

Smith Hill Pass: 1940



**Malcolm Drake, Gradient Consultant
Jumpoff Joe Creek**

**Kelly Rarey, Member
GLO Field Review Subcommittee
Hugo Emigrants Trails Committee**

**Mike Walker, Co-Project Leader,
Hugo Emigrant Trails Committee
Hugo Neighborhood Association & Historical Society**

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Smith Hill Pass: 1940

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Edited by Malcolm Drake, Kelly Rarey, and Mike Walker.

Smith Hill Pass: 1940

I. PURPOSE

The purpose of this paper is to research Smith Hill Pass as it existed in 1940 before the 1921 - 1922 Pacific Highway road base was cut in 1941 and to research the relationship of the Smith Hill Pass to the gradient of the 310' segment of the Applegate Trail at Mt. Sexton Pass.

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Web Page: <http://www.hugoneighborhood.org/>

II. RESOURCES

The creek next to the 310' segment of the Applegate Trail at Mt. Sexton Pass is locally known as Maple Creek. This creek is unnamed on the 1998 Merlin, Oregon Quadrangle.

A. 1923 Oregon Riddle Quadrangle

The *Oregon Riddle Quadrangle*¹⁴ at a scale of 1:125,000 and a contour of 100' creates difficulties in estimating the Smith Hill Pass's original elevation. The Smith Hill Pass is contained between the 2,000' and 2,100' Contours. The distance in a north-south direction between these contours is approximately 940'. This distance provides little useful information concerning the specific location of the summit except that it is relatively broad and flat.

There is a cultural dot on the *Oregon Riddle Quadrangle* adjacent and east of the wagon road (i.e., Applegate Trail) exactly where we would expect the Smith house to be located (Section II.B; Map 1).

B. 1940 Smith Hill Pass Oregon Highway Right-Of-Way Map

Oregon State Highway Department. August 1940. *Right of Way Map, Sexton Mt. Section. Pacific Highway, Josephine County* (Map 2).¹¹

1. *John Smith Family: Hugo Pioneers*

John Smith Family: Hugo Pioneers. Very Draft Brochure 73 in Hugo's Pioneers Brochure Series. Hugo, OR (Map 2).⁷

1877 "John and Susan took up a one hundred and sixty acre homestead in a meadow on the north side of Sexton Mountain. This meadow is where the present Interstate 5 freeway cut is located. At the time they homesteaded, the overland stage road ran through this property. John and Susan farmed their homestead until just after the turn of the century."¹⁰

1896 Hugo Homestead On September 16, 1896 John S. W. Smith was issued a homestead patent for 160 acres in Hugo, Oregon (Patent No. 3749).

2. John Smith Family: House, Barn, & Other Structures

The structures identified on the August 1940 Oregon Highway Drawing. No. 5B-28-11 were all at the Mt. Sexton Summit or north of it, and all were north of the 1/4 section line of Section 23, T.34.S., R.6 W., W.M as this was the southern boundary of the Smith 160 acre homestead (Map 2).¹¹ These structures themselves had some distance between them. For example, it was 245' in a north-south direction from the Chicken House to House No. 3 and 455' in an east-west direction between the barn and the Hog House.

Table 1. Measurements of Smith Buildings to 1/4 Section for Sections 22 and 23¹			
Buildings²	Dimensions	Distance fm 1/4 Corner.³	Comments
Barn	25' x 42'	750' E; 340' N	Assumption: Old Smith barn
Ch. Ho.	10' x 10'	1,075' E; 570' N	Chicken House
Ho. 1	40' x 32'	975' E; 460' N	Assumption: Old Smith house
Ho. 2	15' x 25'	1,050' E; 430' N	House
Gar.	12 x 15'	960' E; 390' N	Garage
Ho. 3	25' x 25'	960' E; 310' N	House
Hog Ho.	12' x 10'	1,195' E; 475' N	Hog House ⁴
Weather Bld	6' x 8'	835' E; 185' N	U.S. Weather Bureau Storage Building
"No name"	30' x 20'	890' E; 45' N	This is the only parallelogram symbol with hash marks inside its boundaries. This symbol is not identified and the meaning of the hash marks is unknown.

1. Oregon State Highway Department. August 1940. *Right of Way Map, Sexton Mt. Section. Pacific Highway, Josephine County*. Scale 1" = 100'. Part 1 of 2, Drg. No. 5B-28-11. The houses were probably part of the Mt. Sexton Summit Auto Court (<http://www.hugoneighborhood.org/autocamp.htm>). The barn and House No. 1 were probably the old smith homestead (Table 1; Map 2).

2. Building: Ch. Ho. = chicken house; Ho. = house; gar = garage.

3. Distance is from the quarter corner (1/4) of sections 22 and 23, T.34S., R.6W., W.M. as measured to the approximate center of buildings. All identified buildings have a square or rectangle shape. The exception is the one unidentified parallelogram.

4. The location of the "Hog House" was definitively found by Malcolm Drake, Kelly Rarey, and Mike Walker on a field trip to the area.

Table 2. Roads¹

The paved Pacific Highway is located on Drawing No. 5B-28-11 and the 1998 Merlin Quad (Map 2; Map 4A). On Map 2 it is 1,000' east of 1/4 corner of sections 22 and 23, T.34.S., R.6 W., W.M.¹¹

It is 80' east of the Smith barn.

It is 138' east of the fence west of the barn.

The Eastern Up Ridge Road is located on Drawing No. 5B-28-11 and the 1998 Merlin Quad (Map 2; Map 4A). This corner is 310' east of the middle of the old Pacific Highway across from the Smith Barn. The Eastern Up Ridge Road is located on Drawing No. 5B-28-11 and the 1998 Merlin Quad; they match per an overlay test.

The Eastern Up Ridge Road is located on the 1998 Merlin Quad. Its southwestern most corner is 50' east of the realigned Pacific Highway per 1998 Merlin Quad.¹⁷

The Western Up Ridge Road is located on Drawing. No. 5B-28-11 and found on ground.¹¹

Maple Creek at the Old Pacific Highway is 250' south of the east-west 1/4 section line of Section 23, T.34.S., R.6 W., W.M.¹

11. Oregon State Highway Department. August 1940. *Right of Way Map, Sexton Mt. Section. Pacific Highway, Josephine County.* Scale 1" = 100'. Part 1 of 2, Drg. No. 5B-28-11.

All measurements are along true courses east-west or north-south from and to the middle of a feature.

Table 3. 310 Segment Of Applegate Trail At Mt. Sexton Pass¹

The 310' Segment Of Applegate Trail At Mt. Sexton Pass is located on Oregon Highway Drawing. No. 5B-28-11 (Map 3). The "South Edge" of the 310' Segment is located 505' East and 598' South from the 1/4 corner of sections 22 and 23, T.34.S., R.6 W., W.M.¹¹ The "South Edge" is the middle of the county road where it first intersects the right-of-way for the Pacific Telephone and Telegraph line.

