## TOPICAL RESPONSE 8: GROUNDWATER SUPPLIES AND OVERDRAFT CLAIMS

Comments have been received on the Draft EIS/EIR, **Section 4.3**, Water Resources, regarding the availability, reliability, and sustainability of local groundwater supplies in the Santa Clarita Valley. Specifically, comments have claimed that the use of groundwater for the Newhall Ranch Specific Plan will deplete local aquifers and lower the water table upon which local vegetation depends. Other comments state that an "overstatement" of groundwater supplies could result in overdraft of the basin, thus affecting the habitat of several listed endangered species.

In addition, comments claim that the Castaic Lake Water Agency (CLWA) and local retail purveyors have underestimated private pumping by the local well owner's association; and, thus, their wells may be affected by additional pumping associated with the proposed Project. Further, comments assert that there is considerable biological evidence that overdraft of the Santa Clara River exists, particularly in the upper reaches. Comments claim that "die back of vegetation away from the center of the streambed in the upper reaches is a prime indication of such overdraft." Comments claim that no studies exist to evaluate this impact and that it is not discussed in the Draft EIS/EIR. Similarly, comments claim that no study of subsidence, another indication of groundwater overdraft, has been conducted for the groundwater basin in the Santa Clarita Valley.

Lastly, comments state that an increase in electrical conductivity (EC) in the Saugus Formation and Alluvial aquifer is indicative of "overdraft" in the groundwater basin. Comments also are critical of the Draft EIS/EIR for not addressing the most recent groundwater basin yield update completed for CLWA and the retail purveyors in the Santa Clarita Valley. This update is entitled, "Analysis of Groundwater Supplies and Groundwater Basin Yield, Upper Santa Clara River Groundwater Basin, East Subbasin," dated August 2009 (2009 Updated Yield Report). Further, comments question the Draft EIS/EIR's reference to reports addressing groundwater recharge in the Santa Clarita Valley, while other comments suggest that a portion of the agricultural water that naturally recharges the local groundwater basin was not accounted for, and because the Specific Plan reduces that recharge, recharge reductions must be subtracted from the 7,038 acre feet of groundwater to be converted for potable use on the Specific Plan site.

Other comments raise concerns regarding the local groundwater supplies becoming unreliable due to contamination. (As to this last issue, please refer to the Final EIS/EIR, **Topical Response 7: Perchlorate Treatment Update**, for further responsive information concerning the detection and treatment of perchlorate in portions of the local groundwater basin.)

This response addresses the above comments with respect to the groundwater supplies in the Santa Clarita Valley. The response is based on the information presented in the Draft EIS/EIR, **Section 4.3**, Water Resources, relevant portions of which are summarized below. It also is based on numerous reports and studies referenced in the Draft EIS/EIR, **Section 4.3,** pages 4.3-6-4.3-9, shown in date order below:

(a) "Memorandum of Understanding" between the Santa Clara River Valley Upper Basin Water Purveyors and United Water Conservation District, August 2001 (2001 MOU; **Appendix 4.3**, Draft EIS/EIR);

(b) "2001 Update Report: Hydrogeologic Conditions in the Alluvial and Saugus Formation Aquifer Systems," July 2002 (Slade Report; **Appendix 4.3**, Draft EIS/EIR);

(c) "Newhall Ranch Revised Additional Analysis, Volume VIII," SCH No. 1995011015, May 2003 (Newhall Ranch Revised Additional Analysis; **Appendix 4.3**, Draft EIS/EIR);

(d) "Groundwater Management Plan -- Santa Clara River Valley Groundwater Basin, East Subbasin," December 2003 (GWMP; **Appendix 4.3**, Draft EIS/EIR);

(e) "Effect of Urbanization on Aquifer Recharge in the Santa Clarita Valley," prepared by CH2MHill, February 2004 (CH2MHill Memorandum; **Appendix 4.3**, Draft EIS/EIR);

(f) "Regional Groundwater Flow Model for the Santa Clarita Valley: Model Development and Calibration," April 2004 (2004 Flow Model; **Appendix 4.3**, Draft EIS/EIR);

(g) 2005 Urban Water Management Plan (UWMP; **Appendix 4.3**, Draft EIS/EIR);

(h) "Analysis of Groundwater Basin Yield, Upper Santa Clara River Groundwater Basin, East Subbasin," August 2005 (2005 Basin Yield Report; **Appendix 4.3**, Draft EIS/EIR);

(i) "Evaluation of Groundwater Recharge Methods for the Saugus Formation in the Newhall Ranch Specific Plan Area," prepared by Luhdorff & Scalmanini Consulting Engineers, March 2006 (Scalmanini Memorandum; **Appendix 4.3**, Draft EIS/EIR);

(j) Santa Clarita Valley Water Reports (2006, 2007 Water Reports; **Appendix 4.3**, Draft EIS/EIR); and

(k) "Technical Memorandum: Potential Effects of Climate Change on Groundwater Supplies for the Newhall Ranch Specific Plan, Santa Clarita Valley, California," March 2008 (GSI Memorandum; **Appendix 8.0**, Draft EIS/EIR).

Additional clarifying information and data used in preparing this response was provided by CLWA and retail water purveyors in the Santa Clarita Valley. The response also is based on information from two reports that became available after the Draft EIS/EIR was circulated for public review in April 2009, namely:

(a) "2008 Santa Clarita Valley Water Report," April 2009 (2008 Water Report; see **Appendix F4.3**, Final EIS/EIR); and

(b) 2009 Basin Yield Update (see **Appendix F4.3**, Final EIS/EIR).

In addition, for further responsive information, please see revised **Section 4.3** of the Final EIS/EIR.

**Introduction**

The Draft EIS/EIR extensively described and assessed the existing groundwater conditions in the Santa Clarita Valley (Valley) based on the reports referenced in **Section 4.3**, Water Resources, **Subsection 4.3.3.3.1**, CLWA Groundwater Management Plan, at pages 4.3-11-4.3-13, and **Subsection 4.3.4.4**, Groundwater Supplies, at pages 4.3-39-4.3-55. It also analyzed impacts on groundwater supplies, levels, and recharge for both the proposed Project and the identified alternatives (Alternatives 1-7). (See Draft EIS/EIR, pages 4.3-76-4.3-116.)

While indirect impacts on groundwater supplies/levels/recharge focused on "recharge" to the Santa Clarita Valley, a substantial amount of information was presented in the Draft EIS/EIR, **Subsection 4.3.4**, concerning the groundwater basin in the Santa Clarita Valley, groundwater levels based on well data, groundwater pumping volumes, and the sustainability of the Valley's groundwater resources based on the CLWA/Purveyor groundwater operating plan. Based on that information, the Draft EIS/EIR, **Subsection 4.3.4**, confirmed the findings in several reports that the Santa Clara River East Subbasin (Basin), comprised of both the Alluvium (also referred to as the Alluvial aquifer) and the Saugus Formation, is not in an overdraft condition, or projected to become overdrafted.

This response will summarize the above analysis, taken primarily from the Draft EIS/EIR, **Section 4.3**, and the 2008 Santa Clarita Valley Water Report (April 2009).[1] It also provides further information on groundwater supplies, levels, recharge, and overdraft claims based on the 2009 Basin Yield Update.[2] Based on that information, it has been determined that the Valley's groundwater supplies are both available and reliable and that the history of groundwater levels in the Alluvium and the Saugus Formation show no signs of water-level related overdraft (*i.e.*, no long-term trend toward decreasing water levels and storage); and, consequently, pumping from the Alluvium and the Saugus Formation has been, and continues to be, sustainable, well within the operational yield of the aquifers on a long-term average basis.

**Groundwater Supplies - Groundwater Basin Yield**[3]

The following text comes from the 2008 Santa Clarita Valley Water Report:

> Prior to 1980, local groundwater extracted from the Alluvium and the Saugus Formation was the sole source of water supply in the Santa Clarita Valley. Since 1980, local groundwater supplies have been supplemented with imported State Water Project (SWP) water supplies, and augmented in 2007 by acquisition of additional supplemental water from the Buena Vista Water Storage District. Those water supplies also have been augmented by deliveries from CLWA's recycled water program since 2003.
>
> The groundwater basin, generally beneath the Santa Clarita Valley, identified in the Department of Water Resources' (DWR) Bulletin 118 as the Santa Clara River Valley Groundwater Basin, East Subbasin (Basin No. 4-4.07), is comprised of two aquifer systems. The Alluvium generally underlies the Santa Clara River and its several tributaries, and the Saugus Formation underlies practically the entire Upper Santa Clara River area. **(**The mapped extent of the Santa Clara River Valley East Subbasin in DWR

[1] The Draft EIS/EIR contained copies of both the 2006 and 2007 Santa Clarita Valley Water Reports (see, **Appendix 4.3**), which contain the same or similar information provided in the 2008 Water Report; however, those reports have been updated in the 2008 Water Report. Therefore, this response relies on the most up-to-date best available information from the 2008 Water Report, a copy of which is provided in **Appendix F4.3** of the Final EIS/EIR.

[2] The 2009 Basin Yield Update is provided in **Appendix F4.3** of the Final EIS/EIR. The prior 2005 Basin Yield Report also was provided in **Appendix 4.3** of the Draft EIS/EIR, and relied upon in **Section 4.3**, Water Resources.

[3] The information provided in this section is taken primarily from the 2008 Water Report (April 2009).

Bulletin 118 and its relationship to the extent of the CLWA service area are illustrated in Figure 3-1 of the 2008 Water Report.) The Subbasin boundary approximately coincides with the outer extent of the Alluvium and Saugus Formation.

A 2001 Update Report (Slade, 2002), which updated analyses and interpretation of hydrogeologic conditions in both the Alluvium and Saugus Formation from earlier reports (Slade, 1986 and 1988), included extensive detail on major aspects of the groundwater basin. Notable parts of the 2001 Update Report relative to groundwater supply included findings that:

(a) Analysis of historical groundwater levels and production indicates that there have been no conditions that would be illustrative of groundwater overdraft;

(b) Utilization of operational yield (as opposed to perennial yield) as a basis for managing groundwater production would be more applicable in this basin to reflect fluctuating utilization of groundwater in conjunction with imported SWP water;

(c) Operational yield of the Alluvium would typically be 30,000 to 40,000 acre-feet per year (afy) for wet and normal rainfall years, with an expected reduction into the range of 30,000 to 35,000 afy in dry years;

(d) Operational yield of the Saugus Formation would typically be in the range of 7,500 to 15,000 afy on a long-term basis, with possible short-term increases during dry periods into a range of 15,000 to 25,000 afy, and to 35,000 afy if dry conditions continue.

