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ENGINEERING GEOLOGY OF THE ELK RIVER FISH HATCHERY SITE

Curry County, Oregon
Sixes River Dist

Investigation of the Elk River Hatchery site was made on November 20, 1967, to determine the geologic conditions as they might affect the design and construction.

Location

The site is located on the south bank of Elk River immediately west of the mouth of Anvil Creek in sec. 6, T. 33 S., R. 14 W. The installation involves a water system which will use stream water collected in a series of perforated pipe placed beneath the stream bed and gravel bar. The gravel and sand will act as a filter to remove leaves, sticks, and other foreign matter from the system. Also to be constructed are: hatchery building, rearing ponds, and three houses for employees and their families.

Geologic formations

Galice Formation. Weakly to moderately metamorphosed, dark gray to black, carbonaceous, slaty to phyllitic mudstone, schistose graywacke, and granule to pebble conglomerate and minor volcanic rocks. Rocks thin banded, light to dark.

Colebrooke Formation. Contains glossy, black, graphitic to silky, white quartz mica schist, greenish chlorite-epidote phyllite, and bedded chert. Metamorphism has obliterated or flattened pebbles in conglomerate so that textures are not obvious.

Humbug Mountain conglomerate. Very massive, coarse conglomerate containing thick zones of interstratified graywacke sandstones and mudstones. These contain much macerated and carbonized plant remains. Some of the bedding is highly contorted.

Rocky Point Formation. Same as Humbug Mountain conglomerate but finer grained. It contains some small pebble conglomerate but mostly mudstones and sandstones. Bedding contorted in some areas.

Eocene rocks. Unmetamorphosed fine-grained, thin to moderately bedded sediments. Siltstones, mudstones, and shales.

Pearse Peak diorite. Large intrusive of dioritic composition which has intruded the Galice Formation. It is about 5 miles in diameter and has altered the surrounding rocks producing the metamorphic Colebrooke schists. The intrusive is probably much larger than its surface outcrop.

General geology

The formation exposed at the hatchery site is a small window of Colebrooke Schist surrounded by a wide band of Humbug Mountain conglomerate (see map). A thin deposit of gravel overlies the conglomerate and schist within the hatchery site adjacent to the river. The gravels contain representatives from a number of rock types occurring upstream in the Elk River drainage. The most abundant is diorite from the Pearse Peak area. Abundant schist and phyllite are also present in the gravel. The metamorphic clasts are subject

to rapid weathering and break down to soil and clay such as occurs in the terrace soils just south of the gravel bar in the area contemplated for the rearing ponds and buildings.

The gravel does not appear to be of good enough quality to produce high strength concrete.

During periods of intense flooding the water will probably rise to the level of the lower terraces. During this period erosion would be most severe and weak rock and soil could be stripped from the north bank of the stream across from the hatchery site. One small landslide has occurred in this area just west of Anvil Creek, but the rock exposed in the lower stream bank appears to be stable and not generally affected by stream erosion. The gravel bar is located on the inside of the bend in the river, and although during high water it might be removed, new gravels should replace them at about the same rate. In the case Anvil Creek flooded at a time Elk River was low, such as a local cloudburst, water would strike the site, and especially the gravel bar, at an unusual attitude and some erosion of the terrace and gravel bar could occur. This seems unlikely since the drainage area of Anvil Creek is small.

Recommendations

The success of the proposed water system depends on keeping the intake pipe buried under several feet of gravel and below the level of the stream during the low water period. It must also be protected from erosion during high water. For this reason I would suggest that the intake pipes be angled upstream so that a major portion is buried as deeply as possible under the thickest gravels and that a shorter amount be under the thinner gravel in the

channel covered by water in late summer. The grade of the intake pipes could be maintained with less bedrock excavation than if the pipes were placed at 90° to the stream. Considerable water should be able to be obtained from the gravel bar adjacent to the stream.