The average physical width of the 310' Segment of the Applegate Trail was 9' on the ground. Drawing measurements ranged from 8' -10', but predominately 8' - 9' from the August 1940 Drawing No. 5B-28-11, within 310' of Pacific Telephone and Telegraph ROW crossing.¹¹

The average course of the road was 44.5 " True per the 1940 Drawing No. 5B-28-11.¹¹

The average 2011 gradient of the northern part of the 310' Segment Of Applegate Trail was 6.5 Degrees/11.5 Percent.^{2A}

11. Oregon State Highway Department. August 1940. *Right of Way Map, Sexton Mt. Section. Pacific Highway, Josephine County.* Scale 1" = 100'. Part 1 of 2, Drg. No. 5B-28-11.

3. 1941 Right-of-way Cleared on Sexton The photo is courtesy of the *Grants Pass Courier* with the following caption (Photo 1).³

“The residence [John S. W. Smith homesteaded in 1877; he was issued a homestead patent for 160 acres in Hugo, Oregon September 16, 1896 (Patent No. 3749)] overlooking the Pacific highway summit [Smith Hill] on the shoulder of Mt. Sexton has been razed, and trees are being felled for 1.92 miles of new construction soon to take place there. Here is a view toward the summit from the Grants Pass side showing the steep, old dirt road on the left [Applegate Trail], the curving present highway on the right [Old Pacific Highway/U.S. 99], and the felled trees on the right-of-way of the new work. The highway summit will be lowered several feet by a deep cut. (Courier Photo and Engraving.)” (Photo 1).³

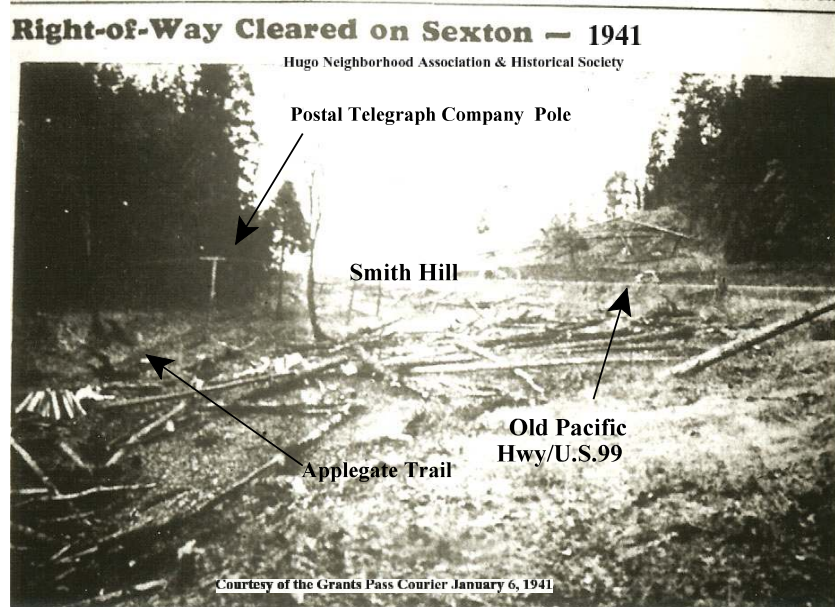


Photo 1. Right-Of-Way Cleared On Mt. Sexton Pass: 1941
Courtesy of Grants Pass Courier

4. Postal Telegraph Company

Lines were built through Josephine County around 1886 - 1887. The PT company operated the line until they had six-pin cross arms. The neat thing about the PT line was that in the middle of WWII it merged with Western Union and the lines were left in place and they disintegrated into the ground. Howard Banks, Insulator Expert, identified a down pole at the south end of the 310' segment of the Applegate Trail as a Postal Telegraph Company pole part of a line from the 1886 - 1887 when everything was pole to pole (Photo 2).⁵

C. 1954 USGS Glendale, Oregon Quadrangle

1954 Mt. Sexton Pass At a scale of 1:62,500 and a contour of 80' it is difficult to estimate the Mt. Sexton Pass's elevation.¹⁵ The Sexton Mt. Pass is contained between the 1,920' and 2,000' contours. The distance in a north-south direction between these contours is approximately 1,584'. This distance provides little useful information concerning the location of the summit except that it is relatively broad and flat.

Bummer Creek The 1954 USGS topo identifies Bummer Creek with two unnamed tributaries, one of which is the creek by the 310' segment of the Applegate Trail in section 23 and the other unnamed tributary goes through the Kennison Reservoir in section 28.

D. 1970 Rogue Drainage Basin Map

Walker feels that the *Rogue Drainage Basin, Oregon* map is a very detailed map and the only one he has found that identifies and locates Antler Creek which is a tributary of Jumpoff Joe Creek (very close and upstream from Schoolhouse Creek) and Maple Creek which appears to be the unnamed south fork of Rat Creek.¹² It is also much more comprehensive in identifying springs and reservoirs.



Taking out lower cut thru Summit. Looking S. from S. side of summit cut. Detour in foreground & finish grade in background. Grave Cr.-Jumpoff Joe Cr. Sec., Pac. Hwy. #1845

Photo 2. Looking South From Mt. Sexton Summit On Old Pacific Highway: 1941

Courtesy of Oregon Department of Transportation

Bummer Creek is identified as being the creek next to the 310' segment of the Applegate Trail at Mt. Sexton Pass; it is locally known as Maple Creek. This creek is unnamed on the 1998 Merlin, Oregon Quadrangle. The headwaters of Bummer Creek is the stream that passes through the Kennison Reservoir in section 28; it is also unnamed on the 1998 quad.

There are three springs (quotes from map follow: “Olden Spr, Canteen Spr, and Maple G Spr”) identified in the very NE corner of section 27. These springs are not identified on the 1954 Glendale, Oregon Quad nor the 1998 Merlin, Oregon Quad.

E. 1998 Merlin, Oregon Quadrangle & 1996 Sexton Mountain, Oregon Quadrangle

1998 Mt. Sexton Pass At a scale of 1:24,000 and a contour of 40' the 1998 Mt. Sexton Pass's elevation can be estimated (Map 4A).¹⁷ The Sexton Mt. Pass is contained between the 2,000' and 1,960' contours. The ODOT I-5 highway sign at

Mt. Sexton Pass identifies the elevation as 1,960'. The National Weather Service Forecast Office identifies it as 1,956' (Appendix A). The distance in a north-south direction between these contours is approximately 400'. This distance provides little useful information concerning the location of the summit except that it is relatively broad and flat.

