NAVD 29
PROJECTION:	TRANSVERSE MERCATOR	ZONE:	CENTRAL OREGON LCS
CENTRAL MERIDIAN:	W 121° 17'00.00"	ORIGIN NORTHING:	0.00F
LATITUDE OF ORIGIN:	N 43° 00'00.00"	ORIGIN EASTING:	3,300,000.00F
LINEAR UNITS:	INTERNATIONAL FOOT	SCALE ALONG MERIDIAN:	1.0001600

GEODETIC AND MAPPING COORDINATES

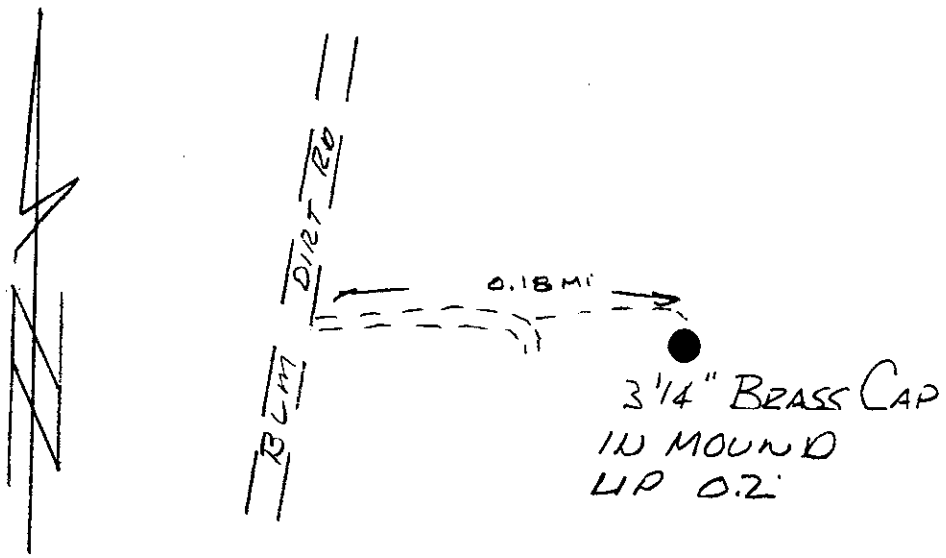
MARK: 15133300 HORIZONTAL ORDER: FIRST

				ONE SIGMA ERROR
Latitude:	44°13'06.896066"	Northing:	444278.484	0.027
Longitude:	121°11'21.340870"	Easting:	3324667.332	0.020
Convergence:	+0°03'56.1802"	Ell Height:	3049.44	0.058
Scale Factor:	1.000160694819	Ortho Height:	3114.51	0.065
Combined Factor:	1.00001495	Geoid Height:	-65.07	

MARK DATA SHEET

NAME OF MARK:	15133400	COUNTY:	DESCHUTES
MARK SET BY:	LS 2282 KENNETH L. GRANTHAM	STATE:	OREGON
DATE OF MARK:	1995	COUNTRY:	U.S.A.
LOCATION:	SECTION 34 TOWNSHIP 15 S RANGE 13 E		
REFERENCE:	OCRR 1294		

MARK SKETCH:



DATA CUMPUTED BY:	DESCHUTES COUNTY SURVEYOR'S OFFICE	DATE:	1995
METHOD-EQUIPMENT:	GPS-TRIMBLE 4000SSE GEODETIC	ADJUSTED WITH:	TRIMNET

HOIZONTAL DATUM:	NAD 83 (91)	VERTICAL DATUM:	NAVD 29
PROJECTION:	TRANSVERSE MERCATOR	ZONE:	CENTRAL OREGON LCS
CENTRAL MERIDIAN:	W 121° 17'00.00"	ORIGIN NORTHING:	0.00F
LATITUDE OF ORIGIN:	N 43° 00'00.00"	ORIGIN EASTING:	3,300,000.00F
LINEAR UNITS:	INTERNATIONAL FOOT	SCALE ALONG MERIDIAN:	1.0001600

GEODETIC AND MAPPING COORDINATES

MARK: 15133400 HORIZONTAL ORDER: FIRST

				ONE SIGMA ERROR
Latitude:	44°13'06.981428"	Northing:	444293.845	0.024
Longitude:	121°10'08.625656"	Easting:	3329963.768	0.019
Convergence:	+0°04'46.8918"	Ell Height:	3045.64	0.051
Scale Factor:	1.000161025228	Ortho Height:	3110.60	0.058
Combined Factor:	1.00001546	Geoid Height:	-64.97	

