Union

RECOMMENDATIONS FOR LOCATION OF WELL ON THE EASTERN OREGON COLLEGE OF EDUCATION CAMPUS

Wayne Howell (1940)

Introduction:

The Oregon State Department of Geology and Mineral Industries was requested by Dr. Maaske to make a water-survey of the area bordering the campus of the Eastern Oregon College of Education to determine the possibilities of a water well which would supply the irrigation needs of the college campus.

On March 30, 31, April 1 and 2, 1940 a field inspection covering the area to the west and south of the campus was made.

Location:

The Eastern Oregon College of Education Campus is located several blocks south of the business district of the city of La Grande, Oregon, on an old lake terrace. Sec. T. 3 S., R. 38 E. W. M.

Topography:

The old lake terrace extends eastward along the southern edge of the Grande Ronde Valley. The terrace rises abruptly above the valley floor. The difference of elevation varies from a few feet to 50 feet.

The terrace will average a half mile or more in width, and its even surface merges on the south and west into alluvial fan and land slump topography.

Mill and Deal Canyons and two or three small gulches, open onto the terrace; each has an alluvial fan at its mouth. East of Mill Canyon several basalt slump blocks form swampy basins below the ridge. The present terrace surface, south of the campus to the hills and west to Deal Canyon, forms a drainage basin whose gentle slopes are towards the drainage. From the abrupt north edge of the terrace the slopes are to the south. The low point of the basin is the site of the college tennis courts which have the same elevation

as the valley floor. At this place the terrace has been bisected by Mill Creek.

Drainage:

Mill and Deal canyons each contain a small intermittent creek. The Deal Canyon creek divides into two distributary streams: one fork flows northward to join the Grande Ronde river; the other flows eastward to join the Mill canyon drainage; the combined drainage, Mill Creek, flows eastward to cross the campus. Mill Creek leaves the terrace a few feet north of the tennis courts.

The surface drainage from several square miles is concentrated in Mill Creek. Gnerally there is no surface flow in Mill Creek later than June first.

The terrace topography controls the direction of flow of a large portion of the sub-surface drainage. Thus most of the drainage is concentrated in the area of the college tennis courts.

Geology:

The terrace, on which the college campus is located, is composed of well-cemented gravel. Sand lenses are intercalated with the gravel but do not seem to be either continuous or extensive. The thickness of the terrace gravels is not definitely known. Wells are reported to have been drilled to a depth of nearly a hundred feet in the gravel. South of the terrace, the basalt ridge is characterized by several large normal fault blocks tilted to the south and west. Distinct alluvial fans have been constructed on the terrace at the mouths of Mill and Deal Canyons.

Data on Water Supply:

Discharge from Eastern Oregon Light and Power Company reservior: discharge is irregular and is entirely used for irrigation purposes in Old Town; thus surface flow resulting from reservoir discharge never reaches the college

campus. (Information from Mr. Walker of Eastern Oregon Light and Power Company)

No. 1 Well:

This well is located across 8th Street from the Ackerman Training School Building. It is a dug well having a depth of 45 feet in well-cemented gravel. The well is situated midway between the present Mill Creek Channel and the old channel occupied by the Deal Canyon drainage; and is not more than 150 feet from either channel.

The well is 4 feet in diamter and 45 feet deep. During the driest season (usually September) the owner reported the well contained 35 feet of water; the capacity in gallons would be approximately 3,200. The owner also stated that the well could be pumped dry and kept dry with a hand pump.

It is evident that this well does not penetrate a good aquifer (water containing bed), and receives water by slow seepage through cemented gravel.

No. 2 Well:

Information given by owner, Mrs. Milne. This is a drilled well 80 feet deep. The dimensions were not known. The well supplies water for household uses and irrigates about an acre of garden. The water supply has been plentiful during the driest months.

No. 3 Well:

Information by Homer Leffel, owner. This well was dug during September, 1939, the driest month of the driest year La Grande has known for a long time.