Based in part on the 2001 Update Report, the groundwater component of the overall water supply in the Valley derives from a groundwater operating plan to meet water requirements (municipal, agricultural, small domestic), while maintaining the basin in a sustainable condition (*i.e.*, no long-term depletion of groundwater or interrelated surface water). This operating plan also addresses groundwater contamination issues in the basin; all consistent with CLWA's adopted Groundwater Management Plan. The groundwater operating plan is based on the concept that pumping can vary from year-to-year to generally rely on increased groundwater use in dry periods and increased recharge during wet periods, and to collectively assure that the groundwater basin is adequately replenished through various wet/dry cycles.

The groundwater operating plan, summarized in **Table TR-8-1**, Groundwater Operating Plan for the Santa Clarita Valley, below, is as follows:

> **Alluvium** – Pumping from the Alluvial aquifer in a given year is related to local hydrologic conditions in the eastern Santa Clara River watershed. Pumping is expected to typically range between 30,000 and 40,000 afy during normal and above-normal rainfall years. Due to hydrogeologic constraints in the eastern part of the Basin, pumping is expected to be typically reduced to between 30,000 and 35,000 afy during locally dry years.

**Saugus Formation** – Pumping from the Saugus Formation in a given year is related to the availability of other water supplies, particularly from the SWP. During average-year conditions within the SWP system, Saugus pumping is expected to typically range between 7,500 and 15,000 afy. Planned dry-year pumping from the Saugus Formation is expected to range between 15,000 and 25,000 afy during a drought year and can increase to between 21,000 and 25,000 afy if SWP deliveries are reduced for two consecutive years, and between 21,000 and 35,000 afy if SWP deliveries are reduced for three consecutive years. Such high pumping is expected to typically be followed by periods of reduced (average-year) pumping, at rates between 7,500 and 15,000 afy, to further enhance the effectiveness of natural recharge processes that would recover water levels and groundwater storage volumes after the higher pumping during dry years.

**Table TR-8-1**[4]
**Groundwater Operating Plan for the Santa Clarita Valley**

| Aquifer | Groundwater Production (af) | | | |
|---|---|---|---|---|
| | **Normal Years** | **Dry Year 1** | **Dry Year 2** | **Dry Year 3** |
| Alluvium | 30,000 to 40,000 | 30,000 to 35,000 | 30,000 to 35,000 | 30,000 to 35,000 |
| Saugus | 7,500 to 15,000 | 15,000 to 25,000 | 21,000 to 25,000 | 21,000 to 35,000 |
| Total | 37,500 to 55,000 | 45,000 to 60,000 | 51,000 to 60,000 | 51,000 to 70,000 |

Source: 2008 Santa Clarita Valley Water Report (April 2009), Table 3-1.

In 2004, as part of analyzing the restoration of perchlorate-impacted groundwater supply in the Valley, a numerical groundwater flow model was developed and calibrated for use in analyzing the response of the groundwater basin to long-term operation at the operational yields noted above, with a focus on perchlorate extraction and the control of perchlorate migration in the basin.[5]

The groundwater flow model also was utilized in 2005 to specifically analyze the sustainability of groundwater supplies in both the Alluvium and the Saugus Formation through a long-term (78-year) hydrologic period that was selected to examine groundwater basin response to variations in pumping in accordance with the groundwater operating plan. Resultant projections of groundwater levels, groundwater storage, and surface water flows showed the basin to respond in a long-term sustainable manner, with no chronic depletion of groundwater levels, storage, or stream flows. The analysis of groundwater sustainability was summarized in the 2005 Basin Yield Report (CH2MHill

[4] This same table is found in the Draft EIS/EIR, **Section 4.3**, on page 4.3-41 (**Table 4.3-11**).

[5] See, "Regional Groundwater Flow Model for the Santa Clarita Valley: Model Development and Calibration," prepared for the Upper Basin Water Purveyors by CH2MHill, April 2004. This report was updated by CH2MHill in a report entitled, "Calibration Update of the Regional Groundwater Flow Model for the Santa Clarita Valley, Santa Clarita, California," August 2005. Copies of these two reports are found in **Appendix 4.3** of the Draft EIS/EIR.

and Luhdorff and Scalmanini Consulting Engineers, 2005)[6], which included the following findings:

(a) The groundwater basin has historically been, and continues to be, in good operating condition and not in overdraft conditions, as indicated by historical data.

(b) The groundwater plan is sustainable over varying hydrologic conditions, because it is feasible to intermittently exceed a long-term average yield for one or more years without creating long-term adverse impacts to the groundwater system and the Santa Clara River.

(c) The groundwater operating plan for the Alluvium and the Saugus Formation can be used for long-term water supply planning purposes. In particular, although increased pumping from the Saugus Formation during dry periods can be expected to cause short-term declines in groundwater levels, it is not projected to cause permanent declines in groundwater discharges or streamflow. Saugus groundwater levels can be expected to recover to pre-drought conditions when pumping is reduced in subsequent wet to normal years.

(d) The strategy around which the groundwater operating plan was designed (maximizing the use of Alluvial Aquifer and imported water during years of normal or above-normal availability of these supplies, while limiting the use of the Saugus Formation during these periods, then temporarily increasing Saugus pumping during years when SWP supplies are significantly reduced because of drought conditions) is viable on a long-term basis.

(e) The historical observations of basin conditions and the model simulations together support the historical and ongoing confidence that groundwater can continue to be a sustainable source of water supply under the groundwater operating plan.

**Alluvium -- General**

The spatial extent of the aquifers used for groundwater supply in the Valley, the Alluvium and the Saugus Formation, are illustrated in Figure 3-1 of the 2008 Water Report (April 2009) (see also Figure III-1 of the 2006 Water Report). Geologic descriptions and hydrogeologic details related to both aquifers are included in several technical reports, including Slade (1986, 1988 and 2002), the 2005 Basin Yield Report (CH2MHill and Luhdorff and Scalmanini Consulting Engineers (2005)), and the 2005 UWMP.

Consistent with the 2001 Update Report, the 2005 Basin Yield Report, and the 2005 UWMP, the management practice of the purveyors continues to be to rely on groundwater from the Alluvium for part of the overall municipal water supply, whereby

[6] A copy of this report is found in **Appendix 4.3** of the Draft EIS/EIR.

total pumping from the Alluvium (by municipal, agricultural, and small private pumpers) is in accordance with the groundwater operating plan, 30,000 to 40,000 afy in wet and normal years, with possible reduction to 30,000 to 35,000 afy in dry years. Such operation maximizes use of the Alluvium because of the aquifer's ability to store and produce good quality water on a sustainable basis, and because the Alluvium is capable of rapid recovery of groundwater storage in wet periods. As with many groundwater basins, it is possible to intermittently exceed a long-term average yield for one or more years without long-term adverse effects. Higher pumping for short periods may temporarily lower groundwater storage and related water levels, as has been the case in the Alluvium several times since the 1930s. However, subsequent decreases in pumping limit the amount of water level decline, and normal to wet-period recharge results in a rapid return of groundwater levels to historic highs. Historical groundwater data collected from the Alluvium over numerous hydrologic cycles continue to provide assurance that groundwater elevations, if locally lowered during dry periods, recover in subsequent average or wet years. Such water level response to rainfall is a significant characteristic of permeable, porous, alluvial aquifer systems that occur within large watersheds. In light of these historical observations, complemented by the long-term sustainability analysis using the numerical groundwater flow model, there is on-going confidence that groundwater will continue to be a sustainable source of water supply at the rates of pumping described in the 2005 UWMP.

Long-term adverse impacts to the Alluvium could occur if the amount of water extracted from the aquifer were to exceed the amount of water that recharges the aquifer over an extended period. However, the quantity and quality of water in the Alluvium and all significant pumping from the Alluvium are routinely monitored, and no long-term adverse impacts have ever been evident. Ultimately, the purveyors have identified cooperative measures to be taken, if needed, to ensure sustained use of the aquifer. Such measures include, but are not limited to, the continuation of conjunctive use of imported SWP water with local groundwater, artificial recharge of the aquifer with local runoff or other surface water supplies, financial incentives discouraging extractions above a selected limit, expanded use of other water supplies such as recycled water, and expanded implementation of demand-side management, including conservation (see, 2008 Santa Clarita Valley Water Report (April 2009), pages 3-5 and 3-6).

**Alluvium -- Historical and Current Conditions**

According to the 2008 Water Report, total pumping from the Alluvium in 2008 was about 41,750 acre-feet (af), an increase of 2,950 af from the preceding year. Total Alluvium pumping was slightly above the groundwater operating plan range. Of the total Alluvial pumping in 2008, about 27,950 af (67 percent) was for municipal water supply, and the balance, about 13,800 af (33 percent), was for agriculture and other smaller uses, including individual domestic uses. In a longer-term context, there has been a change in municipal/agricultural pumping distribution since SWP deliveries began in 1980, toward a higher fraction for municipal water supply (from about 50 percent to more than 65 percent of Alluvial pumpage), which reflects the general land use changes in the area. Ultimately, on a long-term average basis since the beginning of imported water deliveries from the SWP, total Alluvial pumping has been about 32,000 afy, which is at the lower

end of the range of operational yield of the Alluvium. That average has been higher over the last decade, about 38,800 afy, which remains within the range of operational yield of the Alluvium. The overall historic record of Alluvial pumping is illustrated in Figure 3-2 of the 2008 Water Report (April 2009).

Groundwater levels in various parts of the basin historically have exhibited different responses to both pumpage and climatic fluctuations. During the last 20 to 30 years, depending on location, Alluvial groundwater levels have remained nearly constant (generally toward the western end of the basin), or have fluctuated from near the ground surface when the basin is full, to as much as 100 feet lower during intermittent dry periods of reduced recharge (generally toward the eastern end of the basin). For illustration of the various groundwater level conditions in the basin, the Alluvial wells have been grouped into areas with similar groundwater level patterns, as shown in Figure 3-3 of the 2008 Water Report (April 2009). The groundwater level records have been organized into hydrograph form (groundwater elevation vs. time) as illustrated in Figures 3-4 and 3-5 of the 2008 Water Report (April 2009). Also shown on these plots is an annual marker indicating whether the year had a below average amount of rainfall. The wells shown on these plots are representative of the areas, showing the range of values (highest to lowest elevation) through the area, and containing a sufficiently long-term record to illustrate trends over time.