Bummer Creek The 1998 Merlin, Oregon Quadrangle identifies Bummer Creek with three unnamed tributaries, one of which is the creek by the 310' segment of the Applegate Trail in section 23, another unnamed tributary which originates in section 22, and the third other unnamed tributary goes through the Kennison Reservoir in section 28.

F. USGS Bench Marks

USGS elevation bench marks were obtained from the Josephine County Surveyor's Office.

1. Old Pacific Highway

N 293 (Oregon State Highway Department - OSHD)

K 293 [Mount Sexton Summit: 1945] (Oregon State Highway Department - OSHD) – 16.6 miles north of Grants Pass along the old alignment of the Pacific Highway. 7.4 miles south of Wolf Creek post office along the new alignment of Pacific Highway (US Highway 99). 2.7 miles south of bridge over Grave Creek, in a large cut on the summit of Sexton Mountain, 350 feet north from the upper end of a 36 inch concrete culvert [Maple Creek?] near the south end of the cut, 35 feet east of highway center line, 1.5 feet above the pavement on a flat rock. An OSHD disk stamped "K 293 1945" and set in concrete post. 1961.659 feet (by OSHD 1966)

K 256 [Smith Hill Pass: 1934] (USC&GS&SS) – About 14.2 miles north of Grants Pass on Pacific Highway (US Highway 99) old alignment. Near summit of Sexton Mountain Pass, south of milepost 264, 84 feet west of highway, 87 feet south of pole barn, near pole in barnyard, in rock outcrop. A disk stamped "2053 K 256 1934" 2,053.724 feet. Map 2.

L 256 (USC&GS&SS)

2. Interstate 5 (I-5)

M 748 1987 [Mount Sexton Summit: 1987] Approximately 2.35 miles south along I-5 from Lariat Drive in Sunny Valley, in large bedrock cut, 29.9' south of sign (Sexton Mt. Pass), 29.5' east of centerline of north bound lane, bench mark (B.M.) Disk MKD "M 748 1987". Bench mark number M 748 is 1,962.0119' in elevation (NGV88_Elev) set in 1987. Condition is good.

On November 22, 2011 Malcolm Drake and Mike Walker drove to the location of Bench Mark M 748. They measured 29.9' from the south face of the west Sexton Mt. Pass sign support post. They recorded a measurement of 149" (12' 5") east from the white centerline of the north bound I-5 lane to the center of the white fog line. They then measured the remaining distance of 17' 1" to equal 29.5' which was the location at the outer edge of the concrete gutter curb. They dug with a shovel approximately 4" deep and 2' wide into the highway debris without finding the bench mark.

III. SMITH HILL PASS: 1940

A. General Description Of Smith Hill Pass

It is difficult to estimate the Smith Hill Pass's elevation from the 1923 *Oregon Riddle Quadrangle* at a scale of 1:125,000 and a contour of 100' (Map 1).¹⁴ The Smith Hill Pass is contained between the 2,000' and 2,100' contours. The distance in a north-south direction between these contours is approximately 940'. This distance provides little useful information concerning the location of the summit except that it is relatively broad and flat.

The structures identified on the August 1940 Oregon Highway Department Drawing. No. 5B-28-11 were all on the north side of Mt. Sexton Summit (Table 1; Map 2).¹¹ These structures themselves had some distance between them. For example, it was 245' in a north-south direction from the Chicken House. to the House. No. 3 and 455' in an east-west direction between the barn and the Hog House. It is estimated that the old original summit is in the general location of "Summit Y 3" on Map 2.

At a scale of 1:62,500 and a contour of 80' it is difficult to estimate the Mt. Sexton Pass's elevation from the 1954 Glendale quadrangle.¹⁵ The Sexton Mt. Pass is contained between the 1,920' and 2,000' contours. The distance in a north-south direction between these contours is approximately 1,584'. This distance provides little useful information concerning the location of the summit except that it is relatively broad and flat.

At a scale of 1:24,000 and a contour of 40' the 1998 Mt. Sexton Pass's elevation can be estimated from the 1998 Merlin, Oregon Quadrangle (Map 4A).¹⁷ The Sexton Mt. Pass is contained between the 2,000' and 1,960' contours. The ODOT highway sign at Mt. Sexton Pass identifies the elevation at 1,960'. The National Weather Service Forecast Office identifies it as 1,956' (Appendix A). The distance in a north-south direction between these contours is approximately 400'. This distance provides little useful information concerning the location of the summit except that it is relatively broad and flat.

B. Original Smith Hill Pass Elevation

According to Harrington, the original summit was 2,046' "*According to a sign that was there when Harrington visited in November, 1933, the elevation of the pass was 2,046'.*"⁴

Smith Hill Summit Fm Secs 22 & 23 1/4 Cor 380' North; 818" East	B.M. K 256 Fm Secs 22 & 23 1/4 Cor 235' North; 780' East
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In 1934 there used to be a bench mark (B.M) K 256 with an elevation of 2,053.724' near the summit of Sexton Mountain Pass along the old Pacific Highway, south of milepost 264, 84' west of highway, 87' south of pole barn, near pole in barnyard, and in rock outcrop (Section II.F.1.).

Bench Mark K 256 was approximately 10' west of the pole (Map 2). The working hypothesis was that the pole was one of the 1864 Collin's Telegraph Line poles. The location of K 256, the pole barn, pole, and Pacific Highway are identified on Map 2. Therefore, the summit at general location of "Summit Y 3" on Map 2 has to be higher than 2,053.724'.

Summit "Y" 3 is the northern junction of the Pre-Pacific Highway (Applegate Trail North Pass) and the paved 1921 - 1922 Pacific Highway which is assumed to be the Smith Hill Summit (Map 2).

C. Smith Hill/Sexton Pass Highway Cuts

In civil engineering, a cut or cutting is where soil or rock material from a hill or mountain is cut out to make way for a canal, road or railway line.

In cut and fill construction it keeps the route straight and/or flat, where the comparative cost or practicality of alternate solutions (such as diversion) is too prohibitive. Contrary to the general meaning of cutting, a cutting in construction is mechanically excavated or blasted out with carefully placed explosives. The cut may only be on one side of a slope, or directly through the middle or top of a hill. Generally, a cut is open at the top (otherwise it is a tunnel). A cut is (in a sense) the opposite of an embankment.

When used in reference to transportation routes, it reduces the grade of the route. This was the case and purpose of the Smith Hill Pass Cut, to reduce to grade of the highway over the pass.

1. Pacific Highway Side Hill Cut (Smith Hill Pass): 1921 - 1922

It is unknown how much highway was cut at Smith Hill Pass from 1921 - 1922 when the Pacific Highway was paved for the first time. It is assumed that mostly there was little cut to reduce the grade over Smith Hill Pass. It is also assumed that there were side hill cuts in the Pacific Highway near Smith Hill Pass for the purpose of establishing a level road base. A side hill cut of approximately 8' - 10' can be seen in Photo 1.

