SADDLEBACK MEADOWS SUB AREA MASTER PLAN

March 2021

Prepared for:

TRABUCO CANYON WATER DISTRICT

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Project No. 2TRA132500

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1. Project Overview

1.1 General Description

The water and wastewater improvements detailed within this Sub-Area Master Plan (SAMP) are for the proposed residential development of Saddleback Meadows. A SAMP had previously been prepared for this project in 2006. The development area and number of homes have been reduced substantially since the previous SAMP. The current plan calls for 181 dwelling units and this SAMP is being prepared to determine what will be involved in providing water and sewer service to this proposed plan, assuming it goes through the planning approval process in fairly the same configuration.

Sewer service is relatively straight forward in that the landowner purchased capacity in the El Toro Road/Santa Margarita Water District Chiquita Wastewater collection and treatment system many years ago for a previous approved land use plan that contained substantially more dwelling units than is now proposed.

That previous plan had its own proposed potable water reservoir site in the northeast corner of the project at an elevation that was compatible with the District's Harris Grade hydraulic grade line and was sized to serve the much larger proposed demand based on the previous plan. Based on current legal negotiations and landslide analyses, that reservoir site, that was much higher in elevation than is now available on-site, is not feasible. Therefore, the developer and District are looking into available storage options for the project either onsite or off-site. And depending on where the storage is located the water delivery system may require an interconnection with an adjacent agency or other solution for reliability, which has not been analyzed in detail at this point. The recommendations in this SAMP relative to water supply and storage should therefore be considered preliminary until these issues are resolved.

Improvements include the domestic water transmission and wastewater collection/conveyance facilities, which were developed and sized to be consistent with the current version of the appropriate District's Design Criteria, and the District's 1999 Water, Wastewater, and Reclaimed Water Master Plan (1999 Master Plan).

In addition, planning level capital cost estimates were prepared for the recommended off-site facilities. This SAMP will provide the groundwork for the subsequent detailed design of these facilities.

1.2 Proposed Development

The proposed Saddleback Meadows residential development (Project) is located on 222 acres of property within the unincorporated area of southeastern Orange County, California, in the Foothill-Trabuco area. The parcel is being planned and engineered for the California Quartet, LTD by Hunsaker and Associates. The parcel is situated on the

east side of El Toro Road approximately 1,000 feet south of the Live Oak Canyon Road intersection. Aliso Creek runs north to south just outside the western property boundary. As prepared by the developer, Tentative Tract Map No. 15230 dated November 27, 2019 was used for this analysis and is shown on Figure 1-1.

Primary access to the Project site will be along the proposed roadway of Spine Street that extends east from the existing El Toro Road and ends within a cul-de-sac at the easternmost edge of the development. Additionally, a 20' wide trail easement parallels the north side of Spine Street from El Toro Road to the beginning of a 400' wildlife corridor, for riding and hiking. The trail then runs northeast into the Viewport Spur Trail.

The Project is within the Foothill/Trabuco Specific Plan (FTSP) area, which was adopted by the County of Orange in 1991. The development contains 181 detached single-family on lots ranging in size from 4,000 to 13,810 square feet (sf), with an average lot size of 6,067 sf. A summary table prepared by Hunsaker and Associates provides the gross and net square footage of each of the 181 lots and is included in Appendix A.

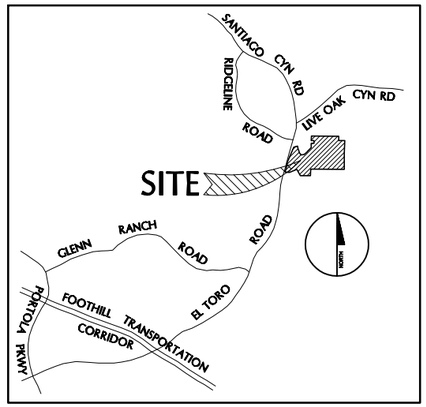
1.3 Urban Water Use Targets

The California Department of Water Resources requires urban water suppliers to prepare and adopt an Urban Water Management Plan (UWMP) every five years. UWMP's are designed to evaluate a retail water supplier's water demand and supplies in order to meet current and future growth within their respective service areas. Since 1999, there have been major legislative changes at the state level which impacts how water is allocated by water purveyors like TCWD. These water conservation-based legislative changes are included in TCWD's 2015 UWMP.

The most significant piece of water conservation-based legislation to affect retail water suppliers is SBx 7-7, enacted in 2009. SBx 7-7 requires the development of urban water use targets to achieve a twenty percent reduction in per capita daily water use by December 31, 2020. TCWD's methodology for determining its water use target to comply with SBx 7-7 is detailed in the 2015 UWMP. The 2020 water use target for TCWD is 200 gallons per capita per day (gpcd). Actual 2015 water use equaled 204 gpcd, approaching the 2020 target and meeting the interim 2015 target of 233 gpcd.

Additionally, TCWD is a member of the Orange County 20 by 2020 Regional Alliance (Regional Alliance) which allows for flexibility in meeting the required per capita water use targets. If the Regional Alliance meets its water use target on a regional basis, then all member agencies are deemed compliant. If the Regional Alliance fails to meet its water use target, then each individual member will have an opportunity to meet their water use targets individually. The Orange County 20 by 2020 Regional Alliance 2015 target was 176 gpcd and the 2020 target is 158 gpcd. The actual 2015 water use in the region was 125 gpcd, already meeting the 2020 goal.

VICINITY MAP



LOT SUMMARY TABLE

LOT NUMBER	LAND USE	AREA
1 – 181	RESIDENTIAL LOTS	25.2 ACRES±
A – K	STREETS	10.5 ACRES±
L – V	OPEN SPACE	34.4 ACRES±
W – AA	OPEN SPACE/NATURAL	152.1 ACRES±

EL TORO ROAD
SPINE STREET
'A' STREET
'B' STREET
'C' STREET
'D' STREET
'E' STREET
'F' STREET
'G' STREET
'H' STREET
'I' STREET
'J' COURT
VALLEY VISTA WAY
MEADOW RIDGE DRIVE
LOT A
LOT B
LOT C
LOT D
LOT E
LOT F
LOT G
LOT H
LOT I
LOT J
LOT K
LOT L
LOT M
LOT N
LOT O
LOT P
LOT Q
LOT R
LOT S
LOT T
LOT U
LOT V
LOT W
LOT X
EXISTING POND H
EXISTING POND Q
EXISTING POND D
LIMITS OF GRADING
FUEL MOD
PROPOSED TRAIL
50' TRAIL EASEMENT
5' SD EASEMENT
IRRIGATION

2ND REVISED VESTING TENTATIVE TRACT MAP NO. 15230

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Figure 1-1

To meet water use targets, TCWD has implementation the following activities.

- Passive and active conservation activities
- Water conservation program permanent restrictions
- Use of additional recycled water

Water conservation activities include the demand management measures (DMMs) that TCWD implements as a signatory member of the California Water Efficiency Partnership (CWEP), formerly the California Urban Water Conservation Council (CUWCC). DMMs include the development of water conservation programs and the education of TCWD customers on the subject of wise water usage.

TCWD adopted its Water Conservation Ordinance, No. 2008-18 (Ordinance) in January 2009. The Ordinance identifies permanent mandatory water use efficiency measures which contribute to the realization of the 2015 UWMP target levels. The Ordinance and the Water Conservation Program Permanent Provisions can be accessed via the District website at www.tcwd.ca.gov.

TCWD has a long-standing practice of using recycled water, wherever possible, in order to offset the use of drinking water for irrigation purposes. TCWD will meet the reduction target levels through the continued use of recycled water in its service area, and any future developments where recycled water is available, and infrastructure can be installed. Unfortunately, the use of recycled water is not an option for the Saddleback Meadows development. Currently, there are no recycled water distribution facilities available in the area.

1.4 Model Water Efficient Landscape Ordinance

On July 15, 2015, the California Water Commission adopted a Model Water Efficient Landscape Ordinance (MWELO), which sets requirements for any new landscaping or landscaping renovation over 500 square feet. Since the Saddleback Meadows development is subject to this MWELO, the water use requirements for all landscaped areas within the project common areas have been calculated for consistency with the maximum allowable water use limits of this new ordinance. The ordinance also sets water use limits for residential landscapes, however, local agencies do not have the resources to monitor and enforce a homeowner's compliance with the ordinance and, as such, modifications and deferred maintenance by homeowners are common. Therefore, projected water use for residential landscapes has been estimated at what is believed to be more realistic values to account for properties which exceed the water use limits set by the MWELO. Specific requirements under the MWELO are as follows:

- The size threshold of landscapes subject to the ordinance is 500 square feet.

- The maximum applied water allowance (MAWA) is equal to 55% of the reference evapotranspiration (ETo) for residential landscape projects and 45% of ETo for non-residential projects.
- The minimum width of areas that can be overhead irrigations is 10 feet. Areas less than 10 feet in width must be irrigated with subsurface drip or other technology that produces no over spray or runoff.