MARK DATA SHEET

NAME OF MARK:	15133500	COUNTY:	DESCHUTES
MARK SET BY:	LS 2282 KENNETH L. GRANTHAM	STATE:	OREGON
DATE OF MARK:	1995	COUNTRY:	U.S.A.
LOCATION:	SECTION 35	TOWNSHIP 15 S	RANGE 13 E
REFERENCE:	OCRR	1293	

MARK SKETCH:

DATA CUMPUTED BY:	DESCHUTES COUNTY SURVEYOR'S OFFICE	DATE:	1995
METHOD-EQUIPMENT:	GPS-TRIMBLE 4000SSE GEODETIC	ADJUSTED WITH:	TRIMNET

HOIZONTAL DATUM:	NAD 83 (91)	VERTICAL DATUM:	NAVD 29
PROJECTION:	TRANSVERSE MERCATOR	ZONE:	CENTRAL OREGON LCS
CENTRAL MERIDIAN:	W 121° 17'00.00"	ORIGIN NORTHING:	0.00F
LATITUDE OF ORIGIN:	N 43° 00'00.00"	ORIGIN EASTING:	3,300,000.00F
LINEAR UNITS:	INTERNATIONAL FOOT	SCALE ALONG MERIDIAN:	1.0001600

GEODETIC AND MAPPING COORDINATES

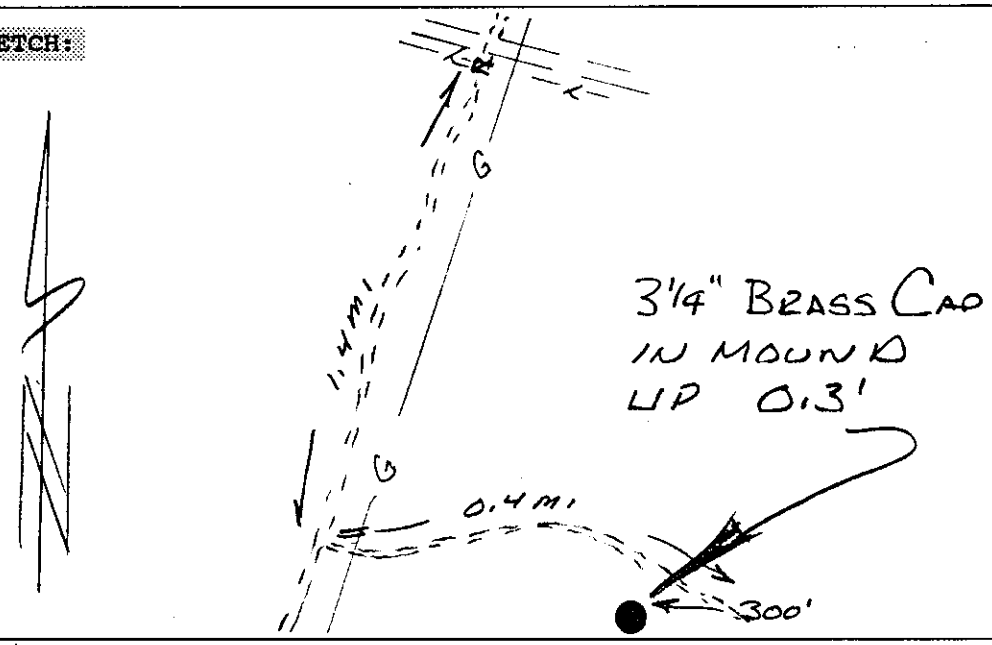
MARK: 15133500 HORIZONTAL ORDER: FIRST

				ONE SIGMA ERROR
Latitude:	44°13'06.839544"	Northing:	444287.471	0.023
Longitude:	121°08'56.092691"	Easting:	3335246.962	0.017
Convergence:	+0°05'37.4760"	Ell Height:	3046.15	0.048
Scale Factor:	1.000161418636	Ortho Height:	3111.01	0.056
Combined Factor:	1.00001583	Geoid Height:	-64.86	

MARK DATA SHEET

NAME OF MARK:	15133600	COUNTY:	DESCHUTES
MARK SET BY:	LS 2282 KENNETH L. GRANTHAM	STATE:	OREGON
DATE OF MARK:	1995	COUNTRY:	U.S.A.
LOCATION:	SECTION 36 TOWNSHIP 15 S	RANGE	13 E
REFERENCE:	OCRR	1295	