In 1934 there used to be a bench mark (B.M) K 256 with an elevation of 2,053.724' near the summit of Sexton Mountain Pass along the old Pacific Highway, south of milepost 264, 84' west of highway, 87' south of pole barn, near pole in barnyard, and in rock outcrop (Section II.F.1.). B.M. K 256 was approximately 10' west of the pole (Map 2). Summit "Y" 3 is the northern junction of the Pre-Pacific Highway (Applegate Trail North Pass) and the paved 1921 - 1922 Pacific Highway which is assumed to be the Smith Hill Summit (Map 2). The 1939 aerial photograph clearly shows the paved 1921 - 1922 Pacific Highway, including where it angles toward the center and lowest point a Smith Hill Pass very close to the Smith barn also clearly visible (Aerial 1A).

The 1939 aerial photograph of Smith Hill Pass also clearly shows the pre-paved 1921 - 1922 Pacific Highway/Applegate Tail North Pass segment (Aerial 1A; Map 2; Aerial 2A) and the pre-paved 1921 - 1922 Pacific Highway/Applegate Trail South Pass (Aerial 1A; Map 3; Aerial 2A).

The 1939 aerial photograph does not show the Eastern Upridge Road that can be identified in the later 1959 aerial photograph and the 1998 Merlin Quadrangle. It might show the Western Upridge Road, but hard to tell as the resolution is poor. The other Smith structures might be there in the trees, but they are not easily discernible (Table 1).

2. Pacific Highway Cut (Smith Hill Pass): 1941

It is assumed that most of the Smith Hill Pass cut occurred in 1941 down to at or near its present elevation of 1,960' (Photo 2 & Photo 3). The 1945 Bench Mark K 293 at Mount Sexton Summit was 1961.659 feet (Section II.F.1). Best estimate from recorded data was that the cut was 84' (2,046' - 1,962' = 84').

The 1959 aerial photograph clearly shows Sexton Mt. Pass after the 1941 cut (Aerial 2A; Aerial 2B). The 1959 aerial photograph also shows the paved 1921 - 1922 Pacific Highway, minus the area over Sexton Mt. Pass. The Smith barn and most of the other Smith structures are gone (Aerial 1A; Aerial 1B). The location of the Hog House was not destroyed by the 1941 cut nor any I-5 cut and is still clearly visible in the ground. In 1941 the U.S. Weather Bureau storage building (Map 2) had been moved to a concrete pad at the base of the Eastern Upridge Road and had been there for many years until around 2009.

The 1959 aerial photograph of Sexton Mt. Pass also clearly shows the pre-paved 1921 - 1922 Pacific Highway/Applegate Tail North Pass segment (Aerial 1A; Map 2; Aerial 2A). The details for the pre-paved 1921 - 1922 Pacific Highway/Applegate Trail South Pass are not quite as evident, but are visible (Aerial 1A; Map 3; Aerial 2A).

The 1959 aerial photograph shows the Eastern Upridge Road that can be identified in the later 1998 Merlin Quadrangle. It might show parts of the Western Upridge Road higher up the ridge closer to the Pacific Telephone buried right-of-way (ROW), but it is hard to tell as the vegetation has grown.



Photo 3. Looking North Toward Mt. Sexton Pass: 1941
Courtesy of Oregon Department of Transportation

3. I-5 Cut (Sexton Pass): ca., 1959 - 1960

The 1959 aerial photograph clearly shows Sexton Mt. Pass after the 1941 cut and before any cut that might have occurred in 1959 - 1960 (Aerial 2A; Aerial 2B).

The C. O. P. Company transmission line (Pacific Power & Light Transmission Line No. 21) is identified on the 2011 assessor map for Section 22, T.34S., R.6W., W.M.

It is unknown if Sexton Mountain Pass was cut down further when I-5 was constructed. The working hypothesis was that it was not.

D. Sexton Mountain Pass: 2011

“Big Tree” in the 310' segment of the Applegate Trail on the south side of the Mt. Sexton Pass is clearly visible as well as the parking area off I-5 (Photo 4).



Photo 4. Looking South From Mt. Sexton Pass: 2004

IV. 310' SEGMENT OF APPLGATE TRAIL AT SOUTH MT. SEXTON PASS

Oregon State Highway Department (OSHD). August 1940. *Right of Way Map, Sexton Mt. Section. Pacific Highway, Josephine County*. Scale 1" = 100'. Part 1 of 2, Drg. No. 5B-28-11 (Map 3).^{5 & 11}

A. Properties Of Upper County Road At 310' Segment

Location: Mt. Sexton Pass, Near I-5 in Josephine County, Oregon.
I-5: Interstate Highway 5 (I-5) Mile Post 69
Length: 310' (Tape measurement)
North Edge: At downed log at I-5 cut (“North Edge/310' Segment”)
South Edge: Telephone right-of-way (ROW) Crossing (“South Edge/310' Segment”)
Photo 4. Modern View From Top Of Mt Sexton Pass
Width: 9.4' (Tape Measured - Ranged from 9' - 11' in width; average was 9.4').
Width: 9' (Drawing measurements ranged from 8' -10', but predominately 8' - 9' from August 1940 Drawing No. 5B-28-11, within 310' of Pacific Telephone and Telegraph ROW crossing.).
Course: ?? " True (Compass)
Course: 44.5 " True Azimuth (August 1940 Drawing No. 5B-28-11).

Gradient: 6.5 Degrees/11.5 Percent^{2A}

On September 15, 2011 two grades were surveyed for the 310' Segment Of Applegate Trail At Mt. Sexton Pass by Malcolm Drake and Mike Walker.^{2A}

Gradient Degrees: 6 Degrees/11 Percent. Six (6) degrees was the gradient Shot Location # 1 and Sight Location # 1 (6 degrees down from horizontal). Six (6) degrees gradient or slope is 11% gradient or slope. The distance between Shot Location # 1 and Sight Location No. # 1 is 66'.

Gradient Degrees: 7 Degrees/12 Percent. Seven (7) degrees was the gradient shot between Shot Location # 2 and Sight Location # 2 (7 degrees down from horizontal). Seven (7) degrees gradient or slope is 12 % gradient or slope. Sight Location # 2 was 84' downhill on the trail segment from Shot Location # 2.

Poles: Postal Telegraph/Telegraph Poles are located on the 1940 OSHD map (Photo 1).

Material: Dirt/Granite

Condition: Natural. Slumped on uphill side; vegetation starting to establish itself in road bed.

B. GPS Marks For Upper County Road At 310' Segment

On November 7, 2011 Malcolm Drake and Mike Walker traveled to Mt. Sexton Pass and took abney measurements and GPS marks.