2. Proposed Domestic Water System

Average-day, maximum-day, and peak-hour demands were estimated for domestic water and Homeowners Association (HOA) irrigation use inside Saddleback Meadows. The development pipelines were added to the District's existing hydraulic model using InfoWater software to analyze various operation and demand scenarios in order to size distribution system pipelines and facilities. The recommended water system facilities for Saddleback Meadows are shown on Figure 2-1 and will be explained in this section.

2.1 Water Use Factors

2.1.1 Average Day Demand

Land use information was provided by the developer's engineer, Hunsaker and Associates, in the form of a proposed land use plan for Tentative Tract Map (TTM) 15230 along with corresponding open space and residential lot square footages. The residential lot data is included in Appendix A and results in an average lot size of 6,067 square feet (sf), with a range of 4,000 to 13,810 sf. Open space areas that are to be irrigated were tabulated by Hunsaker and Associates and are also included in Appendix A. The total irrigated open space area for the project based on this data is equal to 1,414,300 square feet or 32.5 acres. Water demand calculations for the irrigated open space areas are straightforward to estimate as they are required to meet or be lower than the maximum applied water allowance (MAWA) per the State MWELO, which is 45% of the local reference evapotranspiration rate (ET_o). The MAWA will be used to be conservative and that calculation is shown in Table 2-1.

Table 2-1
Irrigation Demand Projections

MAWA Calculation	
Irrigated Area (sf)	1,414,296
ET_o for Irvine CIMIS Station (in)	49.6
MAWA % of Eto for Non-residential	45%
MAWA (gal/yr)(1)	19,571,600
MAWA (gpd)	53,621

(1) MAWA = (0.62) (ET_o) (0.45) (Area, sf)

To develop estimates of the residential water use for the proposed development, two methodologies were utilized. These methods were applied to a slightly earlier version of the TTM, however, the conclusions can still be applied to the latest version dated 11/27/19. First, an attempt to come up with similar sized lots in other areas of the District

OPTION C
PARALLEL PIPELINE
IN EL TORO RD &
SPINE STREET

PRESSURE
REDUCING
VALVES

PRESSURE
REDUCING VALVE

OPTION B
ON-SITE
STORAGE

EXISTING
WATER

OPTION A
EMERGENCY BPS
SMWD INTERTIE
& 1430 PZ PIPELINE
IN B & C STREET

SMWD 1250 PZ
(EXISTING)

EL TORO ROAD

SPINE STREET

"A" STREET

"B" STREET

"C" STREET

"D" STREET

"E" STREET

"F" STREET

"G" STREET

"H" STREET

"I" STREET

"J" COURT

VALLEY VISTA WAY

MEADOW RIDGE DRIVE

LOT V

LOT K

LOT N

LOT M

LOT L

LOT O

LOT D

LOT P

LOT Q

LOT R

LOT S

LOT T

LOT U

LOT X

LOT W

EXISTING POND H

EXISTING POND G

EXISTING POND D

LIMITS OF GRADING

FUEL MOD

PROPOSED TRAIL

PRESSURE ZONE (PZ) LEGEND

- HARRIS GRADE PZ
- 1430 PZ
- 1340 PZ

PRELIMINARY

2ND REVISED VESTING TENTATIVE TRACT MAP NO. 15230

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Figure 2-1 - Water Facilities

was undertaken. Assessor Parcel information on lot size was generated for various lots in Trabuco Highlands, Robinson Ranch and Dove Canyon. Addresses and square footages for lots in these areas were collected until a good sample size (195 residences) was generated with an average lot size similar to the average for the Saddleback Meadows lots. The addresses and square footages for these lots are shown in Appendix B with an average lot size of 6,467 sf, about 6% larger than the Project lots. Maps of these lots are also included in Appendix B. Water meter usage data for calendar years 2017 and 2018 was obtained from the District for the 195 similar lots with an average use of 347 and 358 gpd, respectively in 2017 and 2018, for a two-year average of 352 gpd.

As a check, a second water use methodology was utilized. This method involved generating a typical house footprint in terms of square footage based on home sizes along with typical assumptions for garages, driveways, and hardscapes. This generates a landscape area for each lot and then typical assumptions can be made for plant palettes that will, in turn, generate outside water demand. Adding a reasonable inside water demand per capita and a people per dwelling unit factor was used to generate a total water demand per residence, which was compared to the first method utilized. The previous TTM used for this analysis encompassed the same development area but included less homes, 166 total (versus 181 for the current TTM), on slightly larger lots averaging 6,487 sf. This analysis is detailed in Appendix B with the average outside irrigated area equal to 32% of the average lot area. This same assumption was used for the lots in the revised TTM. The resulting average landscape area for all 181 homes is calculated to equal 1,960 sf based on the average lot size of 6,067 sf.

To determine the average water use for irrigation it is assumed that half of each lot's landscape area is turf with a plant factor (PF) of 0.85 and an irrigation efficiency (IE) of 0.7 and the other half is various ground cover and/or shrubs with a PF of 0.4 and an IE of 0.8. The resulting estimated outside irrigation use is equal to 142 gpd/du. Subtracting this value from the average total water use from the meter reads on the similar lot sizes of 352 gpd results in 210 gpd for inside water use. Assuming an average occupancy of 3.3 people per dwelling unit generates an inside water use of 64 gallons per capita per day (gpcd). The State Department of Water Resources has set a goal of 55 gpcd for new home construction so the 352 gpd/du seems to be a reasonable and conservative value for estimating the total residential water demand for the development plan proposed for Saddleback Meadows (at 3.8 people per dwelling unit the use would be exactly 55 gpcd).

Based on the above, the estimated average day demand (ADD) for Saddleback Meadows is summarized in Table 2-2.

Table 2-2
Water Demand Projections

Land Use	ADD (gpd)	ADD (AFY)
Residential	63,712	71.4
Common Area Irrigation (HOA)	53,621	60.1
Total	**117,333**	**131.4**

Residential Use = 352 gpd/du x 181 du

2.1.2 Peak Water Demands

Maximum-day demand is defined as the largest demand day of the year. A Maximum-day demand (MDD) factor is the ratio of maximum-day demand to average-day demand. Based on an analysis of historical District daily water production and water storage, a MDD factor of 1.95 was calculated for domestic water demand and a factor of 2.2 was estimated for HOA irrigation demand in the 1999 Master Plan.

Peak hour demand is the largest hourly demand of the year. A peak-hour demand (PHD) factor is the ratio of peak-hour demand to maximum-day demand. Based on an evaluation of hourly water use in the Dove Canyon pressure zone, a peak-hour demand (PHD) factor of 2.47 was calculated for domestic water demand for the overall District water system in the 1999 Master Plan. Based on a review of irrigation practices in the District, it was estimated in the 1999 Master Plan that HOA irrigation demand typically occurs nightly between the hours of 7 p.m. and 7 a.m., which is a 12-hour irrigation period. Accordingly, a PHD factor of 2.0 was developed for HOA irrigation in the 1999 Master Plan. These MDD factors will be used in this Sub Area Master Plan. The average-day, maximum-day and peak-hour domestic water and HOA irrigation demands for Saddleback Meadows are shown in Table 2-3.

Table 2-3
Average Day, Maximum Day, and Peak Hour Demands

Land Use	Water Demand (GPD)		
	ADD	MDD[(1)]	PHD[(2)]
Residential	63,712	124,238	306,869
HOA Irrigation	53,621	117,966	235,932
Total	**117,333**	**242,204**	**542,800**

(1) Residential MDD = 1.95 x ADD and HOA MDD = 2.2 x ADD

(2) Residential PHD = 2.47 x MDD and HOA PHD = 2.0 x MDD

2.1.3 Fire Flow Demand

Based on information provided from David Oatis, the developer's consultant who obtained the information from the Orange County Fire Authority, the anticipated fire flow will be 1,125 gpm for a one-hour duration at a minimum residual pressure of 20 psi. This value is based on preliminary home sizes, construction types and sprinkler requirements. Final fire hydrant locations will be developed by the project civil engineer but are assumed to be at approximate 300-foot spacing. Following finalization of the storage and water delivery option, final fire flow analysis will be conducted using the existing and proposed facilities and final pipe sizing within the tract and off-site will be confirmed.

2.2 Source of Supply

The District's Dimension Water Treatment Plant (DWTP) provides water into the Cooks Reservoir pressure zone for further transmission to the rest of the distribution system. Three high service booster pumps at the DWTP have a combined capacity of 6 cfs and lift water from the clearwell directly into the Cooks Reservoir zone at a hydraulic grade line (HGL) of approximately 1,165 feet, equal to the maximum water level in Cooks Reservoir. Water is boosted from the Cooks Reservoir zone to the Harris Grade pressure zone by the Ridgeline Booster Station. This zone is also connected to three other water systems and two water districts, IRWD (Lake Forest), IRWD (Santiago), and SMWD, through interties. The Ridgeline Booster Station has 2 pumps with a combined capacity of 5 cfs. Improvements to the Ridgeline Booster Station have been designed, are currently being constructed and will be in place prior to the Saddleback Meadows project development and will increase the capacity to 6 cfs, matching the capacity of the DWTP booster pumps. The Saddleback Meadows project site will connect to the Harris Grade pressure zone served by the Ridgeline Booster Station. The project will therefore be responsible for its pro-rata share of those upgrades to the Ridgeline Booster Station currently under construction.