MARK SKETCH:



DATA CUMPUTED BY:	DESCHUTES COUNTY SURVEYOR'S OFFICE	DATE:	1995
METHOD-EQUIPMENT:	GPS-TRIMBLE 4000SSE GEODETIC	ADJUSTED WITH:	TRIMNET

HOIZONTAL DATUM:	NAD 83 (91)	VERTICAL DATUM:	NAVD 29
PROJECTION:	TRANSVERSE MERCATOR	ZONE:	CENTRAL OREGON LCS
CENTRAL MERIDIAN:	W 121° 17'00.00"	ORIGIN NORTHING:	0.00F
LATITUDE OF ORIGIN:	N 43° 00'00.00"	ORIGIN EASTING:	3,300,000.00F
LINEAR UNITS:	INTERNATIONAL FOOT	SCALE ALONG MERIDIAN:	1.0001600

GEODETIC AND MAPPING COORDINATES

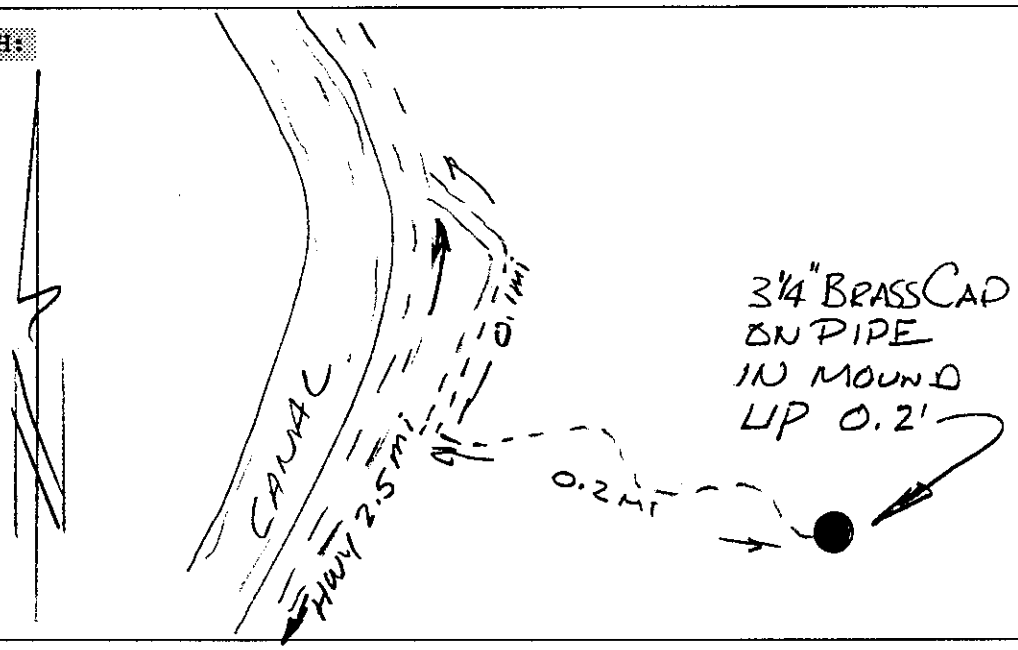
MARK: 15133600 HORIZONTAL ORDER: FIRST

				ONE SIGMA ERROR
Latitude:	44°13'06.683323"	Northing:	444280.964	0.025
Longitude:	121°07'43.389314"	Easting:	3340542.579	0.017
Convergence:	+0°06'28.1790"	Ell Height:	3052.43	0.050
Scale Factor:	1.000161876941	Ortho Height:	3117.17	0.058
Combined Factor:	1.00001599	Geoid Height:	-64.74	

MARK DATA SHEET

NAME OF MARK:	15140600	COUNTY:	CROOK
MARK SET BY:	LS 1031 W. C. KAUFFMAN	STATE:	OREGON
DATE OF MARK:	1994	COUNTRY:	U.S.A.
LOCATION:	SECTION 6 TOWNSHIP 15 S RANGE 13 E		
REFERENCE:	OCRR 1260		

MARK SKETCH:



DATA CUMPUTED BY:	DESCHUTES COUNTY SURVEYOR'S OFFICE	DATE:	1995
METHOD-EQUIPMENT:	GPS-TRIMBLE 4000SSE GEODETIC	ADJUSTED WITH:	TRIMNET