North Edge At downed logs at I-5 cut (“North Edge/310' Segment”)

Mark 414

42° 36' 00.5" North Latitude
123° 22' 56.8" West Longitude

Big Tree

Mark 415

42° 35' 59.9" North Latitude
123° 22' 58.4" West Longitude

ODOT “△” Station The station is an ODOT stake with a “△” on it 149' northwest of wooden post holding telephone right-of-way (ROW) white box at South Edge (Mark 417).

Mark 416

42° 35' 59.0" North Latitude
123° 22' 59.2" West Longitude

South Edge Telephone ROW Crossing (“South Edge/310' Segment”) at I-5 Right-of-Way fence

Mark 417

42° 35' 58.2" North Latitude
123° 23' 00.5" West Longitude

Green box at buried transmission line had number “74-3” on it.

C. 1864 Collins Telegraph Line & 1886 - 1887 Postal Telegraph Line

The pole locations on the 1940 highway map¹¹ along the 310' section of the Applegate Trail represent two telegraph lines:

1. 1864 Collins Telegraph Line, and
2. 1886 - 1887 Postal Telegraph Line.

Both lines are in the same corridor for the lower segment of the 310' Applegate Trail. The 1864 Collins Telegraph Line is adjacent to the Trail. The later 1886 - 1887 Postal Telegraph Line breaks away from the Trail and heads in a more northerly direction over the pass. The 1864 pole locations are convincing evidence that the Hugo Emigrant Trails Committee’s original hypothesis is correct that the upper county road (310' segment) is the original Applegate Trail.

D. Lower County Road

For the last five years the lower road was assumed to be a product of cat work associated with the construction of I-5. However, the 1940 Drawing No. 5B-28-11 identifies two parallel county roads in the area of the 310' segment of the Applegate Trail. In 1940 the county roads intersected approximately 200' north of the “North Edge” of the Trail at the “Upper County Rd “Y” and approximately 375” south of the “South Edge” of the Trail at the “Lower County Road “Y” (Map 3).

Per Drawing No. 5B-28-11, they are approximately 70' - 80' apart at the location of the 310' segment of the Applegate Trail.

There had been an anomaly discovered in 2005 when a highway ROW sign was found downhill a couple hundred feet from the “South Edge” of the Trail (Photo



**Photo 5A. OR Hwy ROW Sign
At Lower County Road**

5A). It was just outside the I-5 ROW fence very close to the west side of Maple Creek.



Photo 5B. Oregon Hwy. ROW Sign At Lower Co. Rd.

The highway ROW sign identification follows (Photo 5B).

? H RW
L P.O S 6 ? 6+00
210

It is now obvious that the highway sign was identifying the Lower County Road.

E. Chain Tree

More recently in 2011 the more intensive Chain Tree analysis suggested a road lower than the Upper County Road.⁵ On Wednesday, August 31, 2011, at the South bound I-5 Sexton Mt. Trail head, a GPS Mark was taken (Map 4A).⁶

42" 35' 58.7" North Latitude
123" 22' 57.9" West Longitude

Chain Tree was downhill from the trail head approximately 150' (Mark 8 eyeball) on a course of 230" azimuth. The headwaters of Maple Creek were generally parallel and west of the line of travel to Chain Tree. A GPS Mark was taken at Chain Tree (Map 4A).⁶

42" 35' 57.0" North Latitude
123" 23' 00.0" West Longitude

V. ANALYSIS

The purpose of this paper is to research the Smith Hill Pass as it existed in 1940 before the 1921 - 1922 Pacific Highway road base was cut in 1941 and to research the relationship of the Smith Hill Pass to the gradient of the 310' segment of the Applegate Trail at Mt. Sexton Pass. It all breaks down into the best available and calculated information for several variables identified in Figure 1.

- Gradient of the 310' Trail Segment (∞)
- Location of North End of 310' Trail Segment (A)
- Elevation of North End of 310' Trail Segment (A)
- Elevation of Original Smith Hill Summit (B)
- Location of Original Smith Hill Summit (B)
- Elevation Difference Between A & B (h)
- Horizontal Distance Between A & B (d)

Slope Distance Between A & B (l)

On November 7, 2011 Malcolm Drake and Mike Walker traveled to Mt. Sexton Pass and took abney measurements and GPS marks.

A. Project Measurements & Calculations

Measure the distance (**d**) from the north end of the 310' segment of the Applegate Trail at Mt. Sexton Pass (area where Malcolm Drake shot the gradient (**A**)²) to an area on I-5 (S "Y" 2 on Map 2) where we estimate the old original Mt. Sexton Pass was located (**B**) (Photo 1).

Calculate/Estimate the elevation of the north end of the 310' segment (**A**) and the elevation of the original pass summit (**B**).

Do some algebra and project gradient from Drake's survey (i.e., 6 - 7 degrees, Section III²) to Mt. Sexton Pass Summit (from (**A**) to (**B**) in Figure 1).

B. Locations

1. Summit Of Mt. Sexton Pass (Point B)

Based upon topography maps and the 1940 Drawing. No. 5B-28-11, we assumed the original summit topography was relative broad and flat. Therefore, we would expect the calculated elevation of the summit would be lower than the actual elevation shown in Figure 1. In other words, the elevation value calculated for DELTA h in Figure 1 would not be high enough.

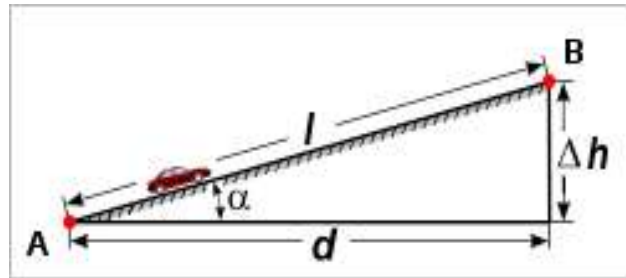


Figure 1. Grade Of Topographic Feature

The structures identified on the 1940 drawing were all on the north side of Mt. Sexton Summit. These structures themselves had some distance between them. For example, there was 245' in a north-south direction from the Chicken House to House # 3 and 455' in an east-west direction between the barn and the Hog House.

At a scale of 1:125,000 and a contour of 100' it is difficult to estimate the Mt. Sexton Pass's elevation from the 1923 Oregon Riddle Quadrangle. The Sexton Mt. Pass is contained between the 2,000' and 2,100' contours. The distance in a north-south direction between these contours is approximately 940'.

At a scale of 1:24,000 and a contour of 40' the 1998 Mt. Sexton Pass's elevation can be estimated from the 1998 Merlin Quad. The Sexton Mt. Pass is contained between the 2,000' and 1,960' contours. The ODOT highway sign at Mt. Sexton Pass identifies the elevation at 1,960'. The

National Weather Service Forecast Office identifies it as 1,956'. The distance in a north-south direction between these contours is approximately 400'. However, this is the lower cut elevation.