2.3 Water Storage Requirements

The total storage requirements for the project are determined based on the criteria from the 1999 Water Master Plan, which calls for 10 hours of maximum day demand for operational storage, five average days for emergency storage, and fire flow storage. Using these criteria and the demand analysis provided, the total storage requirement is as shown in Table 2-4 below.

Table 2-4
Storage Requirement

Storage Type	Volume (gal)
Operational[1]	100,918
Fire Flow[2]	135,000
Emergency[3]	586,664
Total	**822,582**

(1) 10 hours of Maximum Day Demand
(2) 1,125 gpm fire flow for 2 hours
(3) 5 days of Average Day Demand

The preliminary grading plan provided by the developer's engineer and dated July 11, 2019, showed a reservoir located on-site with a pad elevation of 1,420'. Based on discussions with the developer's representative and engineer, this is as high an elevation as can be reasonably provided based on geotechnical concerns due to potential landslides that would require extensive grading and remediation of the site. Such remediation would be extremely expensive and would cause the developer to be sued by the Vedanta Society, who owns the parcel immediately south of the proposed development and who the developer is currently in negotiations with to resolve their long-standing opposition to the project.

If the District were to go forward with construction of a reservoir on the development site, it would be of no real use to the rest of the District and would only serve this project as that elevation is too high for the Dimension/Cooks HGL and too low for the Harris Grade/Saddle Crest Zone with a HGL of 1,504'. In addition, it could become problematic to get the reservoir to turn over enough since it would not be connected to other pressure zones.

Therefore, options being explored are that the District utilize the money that the developer would have spent on this on-site reservoir and pool it with other available storage fee funds to construct additional storage at the existing Harris Grade Reservoir site or an alternate site. The Harris Grade option would involve demolishing the existing smaller tank on this site and construction of a second reservoir similar in size to the larger reservoir. Alternatively, both tanks could be demolished, and one larger tank constructed. However, it is realized this could be problematic and could take many years to accomplish since that site is under a long-term lease from the U. S. Forest Service and a preliminary design has not been conducted to confirm that this is a viable plan. If this plan does not pan out it might be possible to locate an alternative site nearby the Harris Grade site at a similar elevation.

Because of the uncertainty of bringing a new reservoir on-line in a timely manner, an analysis was conducted to evaluate what would happen if the Saddleback Meadows project were allowed to go forward and was built out without additional storage, leaving the District to rely on existing storage for the next few years, at least.

The "existing" scenario that was preliminarily modeled assumed the following:

1. A 12-inch diameter line is constructed from the Ridgeline Booster Pump Station (RBPS) to the Saddleback Meadows entrance road to serve the development with the buildout demand placed on that location.
2. An 18-inch pipeline is constructed from Cook's Corner along Live Oak Canyon Road to the location where the line branches off to the Harris Grade Reservoirs. This line is needed to reduce head loss from the Ridgeline Booster Pump Station and from Saddle Crest Reservoir to Harris Grade Reservoir.
3. The Saddle Crest Reservoir is on-line along with the buildout demands for the Saddle Crest development.
4. The total average day demand (ADD) is 1,640 gpm or about 2.36 MGD (10 percent higher than average over past 7 years).
5. The maximum day demand (MDD) is 2,650 gpm or about 3.81 MGD.
6. All demands are served from the Dimension Water Treatment Plant or from the west (no Rose Canyon Well or SMWD supply), in order to be conservative (worst case).

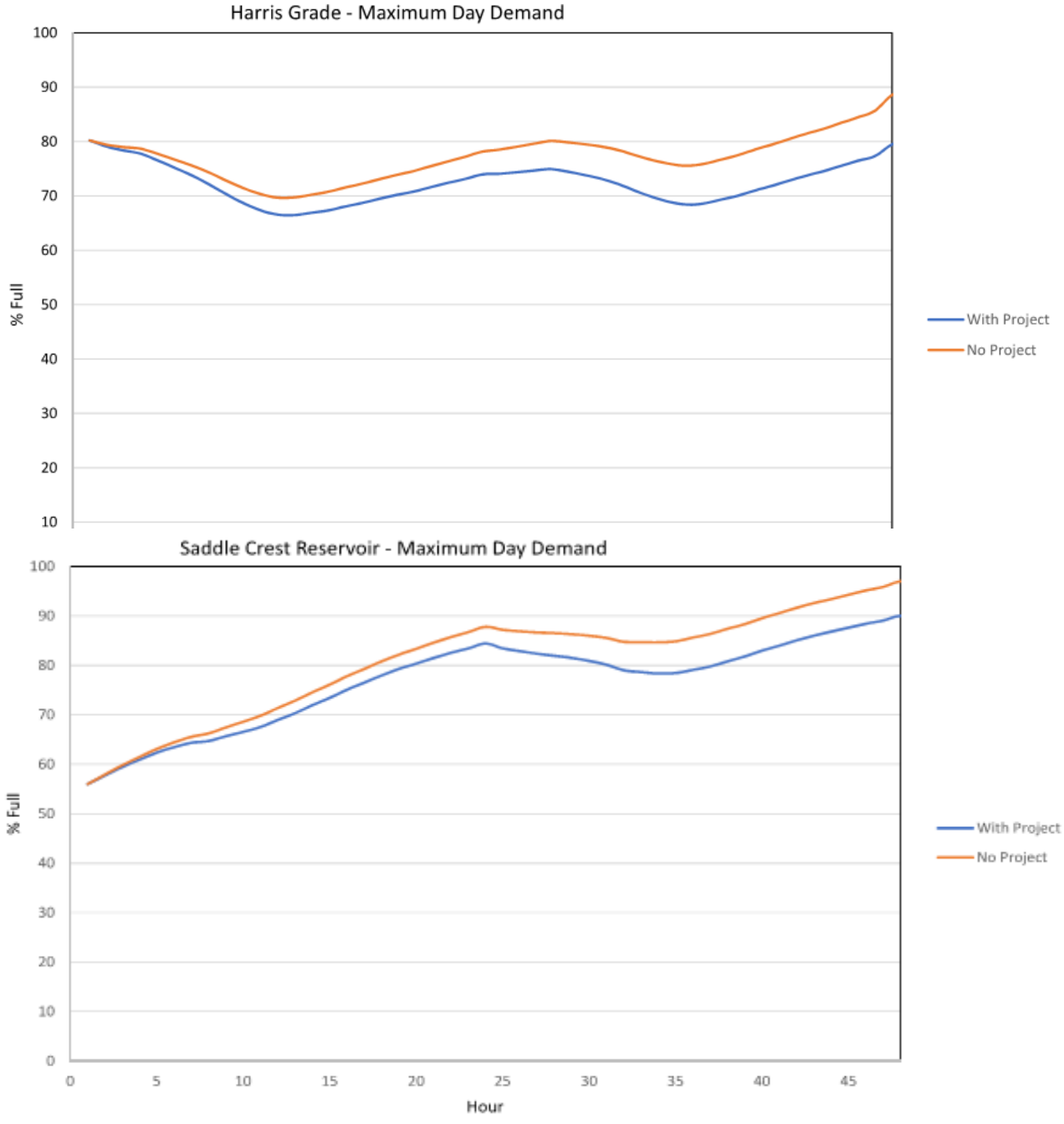
The average day demand and maximum day demand loading in the hydraulic model were updated to reflect 2018 production data provided by the District and included in Appendix C. The ADD for 2018 equaled 2.36 MGD based on monthly production data. The MDD was estimated using daily production data for Dimension Water Treatment Plant (DWTP) and monthly data for supply from Santa Margarita Water District (SMWD). For the purpose of determining demand, it was assumed that SMWD supply was taken at a constant rate during each month. The maximum day in 2018 occurred in August with the estimated daily production equal to 3.81 MGD, close to the flow capacity from DWTP of 3.9 MGD. This MDD flow rate is assumed to be conservative as it is likely that more water was taken from SMWD during periods of no production from DWTP and less taken during high production from DWTP, rather than distributed equally each day as was assumed.

An extended period simulation was run using the District's hydraulic model and the above assumptions. Figure 2-2 shows percent full for both Harris Grade and Saddle Crest Reservoirs for a 48-hour period during assumed MDD conditions. It shows that the Harris Grade Reservoir levels remain virtually the same with the Saddleback Meadows development demands and gradually increase without the development. The Saddle Crest Reservoir levels increase both with and without the Saddleback Meadows demand added.

The RBPS is set to come on and off based on the Harris Grade Reservoir levels and Saddle Crest Reservoir is allowed to fluctuate independently.

The modeled MDD can be sustained with supply from the DWTP both with and without the Saddleback Meadows demand. Additionally, the District could take water from SMWD if higher demand conditions were to occur, which would probably be called for even in the case without the proposed development and its demands.