HOIZONTAL DATUM:	NAD 83 (91)	VERTICAL DATUM:	NAVD 29
PROJECTION:	TRANSVERSE MERCATOR	ZONE:	CENTRAL OREGON LCS
CENTRAL MERIDIAN:	W 121° 17'00.00"	ORIGIN NORTHING:	0.00F
LATITUDE OF ORIGIN:	N 43° 00'00.00"	ORIGIN EASTING:	3,300,000.00F
LINEAR UNITS:	INTERNATIONAL FOOT	SCALE ALONG MERIDIAN:	1.0001600

GEODETIC AND MAPPING COORDINATES

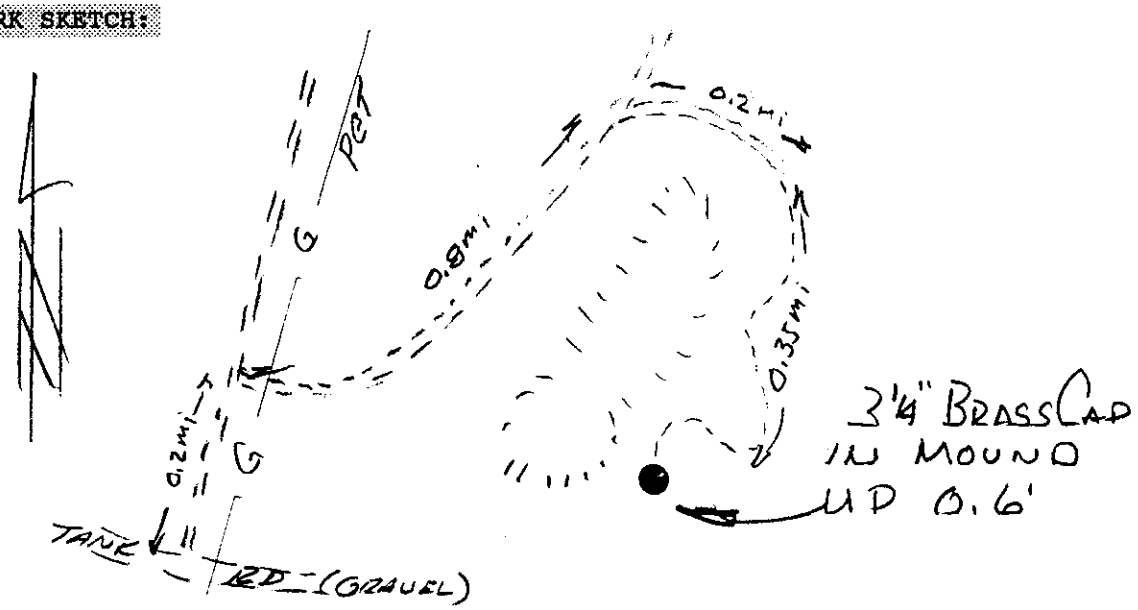
MARK: 15140600 HORIZONTAL ORDER: FIRST

				ONE SIGMA ERROR
Latitude:	44°17'27.894760"	Northing:	470747.855	0.021
Longitude:	121°06'29.484040"	Easting:	3345869.278	0.017
Convergence:	+0°07'20.2925"	Ell Height:	2921.90	0.044
Scale Factor:	1.000162402505	Ortho Height:	2986.76	0.053
Combined Factor:	1.00002275	Geoid Height:	-64.86	

MARK DATA SHEET

NAME OF MARK:	15141900	COUNTY:	CROOK
MARK SET BY:	LS 1031 W. C. KAUFFMAN	STATE:	OREGON
DATE OF MARK:	1994	COUNTRY:	U.S.A.
LOCATION:	SECTION 19	TOWNSHIP 15 S	RANGE 13 E
REFERENCE:	OCRR	1261	

MARK SKETCH:



DATA CUMPUTED BY:	DESCHUTES COUNTY SURVEYOR'S OFFICE	DATE:	1995
METHOD-EQUIPMENT:	GPS-TRIMBLE 4000SSE GEODETIC	ADJUSTED WITH:	TRIMNET

HOIZONTAL DATUM:	NAD 83 (91)	VERTICAL DATUM:	NAVD 29
PROJECTION:	TRANSVERSE MERCATOR	ZONE:	CENTRAL OREGON LCS
CENTRAL MERIDIAN:	W 121° 17'00.00"	ORIGIN NORTHING:	0.00F
LATITUDE OF ORIGIN:	N 43° 00'00.00"	ORIGIN EASTING:	3,300,000.00F
LINEAR UNITS:	INTERNATIONAL FOOT	SCALE ALONG MERIDIAN:	1.0001600