The best 1933 information available that is not in conflict with any other information for the elevation of the original Smith Hill Pass (B in Figure 1) is that recorded by Harrington.⁴ According to Harrington, the original summit was 2,046'

“According to a sign that was there when Harrington visited in November, 1933, the elevation of the pass was 2,046’.”



Photo 6. North Sexton Mt. Pass Sign

The best 1934 information is bench mark (B.M) K 256 with an elevation of 2,053.724' near the summit of Sexton Mountain Pass along the old Pacific Highway, south of milepost 264, 84' west of highway, 87' south of pole barn, near pole in barnyard, and in rock outcrop (Section II.F.1.; Map 2).

The best information available that is not in conflict with any other information for the elevation and location of today's Mt. Sexton Pass is the 2011 I-5 Sexton Mt. Pass Elevation Sign (Photo 6).

“Mile 69, Sexton Mt. Pass, Elev 1,960’”

This means that the total elevation cut was 86' from the original Smith Hill Summit and today's Sexton Mt. Pass.

In summary, actual DELTA h in Figure 1 is either 2,046' according to Harrington or a little higher than 2,054' according to B.M. K 256.

2. 310' Segment Of Applegate Trail At Mt. Sexton Pass (Point A)

The 310' Segment Of Applegate Trail At Mt. Sexton Pass is located on Drawing. No. 5B-28-11. Its southern boundary is located from the 1/4 corner of sections 22 and 23: 505' East and 585' South. The elevation estimated from the 1998 Merlin Quad for the north boundary of the 310' Segment Of Applegate Trail is 2,000'.

C. Distances

1. Horizontal Distance Between the Original Summit & Applegate Trail

A reasonable approximation for this distance would be to take measurements along the I-5 ROW from the estimated original Mt. Sexton Summit and the 310' Segment Of Applegate Trail At Mt. Sexton Pass. The distance from the "West" Sexton Mt. Pass elevation sign south to the north end of the 310' Segment Of Applegate Trail was measured November 7, 2011 to be 405'.

2. Slope Distance Between the Original Summit & Applegate Trail

The assumption that the calculated elevation of the original Smith Hill Summit would be lower than the actual elevation turned out to be correct. The calculated elevation of 2,039' was lower than the actual elevation of 2,046' - 2,054'. In other words, the elevation value calculated for DELTA h in Figure 1 would not be high enough because of the long relatively flat summit.

6.5"	Gradient of the 310' Trail Segment (∞)
1,969'	Calculated Elevation of North End of 310' Trail Segment (Point A)
2,039'	Calculated Elevation of Original Smith Hill Summit (Point B)
610'	Calculated Horizontal Distance Between Point A & Point B (d)

VI. SUMMARY

A. Drake Survey & Calculations

1.	Gradient of the 310' Trail Segment (∞)	6.5 Degrees/11.5 Percent
2.	Location of North End of 310' Trail Segment (A)	1998 Topo; Map 3
3A.	Elevation of North End of 310' Trail Segment (A)	2,000' (1998 Topo)
3B.	Elevation of North End of 310' Trail Segment (A)	1,969' (Drake Survey)
4A.	Elevation of Original Smith Hill Summit (B)	2,046' (Doty's # Harrington)
4B.	Elevation (near) of Original Smith Hill Summit (B)	2,053.724' (Bench Mark K 256)
4C.	Elevation of Original Smith Hill Summit (B)	2,039' (Drake Survey)
5.	Location of Original Smith Hill Summit (B)	1998 Topo; Map 2
6.	Elevation of I-5 Elevation Sign	1,960'
7A.	Elevation Difference Between A & B (h)	70' (Drake Survey)
8.	Horizontal Distance Between A & B (d)	610' (Drake Survey)
9A.	Slope Distance Between A & B (l)	

B. Other Recorded Documents

- 2,046' Smith Hill Pass elevation from Harrington; Section III.B.)
- 2,054' Smill Hill Pass elevation for Bench Mark K 256 near summit of Sexton Mountain Pass; Section II.F.; Map 2)
- 1,960' 2011 Mt. Sexton Pass elevation at I-5 sign

C. Summary

When the research and field work on the purpose of this paper started it was to research the Smith Hill Pass as it existed in 1940 before the 1921 - 1922 Pacific Highway road base was cut in 1941 and to research the relationship of the Smith Hill Pass to the gradient of the 310' segment of the Applegate Trail on the south Mt. Sexton Pass. The working hypothesis was that knowing the gradient of the 310' segment and projecting it to the Smith Hill Pass summit would be another analysis component that could assist in the conclusion that the 310' segment was the Applegate Trail. The calculations were very close to what was expected and the working hypothesis was verified.

Of greater significance the gradient research project created a new analysis element that independently proved the 310' segment was the Applegate Trail without the 10 previous research and analysis elements summarized at Hugo's Applegate Trail web site for trial inventory brochures 18B through 18L (<http://www.hugoneighborhood.org/inventorybrochures.htm>).

1. 1853 Military Road
2. 1855 Oregon General Land Office Survey
3. 1864 Collins Telegraph Line
4. 1886 - 1887 Postal Telegraph Line
5. 1941 Grants Pass Daily Courier Picture At Mt Sexton Pass
5. 2005 Metal Detection Survey
7. 2005 Big Tree Boring Analysis
8. 2010 Topography & Grade Analysis
9. 2010 Chain Tree
10. 2011 Trail Rock

The eleventh (11th) research and analysis element is the 1940 Oregon Highway *Right of Way Map, Sexton Mt. Section. Pacific Highway, Josephine County*.¹¹ This map proves conclusively that from a scientific “engineering” point of view and cultural point of view (i.e., 1864 Collins Telegraph Line poles) that the 310' segment on the south Mt. Sexton Pass is the old Applegate Trail.

VII. AUTHORS

Malcolm Drake, Gradient Consultant
1200 Jumpoff Joe Creek Road
Grants Pass, Oregon 97526
541-476-6166
Email: jumpoffjoe@roguelinkdsl.com

Kelly Rarey, Member
GLO Field Review SubCommittee
Hugo Emigrants Trails Committee
Hugo Neighborhood
275 Canyon Oak Drive
Grants Pass, Oregon 97526
541-471-0859
Email: Krarey@msn.com
Web Site: <http://www.hugoneighborhood.org/>

Mike Walker, Education Chair
Hugo Neighborhood Association & Historical Society
3388B Merlin Rd #195
Grants Pass, Oregon 97526
541-471-8271
Email: hugo@jeffnet.org
Web Page: <http://www.hugoneighborhood.org/>

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 - JR Of Applegate Trail: 1853 Military Road At Mt. Sexton Pass JA-14C
 - JR Of Applegate Trail: 1864 Collins Telegraph Line At Mt. Sexton Pass JA-14D
 - JR Of Applegate Trail: 1886 - 1887 Postal Telegraph Line At Mt. Sexton Pass JA-14E
 - JR Of Applegate Trail: 1941 At Mt. Sexton Pass JA-14F
 - JR Of Applegate Trail: 2005 Metal Detection Survey At Mt. Sexton Pass JA-14G
 - JR Of Applegate Trail: 2010 Big Tree At Mt. Sexton Pass JA-14H
 - JR Of Applegate Trail: Topography & Grade At Mt. Sexton Pass JA-14I
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APPENDIX A. LOCAL MOUNTAIN GRADE INFORMATION

No information is intended to tell you how to navigate a mountain grade.