Figure 2-2
Storage Analysis



2.4 Computer Modeling and System Layout

Water service to the Saddleback Meadows project can be extended from the existing 12-inch water line in El Toro Road that is boosted from the Ridgeline Booster Station to the Harris Grade pressure zone. The Harris Grade Reservoirs have a high water elevation of 1,504 feet. An approximate alignment for this pipeline from the hydraulic model is illustrated on Figure 2-3. As stated previously, the improvements to the Ridgeline Booster Station will be completed prior to the Saddleback Meadows development coming online and are included in model simulations for the Project. Also, a new 18-inch transmission pipeline will be constructed from Cook's Corner along Live Oak Canyon Road to the location where the line branches off to the Harris Grade Reservoirs. This pipeline is assumed to be in place for Project simulations and would replace an existing 10-inch pipeline.

The proposed onsite water facilities were added to the District's existing water system model, which uses InfoWater hydraulic modeling software. The proposed water system facilities are illustrated on Figure 2-1. The proposed system meets the District's looping criteria which states that two water main connections are required for each street unless it is a dead-end street serving 25 or less normal-size residential lots. A pipeline easement will be required between the eastern end of "G" Street and the southern end of "H" Street to connect these two cul-de-sacs, in order to satisfy District looping criteria.

2.4.1 Pressure Zones

Pad elevations within the Saddleback Meadows development range from 1,100 to 1,314 feet above sea level. A proposed pipeline from the Ridgeline Booster Station to the project site along El Toro Road will serve the project from the Harris Grade Reservoir Pressure Zone with a HGL of 1504 feet (full reservoir). In order to provide adequate pressure to customers, a planning guideline of providing a minimum static pressure of 50 psi at the highest service elevation is typically used in the initial layout of the proposed system. This way, a minimum dynamic pressure of 40 psi can be maintained with the reservoir at a lower than full level and during peak hour demand conditions. Adequate flows and pressures must also be achieved under fire flow conditions. Additionally, the District wants to keep distribution pipeline pressures below 150 psi.

Pressure zone boundaries were set to achieve adequate pressures throughout the proposed development based on model simulations. Two pressure zones are recommended for the site based on the range of lot elevations. The higher pressure zone will serve the higher elevation lots on the easterly portion of the site starting at "F" Street to the cul-de-sac at the eastern end of Spine Street. The lower pressure zone will serve the remaining lots from El Toro Road and east to "C" Street. Both zones will be reduced off of the Harris

PSOMAS

Figure 2-3
Project Transmission Pipeline

Grade Pressure Zone using pressure reducing stations to limit excessive pressures, particularly when the Ridgeline Booster Station is operating. The upper zone is set to a HGL of 1430 feet and the lower zone is set to a HGL of 1340 feet. The recommended locations of the PRV stations and pressure zones are illustrated on Figure 2-1.

2.4.2 Model Simulations and Results

Various operation and demand scenarios were analyzed with the model to size system pipelines and facilities such that performance meets all District criteria as outlined in the TCWD Design Criteria and Standard Drawings for Water and Sewer Facilities, June 2002. The proposed facilities were modeled using ADD, PHD, and MDD plus fire flow. Fire flows were preliminarily modeled at 1,500 gpm during maximum day demand conditions (higher and more conservative than the 1,125 gpm recently confirmed by OCFA). Sufficient service and fire pressures were modeled using each scenario. The model output and corresponding node diagram are included in Appendix D.

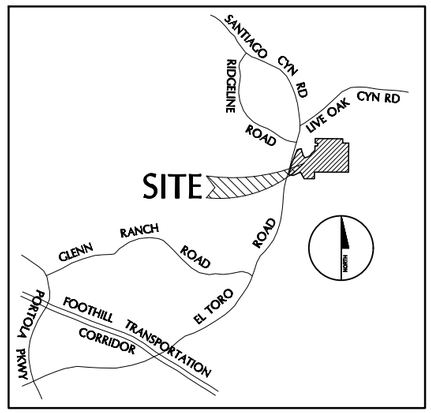
Fire flow demand occurring on the MDD typically controls distribution main sizing. Fire simulations were run at the highest locations in each pressure zone, at the eastern end of Spine Street in the 1430 zone and the southern end of "D" Street in the 1340 zone. Based on model results, a 12-inch distribution pipeline is recommended along Spine Street from El Toro Road to "I" Street with 8-inch distribution pipelines elsewhere within the tract.

Peak-hour demand for domestic water and HOA irrigation are simulated in the model using a diurnal curve with peak domestic demand occurring in the morning between the hours of 7:00 a.m. and 8:00 a.m. and HOA demand between the hours of 11:00 p.m. and 7:00 a.m., which is an 8-hour irrigation period. Therefore, the combined peak-hour demand for domestic water and HOA irrigation occurs at approximately 7:00 a.m. Model simulation results show sufficient pressure during peak hour demand, above 40 psi, and pipeline velocities less than 8 feet per second.

Per District and uniform plumbing code (UPC) criteria, pressure regulators are required on the customer's side of the meter where static pressures exceed 80 psi at the meter. Based on PRV settings, static pressures above 80 psi occur at the lots along "A" Street in the lower zone and along "E" and "F" Streets in the upper zone and a single lot on "H" Street. These lots (requiring individual pressure regulators) are highlighted on Figure 2-4.

Upstream of the pressure reducing stations, at the entrance to the project, there are pressures equal to approximately 190 psi, in excess of the maximum desired pressure of 150 psi. These would occur along the 12-inch transmission pipeline serving the project from Ridgeline Booster Station. It is recommended to use higher pressure class for this reach of transmission pipeline. It should be pointed out here again, that the water system layout is preliminary as with no storage on-site a second supply would be required for reliability and with on-site storage, the pressure zone HGLs could be somewhat different.

VICINITY MAP



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Highlighted lots require individual pressure regulators per District criteria.

2ND REVISED VESTING TENTATIVE TRACT MAP NO. 15230

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Figure 2-4

3. Wastewater System

3.1 Regional Collection, Treatment and Disposal Facilities

Wastewater generated from Saddleback Meadows will be conveyed into the District's existing El Toro Road Collection Zone. This collection zone receives wastewater from the District, SMWD, and IRWD. Wastewater collected in this zone is conveyed through the El Toro Road Collection System, which consists of a 15-inch trunk sewer in El Toro Road, the El Toro Road Sewage Lift Station, and dual forcemains in Santa Margarita Parkway, to the SMWD wastewater system.

The District owns 1.12 mgd capacity in the El Toro Road System and 0.428 mgd in the SMWD Chiquita sewage system, which includes collection, treatment at the Chiquita Water Reclamation Plant, and ultimate disposal of treated effluent via the Chiquita Land Outfall and the Serra Ocean Outfall. Ownership capacity in the El Toro Road system and the SMWD system is shown in Table 3-1. The total capacity of the El Toro Road system is 1.96 mgd. However, capacity in the SMWD system is currently limited to 1.15 mgd.

Table 3-1
Sewer Capacity Allocation by Original Property Owner

District	Capacity Ownership (mgd)	
	El Toro Road Collection System	SMWD Collection, Treatment & Disposal System
TCWD	1.12	0.43
SMWD	0.08	N.A.
IRWD	0.76	0.64
Total Capacity	1.96	1.15

3.2 Wastewater Flow Factors

Since all the land uses within the proposed projects are similar residential uses, the only flow factor to be concerned with is the inside water use within the homes that is discharged to the sewer system. Average dry weather wastewater flow (ADWF) in the District was determined to be 270 gpd/du in the 1999 Master Plan, based on calibration of the sewer model. The housing density for Saddleback Meadows is approximately 5 dwelling units per acre after subtracting out the open space within the development boundaries. Based on indoor water use factors from IRWD for this housing density, a wastewater generation of 200 to 225 gpd/du is appropriate. The demand analysis presented in Section 2.1 estimated an indoor use for the Project equal to 210 gpd/du, within this expected range. Also discussed in Section 2.1, the State Department of Water Resources has set a goal of 55 gpcd for indoor water use for new home construction. With an estimated 3.3 persons per du, the indoor use would equal 64 gpcd, making 210 gpd/du conservative when compared to State standards. Applying the more conservative

Master Plan factor 270 gpd/du to the 181 dwelling units, results in an average flow of 48,870 gpd or 0.05 mgd. The District owns sewer rights of up to 200,000 gpd of average flow for the benefit of the project.

Peak dry-weather wastewater flows (PDWF) were derived from the formula PDWF = 1.84 x $(ADWF)^{0.92}$, where flow is in cubic feet per second (cfs). The formula, which was originally developed by Los Angeles County Sanitation District, was assessed to be valid in the 1999 Master Plan by comparing the measured peak factors at three District lift stations with the calculated peak flows using this formula. The resulting peak flow for the Project equals 110,550 gpd or 0.11 mgd. The resulting average flow to peak flow factor equals 2.26.

3.3 System Layout

The minimum pipe size for gravity sewers per the District's standards is 8-inches in diameter and the Saddleback Meadows development is not large enough to warrant anything bigger than this. Using the District minimum slope criteria of 0.4 percent, the maximum depth to diameter ratio (d/D) equals 0.32 for the Project peak flow of 0.11 mgd. The District standard for maximum d/D ratio for 8-inch pipeline is equal to 0.50. Therefore, all gravity sewer pipelines constructed for the project site will be 8-inch, except for private lateral sewers.