GEODETIC AND MAPPING COORDINATES

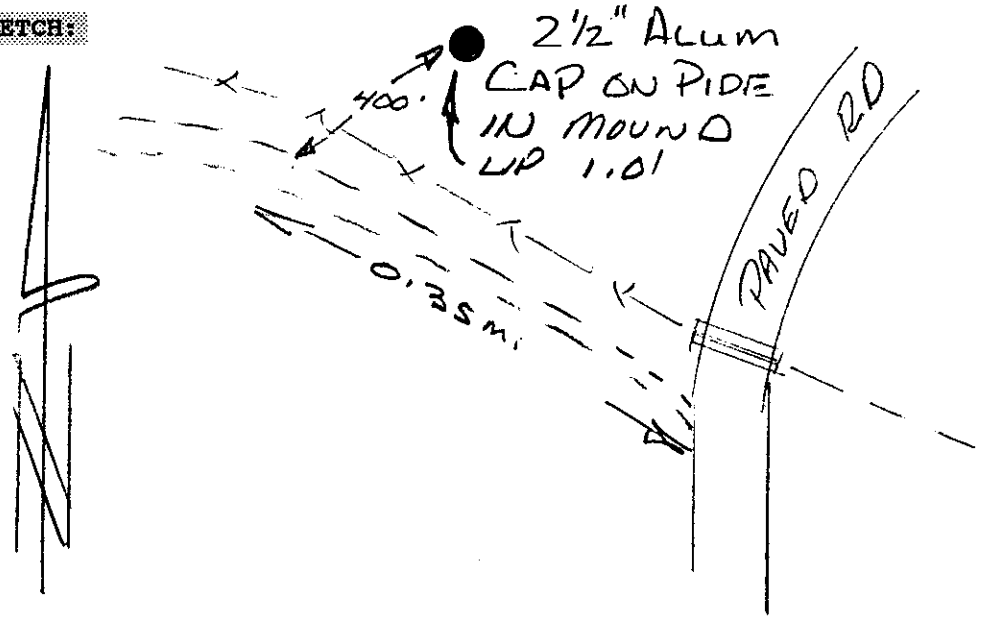
MARK: 15141900 HORIZONTAL ORDER: FIRST

				ONE SIGMA ERROR
Latitude:	44°14'51.107643"	Northing:	454867.951	0.016
Longitude:	121°06'30.182072"	Easting:	3345852.343	0.012
Convergence:	+0°07'19.4622"	Ell Height:	3019.52	0.035
Scale Factor:	1.000162400756	Ortho Height:	3084.26	0.045
Combined Factor:	1.00001809	Geoid Height:	-64.74	

MARK DATA SHEET

NAME OF MARK:	15143000	COUNTY:	CROOK
MARK SET BY:	LS 1026 DAVID ARMSTRONG	STATE:	OREGON
DATE OF MARK:	1993	COUNTRY:	U.S.A.
LOCATION:	SECTION 30 TOWNSHIP 15 S RANGE 13 E		
REFERENCE:	OCRR 1304		

MARK SKETCH:



DATA CUMPUTED BY:	DESCHUTES COUNTY SURVEYOR'S OFFICE	DATE:	1995
METHOD-EQUIPMENT:	GPS-TRIMBLE 4000SSE GEODETIC	ADJUSTED WITH:	TRIMNET

HOIZONTAL DATUM:	NAD 83 (91)	VERTICAL DATUM:	NAVD 29
PROJECTION:	TRANSVERSE MERCATOR	ZONE:	CENTRAL OREGON LCS
CENTRAL MERIDIAN:	W 121° 17'00.00"	ORIGIN NORTHING:	0.00F
LATITUDE OF ORIGIN:	N 43° 00'00.00"	ORIGIN EASTING:	3,300,000.00F
LINEAR UNITS:	INTERNATIONAL FOOT	SCALE ALONG MERIDIAN:	1.0001600