Question: What does the (%) percentage grade mean?

Answer: It refers to how many feet you'll descend/ascend per 100 horizontal foot of roadway. On a 5% grade, you'll descend/ascend 5 feet per 100 horizontal feet of roadway.

A grade has a *percentage* and a *length*. For example, let's take a 6% grade that is one (1) horizontal mile long. This means that for every 100 horizontal foot of roadway, you are going to drop 6 feet. Therefore, in one mile you'd descend 316.8', since 5,280 feet equals one mile ($5,280'/100' = 52.8 \times 6' = 316.8'$).

The drive along Interstate 5 offers scenic views of the mountains and valleys as it climbs Stage Road Pass, Smith Hill Summit, and Sexton Mountain Pass. There are several stretches of five and six percent grades on these passes.

Mountain Directory books (<http://www.mountaindirectory.com/ebooks.html>) tell you where the steep grades are, how long they are, how steep (%) they are, whether the road is two lane, three lane, or four lane, if there are escape ramps, switchbacks, sharp curves, speed limits, etc.

Pass Name	Elevation*	I-5 Gradient
Canyon Creek Pass:	Elevation: 2,020'*	
Stage Road Pass	Elevation: 1,830'*	
Smith Hill Summit	Elevation: 1,730'*	
Sexton Mountain Pass	Elevation: 1,956'*	
Sexton Mountain Pass	Elevation: 1,960'**	

Sexton Mt. Pass Grade Toward Jumpoff Joe Six (6) percent

* Elevations are from the National Weather Service Forecast Office. Downloaded September 20, 2011 from http://www.wrh.noaa.gov/pqr/elevations_cascades.php.

** The elevation at Mt. Sexton Pass according to a sign at its summit is 1,960'. This is a difference of four (4) feet from the National Weather Service Forecast Office elevation.

APPENDIX B. DRAKE ABNEY LEVEL CALCULATIONS FOR NORTH END OF 310' APPLGATE TRAIL SEGMENT & ORIGINAL SMILL HILL SUMMIT

by **Malcolm Drake, Gradient Consultant, Jumpoff Joe Creek**

I. ABNEY LEVEL CALCULATIONS

Malcolm has his own K-E Abney Level or surveyor level. The Abney Level is a device that can be used for measuring slope. It can also be used to determine the heights of trees, poles, overhead wires and the like, to measure ground elevations, to reduce measurements made on a slope to their horizontal equivalents, and to run lines of levels.

Malcolm stated, “The Abney Level is potentially very accurate, and it is also hard to use accurately because the bubble bounces around unless you hold it real steady. To get a good reading you have to hold the level for quite a long time.” “The Abney has a bubble level. The fluid inside of the bubble has some material, probably oil, which makes the bubble slow to move. This instrument has been around since the 1870s.”

The reader is referenced to *Gradient Measurement Field Trip: 310' Segment Of Applegate Trail At Mt. Sexton Pass* for use of the Abney, especially Appendix A Abney Level; Appendix B, Gradient; and Appendix C, Malcolm Drake’s Abney Level (Drake, M. & Walker, M. September 15, 2011. *Gradient Measurement Field Trip: 310' Segment Of Applegate Trail At Mt. Sexton Pass*. For Hugo Neighborhood Association & Historical Society. Hugo, OR.).

II. ABNEY LEVEL FIELD WORK

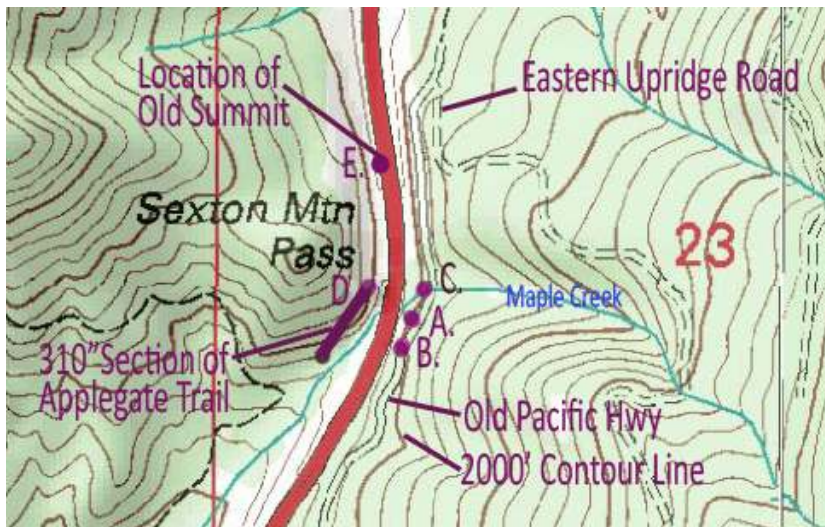
Malcolm Drake and Mike Walker’s field trip to Sexton Mountain Pass on November 7, 2011 resulted in Abney level calculations for the elevation of the north end of the 310' Section of the Applegate Trail on the southside of Mt. Sexton Pass, and the estimated location of the old Sexton/Smith Hill Summit (Appendix B Map).

Elevations & Distances The following points A - E are not the same as for Figure 1. They represent points in this Appendix B analysis.

Point A	2,008' elevation
Point B	2,000' elevation
Point C	Not measured
Point D	1,969' elevation - North end of the 310' section of the Applegate Trail (Point D = Point A in Figure 1)
Point E	2,039' elevation - Estimated location of the old Sexton/Smith Hill Summit (Point E = Point B and elevation DELTA h in Figure 1)
610'	Distance “d” in Figure 1 is 610'.
Summit	2,046' (from Doty’s about Harrington; Section III.B.)
Summit	2,054' (B.M. K 256 near summit of Sexton Mountain Pass; Section II.F; Map 2)

1. Beginning at **Point C**, (west edge of Old Hwy 99 at outlet of culvert crossing of Maple Creek), Drake paced 316 feet (scaled from *Appendix B Map*) south along highway to establish point where highway crosses 2,000 foot contour line, establishing that point as **Point B**.

2. From **Point B**, Drake paced 132 feet north, along highway, to establish **Point A**. **Point A** is the point from which Walker, was standing at the north end of the **310' section of the Applegate Trail (Point D)** was visible through the trees.)



