

MONITORING WELL DESIGN

Three Rivers Levee Improvement Authority

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Introduction

As part of continuing repairs for the Three Rivers Levee Improvement Authority levee repairs projects, HDR has completed design of three monitoring wells, two near the Yuba River Left Bank Levee and one on the Western Pacific Interceptor Canal (WPIC) West Levee.

Design Process

Monitoring Well Description

Monitoring wells are passive investigative tools for monitoring subsurface conditions in areas where a coarse grained layer of soil is overlain by a fine grained “blanket”. These wells monitor the subsurface pressures at points of interest. The wells proposed for this project are designed to monitor the pressures in two areas, the soil stratum below the blanket and the blanket layer itself. This is accomplished by using two 2.0’ slotted well screens placed at the appropriate elevations. The sizes of the well screens will be determined by the contractor. A sand filter is backfilled around the screens. A solid PVC riser connects the slotted well screens to the ground surface. The solid portions of pipe are backfilled with bentonite. A 2-foot concrete collar is placed at the top of the well for protection and to provide access.

WPIC Right Bank Levee

During the winter 2005/2006 season a pin boil was discovered on the landside toe of the WPIC West Levee near station 216+00. Investigations have found no obvious source of this pin boil. It has been requested that a monitoring well be installed through the crown of the levee near this pin boil to monitor the subsurface conditions.

Soil stratigraphy taken from Kleinfelder’s PIR suggests the lower limit of the blanket layer lies at elevation 35. The crown elevation of the WPIC Left Levee is roughly 62 feet. The proposed monitoring well will extend from the landside hinge point of the WPIC levee, through the blanket layer, and end at approximate elevation 25. The slotted well screens will be placed at elevation 35 in the silty sand layer and at elevation 25 in the sand layer itself.

Yuba River Seepage Berm

Two monitoring wells have been proposed for the corner seepage berm currently under construction as part of Phase 4 of this levee repairs project. These wells are proposed due to the uncertainty of the underseepage transition zone between the seepage berm constructed in 2005 as part of Phase 2 levee work and the SCB Cutoff wall completed during Phase 4 work. One well will be constructed at station 35+50 and the other further upstream at station 37+70. Exact locations of these wells can be seen on Figure 1.

The ground surface elevation at the corner seepage berm is roughly 65 feet. According to the Kleinfelder PIR, the bottom of the blanket layer is at roughly elevation 45 feet. The monitoring wells in this area will extend to elevation 25 feet. The slotted well screens will be placed at elevation 40 in the silty sand layer and at elevation 25 in the sand layer itself. Due to the risk of artesian conditions with the low elevation of the seepage berm, the monitoring wells will be extended three feet above the ground surface. This portion of the well will be encased in a steel pipe with a threaded cap to prevent water from escaping.

References

Kleinfelder (2004), *Problem Identification Report Bear River North Levee and the Western Pacific Interceptor Canal West Levee, Reclamation District 784, Yuba County, CA* May 7, 2004.

Kleinfelder (2004), *Problem Identification Report Yuba River Left Bank Levee Highway 70 to SPRR (Approximate PLM 0.32 to 0.91), Reclamation District 784, Yuba County, CA* June 11, 2004.