

## Duck Creek

Within the area of this investigation Duck Creek is a perennial stream. The channel has a concrete liner from Warm Springs Road, northeast to the end of Sandhill Road (Figure 3). The concrete liner was recently installed for erosion control due to the periodic flooding, which occurs in this channel. The presence of a concrete liner inhibits the evaluation of groundwater contribution along reaches and limits the expected interaction. From the end of Sandhill Road, northeast to Patrick Lane, the channel is an engineered culvert lined with loose rock for erosion control. Below Patrick Lane, the channel is a natural stream incised approximately 15 feet below the surrounding grade. The bank material is composed of fine grained sands and silts. Initial investigations were conducted during a period of dry weather flow.

The majority of dry weather flow in Duck Creek is groundwater base flow and input from shallow groundwater dewatering. During dry periods, urban runoff is a minor constituent of the flow in the Duck Creek study area. Field investigation indicated that the effective headwaters for the perennial flow in Duck Creek is a dewatering discharge from a sump pump located on the former Domino Estate at 7030 Tomiyasu (Figure 4). Dewatering discharge averages 70 gallons per minute (gpm) with regular cycles throughout the day. The Domino outfall drains into a lined portion of Duck Creek (Figure 5). Flow increased downstream from 70 gpm at Domino to 1000 gpm near Mountain Vista. Electroconductivity (EC) increased down stream from 4290 to 5130 micro siemens per centimeters ( $\mu\text{S}/\text{cm}$ ). The increase in flow and EC, combined with minimal surface water contributions, suggests significant groundwater contribution. The initial investigation revealed consistent contributions from the shallow groundwater system throughout the unlined section of the Duck Creek Channel, from the end of Sandhill Road to the confluence with the Rawhide Channel.

The Domino discharge site was selected as a starting point for characterization of the surface flow of Duck Creek and as a possible area of ISDS influence. A second sample site, DK APT BRIDGE, was selected approximately  $\frac{1}{4}$  mile down stream from the end of the lined channel near an unnamed bridge in an apartment complex (DK APT BRIDGE, Figure 6). This site is in close proximity to an area of numerous ISDS and is below a reach of the stream influenced by shallow groundwater. An EC increase from 4310 to 4540  $\mu\text{S}/\text{cm}$  and a change in flow from 70 to 300 gpm strongly indicated that shallow groundwater was contributing to the channel in the reach between the end of the lined portion of Duck Creek and the apartment bridge. After the initiation of regular sampling, monitor wells were discovered at Maple Cleaners near the corner of Sunset and Sandhill Road. Maple MW-2 is at the site of a Perchloroethylene (PCE) release and subsequent remediation with a clean site closure in 1998 (NDEP site No. H-001037). Downstream of DK APT BRIDGE, Duck Creek passes another area of high ISDS density, between Patrick Lane and Russell Roads to the north and south, bounded by Pecos Road to the west and Duck Creek to the east. DK APT BRIDGE functions as the up-gradient site for the



**Figure 3. Map detailing sampling sites along Duck Creek. The Domino site is the start of perennial flow in Duck Creek. Lined channel highlighted in yellow, natural channel highlighted in green.**



**Figure 4. Photo of the Domino Estate dewatering outfall. This outfall functions as the start of perennial flow in Duck Creek.**



Figure 5. Map detailing the Domino Equestrian Estate dewatering site. This outfall functions as the start of perennial flow in Duck Creek.



Figure 6. Map detailing location of Maple-MW-2 and the sampling site along Duck Creek under the apartment bridge.



**Figure 7. Map detailing the location of the Duck Creek sampling site below the Mountain Vista bridge.**

lower reach. The down gradient site is located at the Mountain Vista bridge near Russell Road (DK MT VISTA, Figures 3 and 7). Preliminary investigation along this reach of Duck Creek indicated that additional sites would be required to assess the effects in other geographic areas.