Situated along the eastern upstream end of the Santa Clara River Channel, the "Mint Canyon" area, located at the far eastern end of the groundwater basin, and the nearby "Above Saugus WRP" areas generally exhibit similar groundwater level responses (Figure 3-4, 2008 Water Report [April 2009]) to hydrologic and pumping conditions. As shown in Figure 3-6 of the 2008 Water Report (April 2009), the purveyors decreased total Alluvial pumping from the "Mint Canyon" area steadily from 2000 through 2003, and correspondingly increased pumping in the "Below Saugus WRP" and "Below Valencia WRP" areas. In spite of a continued period of below-average precipitation from 1999 to 2003, that progressive decrease in pumping resulted in a cessation of groundwater level decline in the "Mint Canyon Area." Subsequent wet conditions in late 2004, continuing into 2005, resulted in full recovery of groundwater storage. With such high groundwater levels, pumping in the "Mint Canyon" area was increased in 2005 and 2006, with no significant change in groundwater levels in 2005 and a slight decrease in 2006. Partly in response to decreased pumping in "Mint Canyon" and "Above Saugus WRP" areas in 2007 and 2008, groundwater levels slowed their decrease, leveled off, or increased in late 2008 with the onset of seasonal precipitation. These parts of the Valley have historically experienced a number of alternating wet and dry hydrologic conditions (Figure 3-4, 2008 Water Report [April 2009]) during which groundwater level declines have been followed by returns to high or mid-range historic levels. This trend has continued over the last 3 years where average hydrologic conditions in 2008 followed two dry years, and groundwater levels remain within mid-range levels.

In the "Bouquet Canyon" area, pumping has remained relatively constant for the last ten years, and water levels have fluctuated with consecutive wet or dry years. During and since the most recent wet conditions of 2004 and 2005, water levels returned to within historic mid-range levels. This groundwater level response to wet/dry years and pumping

is typical for these areas of the basin. When water levels are low, well yields and pumping capacities in these areas can be impacted. The affected purveyors typically respond by increasing use of Saugus Formation and imported SWP supplies, as shown in Table 2-3 of the 2008 Water Report (April 2009). The purveyors also shift a fraction of the Alluvial pumping that would normally be supplied by these eastern areas to areas further west, where well yields and pumping capacities remain fairly constant because of smaller groundwater level fluctuations.

In the western parts and lower elevations of the Alluvium, groundwater levels respond to pumping and precipitation in a similar manner, but to an attenuated or limited extent of those situated in the eastern, higher elevations areas. As shown in the western group of hydrographs in Figure 3-5 of the 2008 Water Report (April 2009), groundwater level fluctuations become more subtle moving westward and lower in the Valley. The "Below Saugus WRP" area, along the Santa Clara River immediately downstream of the Saugus Water Reclamation Plant (WRP), and the "San Francisquito Canyon" area generally exhibit similar groundwater level trends. In this middle part of the basin, historical groundwater levels were lower in the 1950s and 1960s than current levels. Groundwater levels in this area notably recovered as pumping declined through the 1960s and 1970s. They have subsequently sustained generally high levels for much of the last 30 years, with three dry-period exceptions: mid-1970s, late 1980s to early 1990s, and the late 1990s to early 2000s. Recoveries to previous high groundwater levels followed both of the short dry-period declines in the 1970s and 1990s. More recently, groundwater levels recovered significantly in both areas, to historic highs, following a wetter-than-average year in 2004 and significantly wet 2005. Since 2005, pumping has been increasing in the "Below Saugus WRP" area, while "San Francisquito Canyon" area pumping approximately doubled in 2005, but has since progressively declined. Coupled with the dry 2006-2007 period, water levels had seen varying degrees of decline until they leveled off with the onset of a "near-normal" amount of seasonal precipitation in 2008. By the end of 2008, water levels remained in mid-range to high historical range.

The "Castaic Valley" area is located along Castaic Creek below Castaic Lake. Below that and along the Santa Clara River, downstream of the Valencia WRP, is the "Below Valencia WRP" area, where discharges of treated effluent from the Valencia WRP to the Santa Clara River contribute to groundwater recharge. In the "Castaic Valley" area, groundwater levels continue to remain fairly constant, with slight responses to climatic and other fluctuations, since the 1950s (Figure 3-5, 2008 Water Report [April 2009]). Small changes in groundwater levels in 2007 and 2008 were consistent with other short-term historical fluctuations. The long-term, generally constant trend remained through 2008. The "Below Valencia WRP" area groundwater levels exhibit slight, if any, response to climatic fluctuations, and have remained fairly constant since the 1950s despite, over the last 20 years, a notable increase in pumping that continued through 2008 in that area (Figure 3-5 and 3-6, 2008 Water Report [April 2009]).

In summary, depending on the period of available data, all the history of groundwater levels in the Alluvium shows the same general picture: recent (last 30 years) groundwater levels have exhibited historic highs; in some locations, there are intermittent dry-period declines (resulting from use of some groundwater from storage) followed by wet-period

recoveries (and associated refilling of storage space). On a long-term basis, whether over the last 28 years since importation of supplemental SWP water, or over the last 40 to 50 years (since the 1950s - 1960s), the Alluvium shows no signs of water level-related overdraft (*i.e.*, no long-term trend toward decreasing water levels and storage). Consequently, pumping from the Alluvium has been and continues to be sustainable, well within the operational yield of that aquifer on a long-term average basis, and also within the operating yield in almost every individual year.

**Saugus Formation -- General**

Saugus wells operated by the purveyors are located in the southern portion of the basin south of the Santa Clara River (see Figure 3-7, 2008 Water Report [April 2009]). Consistent with the 2001 Update Report and the 2005 Basin Yield Report, the purveyors utilize the Saugus in accordance with the groundwater operating plan, in the range of 7,500 to 15,000 afy in average/normal years, with planned dry-year pumping of 15,000 to 35,000 afy for one to three consecutive dry years, when shortages to CLWA's SWP water supplies could occur. Such high pumping would be followed by periods of lower pumping (7,500 to 15,000 afy in average/normal years as noted above) in order to allow recharge to recover water levels and storage in the Saugus. Maintaining the substantial volume of water in the Saugus Formation is an important strategy to help maintain water supplies in the Santa Clarita Valley during drought periods.

**Saugus Formation -- Historical and Current Conditions**

Total pumping from the Saugus in 2008 was about 6,950 af, or about 750 af less than in the preceding year. Of the total Saugus pumping in 2008, most (about 5,950 af) was for municipal water supply, and the balance (1,000 af) was for agricultural and other irrigation uses. Historically, groundwater pumping from the Saugus peaked in the early 1990s and then steadily declined through the remainder of that decade. Since then, Saugus pumping had been in the range of about 4,000 to 6,500 afy, with the increase to almost 7,700 af in 2007. Over the last five years, the municipal use of Saugus water has been relatively unchanged; almost all of the relatively small fluctuations from year-to-year have been related to non-municipal usage. On a long-term average basis since the importation of SWP water, total pumping from the Saugus Formation has ranged between a low of about 3,700 afy (in 1999) and a high of nearly 15,000 afy (in 1991); average pumping from 1980 to present has been about 6,800 afy. These pumping rates remain well within, and generally at the lower end of the range of operational yield of the Saugus Formation. The overall historic record of Saugus pumping is illustrated in Figure 3-8 of the 2008 Water Report (April 2009).

Unlike the Alluvium, which has an abundance of wells with extensive water level records, the water level data for the Saugus Formation are limited by both the distribution of the wells in that Formation and the periods of water level records. The wells that do have water level records extending back to the mid-1960s indicate that groundwater levels in the Saugus Formation were highest in the mid-1980s and are currently higher than they were in the mid-1960s (Figure 3-9, 2008 Water Report [April 2009]). Based on these data, there is no evidence of any historic or recent trend toward permanent water

level or storage decline. There continue to be seasonal fluctuations in groundwater levels but the prevalent longer-term trend is one of general stability.

Consistent with the 2001 Update Report, the 2005 Basin Yield Report, and the 2005 UWMP, the purveyors continue to maintain groundwater storage and associated water levels in the Saugus Formation so that supply is available during drought periods, when Alluvial pumping might be reduced and/or SWP supplies also decreased. The period of increased pumping during the early 1990s is a good example of this management strategy. Most notably, in 1991, when SWP deliveries were substantially reduced, increased pumping from the Saugus made up almost half of the decrease in SWP deliveries. The increased Saugus pumping over several consecutive dry years (1991-1994) resulted in short-term declining groundwater levels, reflecting the use of water from storage. However, groundwater levels subsequently recovered when pumping declined, reflecting recovery of groundwater storage in the Saugus Formation.

**Santa Clara River -- Surface Water Flow Impacts**

In 2001, the Santa Clarita Valley purveyors and the United Water Conservation District entered into a Memorandum of Understanding (MOU), which manages surface and groundwater resources in seven groundwater basins in the Lower Santa Clara River Valley Area. The MOU initiated a collaborative and integrated approach to data collection; database management; groundwater flow modeling; assessment of groundwater basin conditions, including determination of basin yield amounts; and preparation and presentation of reports, including continued annual water reports for current planning and consideration of development proposals, and also including more technically detailed reports on geologic and hydrologic aspects of the overall stream-aquifer system. Meetings of the MOU participants have continued, and integration of the Upper (Santa Clarita Valley) and Lower (United Water Conservation District) Santa Clara River databases has been accomplished. As discussed above, a numerical groundwater flow model of the entire Santa Clarita groundwater basin was developed and calibrated in 2002-2004. After the model's initial use in 2004 for assessing the effectiveness of various operating scenarios to restore pumping capacity impacted by perchlorate contamination (by pumping and treating groundwater for water supply while simultaneously controlling the migration of contaminated groundwater), in 2005, the model was used for evaluation of basin yield under varying management actions and hydrologic conditions. The results completed the determination of sustainable operating yield values for both the Alluvium and the Saugus Formation, which are now incorporated in the 2005 UWMP.