GEODETIC AND MAPPING COORDINATES

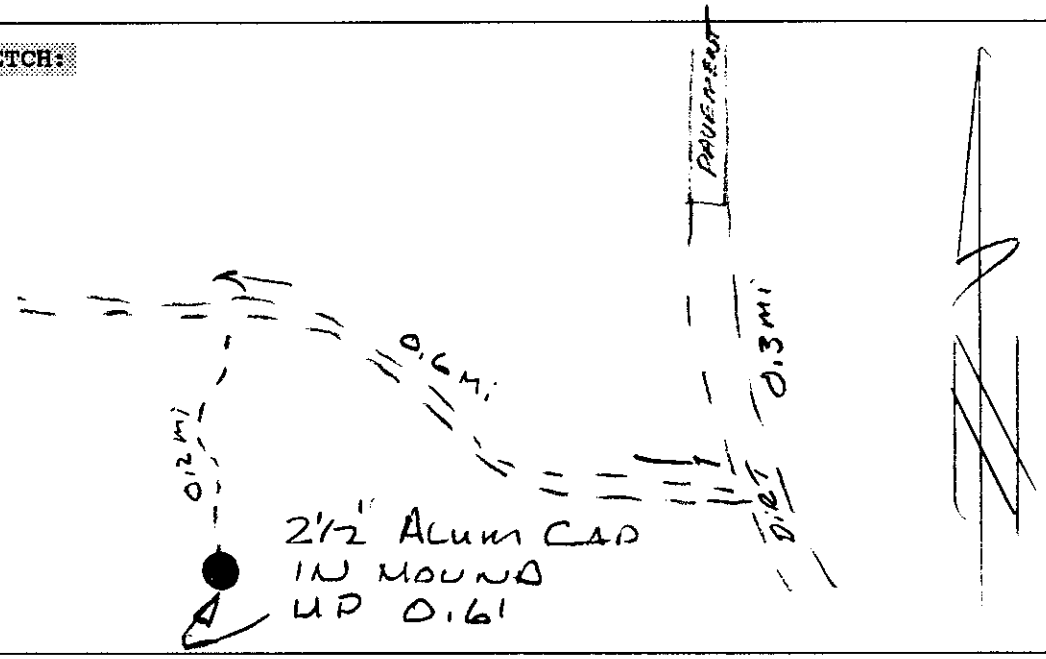
MARK: 15143000 HORIZONTAL ORDER: FIRST

				ONE SIGMA ERROR
Latitude:	44°13'58.865055"	Northing:	449576.663	0.021
Longitude:	121°06'30.523085"	Easting:	3345838.783	0.017
Convergence:	+0°07'19.1100"	Ell Height:	3027.48	0.051
Scale Factor:	1.000162399345	Ortho Height:	3092.17	0.059
Combined Factor:	1.0000177	Geoid Height:	-64.69	

MARK DATA SHEET

NAME OF MARK:	15143100	COUNTY:	CROOK
MARK SET BY:	LS 1026 DAVID ARMSTRONG	STATE:	OREGON
DATE OF MARK:	1993	COUNTRY:	U.S.A.
LOCATION:	SECTION 31 TOWNSHIP 15 S RANGE 13 E		
REFERENCE:	OCRR 1255		

MARK SKETCH:



DATA CUMPUTED BY:	DESCHUTES COUNTY SURVEYOR'S OFFICE	DATE:	1995
METHOD-EQUIPMENT:	GPS-TRIMBLE 4000SSE GEODETIC	ADJUSTED WITH:	TRIMNET

HOIZONTAL DATUM:	NAD 83 (91)	VERTICAL DATUM:	NAVD 29
PROJECTION:	TRANSVERSE MERCATOR	ZONE:	CENTRAL OREGON LCS
CENTRAL MERIDIAN:	W 121° 17'00.00"	ORIGIN NORTHING:	0.00F
LATITUDE OF ORIGIN:	N 43° 00'00.00"	ORIGIN EASTING:	3,300,000.00F
LINEAR UNITS:	INTERNATIONAL FOOT	SCALE ALONG MERIDIAN:	1.0001600