The well is 4 feet in diamter and 35 feet deep. When completed there was 17 feet of water; equivalent to 1,575 gallons. The contractor who supervised the digging of the well reports that each morning and sometimes at noon up to two hours were required for draining the well by using a pump of 1,000 gal/hr

capacity. In digging the well several aquifers a few inches in thickness were crossed.

No. 4 Well:

Information by Burt Kail, owner. This is a driven well, 22 feet deep, consisting of a 1 1/2 inch pipe. Mr. Kail reports that when driving the pipe at 20 feet there was two feet of water in the pipe, and at 22 feet there was 7 feet.

Mr. Kail irrigates one and a half acres of orchard and alfalfa by using a No. 2 pump (rotary - 1 1/2" suction) having a capacity of 2,280 gal/hr. He states that he has started the pump at 3:00 A.M. and operated continuously until 10:00 P.M. without water failure. Last September, (1939) the pipe contained 7 feet of water as in previous months.

Summary:

1. Drainage from a large area is controlled by Mill Creek which flows across the college campus.
2. Surface drainage is intermittent--usually no surface flow later than June first.
3. One well across 8th Street from the campus, and wells in Old Town have a good water supply through the dry months, indicating a sub-surface water supply.
4. A continuous water supply for each of these wells seems to depend on whether a good aquifer was penetrated. Some wells having a better supply than others.
5. No. 1 well (sketch map) has a slow continuous water-supply although it does not penetrate an aquifer.
6. The three wells (No. 2, 3, and 4) located just beyond the terrace in valley-

fill which is only slightly cemented to a depth of 25 feet are reported to receive an adequate constant flow of water. Below 25 feet wells 2 and 3 are in cemented gravel.

Conclusions:

1. Sub-surface water is present in the terrace; although continuous aquifers do not seem to be present.
2. Seepage through the cemented gravels is slow and not of sufficient quantity to fulfill the irrigation requirements (est. 200 gal/minute) for the college.
3. A well located between the athletic field and the Training School or between the tennis courts and the athletic field might penetrate an aquifer, but also, it might not, in which case excessive depth would be necessary with no assurance of an adequate water supply.
4. Directly in front of the terrace at the tennis courts and within a radius of 600 to 800 feet are three wells having a continuous water-supply. Of these three wells, Mr. Burt Kail's is the only one for which definite information could be obtained. Mr. Kail, also, reported several other wells, east of his own, having a good aquifer at approximately 22 feet. Homer Leffel's well seems to have penetrated the same aquifer as the Kail well.
5. Since these wells find a good water supply at approximately the same depth in uncemented valley-fill it would seem to indicate a saturated zone at that horizon and probably overlying cemented gravel.

Recommendations:

In order to secure the greatest possible water-supply, a well should be located in the rectangular area (sketch map) north of the tennis courts and preferably as near as possible to the street. This location seems to be best

in order to tap the saturated zone which apparently underlies at least this part of the valley at a depth of 20 to 25 feet.

Dr. Logan estimates that 200 gals/minute will be needed while the sprinkler system is in use. This requirement means that a steady flow of water nearly equivalent to the needs will be necessary if the sprinkling system is to be used continuously. If there is a smaller flow of sub-surface water into the well, it would be necessary to use the sprinkler system intermittently.

A well located in the area between the tennis courts, the athletic field and the Ackerman Training School is not recommended because the terrace gravels are too well-cemented to permit seepage of ground-water in quantities that would meet the campus water requirements.

It is recommended that a well 4' feet square be sunk to approximately 30 feet to penetrate the aquifer or saturated zone that seems to be present at that depth. The type of reservoir and the accompanying pumping system can be worked out after the water-flow into the well is determined.

If the sprinkler system is used during the late evening, early morning, or night hours, there will be much less evaporation than during the daytime. The conservation of water might not be large but during the dry summer months every possible gallon of water should be conserved.

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