The proposed sewer system layout is shown in Figure 3-1. The system will collect to Spine Street and cross El Toro Road to connect with the existing 15-inch TCWD trunk sewer just to the west of El Toro Road. The sewer should be designed to meet District criteria; 7 feet minimum depth of cover from finished grade to the top of sewer and manhole spacing not to exceed the maximum of 400 linear feet for 8-inch sewer. The sewers will be constructed of PVC pipe per District criteria, with special requirements for the El Toro Road sewer crossing and any deep sewers.

Figure 3-1 - Sewer Facilities

4. Project Costs

The engineer for the developer will be responsible for preparing a cost estimate for all onsite water and wastewater facilities that are to be constructed to serve the project. The developer will be responsible for a pro-rata share of the cost to upgrade the Ridgeline Booster Station and pipeline upgrades between Ridgeline and Harris Grade Reservoirs. The costs will be determined by the District prior to issuance of a will serve letter.

The developer will also be responsible for the construction of adequate offsite storage for their project's water demands. From historical unit project costs for steel tanks in the range of one to two million gallons, the unit construction cost runs approximately $1.50 per gallon including technical services, administration and contingencies (not including land acquisition and grading costs, which vary significantly depending on the site).

The total project water use from Table 2-2 is equal to 117,333 gpd. Dividing by the 181 dwelling units results in an average total development water use of 648 gpd/du. The total water demand of 117,333 gpd divided by the District average equivalent dwelling unit (edu) demand of 459 gpd/edu yields approximately 256 edus for the entire development or 2.54 edu/du.

Water capital improvement charges for up to 715 edus were previously purchased for Tract 15239 (formerly Tract 10692) by a prior owner through an agreement with the District dated September 21, 1988 and have been reserved by the District for this development. This agreement was for Tract 10692, which included 705 dwelling units and 1.7 acres of commercial land. This tract was also included in the original 6 cubic feet per second of water supply capacity from 1988 Water Allocation Report. Therefore, no water capital improvement charges or supplemental water capacity fees are due for this project.

For sewer service, the landowner purchased capacity in the El Toro Road/Santa Margarita Water District Chiquita Wastewater collection and treatment system many years ago for a previous approved land use plan that contained substantially more dwelling units than is now proposed. Therefore, no sewer capacity charges are due for this project.

The planning-level estimated costs for the recommended off-site water and sewer facilities are shown in Table 4-1 and 4-2, respectively. The estimated construction cost includes a 20% contingency. The capital project cost was developed by applying 25% to the construction cost to account for technical, legal, and administrative costs and including permitting costs.

Table 4-1
Off-site Water Facilities Cost[(d)]

Description	Units	Unit Cost	Cost
Mobilization	LS	-	$100,000
Storage [(a)]	0.9 MG	TBD	TBD
Ridgeline Pump Station [(b)]	LS	-	$166,500
12” Transmission Pipeline in El Toro Road	1,500 LF	$150/LF	$225,000
12" Butterfly Valve	3	$3,300 EA	$9,900
18” Transmission Pipeline [(c)]	4,500 LF	6% of $300/LF	$81,000
18” Butterfly Valve [(c)]	5	$6,000	$30,000
Subtotal	-	-	TBD
20% Contingency	-		TBD
Construction Cost	-	-	TBD
25% Technical, Legal & Administration	-	-	TBD
Capital Project Cost	-	-	TBD

(a) Storage solution is pending and therefore cost cannot be determined at this point. Estimated cost for reservoir could include pro-rata participation in demo of existing smaller reservoir and re-construction of new reservoir at Harris Grade, which is currently being evaluated for feasibility. If this project is deemed infeasible, alternate project could impact cost.
(b) Pro-rata participation in District costs for 6 cfs Ridgeline Booster Station based on Project MDD = 0.37 cfs. District paying 100% of 2 cfs capacity ($0.27 million) and sharing the cost with another developer for the remaining 4 cfs capacity ($1.26 million District portion). Saddleback Meadows cost = 0.37/2 x $0.27 million + 0.37/4 x $1.26 million.
(c) Pro-rata participation in water transmission line from Cook's Corner to Harris Grade Reservoir. Project MDD = 0.37 cfs, Capacity = 6.0 cfs; Therefore, pro rata share = 6.0%.
(d) All pro-rata participation and cost estimates should be considered preliminary and subject to change.

Table 4-2
Off-site Sewer Facilities Cost

Description	Units	Unit Cost	Cost
Mobilization	LS		$60,000
8” Sewer [a]	130 LF	$325/LF	$42,250
8" Sewer [b]	150 LF	$150/LF	$22,500
Standard Manholes	2	$5,500/EA	$11,000
Connect to Existing Sewer	LS		$30,000
Subtotal	-		$165,750
20% Contingency	-		$33,150
Construction Cost	-		$198,900
25% Technical, Legal & Administration	-		$49,725
Capital Project Cost	-		$248,625

(a) Jack and bore 8" pipe in steel casing across El Toro Road.
(a) Down slope to connect to existing trunk sewer in trail.
(b) All cost estimates should be considered preliminary and subject to change. While these are titled off-site sewer facilities they are assumed to be constructed as part of subdivision improvements by developer.

APPENDIX A

Saddleback Meadows TTM Lot Statistics

LOT SUMMARY TABLE

Lot No.	Gross SQ.FT.	Net SQ.FT.	Lot No.	Gross SQ.FT.	Net SQ.FT.	Lot No.	Gross SQ.FT.	Net SQ.FT.	Lot No.	Gross SQ.FT.	Net SQ.FT.
1	5,708	5,308	47	4,120	4,120	93	5,119	4,884	139	6,597	5,713
2	4,978	4,721	48	4,113	3,913	94	4,268	4,268	140	6,851	5,925
3	4,941	4,941	49	4,378	4,378	95	4,394	4,394	141	6,007	5,769
4	4,990	4,990	50	4,654	4,654	96	8,241	8,241	142	5,524	5,523
5	9,731	9,731	51	4,816	4,570	97	8,110	8,110	143	8,673	8,410
6	5,523	5,286	52	4,457	4,219	98	4,366	4,366	144	5,676	5,461
7	4,745	4,504	53	4,156	3,939	99	5,262	4,699	145	5,269	5,052
8	4,660	4,430	54	4,125	3,916	100	7,175	6,095	146	5,362	5,362
9	4,462	4,462	55	4,167	3,958	101	6,436	5,640	147	9,545	9,545
10	4,314	4,355	56	4,346	4,346	102	6,196	5,610	148	7,661	6,692
11	4,278	4,278	57	4,606	4,379	103	5,074	4,779	149	5,442	5,211
12	4,274	4,274	58	7,624	7,387	104	4,942	4,500	150	6,054	5,511
13	4,308	4,077	59	6,624	6,411	105	4,311	4,311	151	5,822	5,275
14	4,319	4,100	60	4,623	4,405	106	4,266	4,266	152	6,024	5,261
15	4,313	4,094	61	4,899	4,688	107	4,851	4,308	153	5,950	5,291
16	4,284	4,066	62	4,621	4,421	108	7,502	7,502	154	5,977	5,317
17	4,287	4,069	63	4,720	4,720	109	6,966	6,966	155	6,870	6,207
18	4,531	4,302	64	4,658	4,658	110	13,810	13,810	156	7,167	5,563
19	5,064	5,064	65	5,577	4,810	111	6,950	6,950	157	8,669	6,768
20	5,247	5,118	66	7,332	7,332	112	7,622	7,622	158	5,962	4,860
21	4,692	4,437	67	4,883	4,883	113	7,142	7,142	159	6,799	6,372
22	8,103	7,521	68	5,528	5,528	114	6,465	6,465	160	5,332	5,117
23	8,772	8,772	69	5,984	5,984	115	5,804	5,804	161	5,253	5,253
24	6,977	6,977	70	10,043	7,734	116	7,122	7,122	162	5,275	5,275
25	10,874	10,355	71	5,682	4,837	117	7,412	7,412	163	5,301	5,301
26	5,985	5,760	72	5,453	4,668	118	8,415	8,415	164	5,530	5,530
27	4,601	4,372	73	5,328	4,551	119	11,213	11,213	165	5,720	5,720
28	4,357	4,357	74	5,820	5,024	120	10,069	10,069	166	8,230	8,230
29	4,846	4,346	75	4,140	3,930	121	10,750	10,750	167	11,049	11,049
30	4,000	3,600	76	4,110	3,899	122	8,136	8,136	168	8,771	8,771
31	4,000	3,800	77	4,189	3,974	123	7,597	7,232	169	5,088	4,882
32	4,000	3,800	78	4,186	3,983	124	6,514	6,082	170	5,000	4,800
33	4,000	3,800	79	4,195	4,195	125	6,437	5,954	171	5,000	4,800
34	4,000	3,800	80	9,386	9,386	126	5,796	5,762	172	5,000	4,800
35	4,000	3,800	81	9,052	9,052	127	5,429	5,209	173	6,175	5,972
36	4,000	4,000	82	5,263	5,263	128	5,577	5,352	174	6,765	5,249
37	4,200	4,200	83	7,810	7,279	129	6,549	5,991	175	7,299	5,281
38	4,300	3,600	84	6,199	6,199	130	6,307	5,403	176	10,672	6,445
39	4,021	4,021	85	4,556	4,556	131	6,451	5,753	177	8,864	7,532
40	8,015	7,319	86	5,212	4,835	132	6,749	6,017	178	9,070	7,871
41	4,436	4,209	87	4,764	4,417	133	6,710	5,945	179	7,909	7,055
42	4,573	4,370	88	4,492	4,176	134	6,598	5,802	180	7,749	6,966
43	6,410	6,201	89	5,856	5,095	135	7,404	5,844	181	10,981	10,981
44	7,727	6,146	90	4,641	4,026	136	8,752	7,378			
45	7,267	4,719	91	4,077	3,875	137	6,523	5,679			
46	7,013	5,699	92	6,261	5,587	138	6,504	5,679			

Total Gross	1,098,072	S.F.
Average Gross	6,067	S.F.
Total Net	1,029,210	S.F.
Averae Net	5,686	S.F.