Appendix B Map. Sexton Pass Elevations¹
Courtesy of Malcolm Drake
Cartography by Tommi Drake

Trail (Point D) was visible through the trees.)

3. Drake shot slope (uphill), using Abney Level, from **Point B** to **Point A**, at 3.5° (6.1%). Thus ($132' \times 6.1\% = 8'$) **Point A** is 8 feet higher than **Point B**. So **Point A** is at 2,008 feet elevation.

4. Drake took compass reading from **Point A** to **Point D**; reading = 290° *Absolute (true) Bearing*. Line drawn on Map 5 “*Applegate Trail South & North Mt. Sexton Pass*” from **Point A** at that angle runs

“exactly” through **Point D**. Congratulations to Walker for the accuracy of Map 5.

5. Drake shot slope downwards from **Point A** to **Point D** using Abney Level, at 9.5° (16.3%). Horizontal distance from **Point A** to **Point D** (scaled from Map 5) is 235'; so ($235' \times 16.3\% = 39'$) **Point D** is 39 feet lower than **Point A**. Thus, ($2008 - 39 = 1969'$) **Point D** is at 1,969 foot elevation.

6. **Point E** is the estimated location of the old Sexton/Smith Hill Summit.

7. **Point D** to **Point E** (scaled from Appendix B Map) is 610 feet.

8. Assuming the **310 foot section of Applegate Trail** continues 610 feet, uphill, at the previously surveyed 6.5° (11.4%) slope, the elevation of the summit-**Point E**-would be the elevation of **Point D** plus ($610' \times 11.4\% = 70'$) 70 feet; thus the elevation of **Point E** is 2,039 feet. This is very close to the 2,046' (from Doty's about Harrington; Section III.B.)

1. Base map: U.S. Geological Survey, U.S. Department of the Interior. 1998. *Merlin Quadrangle, Oregon-Josephine Co., 7.5-Minute Series (Topographic)*. Scale 1:24,000, and contour interval 40 feet. Denver, CO.

APPENDIX C. RAREY SURVEYING DIFFERENTIAL LEVELING FOR NORTH END OF 310' APPLGATE TRAIL SEGMENT

I. DIFFERENTIAL LEVELING

A. Differential Leveling

<https://engineering.purdue.edu/~asm215/topics/difflevl.html>

DEFINITION OF DIFFERENTIAL LEVELING

The establishment of differences in elevation between two or more points with respect to a datum. Normally we will assign an elevation of 100.00 to the datum rather using the mean sea level elevation.

DEFINITIONS OF KEY TERMS

Set. The location of the level. (where it is set-up)

Bench Mark (BM). A permanent point of known elevation.

Temporary Bench Mark (TBM). A point of known elevation.

Turning Point (TP). An intervening point between BMs or TBMs upon which a backsight and a foresight are taken.

Backsight (BS). A rod reading taken by "looking back" at a point of known elevation such as a BM or TP.

Foresight (FS). A rod reading taken when "looking ahead" at a point where you want to determine its elevation, such as a TP, TBM or BM.

Height of Instrument (HI). The elevation of the line of sight in the telescope of the level.

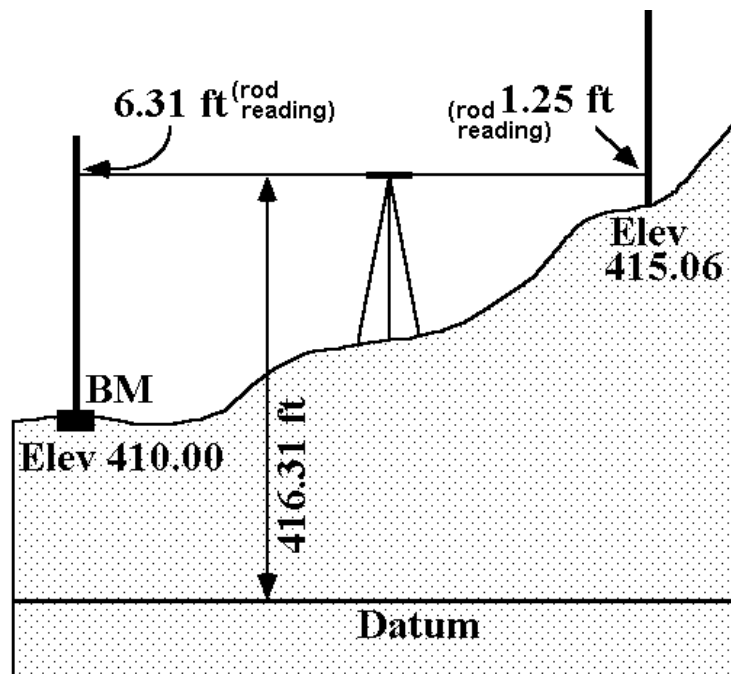
Balancing of Sights. The rod person keeps track of the distance of each FS and BS taken and tries to keep them equal.

Closed Circuit. A complete trace of the line of sight of the instrument back to the beginning point.

Closure. The difference between beginning and ending elevations.

THEORY

Add rod readings (BS) to benchmark or known turning point elevations to



get the elevation of the line of sight (HI). Subtract rod readings (FS) from the line of sight to establish elevations of unknown points. Repeat over and over.

REDUCING ERRORS

Make certain the bubble is centered when you make a rod reading.

Keep the rod plumb when the reading is taken.

Establish equal BS and FS reading distances.

Equal reading distances will cancel out any error caused by the line of sight not being parallel with the axis of the bubble tube on the Dumpy Level.

Not as important with the self-leveling Automatic Levels.

Not always possible due to terrain.

COMMON MISTAKES

Faulty reading of the rod.

Not fully extending the rod for high readings.

Touching the tripod during reading.

Confusion between recording BS and FS entries into the field book.

CHECKS

Page Check

Method of checking arithmetic.

The BS and FS columns are added up and their difference should be equal to the difference between the beginning and ending elevations. Closure Method of checking accuracy.

The difference between the beginning and ending elevations for a loop or the difference between the ending elevation and the known elevation of the ending BM.

B. Surveying - Differential Leveling

http://www.ce.memphis.edu/1101/notes/surveying/surveying_levling.pdf

C. Section 2: Differential Leveling

http://onlinemanuals.txdot.gov/txdotmanuals/ess/differential_leveling.htm

II. DIFFERENTIAL LEVELING FIELD WORK

Since we don't have access to a tripod mounted self leveling level we will simply use a hand held level, as our purpose does not require a high level of accuracy. Two field trips already to the general location of Bench Mark M 748 1987 (Mount Sexton Summit: 1987; see Section II.F.) have not been able to locate the bench mark. Future differential leveling field work will be covered with it's own set of minutes.