Issues have been raised about whether use and management of groundwater in the Santa Clarita Valley have adversely impacted surface water flows into Ventura County. Part of the groundwater modeling work has addressed the surface water flow question as well as groundwater levels and storage. While the sustainability of groundwater has logically derived primarily from projected long-term stability of groundwater levels and storage, it also has derived in part from modeled simulations of surface water flows and the lack of streamflow depletion by groundwater pumping. In addition, the long-term history of groundwater levels in the western and central part of the basin, as illustrated in Figures 3-

4 and 3-5 of the 2008_Water Report (April 2009), supports the modeled analysis and indicates that groundwater has not been lowered in such a way as to induce infiltration from the river and thus impact surface water flows.

In addition, historical annual average of daily mean streamflow in the Santa Clara River, into and out of the Santa Clarita Valley, is shown on Figure 3-14 of the 2008Water Report (April 2009). The upstream gage at Lang Station was reinstated in 2002 and shows a wide range of average annual inflow over the last five years. The downstream gage was moved in 1996 to its present location near Piru, about two miles downriver from the former County Line Gage. The combined record of these two downstream gages indicates an average daily streamflow of about 65 cfs. These data gaged near the County line show notably higher flows from the Santa Clarita Valley into the uppermost downstream basin, the Piru Basin, located in Ventura County, over the last 30 to 35 years. (For further information regarding surface water flows, please refer to the 2009 Basin Yield Update, Ch. 4, Section 4.3, River Flows.)

**Summary**

In summary, then, based on the data presented in the 2001 Update Report, the 2005 Basin Yield Report, the 2005 UWMP, and the Santa Clarita Valley Water Reports (*e.g.*, 2006, 2007, and 2008), as summarized above, the Alluvium, on a long-term basis, whether over the last 28 years since the importing of supplemental SWP water, or over the last 40 to 50 years, shows no signs of water-level related overdraft (*i.e.*, no long-term trend toward decreasing water levels and storage). As a result, pumping from the Alluvium has been, and continues to be, sustainable and within the operational yield of that aquifer. The ongoing data also indicates that the Alluvium can continue to support pumping in the operating range included in the groundwater operating plan of the 2005 UWMP, or slightly higher, without adverse results (*e.g.*, long-term water level decline, degradation of water quality, or impacted surface water flows).

In addition, the purveyors in the Santa Clarita Valley continue to maintain groundwater storage and associated water levels in the Saugus Formation so that supply is available during drought periods, when Alluvial pumping might be reduced and/or imported SWP supplies also decreased. Based on the data, there is no evidence of any historic or recent trend toward permanent water level or storage decline in the Saugus Formation; instead, there continues to be seasonal fluctuation in groundwater levels while the prevalent longer-term trend in the Saugus Formation is one of general stability.

Lastly, based on the data, as summarized above, the use and management of groundwater in the Santa Clarita Valley has not had any adverse impact on surface water flows in the Santa Clara River, in that groundwater has not been lowered in such a way as to induce infiltration from the Santa Clara River and thus impact surface water flows in the river or downstream into Ventura County.

In conclusion, based on the data summarized above, it has been determined that neither the proposed Project nor any of the alternatives would have any impact on groundwater supplies or groundwater levels in the Santa Clara River Valley East Subbasin (*i.e.*, no long-term depletion of groundwater, groundwater levels, or interrelated surface water). (The same conclusion has been reached based on data presented in the Draft EIS/EIR, which is summarized below.)

**Draft EIS/EIR's Description and Assessment of Groundwater Supplies, Levels, and Overdraft**

The Draft EIS/EIR includes a thorough discussion of groundwater supplies, levels and overdraft, and much of the information presented above was addressed in the Draft EIS/EIR, **Section 4.3**, Water Resources.

For example, as background, the Draft EIS/EIR summarized the results of a substantial amount of study that was conducted to establish the historic and present condition of the basin. Specifically, on pages 4.3-11-4.3-12, the Draft EIS/EIR explained that in 2001, CLWA, the Santa Clarita purveyors, and the United Water Conservation District entered into the MOU (summarized above), which initiated local groundwater management of the basin, now embodied in CLWA's Groundwater Management Plan (GWMP). CLWA's 2003 GWMP "contains four management objectives for the Basin, including: (1) development of an integrated surface water, groundwater and recycled water supply to meet existing and projected demands for municipal, agricultural and other water uses; *(2) assessment of Basin conditions to determine a range of operational yield values that use local groundwater conjunctively with supplemental SWP supplies and recycled water to avoid groundwater overdraft*; (3) preservation of groundwater quality, and active characterization and resolution of groundwater contamination problems, including perchlorate; and (4) preservation of interrelated surface water resources, which includes managing groundwater in a manner that does not adversely impact surface and groundwater discharges or quality to downstream basins." (Draft EIS/EIR, p. 4.3-11, italics added.)

The Draft EIS/EIR summarized the ongoing work since CLWA adopted the GWMP, including completion of the 2005 Basin Yield Report and its associated findings:

> "Work on a number of the GWMP [2003 Groundwater Management Plan] elements has been on-going. An important aspect of this work was completion of the 2005 Basin Yield Report. The primary determinations made in that report are that: (1) both the Alluvial aquifer and the Saugus Formation are sustainable sources at the operational plan yields stated in the 2005 UWMP over the next twenty-five years; (2) the yields are not overstated and will not deplete or "dry up" the groundwater basin; and (3) there is no need to reduce the yields shown in the 2005 UWMP. Additionally, *the 2005 Basin Yield Report concluded that neither the Alluvial aquifer nor the Saugus Formation is in an overdraft condition, or projected to become overdrafted.*" (Draft EIS/EIR, p. 4.3-12, italics added.)

The 2005 Basin Yield Report was included in **Appendix 4.3** of the Draft EIS/EIR, as noted in the Draft EIS/EIR at page 4.3-7. As stated in the 2009 Basin Yield Report:

> "In 2003, the retail purveyors in the Santa Clarita Valley also commissioned CH2MHill to develop, calibrate, and utilize a numerical groundwater model for purposes of analyzing the sustainability of local groundwater as a component of overall water supply in the Valley. At that time, the question of groundwater sustainability was complemented by a question about whether part of overall groundwater pumping could be employed to achieve containment and removal of perchlorate contamination in the deeper aquifer, the Saugus Formation, beneath the Valley. The results of those modeling efforts concluded that a certain groundwater operating plan (rates and distributions of groundwater

> pumping under varying local hydrologic conditions) would be expected to produce long-term sustainable groundwater conditions, and that a certain focused part of overall pumping would be expected to both extract perchlorate-contaminated groundwater (for use after treatment) and contain the migration of perchlorate-impacted groundwater.
>
> The development and calibration of the numerical groundwater flow model is described in *Regional Groundwater Flow Model for the Santa Clarita Valley, Model Development and Calibration* (CH2MHill, April 2004). Application of the model for extraction and containment of perchlorate-impacted groundwater is described in *Analysis of Perchlorate Containment in Groundwater Near the Whittaker-Bermite Property* (CH2MHill, December 2004). And application of the model for analysis of basin yield, including sustainability of groundwater pumping consistent with that employed in the perchlorate containment analysis, is documented in 2005 Basin Yield Report (CH2MHill and Luhdorff and Scalmanini Consulting Engineers, August 2005).[7]" (*Id.*)

These three reports were included in **Appendix 4.3** of the Draft EIS/EIR, as noted in the Draft EIS/EIR at pages 4.3-7-4.3-8. The two 2004 CH2MHill reports also were described in the Draft EIS/EIR on page 4.3-41 and footnoted.

In addition, the Draft EIS/EIR contained a thorough description and analysis of the Valley's groundwater supplies, including the purveyors' groundwater operating plan. For example, the Draft EIS/EIR, at page 4.3-39, stated as follows:

> "**4.3.4.4 Description of Groundwater Supplies**
>
> The Project area lies within the groundwater basin identified in DWR Bulletin 118 (2003 Update) as the Santa Clara River Valley Groundwater Basin, East Subbasin (Basin). The Basin is comprised of two aquifer systems, the Alluvium (also referred to as the Alluvial aquifer) and the Saugus Formation. The Alluvium generally underlies the Santa Clara River and its several tributaries, and the Saugus Formation underlies practically the entire Upper Santa Clara River area. There are also some scattered outcrops of terrace deposits in the Basin that likely contain limited amounts of groundwater. Since these deposits are located in limited areas situated at elevations above the regional water table and are also of limited thickness, they are of no practical significance as aquifers and, consequently, have not been developed for any significant water supply. **Figure 4.3-4** illustrates the mapped extent of the Santa Clara River Valley East Subbasin, which approximately coincides with the outer extent of the Alluvium and Saugus Formation. The CLWA service area and the location of the two existing WRPs in the Valley also are shown on **Figure 4.3-4**. [See this figure in the Draft EIS/EIR on page 4.3-40.]
>
> **Groundwater Operating Plan.** The groundwater component of overall water supply in the Santa Clarita Valley derives from a groundwater operating plan developed by CLWA and the local retail purveyors over the past 20 years to meet water requirements (municipal, agricultural, small domestic), while maintaining the Basin in a sustainable

[7] "Analysis of Groundwater Supplies and Groundwater Basin Yield, Upper Santa Clara River Groundwater Basin, East Subbasin," August 2009.

> condition (*i.e.*, no long-term depletion of groundwater or interrelated surface water). This operating plan also addresses groundwater contamination issues in the Basin, all consistent with both the GWMP [2003 Groundwater Management Plan] and the MOU [2001 Memorandum of Understanding] described above. This operating plan is based on the concept that pumping can vary from year-to-year to allow increased groundwater use in dry periods and increased recharge during wet periods, and to collectively assure that the Basin is adequately replenished through various wet/dry cycles. As described in the GWMP and the MOU, the operating yield concept has been quantified as ranges of annual pumping volumes." (*Id.*)

The Draft EIS/EIR, at pages 4.3-41-4.3-42, also described the groundwater operating plan and summarized it in **Table 4.3-11**. In addition, the Draft EIS/EIR referenced the groundwater operating plan's historical groundwater production by retail water purveyor (from 2001 through 2007), as well as the projected groundwater production by purveyor (in 2010, 2015, 2020, 2025, and 2030). (Please refer to **Tables 4.3-12** and **4.3-13** of the Draft EIS/EIR.)