OPEN SPACE AREAS

Lot No.	Use	Area SQ.FT.	Landscaped/Irragated Area SQ.FT.	Trail SQ.FT.
A	Road	46,029	0	0
B	Road	79,028	0	0
C	Road	21,711	0	0
D	Road	21,376	0	0
E	Road	9,005	0	0
F	Road	32,571	0	0
G	Road	31,497	0	0
H	Road	34,247	0	0
I	Road	31,312	0	0
J	Road	4,965	0	0
K	Road	145,055	0	0
L	Landscape/Trail	178,396	169,931	8,465
M	Landscape	173,316	173,316	0
N	Landscape	22,200	22,200	0
O	Landscape	61,359	57,917	0
P	Landscape	102,572	102,572	0
Q	Landscape	3,365	3,365	0
R	Landscape	85,367	85,367	0
S	Landscape	60,167	60,167	0
T	Landscape/Open Space	228,490	30,853	0
U	Landscape/Open Space	196,983	86,638	0
V	Landscape/Open Space/Water Quality/20' Equestrian Trail	385,967	276,482	50,709
W	Open Space	87,942	0	0
X	Open Space	1,754,047	0	0
Y	Open Space	3,522,717	146,801	0
Z	Open Space	1,185,159	198,687	0
AA	Open Space	76,919	0	0

APPENDIX B

Water Demand Support Data

Lot Sizes, Hardscape/Landscape Area and Water Use Calculation

(all areas in square feet (sf), lots sorted smallest to largest)

Lot No.	Lot sf	House	Building Footprint	Garage	Drive-way	Footprint + Garage + D'way	Remainder	Hardscape	Landscape	% Irrigated Area
30	4,500	3,555	1,955	400	440	2,795	1,705	682	1,023	23%
31	4,500	3,555	1,955	400	440	2,795	1,705	682	1,023	23%
32	4,500	3,555	1,955	400	440	2,795	1,705	682	1,023	23%
33	4,500	3,555	1,955	400	440	2,795	1,705	682	1,023	23%
11	4,620	3,555	1,955	400	440	2,795	1,825	730	1,095	24%
55	4,621	3,555	1,955	400	440	2,795	1,826	730	1,095	24%
53	4,623	3,555	1,955	400	440	2,795	1,828	731	1,097	24%
47	4,630	3,555	1,955	400	440	2,795	1,835	734	1,101	24%
57	4,658	3,555	1,955	400	440	2,795	1,863	745	1,118	24%
10	4,668	3,555	1,955	400	440	2,795	1,873	749	1,124	24%
69	4,673	3,555	1,955	400	440	2,795	1,878	751	1,127	24%
84	4,674	3,555	1,955	400	440	2,795	1,879	752	1,127	24%
9	4,701	3,555	1,955	400	440	2,795	1,906	762	1,143	24%
56	4,720	3,555	1,955	400	440	2,795	1,925	770	1,155	24%
41	4,725	3,555	1,955	400	440	2,795	1,930	772	1,158	25%
48	4,728	3,555	1,955	400	440	2,795	1,933	773	1,160	25%
42	4,735	3,555	1,955	400	440	2,795	1,940	776	1,164	25%
95	4,792	3,555	1,955	400	440	2,795	1,997	799	1,198	25%
70	4,794	3,555	1,955	400	440	2,795	1,999	800	1,199	25%
94	4,798	3,555	1,955	400	440	2,795	2,003	801	1,202	25%
46	4,843	3,555	1,955	400	440	2,795	2,048	819	1,229	25%
8	4,849	3,555	1,955	400	440	2,795	2,054	822	1,232	25%
49	4,874	3,555	1,955	400	440	2,795	2,079	832	1,247	26%
60	4,883	3,555	1,955	400	440	2,795	2,088	835	1,253	26%
93	4,889	3,555	1,955	400	440	2,795	2,094	838	1,256	26%
54	4,899	3,555	1,955	400	440	2,795	2,104	842	1,262	26%
43	4,963	3,555	1,955	400	440	2,795	2,168	867	1,301	26%
117	4,970	3,555	1,955	400	440	2,795	2,175	870	1,305	26%
27	5,000	3,555	1,955	400	440	2,795	2,205	882	1,323	26%
92	5,000	3,555	1,955	400	440	2,795	2,205	882	1,323	26%
115	5,060	3,555	1,955	400	440	2,795	2,265	906	1,359	27%
118	5,065	3,555	1,955	400	440	2,795	2,270	908	1,362	27%
6	5,091	3,555	1,955	400	440	2,795	2,296	918	1,377	27%
28	5,100	3,555	1,955	400	440	2,795	2,305	922	1,383	27%
29	5,100	3,555	1,955	400	440	2,795	2,305	922	1,383	27%
88	5,128	3,555	1,955	400	440	2,795	2,333	933	1,400	27%
114	5,148	3,555	1,955	400	440	2,795	2,353	941	1,412	27%
50	5,168	3,555	1,955	400	440	2,795	2,373	949	1,424	28%
12	5,199	3,555	1,955	400	440	2,795	2,404	962	1,442	28%
119	5,199	3,555	1,955	400	440	2,795	2,404	962	1,442	28%
26	5,224	3,555	1,955	400	440	2,795	2,429	972	1,457	28%

Lot Sizes, Hardscape/Landscape Area and Water Use Calculation

(all areas in square feet (sf), lots sorted smallest to largest)

Lot No.	Lot sf	House	Building Footprint	Garage	Drive-way	Footprint + Garage + D'way	Remainder	Hardscape	Landscape	% Irrigated Area
13	5,233	3,555	1,955	400	440	2,795	2,438	975	1,463	28%
14	5,233	3,555	1,955	400	440	2,795	2,438	975	1,463	28%
91	5,257	3,555	1,955	400	440	2,795	2,462	985	1,477	28%
78	5,263	3,555	1,955	400	440	2,795	2,468	987	1,481	28%
81	5,293	3,555	1,955	400	440	2,795	2,498	999	1,499	28%
15	5,300	3,555	1,955	400	440	2,795	2,505	1,002	1,503	28%
68	5,323	3,555	1,955	400	440	2,795	2,528	1,011	1,517	28%
76	5,344	3,555	1,955	400	440	2,795	2,549	1,020	1,529	29%
3	5,345	3,555	1,955	400	440	2,795	2,550	1,020	1,530	29%
45	5,362	3,555	1,955	400	440	2,795	2,567	1,027	1,540	29%
44	5,381	3,555	1,955	400	440	2,795	2,586	1,034	1,551	29%
34	5,383	3,555	1,955	400	440	2,795	2,588	1,035	1,553	29%
2	5,465	3,555	1,955	400	440	2,795	2,670	1,068	1,602	29%
155	5,500	3,555	1,955	400	440	2,795	2,705	1,082	1,623	30%
156	5,500	3,555	1,955	400	440	2,795	2,705	1,082	1,623	30%
157	5,500	3,555	1,955	400	440	2,795	2,705	1,082	1,623	30%
116	5,501	3,555	1,955	400	440	2,795	2,706	1,082	1,623	30%
148	5,503	3,555	1,955	400	440	2,795	2,708	1,083	1,625	30%
149	5,508	3,555	1,955	400	440	2,795	2,713	1,085	1,628	30%
150	5,513	3,555	1,955	400	440	2,795	2,718	1,087	1,631	30%
83	5,515	3,555	1,955	400	440	2,795	2,720	1,088	1,632	30%
80	5,516	3,555	1,955	400	440	2,795	2,721	1,088	1,632	30%
111	5,526	3,555	1,955	400	440	2,795	2,731	1,092	1,638	30%
61	5,528	3,555	1,955	400	440	2,795	2,733	1,093	1,640	30%
58	5,577	3,555	1,955	400	440	2,795	2,782	1,113	1,669	30%
7	5,598	3,555	1,955	400	440	2,795	2,803	1,121	1,682	30%
18	5,603	3,555	1,955	400	440	2,795	2,808	1,123	1,685	30%
87	5,643	3,555	1,955	400	440	2,795	2,848	1,139	1,709	30%
151	5,657	3,555	1,955	400	440	2,795	2,862	1,145	1,717	30%
24	5,704	3,555	1,955	400	440	2,795	2,909	1,164	1,745	31%
103	5,713	3,555	1,955	400	440	2,795	2,918	1,167	1,751	31%
105	5,746	3,555	1,955	400	440	2,795	2,951	1,180	1,770	31%
67	5,760	3,555	1,955	400	440	2,795	2,965	1,186	1,779	31%
21	5,767	3,555	1,955	400	440	2,795	2,972	1,189	1,783	31%
77	5,782	3,555	1,955	400	440	2,795	2,987	1,195	1,792	31%
1	5,785	3,555	1,955	400	440	2,795	2,990	1,196	1,794	31%
121	5,798	3,555	1,955	400	440	2,795	3,003	1,201	1,802	31%
36	5,807	3,555	1,955	400	440	2,795	3,012	1,205	1,807	31%
104	5,839	3,555	1,955	400	440	2,795	3,044	1,218	1,826	31%
17	5,877	3,555	1,955	400	440	2,795	3,082	1,233	1,849	31%
25	5,909	3,555	1,955	400	440	2,795	3,114	1,246	1,868	32%