GEODETIC AND MAPPING COORDINATES

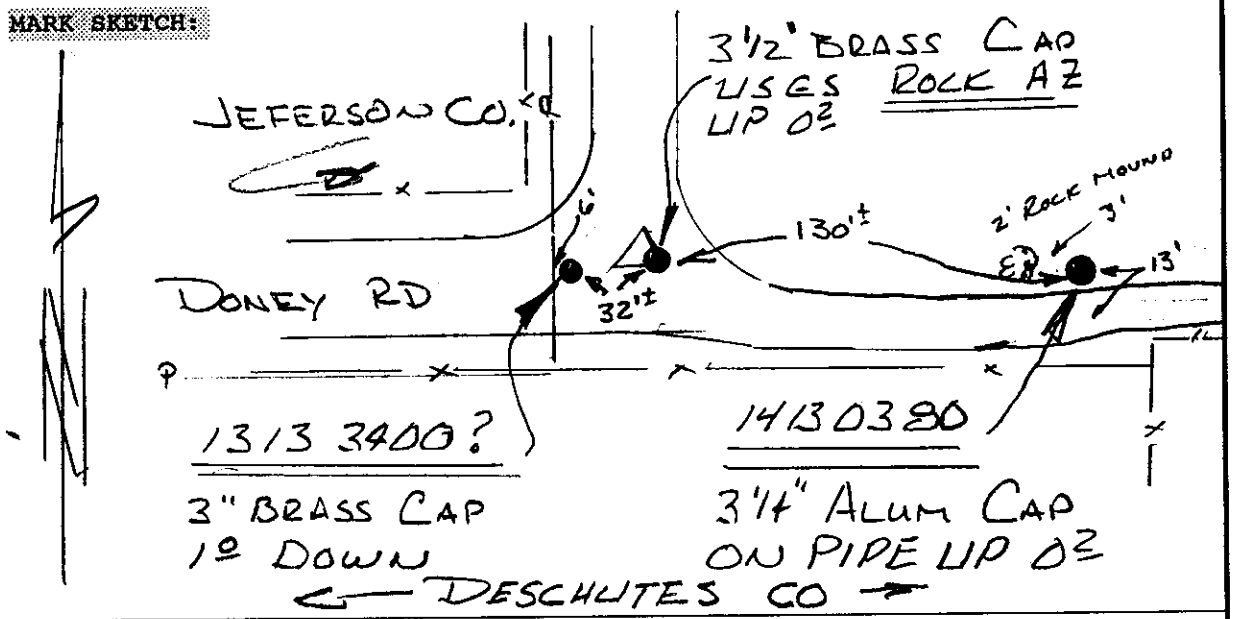
MARK: 15143100 HORIZONTAL ORDER: FIRST

				ONE SIGMA ERROR
Latitude:	44°13'06.668482"	Northing:	444290.071	0.015
Longitude:	121°06'30.731674"	Easting:	3345834.842	0.013
Convergence:	+0°07'18.8504"	Ell Height:	3037.04	0.042
Scale Factor:	1.000162398940	Ortho Height:	3101.67	0.051
Combined Factor:	1.00001725	Geoid Height:	-64.62	

MARK DATA SHEET

NAME OF MARK:	ROCK AZ 1945	COUNTY:	JEFFERSON
MARK SET BY:	U.S. C. & G.S.	STATE:	OREGON
DATE OF MARK:	1945	COUNTRY:	U.S.A.
LOCATION:	SECTION 34	TOWNSHIP 13 S	RANGE 13 E
REFERENCE:	NONE		

MARK SKETCH:



DATA CUMPUTED BY:	DESCHUTES COUNTY SURVEYOR'S OFFICE	DATE:	1995
METHOD-EQUIPMENT:	GPS-TRIMBLE 4000SSE GEODETIC	ADJUSTED WITH:	TRIMNET

HOIZONTAL DATUM:	NAD 83 (91)	VERTICAL DATUM:	NAVD 29
PROJECTION:	TRANSVERSE MERCATOR	ZONE:	CENTRAL OREGON LCS
CENTRAL MERIDIAN:	W 121° 17'00.00"	ORIGIN NORTHING:	0.00F
LATITUDE OF ORIGIN:	N 43° 00'00.00"	ORIGIN EASTING:	3,300,000.00F
LINEAR UNITS:	INTERNATIONAL FOOT	SCALE ALONG MERIDIAN:	1.0001600

GEODETIC AND MAPPING COORDINATES

MARK: ROCK AZ 1945 HORIZONTAL ORDER: FIRST

				ONE SIGMA ERROR
Latitude:	44°23'26.274518"	Northing:	507017.905	0.020
Longitude:	121°10'07.596667"	Easting:	3329951.122	0.017
Convergence:	+0°04'48.4955"	Ell Height:	2690.00	0.050
Scale Factor:	1.000161024321	Ortho Height:	2755.00	0.058
Combined Factor:	1.00003246	Geoid Height:	-65.00	