Further, on pages 4.3-44 through 4.3-54, the Draft EIS/EIR assessed three factors affecting the availability of the Valley's groundwater supplies under the CLWA/purveyor groundwater operating plan, now incorporated in the 2005 UWMP. One of the three factors involved sustainability of the groundwater resources for meeting pumping demand on a renewable basis without adverse impacts (*i.e.*, no long-term decline in groundwater levels or storage). As to the Alluvial aquifer, the Draft EIS/EIR summarized significant data, including the determination that the Alluvial aquifer shows no signs of water level-related overdraft:

> "**Alluvial Aquifer.** Based on a combination of historical operating experience and recent groundwater modeling analysis, the Alluvial aquifer can supply groundwater on a long-term sustainable basis in the overall range of 30,000 to 40,000 afy, with a probable reduction in dry years to a range of 30,000 to 35,000 afy. Both of those ranges include about 15,000 afy of Alluvial pumping for current agricultural water uses and an estimated pumping of up to about 500 afy by small private pumpers. The dry year reduction is a result of practical constraints in the eastern part of the Basin, where lowered groundwater levels in dry periods have the effect of reducing pumping capacities in that shallower portion of the aquifer.
>
> **…**
>
> In summary, depending on the period of available data, all the history of groundwater levels in the Alluvium shows the same general picture: recent (last 30 years) groundwater levels have exhibited historic highs; in some locations, there are intermittent dry-period declines (resulting from use of some groundwater from storage) followed by wet-period recoveries (and associated refilling of storage space). *On a long-term basis, whether over the last 27 years since importation of supplemental SWP water, or over the last 40 to 50 years (since the 1950s - 1960s), the Alluvium shows no signs of water level-related overdraft (i.e., no trend toward decreasing water levels and storage). Consequently, pumping from the Alluvium has been and continues to be sustainable, well within the operational yield of that aquifer on a long-term average basis, and also within the*

*operating yield in almost every individual year*." (Draft EIS/EIR, pp. 4.3-44-4.3-46, italics added.)

The Draft EIS/EIR also summarized data confirming the long-term sustainability or renewability of the Alluvial aquifer:

"**Sustainability.** Until recently, the long-term renewability of Alluvial groundwater was empirically determined from approximately 60 years of recorded experience. This empirical data confirmed long-term stability in groundwater levels and storage, with some dry period fluctuations in the eastern part of the Basin, over a historical range of total Alluvial pumpage from as low as about 20,000 afy to as high as about 43,000 afy. These empirical observations have been complemented by the development and application of a numerical groundwater flow model, which has been used to predict aquifer response to the planned operating ranges of pumping. . . .

To examine the yield of the Alluvium or, the sustainability of the Alluvium on a renewable basis, the groundwater flow model was used to examine the long-term projected response of the aquifer to pumping for municipal and agricultural uses in the 30,000 to 40,000 afy range under average/normal and wet conditions, and in the 30,000 to 35,000 afy range under locally dry conditions. To examine the response of the entire aquifer system, the model also incorporated pumping from the Saugus Formation in accordance with the normal (7,500-15,000 afy) and dry year (15,000-35,000 afy) operating plan for that aquifer. The model was run over a 78-year hydrologic period, which was selected from actual historical precipitation to examine a number of hydrologic conditions expected to affect both groundwater pumping and groundwater recharge. The selected 78-year simulation period was assembled from an assumed recurrence of 1980 to 2003 conditions, followed by an assumed recurrence of 1950 to 2003 conditions. The 78-year period was analyzed to define both local hydrologic conditions (normal and dry), which affect the rate of pumping from the Alluvium, and hydrologic conditions that affect SWP operations, which in turn affect the rate of pumping from the Saugus. The resultant simulated pumping cycles included the distribution of pumping for each of the existing Alluvial aquifer wells, for normal and dry years, respectively, as shown in **Table 4.3-14** [Active Municipal Source Capacity - Alluvial Aquifer Wells].

Simulated Alluvial aquifer response to the range of hydrologic conditions and pumping stresses is essentially a long-term repeat of the historical conditions that have resulted from similar pumping over the last several decades. *The resultant response consists of: (1) generally constant groundwater levels in the middle to western portion of the Alluvium and fluctuating groundwater levels in the eastern portion as a function of wet and dry hydrologic conditions; (2) variations in recharge that directly correlate with wet and dry hydrologic conditions; and (3) no long-term decline in groundwater levels or storage. The Alluvial aquifer is considered a sustainable water supply source to meet the Alluvial portion of the operating plan for the Basin. This is based on the combination of actual experience with Alluvial aquifer pumping at capacities similar to those planned for the future and the resultant sustainability (recharge) of groundwater levels and storage, and further based on modeled projections of aquifer response to planned*

*pumping rates that also show no depletion of groundwater*." (Draft EIS/EIR, p. 4.3-39, italics added.)

Further, the Draft EIS/EIR assessed and confirmed the sustainability and renewability of the Saugus Formation:

"**Saugus Formation.** Based on historical operating experience and extensive recent testing and groundwater modeling analysis, the Saugus Formation can supply water on a long-term sustainable basis in a normal range of 7,500 to 15,000 afy, with intermittent increases to 25,000 to 35,000 af in dry years. The dry-year increases, based on limited historical observation and modeled projections, demonstrate that a small amount of the large groundwater storage in the Saugus Formation can be pumped over a relatively short (dry) period. This would be followed by recharge (replenishment) of that storage during a subsequent normal-to-wet period when pumping would be reduced.

**Background.** Total pumping from the Saugus in 2007 was about 7,700 af, or about 400 af more than in the preceding year. Of the total Saugus pumping in 2007, most (nearly 6,000 af) was for municipal water supply, and the balance (about 1,700 af) was for agricultural and other irrigation uses. Historically, groundwater pumping from the Saugus peaked in the early 1990s and then steadily declined through the remainder of that decade. Since then, Saugus pumping had been in the range of about 4,000 to 6,500 afy, with the increase to about 7,700 af in 2007. On a long-term average basis since the importation of SWP water, total pumping from the Saugus Formation has ranged between a low of about 3,700 afy (in 1999) and a high of nearly 15,000 afy (in 1991); average pumping from 1980 to present has been about 6,700 afy. These pumping rates remain well within, and generally at the lower end of, the range of operational yield of the Saugus Formation. The overall historic record of Saugus pumping is illustrated in Figure III-8 of the 2007 Water Report.

Unlike the Alluvium, which has an abundance of wells with extensive water level records, the water level data for the Saugus Formation are limited by both the distribution of the wells in that Formation and the periods of water level record. The wells that do have water level records extending back to the mid-1960s indicate that groundwater levels in the Saugus Formation were highest in the mid-1980s and are currently higher than they were in the mid-1960s (2007 Water Report, Figure III-9). Based on these data, there is no evidence of any historic or recent trend toward permanent water level or storage decline.

Consistent with the 2001 Update Report (Slade), the 2005 Basin Yield Report (CH2MHill and Luhdorff and Scalmanini Consulting Engineers), and the 2005 UWMP, the management practice of the purveyors continues to be to maintain groundwater storage and associated water levels in the Saugus Formation so that supply is available during drought periods, when Alluvial pumping might be reduced and SWP supplies also could be decreased. The period of increased pumping during the early 1990s is a good example of this management strategy. Most notably, in 1991, when SWP deliveries were substantially reduced, increased pumping from the Saugus made up almost half of the decrease in SWP deliveries. The increased Saugus pumping over several consecutive dry

years (1991-1994) resulted in short-term declining groundwater levels, reflecting the use of water from storage. However, groundwater levels subsequently recovered when pumping declined, reflecting recovery of groundwater storage in the Saugus Formation.

**Sustainability.** Until recently, the long-term sustainability of Saugus groundwater was empirically determined from limited historical experience. The historical record shows fairly low annual pumping in most years, with one four-year period of increased pumping up to about 15,000 afy that produced no long-term depletion of the substantial groundwater storage in the Saugus. Those empirical observations have now been complemented by the numerical groundwater flow model, which has been used to examine aquifer response to the operating plan and to examine the effectiveness of pumping for contaminant control within the Saugus Formation. The latter aspects of Saugus pumping are discussed in further detail in Chapter 5 of the 2005 UWMP (see EIS/EIR, **Appendix 4.3**, for the 2005 UWMP).

To examine the yield of the Saugus Formation or, its sustainability on a renewable basis, the groundwater flow model was used to examine long-term projected response to pumping from both the Alluvium and the Saugus over the 78-year period of hydrologic conditions (purveyors believe that this period best represents potential variations in pumping). The pumping simulated in the model was in accordance with the operating plan for the Basin. For the Saugus, simulated pumpage included the planned restoration of recent historic pumping from the perchlorate-impacted wells. In addition to assessing the overall recharge of the Saugus, that pumping was analyzed to assess the effectiveness of controlling the migration of perchlorate by extracting and treating contaminated water close to the source of contamination. For a discussion regarding the effects of climate change on water supplies, please see **Subsection 4.3.3.2.2**, Water Supply and Demand, above. In addition, please refer to this EIS/EIR, **Section 8.0**, Global Climate Change, and, specifically, the appendices to that section. The appendix contains the best available information on the subject of global climate change and its effects on California's water supplies.

Simulated Saugus Formation response to the ranges of pumping under assumed recurrent historical hydrologic conditions is consistent with actual experience under smaller pumping rates. *The response consists of: (1) short-term declines in groundwater levels and storage near pumped wells during dry-period pumping; (2) rapid recovery of groundwater levels and storage after cessation of dry-period pumping; and (3) no long-term decreases or depletion of groundwater levels or storage. The combination of actual experience with Saugus pumping and recharge up to about 15,000 afy, now complemented by modeled projections of aquifer response that show long-term utility of the Saugus at 7,500 to 15,000 afy in normal years and rapid recovery from higher pumping rates during intermittent dry periods, shows that the Saugus Formation can be considered a sustainable water supply source to meet the Saugus portion of the operating plan for the Basin.*" (Draft EIS/EIR, pp. 4.3-50-4.3-51, 4.3-53-4.3-54, italics added.)

Based on the Draft EIS/EIR's analysis, the Valley's groundwater supplies show no evidence of water-level related overdraft (*i.e.*, no long-term trend toward decreasing water levels and storage); and consequently, pumping from both the Alluvium and the Saugus Formation has been, and continues to be, sustainable,

and well within the operational yield of the aquifers on a long-term average basis. Based on the data analyzed in the Draft EIS/EIR, and because the amount of groundwater will not change or increase as a result of the proposed Project or the alternatives, neither the proposed Project nor any of the alternatives would have any impact on groundwater supplies or groundwater levels in the Santa Clara River Valley East Subbasin (*i.e.*, no long-term depletion of groundwater, groundwater levels, or interrelated surface water).