Lot Sizes, Hardscape/Landscape Area and Water Use Calculation

(all areas in square feet (sf), lots sorted smallest to largest)

Lot No.	Lot sf	House	Building Footprint	Garage	Drive-way	Footprint + Garage + D'way	Remainder	Hardscape	Landscape	% Irrigated Area
125	5,948	3,555	1,955	400	440	2,795	3,153	1,261	1,892	32%
99	5,951	3,555	1,955	400	440	2,795	3,156	1,262	1,893	32%
152	5,965	3,555	1,955	400	440	2,795	3,170	1,268	1,902	32%
62	5,984	3,555	1,955	400	440	2,795	3,189	1,276	1,913	32%
65	6,002	3,555	1,955	400	440	2,795	3,207	1,283	1,924	32%
79	6,032	3,555	1,955	400	440	2,795	3,237	1,295	1,942	32%
120	6,052	3,555	1,955	400	440	2,795	3,257	1,303	1,954	32%
158	6,080	3,555	1,955	400	440	2,795	3,285	1,314	1,971	32%
66	6,115	3,555	1,955	400	440	2,795	3,320	1,328	1,992	33%
97	6,153	3,555	1,955	400	440	2,795	3,358	1,343	2,015	33%
52	6,190	3,555	1,955	400	440	2,795	3,395	1,358	2,037	33%
82	6,261	3,555	1,955	400	440	2,795	3,466	1,386	2,079	33%
101	6,298	3,555	1,955	400	440	2,795	3,503	1,401	2,102	33%
124	6,310	3,555	1,955	400	440	2,795	3,515	1,406	2,109	33%
16	6,327	3,555	1,955	400	440	2,795	3,532	1,413	2,119	33%
135	6,331	3,555	1,955	400	440	2,795	3,536	1,414	2,121	34%
138	6,353	3,555	1,955	400	440	2,795	3,558	1,423	2,135	34%
122	6,395	3,555	1,955	400	440	2,795	3,600	1,440	2,160	34%
112	6,473	3,555	1,955	400	440	2,795	3,678	1,471	2,207	34%
140	6,509	3,555	1,955	400	440	2,795	3,714	1,486	2,228	34%
64	6,518	3,555	1,955	400	440	2,795	3,723	1,489	2,234	34%
139	6,593	3,555	1,955	400	440	2,795	3,798	1,519	2,279	35%
102	6,653	3,555	1,955	400	440	2,795	3,858	1,543	2,315	35%
100	6,697	3,555	1,955	400	440	2,795	3,902	1,561	2,341	35%
113	6,709	3,555	1,955	400	440	2,795	3,914	1,566	2,348	35%
40	6,724	3,555	1,955	400	440	2,795	3,929	1,572	2,357	35%
142	6,774	3,555	1,955	400	440	2,795	3,979	1,592	2,387	35%
129	6,778	3,555	1,955	400	440	2,795	3,983	1,593	2,390	35%
141	6,781	3,555	1,955	400	440	2,795	3,986	1,594	2,391	35%
128	6,823	3,555	1,955	400	440	2,795	4,028	1,611	2,417	35%
123	6,918	3,555	1,955	400	440	2,795	4,123	1,649	2,474	36%
107	6,931	3,555	1,955	400	440	2,795	4,136	1,654	2,481	36%
38	6,932	3,555	1,955	400	440	2,795	4,137	1,655	2,482	36%
143	7,170	3,555	1,955	400	440	2,795	4,375	1,750	2,625	37%
106	7,176	3,555	1,955	400	440	2,795	4,381	1,752	2,628	37%
146	7,177	3,555	1,955	400	440	2,795	4,382	1,753	2,629	37%
85	7,183	3,555	1,955	400	440	2,795	4,388	1,755	2,633	37%
51	7,236	3,555	1,955	400	440	2,795	4,441	1,776	2,664	37%
37	7,271	3,555	1,955	400	440	2,795	4,476	1,790	2,685	37%
90	7,272	3,555	1,955	400	440	2,795	4,477	1,791	2,686	37%
59	7,332	3,555	1,955	400	440	2,795	4,537	1,815	2,722	37%

Lot Sizes, Hardscape/Landscape Area and Water Use Calculation

(all areas in square feet (sf), lots sorted smallest to largest)

Lot No.	Lot sf	House	Building Footprint	Garage	Drive-way	Footprint + Garage + D'way	Remainder	Hardscape	Landscape	% Irrigated Area
75	7,390	3,555	1,955	400	440	2,795	4,595	1,838	2,757	37%
86	7,414	3,555	1,955	400	440	2,795	4,619	1,848	2,771	37%
130	7,424	3,555	1,955	400	440	2,795	4,629	1,852	2,777	37%
96	7,502	4,331	2,382	600	640	3,622	3,880	1,552	2,328	31%
39	7,545	4,331	2,382	600	640	3,622	3,923	1,569	2,354	31%
147	7,551	4,331	2,382	600	640	3,622	3,929	1,572	2,357	31%
126	7,665	4,331	2,382	600	640	3,622	4,043	1,617	2,426	32%
23	7,758	4,331	2,382	600	640	3,622	4,136	1,654	2,482	32%
132	7,770	4,331	2,382	600	640	3,622	4,148	1,659	2,489	32%
5	7,824	4,331	2,382	600	640	3,622	4,202	1,681	2,521	32%
160	7,982	4,331	2,382	600	640	3,622	4,360	1,744	2,616	33%
20	8,016	4,331	2,382	600	640	3,622	4,394	1,758	2,636	33%
71	8,115	4,331	2,382	600	640	3,622	4,493	1,797	2,696	33%
4	8,125	4,331	2,382	600	640	3,622	4,503	1,801	2,702	33%
35	8,125	4,331	2,382	600	640	3,622	4,503	1,801	2,702	33%
127	8,281	4,331	2,382	600	640	3,622	4,659	1,864	2,795	34%
134	8,331	4,331	2,382	600	640	3,622	4,709	1,884	2,825	34%
137	8,333	4,331	2,382	600	640	3,622	4,711	1,884	2,827	34%
144	8,334	4,331	2,382	600	640	3,622	4,712	1,885	2,827	34%
74	8,372	4,331	2,382	600	640	3,622	4,750	1,900	2,850	34%
165	8,378	4,331	2,382	600	640	3,622	4,756	1,902	2,854	34%
131	8,385	4,331	2,382	600	640	3,622	4,763	1,905	2,858	34%
73	8,451	4,331	2,382	600	640	3,622	4,829	1,932	2,897	34%
136	8,465	4,331	2,382	600	640	3,622	4,843	1,937	2,906	34%
164	8,526	4,331	2,382	600	640	3,622	4,904	1,962	2,942	35%
19	8,684	4,331	2,382	600	640	3,622	5,062	2,025	3,037	35%
145	8,702	4,331	2,382	600	640	3,622	5,080	2,032	3,048	35%
159	8,995	4,331	2,382	600	640	3,622	5,373	2,149	3,224	36%
109	9,062	4,331	2,382	600	640	3,622	5,440	2,176	3,264	36%
133	9,191	4,331	2,382	600	640	3,622	5,569	2,228	3,341	36%
110	9,288	4,331	2,382	600	640	3,622	5,666	2,266	3,400	37%
163	9,342	4,331	2,382	600	640	3,622	5,720	2,288	3,432	37%
162	9,363	4,331	2,382	600	640	3,622	5,741	2,296	3,445	37%
154	9,632	4,331	2,382	600	640	3,622	6,010	2,404	3,606	37%
22	9,656	4,331	2,382	600	640	3,622	6,034	2,414	3,620	37%
153	9,949	4,331	2,382	600	640	3,622	6,327	2,531	3,796	38%
63	10,043	4,331	2,382	600	640	3,622	6,421	2,568	3,853	38%
108	10,323	4,331	2,382	600	640	3,622	6,701	2,680	4,021	39%
89	10,651	4,331	2,382	600	640	3,622	7,029	2,812	4,217	40%
161	10,655	4,331	2,382	600	640	3,622	7,033	2,813	4,220	40%
72	10,795	4,331	2,382	600	640	3,622	7,173	2,869	4,304	40%