The location for the intake should be downstream from the mouth of Anvil Creek for several reasons. The gravel is less likely to be eroded in this area. Also the gravels are deeper and the intake will be better protected than at the upstream end of the bar.

Water well possibilities in the matamorphic country rock are not good. The chances for good well water of sufficient quantity appear rather remote. A spring, if any occurs, might be developed if the use of stream water is objectionable.

Foundation characteristics of the terrace soils appear to be poor and light structures can probably be founded on spread footings if the top several feet is removed. Heavy structures such as water tanks, etc., should be founded on bedrock if possible.

Prior to construction the depth of the gravels should be determined by back-hoe in the area contemplated for the intake pipes, and foundation soils should be tested.

If you have any questions concerning this report or items not covered I will be happy to discuss them with you.

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References:

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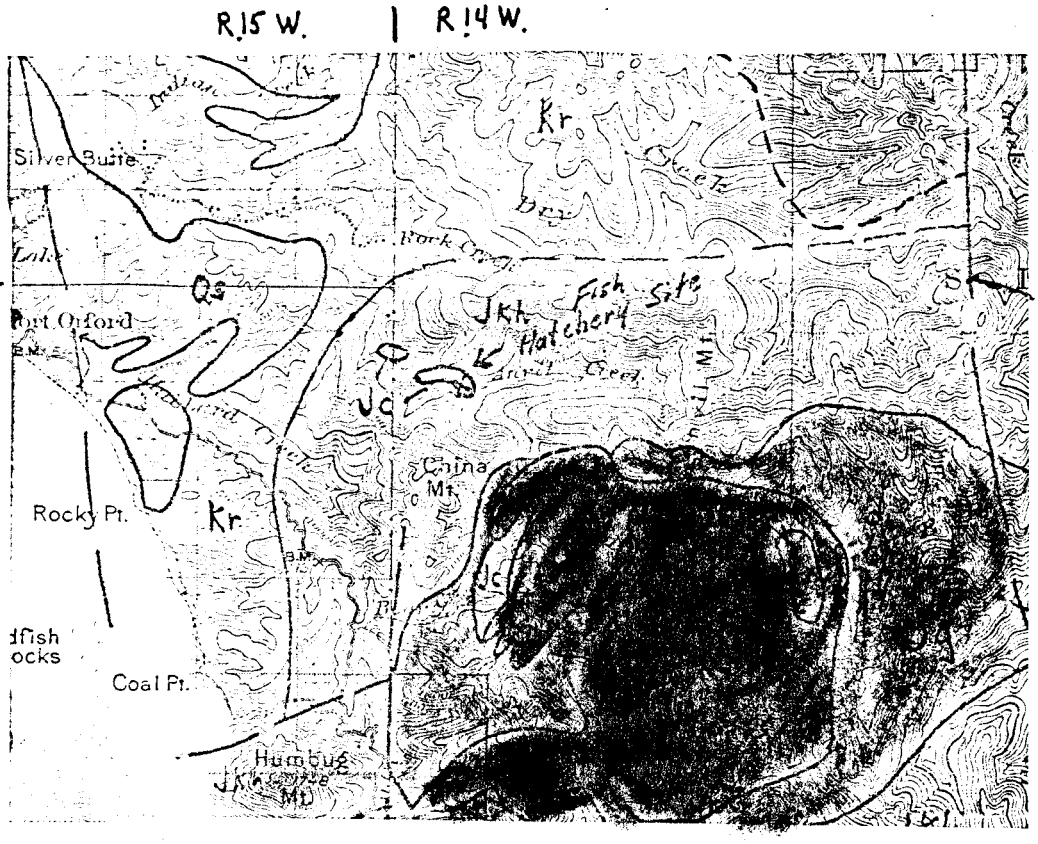

Qs	Marine terraces & Dunes
Te	Eocene rocks
Kr	Rocky Point fm.
JKh	Humbug Mt. Conglomerate
	Pearse Peak Diorite
Jg	Galice fm.
Jc	Colebrooke fm.
Jd	Dothan fm.