Metropolitan Domestic Water Improvement District
Board of Directors Meeting

November 14, 2011

Status of Avra Valley Recharge Project

Synopsis

This report summarizes the capital project and initial performance results from modifying Basin 4 at the Avra Valley Recharge Project (AVRP).

Basin 4 Modification

The AVRP is permitted to annually store up to 11,000 acre-feet. However, the recharge facility can operationally store 7,700 acre-feet per year because of low infiltration rates in Recharge Basin 4 (RB-4) due to a five to seven foot thick layer of clay at the surface.

Per the Board of Directors approval on December 10, 2010, a portion of the unused AVRP operations and maintenance budget was expended for a consultant to develop feasible options to modify Basin 4 beyond recharging 2 acre-feet per day. Clear Creek Associates' contract was amended to complete a modification proposal for the Arizona Department of Water Resources' (ADWR) review and decision. The purpose of the proposal to ADWR was to learn if ADWR would require a permit modification and what the permit fee would be.

Clear Creek Associates and the District submitted to ADWR a proposal with five enhancement options to modify Basin 4 on March 15, 2011. A favorable response was received on April 14, 2011 in which a permit modification was stated by ADWR as not necessary, thus saving the District $75,000 in regulatory and consulting fees budgeted for FY11/12. District staff decided to pursue the adding borings (Option 4) to Basin 4 as the most time efficient and within District's staff expertise and budget.

The District contracted with a local drilling firm to have 4 foot diameter borings completed to a depth of 12 to 14 feet (Figure 1). On Tuesday, August 23, 2011, Sierrita Mining and Ranching Company augured 20 borings ranging in depth from 9 feet to 14 feet deep (Figure 2, Table 1, Photographs 1 and 2). A total of 243.75 feet of borehole was augured or an average depth of 12.15 feet at each boring. Only Boring 16 was unstable with the borehole walls caving in. Its depth was limited to 9 feet deep. All the other borings had stable walls with no caving (Photograph 3). The shallowest borings were where clay layers were absent or 1 to 2 feet thick. The deepest borings corresponded to where the clay was the thickness. Borings 1, 2, and 3 were augured to 14 feet deep to learn if a gravel/cobble layer existed below the red sand and if the layer would promote infiltration. All three of these borings did encounter a cobble layer, but it was found that clay was intermixed between the cobbles.

The spoils from the augured hole were removed by a rented front end loader and deposited into a District dump truck. The spoil materials were then dumped at a spoils pile west of the recharge project that has been used by the Central Arizona Water Conservation District for stockpiling fine-grained materials removed during basin maintenance at Avra Valley Recharge Project.

The District used the front end loader to place the clean coarse fill material purchased from a sand and gravel pit and transport the materials into the excavated borings. The backfill material consisted of a washed semi-rounded aggregate used in the making of concrete (Photograph 4). The material was screened at ¾ inch minus. A total of 199.57 tons of the aggregate material was purchased from Vulcan Materials Company at 9300 West Avra Valley Road, Marana, Arizona. On August 17 and 18, 2011, the material was trucked from Vulcan Materials Company's facility by Vaquero Trucking and Excavating, LLC and stockpiled in RB-4. On Thursday, August 25, 2011, BKW Farms ripped RB-4 with a spring-tooth harrow to restore the soil compacted during the heavy vehicle traffic over the basin (Photograph 5).

Modification Cost

The total cost for the previously described work was approximately $10,000 out of the $25,000 capital budget. The breakdown by expense item is on Table 2. The cost per drainage hole was about $500.

Table 2 – Modification Costs

Expense Item	Cost
Backfill aggregate material	$2,992
Trucking of aggregate (7 miles)	$960
20 Borings (4' Dia, average 12 feet deep)	$5,000
1 Day rental of Front End Loader	$757
Ripping of basin	$500
TOTAL	$10,209

Performance Results

District Utility staff on September 13, 2011 calibrated the transducer for RB-4 weir. Recharge operations began on September 23, 2011 at 8:00 a.m., but were temporarily suspended a half a day between October 12th and 13th because of a BKW pump equipment failure at the CAP canal. The basin inflow was a constant 2 acre-feet per day equal with an infiltration rate of 0.57 feet per day (Table 3). On October 27th, District staff decided to run a high volume test and began delivering 6 acre-feet per day with an infiltration rate of 1.7 feet per day, but the rate was found to be too high since the basin water level would not stabilize. The results were used to predict the maximum sustainable infiltration rate as 1.0 feet per day or 3.5 acre-feet per day. Staff will resume testing at this rate to verify the prediction.

Summary

As of today, it appears that the modifications to Basin 4 have been successful and that the recharge inflation rate has increased for the Avra Valley Recharge Project. Staff will be available to answer any questions about this capital project. No motion is required for this agenda item.

Respectfully submitted,

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