Some comments on the Draft EIS/EIR suggested that vegetation die back, subsidence, and an increase in electrical conductivity (EC) represent indications that overdraft exists in the groundwater basin. The comments state that no studies exist to evaluate these alleged indicators. The comments do not provide any evidence in support of their claims. However, as analyzed in the Draft EIS/EIR (and summarized above), no overdraft of the groundwater basin has occurred or would occur in the future under the Santa Clarita Valley's water purveyor's groundwater operating plan. There is no reason to believe that further study of vegetation die back, subsidence, or EC would alter this conclusion.

**Summary of 2009 Groundwater Basin Yield Update and Associated Findings**

The information below comes from the 2009 Updated Yield Report, prepared by Luhdorff & Scalmanini and GSI Water Solutions, Inc.

In 2008, partly in preparation for the next UWMP in 2010, and partly because of recent events that are expected to impact the future reliability of the supplemental SWP water supply for Santa Clarita Valley, the purveyors concluded that an updated analysis was needed to further assess groundwater development potential and possible augmentation of the CLWA/purveyor groundwater operating plan. The 2009 Updated Yield Report found that near-term reductions in SWP water deliveries to CLWA are possible because of court rulings (*i.e.*, *Wanger* decisions) that are expected to reduce exports from the Bay-Delta in the immediate future. Additionally, the report found that Biological Opinions also are expected to reduce exports from the Bay-Delta, including, for example, the National Marine Fisheries Service's (NMFS) release of its Biological Opinion addressing long-term operations of the Central Valley Project (CVP) and SWP on June 4, 2009. The report noted that the proposed regulatory actions will further restrict Delta export operations of the SWP; however, studies by DWR have not been completed quantifying impacts on SWP reliability. The report also stated the duration of reductions are unknown and depend on a number of factors, including whether DWR can construct alternative facilities in the future to make up for reductions. The report explained that DWR is evaluating the potential magnitude of longer-term future reductions in SWP deliveries because of potential effects of global climate change. (Please refer to **Topical Response 5: Water Litigation And Regulatory Action Update**; **Topical Response 6: CLWA's 41,000 Afy Water Transfer**; and **Topical Response 9: State Water Project Supply Reliability**, for further information concerning the subject of SWP supplies, operations, and deliveries, as well as environmental, legal, and other constraints.)

According to the 2009 Updated Yield Report, a second consideration in completing the update was that global climate change could alter local rainfall and associated recharge patterns, thus affecting local groundwater supplies (*i.e.*, the yield of the basin). Therefore, the report simulated basin response to the 2008 Operating Plan under a range of potential climate change scenarios. The report also considered plans by the Los Angeles County Flood Control District for small flood control projects in the Santa Clarita Valley; and estimated the amounts of conservation/groundwater recharge potential that are being considered by the District for each of the individual projects. The report noted that purveyors have an

interest in whether the potential groundwater recharge from such projects could appreciably augment the yield of the basin.

In light of the above, the scope of the 2009 Basin Yield Update, reported below, included the following:

(a) consideration of the potential increased utilization of groundwater for regular (wet/normal) and/or dry-year water supply, including distribution of the yield by reach of the Santa Clara River alluvium and its various tributaries;

(b) description of general impacts of climate change on the groundwater basin and its yield, quantitatively or qualitatively, depending on the availability of technical reference material; and

(c) consideration of the potential augmentation of basin yield via initiation of artificial groundwater recharge using stormwater runoff in selected areas of the basin as being planned by Los Angeles County Flood Control District.

The primary objective of the report was to evaluate the planned utilization of groundwater by the purveyors for sustainability of the groundwater resource and for physical ability to extract groundwater at desired rates, after considering potential impacts/reductions in SWP water supplies, and in recognition of ongoing pumping by others for agricultural and other private water supply. Sustainability was defined in the report in terms of renewability (recharge) of groundwater as reflected by the following indicators:

(a) lack of chronic, or sustained, depletion of groundwater storage, as indicated by projected groundwater levels, over a reasonable range of wet, normal, and dry hydrologic conditions; and

(b) maintenance of surface water flows in the western portion of the basin (which are partially maintained by groundwater discharge) and surface water outflow to downstream basins over the same range of hydrologic conditions.

A second objective of the report was to investigate and describe potential impacts of expected climate change on the groundwater basin and its yield. A third objective was to consider potential augmentation of basin yield via potential artificial groundwater recharge using storm water runoff in selected areas of the basin as planned by the Los Angeles County Flood Control District.

The report's first objective was investigated by analyzing, with the numerical groundwater flow model of the basin, two groundwater operating plans: (a) 2008 Operating Plan to reflect currently envisioned pumping rates and distribution throughout the Valley, including fluctuations through wet/normal and dry years, to achieve a desired amount of water supply that, in combination with anticipated supplemental water supplies, can meet existing and projected water requirements in the Valley; and (b) Potential Operating Plan that envisions potentially increased utilization of groundwater during both wet/normal and dry years.

The 2008 Operating Plan for the local groundwater basin involved pumping from the Alluvial aquifer in ranges between 30,000 and 40,000 afy during normal/wet years but, because of operational constraints in the eastern part of the basin, reduced pumping to between 30,000 and 35,000 afy during locally dry years. Pumping from the Saugus Formation ranges between 7,500 and 15,000 afy during normal/wet years, with planned dry-year pumping ranging between 15,000 and 25,000 afy during a dry year. Saugus pumping would increase to between 21,000 and 25,000 afy if SWP allocation is reduced to about 35 percent or less of the maximum Table A amount for two consecutive years, and between 21,000 and 35,000 afy if SWP

allocation is reduced to about 35 percent or less of the maximum Table A amount for three consecutive years.

Simulated pumping rates under the 2008 Operating Plan for production wells in the Alluvial aquifer were listed in Table 3-4 of the 2009 Updated Yield Report, which included the purveyor wells, wells owned by Newhall Land and Farming, and private wells owned by Robinson Ranch and Wayside Honor Rancho (WHR).[8] The plan also accounted for historical perchlorate detections in two Alluvial wells.

According to the report, the water management practices of the purveyors recognize ongoing Alluvial aquifer pumping for other smaller private domestic and related pumping (despite comments claiming that groundwater pumping is underestimated due to private well usage), and the annual water reports for the Santa Clarita Valley have included estimates of the private well pumping. (See, for example, the 2007 Water Report, found in **Appendix 4.3** of the Draft EIS/EIR, Table II-7, Individual Water Supply Utilization by Agricultural and Other Users, and Table II-8, Total Water Supply Utilization for Municipal, Agricultural and Other Users. Please also refer to the 2008 Water Report, Table 2-2, Individual Water Supply Utilization by Agricultural and Other Users, and Table 2-3, Total Water Supply Utilization for Municipal, Agricultural and Other Users, which is found in **Appendix F4.3** of the Final EIR. Both reports take into account estimates of private well usage.)

Based on limited data provided by private well owners as part of the overall GWMP effort, the report estimated that small private pumping is within 500 afy, or approximately one percent of typical Alluvial aquifer pumping by the purveyors and other known private well owners (including agricultural pumpers) combined; however, the small private wells are not explicitly modeled in the 2009 Basin Yield Update because their locations and operations are not known, and their operation creates a pumping stress that is essentially negligible at the scale of the overall groundwater model. Ultimately, as discussed in the report, the intent of the 2008 Operating Plan is to maintain overall pumping, including private pumping, within the operating plan to result in sustainable groundwater conditions to support the combination of municipal (purveyor), agricultural, and private groundwater use on an ongoing basis. Thus, the report states that private well owners in the basin, like the large municipal and agricultural pumpers, can expect groundwater supplies to continue to be available as they have been in the past, with some fluctuations in water levels through wet and dry periods, but no long-term depletion of supply.

As to the two respective operating plans, the first conclusion made in the report is that the 2008 Operating Plan will not cause detrimental short- or long-term effects to the groundwater and surface water resources in the Valley and, therefore, is sustainable. The report stated that, consistent with actual operating experience and empirical observations of historical basin response to groundwater pumping, the 2008 Operating Plan can be expected to have local difficulty in the Alluvium at the eastern end of the basin during locally dry periods, with achievement of all the Alluvial pumping in the 2008 Operating Plan. The report stated that this condition is particularly evident if several decades of predominantly below-normal

[8] The 2009 Basin Yield Update, at pages III-5 and III-6, acknowledged that portions of the current pumping by Newhall Land and Farming "are planned to be converted to pumping by Valencia Water Company's supply of potable water" to the Newhall Ranch Specific Plan. The Update also pointed out that the "planned change from agricultural to municipal supply is expected to result in only locally small changes in pumping locations (new municipal supply wells in close proximity to existing agricultural wells that will then be abandoned), resulting in practically similar spatial distribution of pumping and thus similar conditions as simulated in the 2008 Operating Plan."

rainfall years were to occur in the future such as occurred during much of the five decades from the mid-1920s through the mid-1970s. In other words, while the basin as a whole can sustain the pumping shown in the 2008 Operating Plan, local conditions in the Alluvium in the eastern end of the basin can be expected to repeat historical groundwater level declines during dry periods, necessitating a reduction in desired Alluvial aquifer pumping due to decreased well yield and associated actual pumping capacity. According to the report, the modeling analysis conducted to date suggests that those reductions in pumping from the Alluvial aquifer can be made up by an equivalent amount of increased pumping in other parts of the basin without disrupting basin-wide sustainability or local pumping capacity in those other areas (see discussion of "2008 Operating Plan with Pumping Redistribution," below). For the Saugus Formation, the modeling analysis indicates that this aquifer can sustain the pumping from this unit that is shown in the 2008 Operating Plan.

The report also stated that the "2008 Operating Plan with Pumping Redistribution" was developed in response to model simulation results that identified a potential lack of achievability in maintaining Alluvial pumping in the eastern end of the basin. According to the report, the model simulations of the 2008 Operating Plan indicated that such declines could occur during periods that experience prolonged dry conditions, such as occurred from the mid-1940s through the mid-1970s, when there were few years of significantly greater-than-average rainfall. For this three decade period, the model simulation found that the 2008 Operating Plan was not achievable in the most eastern part of the basin, the "Above Mint Canyon" subarea. However, it also was recognized that achievability could be accomplished by redistributing some pumping to other areas, specifically to reduce pumping stress in the most eastern part of the basin and replace it with increased pumping farther west in the basin. The report also stated that Santa Clarita Water Division (SCWD) is currently constructing new or replacement wells (*e.g.*, to replace its perchlorate-impacted Stadium well) to the west of the "Above Mint Canyon" subarea; therefore, a redistribution of some of SCWD's pumping, as analyzed in the 2008 Operating Plan, was crafted whereby 1,600 afy of pumping was moved from three SCWD wells in the "Above Mint Canyon" subarea (near the mouth of Sand Canyon) to the replacement SCWD Santa Clara and Bouquet wells, located in the "Above Saugus WRP" and "Bouquet Canyon" subareas, respectively.

According to the report, simulation of the "2008 Operating Plan with Pumping Redistribution" indicates that westerly redistribution of 1,600 afy of Alluvial pumping from the eastern end of the basin would help, but not eliminate, the lack of achievability. The report stated that residual unachievable pumping in the east end of the basin, about 4,500 afy, could be redistributed to other areas of the basin with minimal impact on groundwater levels. According to the report, in this case, total Alluvial pumping in the basin could remain near the upper end of the 2008 Operating Plan range of 30,000 to 35,000 afy. Conversely, absent any additional efforts to redistribute pumping, the total Alluvial pumping capacity during extended dry periods would likely shrink toward the lower end of the 2008 Operating Plan range, toward 30,000 afy.

The other operating plan analyzed in the 2009 Updated Yield Report was the "Potential Operating Plan," which contemplated increased utilization of groundwater during both regular (wet/normal) years and dry years. Under this potential plan, Alluvial aquifer pumping would be on the order of 47,500 afy in normal/wet years and would be reduced to about 41,500 afy following two or more years of below-normal rainfall locally. Saugus Formation pumping would be on the order of 16,350 afy during years of normal SWP water availability and would increase to over 39,500 afy in the third year of reduced SWP water availability. Consequently, total groundwater pumping under this potential plan would be almost 64,000 afy during normal years (compared with about 51,000 afy in the 2008 Operating Plan) and could

be as high as about 87,000 afy during the highest pumping years (compared with about 73,500 afy in the 2008 Operating Plan).

The report concluded that the Potential Operating Plan would result in lower groundwater levels, failure of the basin to fully recover (during wet hydrologic cycles) from depressed storage that occurs during dry periods, and generally declining trends in groundwater levels and storage. According to the report, this conclusion is strongly suggested for the Alluvial aquifer by the modeling results, but the model also indicated that long-term lowering of groundwater levels could occur in the Saugus Formation, with only partial water level recovery occurring in the Saugus. Thus, the report found that the Potential Operating Plan would not be sustainable over a long-term period. According to the report, the simulated combination of lower and declining groundwater levels under the Potential Operating Plan also led to the conclusion that such an operating plan could not be physically achieved in several areas within the basin.

The report also considered potential augmentation of basin yield *via* initiation of artificial groundwater recharge using stormwater runoff in selected areas of the basin as planned by the Los Angeles County Flood Control District. After investigating the local artificial recharge projects, the report concluded that the small planned projects were unlikely to provide any substantial recharge that does not already occur; additionally, the proposed projects were mostly located in areas of the basin where the Alluvial aquifer is of insufficient thickness and storage (and is thus not developed for water supply) or where the Alluvial aquifer already fully recharges when stream flows are naturally present.

In addition, the report considered impacts of climate change on the local groundwater basin and its yield. Specifically, the report examined three simulated climate change scenarios to provide a level of quantification of the possible impact of climate change on local groundwater basin yield and the availability of groundwater as part of the overall water supply to the Valley. It recognized that the scenarios cannot be expected to be representative of hydrologic conditions in the Valley and that the purveyors will have to manage whatever future patterns of rainfall occur over time (*i.e.*, wet-dry cycles that are similar to or different from historically-recorded conditions). For such reasons, the report found it useful to consider climate change effects over the UWMP planning horizon of 20 to 25 years. Focusing on that horizon, the report concluded:

> "For the range of relatively wet to relatively dry conditions analyzed herein, all three scenarios suggest that the 2008 Operating Plan can be considered sustainable and, with the same local exceptions as simulated through a repetition of historical hydrology (e.g. mainly at and above Mint Canyon), achievable over the UWMP planning horizon. Beyond that horizon, greater uncertainty exists because the global climate models use different emissions scenarios and also become increasingly uncertain over time because of predictive uncertainty pertaining to the forward-looking representation of the many physical processes that affect climate into the future. As a result, for time periods beyond the UWMP planning horizon, some models predict long-term drying and subsequent sustained declines in groundwater levels, which would result in a smaller local groundwater supply over time, while other models predict hydrologic conditions similar to or wetter than those that have been historically observed, in which case the 2008 Operating Plan can be considered sustainable, albeit with some local issues relative to actual pumping capability at certain times (mainly in the Alluvium at the eastern end of the Valley)." (2009 Basin Yield Report, pp. V-5 and V-6.)

As stated above, the 2009 Basin Yield Update is provided in **Appendix F4.3** of the Final EIS/EIR.

**Groundwater Recharge**

As stated above, comments question the Draft EIS/EIR's reliance on reports addressing groundwater recharge in the Santa Clarita Valley; specifically, comments claim that the Draft EIS/EIR incorrectly concluded based on the reports referenced that, with the Newhall Ranch Specific Plan the amount of recharge to the basin would increase over existing conditions. As explained below, the Draft EIS/EIR's analysis of groundwater recharge is based on substantial evidence that supports the conclusion that the Specific Plan's impacts on groundwater recharge and levels would be less than significant. No comments on the Draft EIS/EIR have presented any evidence that calls this conclusion into question.

The Draft EIS/EIR analyzed the significance of the Specific Plan's influence on groundwater recharge by examining whether the Specific Plan would:

> "1. Substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level (Significance Criterion 1)." (Draft EIS/EIR, page 4.3-76.)

Based on substantial evidence, including information provided by technical experts[9] with knowledge of groundwater conditions in the Santa Clarita Valley, the Draft EIS/EIR concluded that implementation of the Specific Plan would not result in significant impacts associated with groundwater recharge. As indicated in the Draft EIS/EIR:

> "Groundwater recharge would not be substantially impacted by the water demands based on the best available information. This information shows that no adverse impacts on Basin recharge have occurred or would occur due to the existing or projected use of local groundwater supplies. Based on a memorandum prepared by CH2MHill (Effect of Urbanization on Aquifer Recharge in the Santa Clarita Valley, February 22, 2004; see **Appendix 4.3**), no significant impacts would occur to the groundwater basin with respect to aquifer recharge. Urbanization in the Santa Clarita Valley has been accompanied by long-term stability in pumping and groundwater levels and the addition of imported SWP water to the Valley; together, these actions have not reduced recharge to groundwater, nor depleted the amount or level of groundwater in storage within the local groundwater basin. These findings are also consistent with the CLWA/purveyor groundwater operating plan for the Basin (see EIS/EIR, **Appendix 4.3**, 2005 Basin Yield Report).
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> . . .

[9] See Technical Memorandum entitled, "Evaluation of Groundwater Recharge Methods for the Saugus Formation in the Newhall Ranch Specific Plan Area," prepared by Luhdorff & Scalmanini Consulting Engineers, dated March 2006 (Scalmanini Memorandum); and Memorandum entitled, "Effect of Urbanization on Aquifer Recharge in the Santa Clarita Valley," prepared by CH2MHill, dated February 22, 2004 (CH2MHill Memorandum). Both documents are presented in the Draft EIS/EIR, **Appendix 4.3**.

> Currently, portions of the Specific Plan area are irrigated agricultural land. Some of these areas would be developed for the proposed Project, introducing impervious surface over approximately 30 percent of the Project area. The reduction in irrigated agriculture and the increase in paved area would reduce overall recharge; however, several factors would serve to counter the impact of urbanization on groundwater recharge within the Specific Plan area:
>
> - Development within the Specific Plan area would increase runoff volume discharged after treatment (*e.g.*, in water quality control facilities) to the Santa Clara River, whose channel is predominantly natural and consists of vegetation and coarse-grained sediments. The porous nature of the sands and gravels forming the streambed allows for significant infiltration to occur to the Alluvial aquifer underlying the Santa Clara River;
>
> - Development of the Specific Plan area would significantly increase the area of irrigated landscaping on currently undeveloped land, which would serve to increase the amount of recharge to the area [approximately 1,790 acres of irrigated landscape area under the Specific Plan vs. 509 acres of currently irrigated agricultural land, an increase of 252 percent in irrigated land area]; and
>
> - The groundwater supply for the Specific Plan post-development would not require an increase in groundwater pumping beyond the applicant's existing agricultural allocation (7,038 afy). In addition, irrigation used in the Project area would increase the amount of recharge available to the Santa Clara River.
>
> Based on the above information, the Specific Plan impacts on groundwater recharge and levels would be less than significant relative to Significance Criterion 1." (Draft EIS/EIR, pp. 4.3-86-4.3-87.)

As indicated, the above findings in the Draft EIS/EIR were based in part on the two referenced technical reports (CH2MHill Memorandum and Scalmanini Memorandum). In the CH2MHill Memorandum, CH2MHill summarized its recharge findings, explaining that natural recharge occurs in the Santa Clarita Valley largely because: (a) a significant volume of natural recharge occurs in the Santa Clara River mainstem and associated tributaries, which contain soft-bottom alluvial deposits in contrast to paved, urban land areas; and (b) importation of SWP water since 1980 has contributed to recharge in the Valley:

> "In the Santa Clarita Valley, stormwater runoff finds its way to the Santa Clara River and its tributaries, whose channels are predominantly natural and consist of vegetation and coarse-grained sediments (rather than concrete). The stormwater that flows across paved lands in the Santa Clarita Valley is routed to stormwater detention basins and to the river channels, where the porous nature of the sands and gravels forming the streambeds allow for significant infiltration to occur to the underlying groundwater.
>
> Increased urbanization in the Valley has resulted in the irrigation of previously undeveloped lands. The effect of irrigation is to maintain higher soil moisture levels during the summer than would exist if no irrigation were occurring. Consequently, a greater percentage of the fall/winter precipitation recharges groundwater beneath

> irrigated land parcels than beneath undeveloped land parcels. In addition, urbanization in the Santa Clarita Valley has occurred in part because of the importation of State Water Project (SWP) water, which began in 1980. SWP water use has increased steadily, reaching nearly 44,500 acre-feet (AF) in 2003. Two-thirds of this water is used outdoors, and a portion of this water eventually infiltrates to groundwater. The other one-third is used indoors and is subsequently routed to local water reclamation plants (WRPs) and then to the Santa Clara River (after treatment). A portion of this water flows downstream out of the basin, and a portion infiltrates to groundwater.
>
> Records show that groundwater levels and the amount of groundwater in storage were similar in both the late 1990s and the early 1980s, despite a significant increase in the urbanized area during these two decades. This long-term stability of groundwater levels is attributed in part to the significant volume of natural recharge that occurs in the streambeds, which do not contain paved, urban land areas. On a long-term historical basis, groundwater pumping volumes have not increased due to urbanization, compared with pumping volumes during the 1950s and 1960s when water was used primarily for agriculture. Also, the importation of SWP water is another process that contributes to recharge in the Valley. In summary, urbanization has been accompanied by long-term stability in pumping and groundwater levels, plus the addition of imported SWP water to the Valley, which together have not reduced recharge to groundwater, nor depleted the amount of groundwater that is in storage within the Valley." (Draft EIS/EIR, **Appendix 4.3**, CH2MHill Memorandum, pp. 1-2.)

The Scalmanini Memorandum also provided additional data, focusing on the Saugus Formation, the recharge methods in that basin, and the feasibility of artificially augmenting natural recharge in the Newhall Ranch Specific Plan area. (See Draft EIS/EIR, **Appendix 4.3**.) The findings from the Scalmanini Memorandum were summarized in the Draft EIS/EIR, **Section 4.3**, pp. 4.3-86-4.3-87. Based on all of the above data, the Draft EIS/EIR correctly assessed groundwater recharge as a result of the proposed Newhall Ranch Specific Plan.

Since public circulation of the Draft EIS/EIR in April 2009, the 2009 Basin Yield Update also provides additional useful information concerning groundwater recharge, discharge, and storage. In that Update, the sustainability of the two operating plans (2008 Operating Plan and Potential Operating Plan) was evaluated by examining trends in groundwater recharge and groundwater discharge during an 86-year simulation. Focusing on the 2008 Operating Plan, the Update compared the magnitudes and trends in groundwater recharge and groundwater discharge, and concluded that the "2008 Operating Plan is sustainable in the long-term, a conclusion that is consistent with the examination of the groundwater elevation hydrographs discussed . . . in Section 4.1.1" of the 2009 Basin Yield Update. As stated, the 2008 Operating Plan evaluated in the 2009 Basin Yield Update accounts for the groundwater pumping by the applicant, which is planned to be converted to provide potable water to the Newhall Ranch Specific Plan, without any increase in the amount of groundwater pumped from the Alluvial aquifer. (See, 2009 Basin Yield Update, pp. III-5 and III-6.)

**Other Recharge Claims**

Other comments suggest that irrigation return flows (i.e., the amount of agricultural water that returns to the ground as recharge) account for as much as 70 percent of the agricultural water currently used on site,

and that because the Specific Plan reduces that recharge, recharge reductions must be subtracted from the 7,038 acre feet of groundwater to be converted for potable use on the Specific Plan site.

As evaluated above, and as indicated in the Draft EIS/EIR, **Section 4.3**, development of the Specific Plan area would significantly increase the area of irrigated non-residential landscaping (*i.e.*, land planned for parks, a golf course, highway landscaping and irrigated slopes) on currently undeveloped land. However, irrigation return flows during the period 1996-2000 are estimated to have averaged 2,583 afy, which is only 37 percent of the average 7,038 afy of Alluvial pumping and subsequent farming water use.[10]

In addressing the topic of recharge, it is important to consider the proposed Project's influence on recharge from a basin-wide perspective. Specifically, due to the size and historical stability of the basin, it is highly unlikely that reduced recharge resulting from development of the Specific Plan will have any appreciable effect on the water table elevation or the amount of Alluvial aquifer groundwater available for potable water supply. As described below, and above under "Groundwater Recharge," because the proposed Project is unlikely to cause any significant impacts to basin recharge, no reduction in the 7,038 af of groundwater historically pumped for agricultural irrigation on the proposed Project site is needed or appropriate.

The urbanization of agricultural lands may reduce recharge to the portion of the Alluvial aquifer *directly underlying* those former agricultural land parcels. However, as discussed below, significantly larger historical fluctuations in pumping have not resulted in any long-term sustained water level declines in the Alluvial aquifer along the Santa Clara River west of I-5 and only small year-to-year fluctuations in water levels compared with upgradient portions of the Alluvial aquifer east of I-5. Based on the information presented in the studies relied upon and incorporated by reference in Draft EIS/EIR Section 4.3, it is highly unlikely that reduced recharge resulting from development of the Specific Plan will have any appreciable effect on the water table elevation or the amount of Alluvial aquifer groundwater available for potable water supply. Specifically, GSI Groundwater Solutions, Inc., a hydrogeology and groundwater resource management firm, reviewed historic groundwater elevation records from the past 60 years,[11] and that data shows (1) no long-term sustained water level declines and (2) only small year-to-year fluctuations in water levels compared with upgradient portions of the Alluvial aquifer east of I-5. Alluvial aquifer water levels west of I-5 have remained stable over the long-term despite three distinctly different historical periods for Alluvial pumping: (1) pre-urbanization conditions prior to the 1960s, when agricultural pumping from the Alluvial aquifer occurred *primarily west of I-5* (including the proposed Project site and its vicinity) and at rates typically between 35,000 and 40,000 afy; (2) early urbanization from the mid-1960s through the early 1980s, when Alluvial aquifer pumping decreased gradually to as little as 20,000 afy in 1983; and (3) continued urbanization since that time as Alluvial aquifer pumping has returned to pre-urbanization rates and also shifted gradually eastward. According to GSI Groundwater Solutions, Inc., these historical trends in Alluvial aquifer pumping – specifically the 15,000 to 20,000 afy changes in Alluvial aquifer pumping west of I-5 during the periods listed in (2) and (3) above -- are far more significant in volume than any changes to local groundwater recharge that might occur as Newhall's agricultural lands are urbanized. The fluctuations in pumping described above

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[10] See Newhall Ranch Revised Draft Additional Analysis (November 2002), Appendix 2.5m and Appendix C ("Regional Groundwater Flow Model for the Santa Clarita Valley: Model Development and Calibration") (CH2MHILL, 2004).

[11] See 2007 Santa Clarita Valley Water Report, Draft EIS/EIR Appendix 4.3, Figures III-4 and III-5.

historically have caused no apparent adverse effect on Alluvial aquifer groundwater levels or the long-term availability of Alluvial aquifer groundwater: (1) west of I-5 (including within the proposed Project site); and (2) elsewhere in the basin. This well-documented stability in groundwater levels (and therefore groundwater availability) has occurred even with the large historic fluctuations in pumping (15,000 to 20,000 afy reductions, followed by 15,000 to 20,000 afy increases), which are approximately 6 to 8 times greater in magnitude than the 2,583 af fluctuation/reduction in onsite irrigation return flow that is estimated for the proposed Project site. Given that large historical fluctuations in pumping have resulted in stable Alluvial aquifer groundwater levels in the past (including west of I-5 and within the proposed Project site), the substantially smaller volumetric changes in recharge beneath agricultural lands on the proposed Project site are unlikely to affect the amount of Alluvial aquifer groundwater available for water supply. Therefore, the agricultural return flows should not be subtracted from the 7,038 acre-feet that would be converted to potable uses for the Specific Plan.

**Other Overdraft Claims**

As indicated above, comments have claimed that the use of groundwater for the Specific Plan will deplete the local aquifers, resulting in "overdraft" and adverse effects on the habitat of several listed species. No supporting data was provided to substantiate such comments. In addition, the analysis provided in the Draft EIS/EIR and above confirms that the local groundwater basin is not in a state of overdraft; therefore, there would be no impact on habitats or listed/sensitive species as a result of overdraft. By asserting that there is biological evidence for overdraft of the Santa Clara River, comments seems to imply that this is an indication of overdraft conditions in the Alluvial aquifer, which is hydraulically connected to the river. However, there is no hydrologic evidence of such overdraft. Specifically, groundwater levels in the Alluvial aquifer do not show year-over-year declines. In the upper reaches of the Santa Clara River, groundwater levels do show large fluctuations over multi-year periods, according to recurring cycles of predominantly below-normal versus above-normal rainfall. However, detailed water level records collected by the local water purveyors over multiple decades show that following periods of below-normal rainfall and associated declining groundwater levels, subsequent large-scale rainfall events cause groundwater levels to rapidly return to their historical high levels, which are at or near ground surface. These data show that although the Alluvial aquifer can experience periods of declining groundwater levels during the relatively dry time periods that occur between large-scale rainfall events, (1) the dry-year conditions are not permanent, because wet-year rainfall and runoff rapidly recharge the Alluvial aquifer to an extent that groundwater levels return to their historical high levels; and (2) because these periodic large-scale recharge events naturally refill the aquifer to a "full" condition (i.e., groundwater levels are at or near the ground surface), there is no long-term overdraft of the Alluvial aquifer, even along the upper reaches of the river.

These data and observations have been analyzed and discussed in annual water reports prepared since 1999 by the local water purveyors, and have also been the subject of several detailed reports prepared by the purveyors, including three reports contained in the Draft EIS/EIR (see **Appendix 4.3**). These data and observations were also reexamined and further evaluated in the 2009 Basin Yield Update, discussed above. That report contained an updated analysis of the sustainability of the purveyors' groundwater pumping plan for the local groundwater system (which is identified by DWR as the "East Subbasin of the Upper Santa Clara River Groundwater Basin"), including along the upper reaches of the Santa Clara River. The report concluded that historical overdraft conditions have not occurred and that the current operating plan for the basin, including the use of 7,038 afy of alluvial aquifer groundwater at the west end of the basin to meet water demands in the Specific Plan, is sustainable. The report also concluded that

since the time SWP water imports began (in 1980), non-storm flows in the perennial reach of the Santa Clara River, which extends from Round Mountain (just east of I-5) to the Los Angeles County/Ventura County line, have been higher than were recorded before SWP water importation began. In summary, the water level records and the multiple detailed studies conducted by the purveyors, including detailed data and modeling analyses, indicate that the Alluvial aquifer (as well as the deeper Saugus Formation aquifer) is not in overdraft conditions.