Lot Sizes, Hardscape/Landscape Area and Water Use Calculation

(all areas in square feet (sf), lots sorted smallest to largest)

Lot No.	Lot sf	House	Building Footprint	Garage	Drive-way	Footprint + Garage + D'way	Remainder	Hardscape	Landscape	% Irrigated Area
166	12,544	4,331	2,382	600	640	3,622	8,922	3,569	5,353	43%
98	14,324	4,331	2,382	600	640	3,622	10,702	4,281	6,421	45%
Total	**1,076,807**								**347,834**	
Average	**6,487**								**2,095**	**32%**

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PSOMAS

Trabuco Highlands Lots

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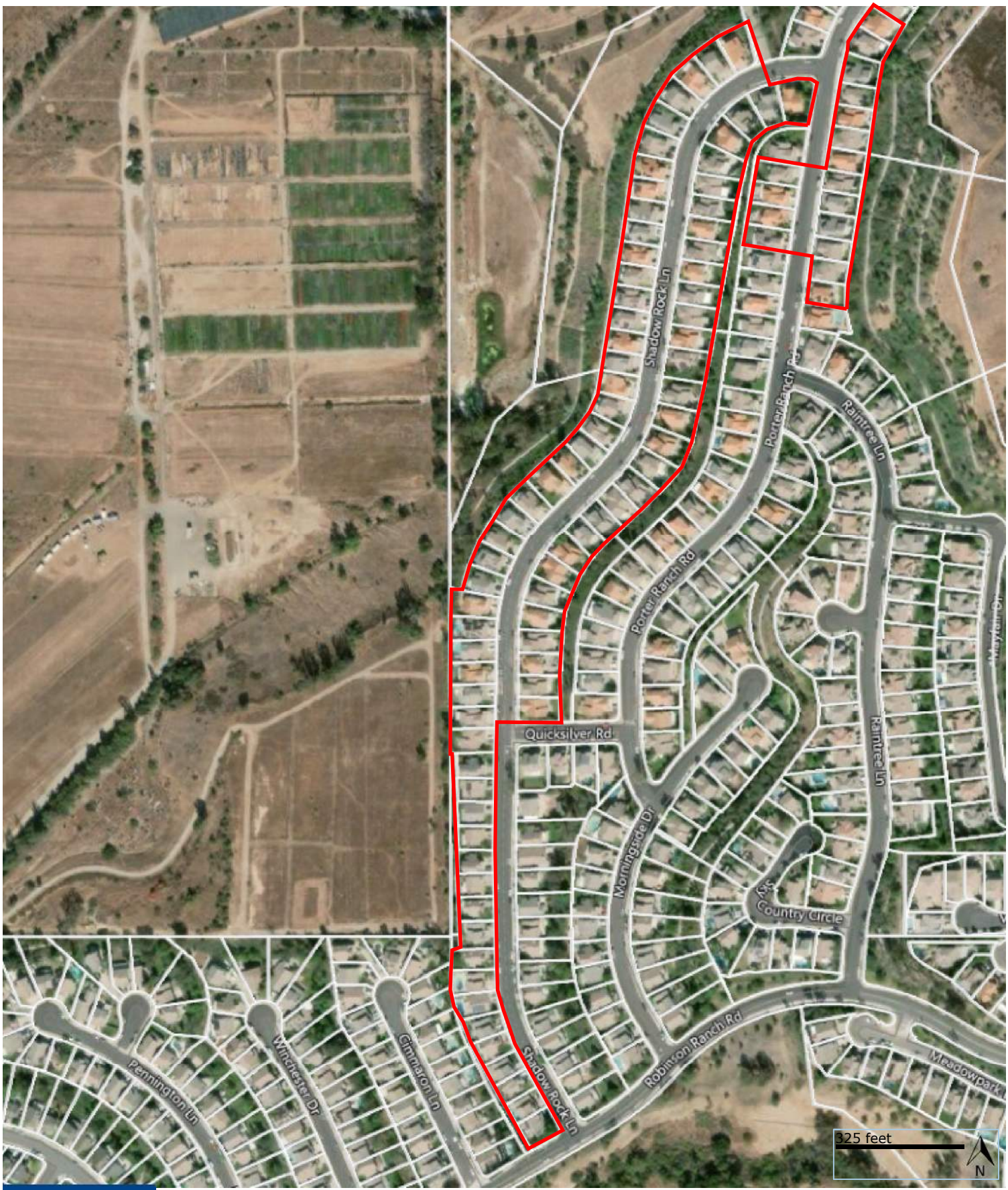
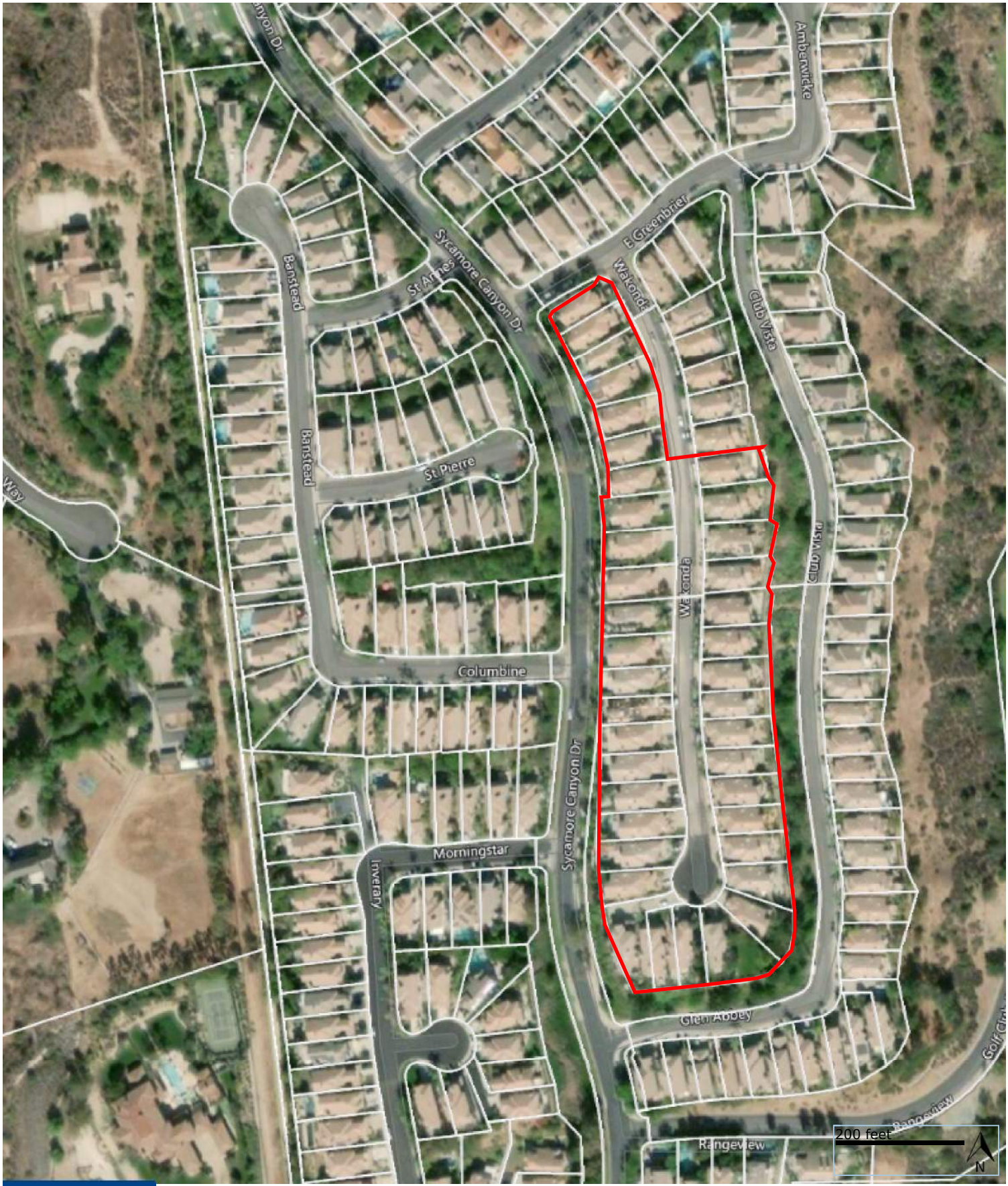


PSOMAS

Robinson Ranch Lots



PSOMAS

Dove Canyon Lots

Similar Lots in Trabuco Highlands, Robinson Ranch and Dove Canyon

Address	Lot Size (sf)	Address	Lot Size (sf)	Address	Lot Size (sf)	Address	Lot Size (sf)	Address	Lot Size (sf)
21381 Birdhollow Dr	7,800	32592 Coppercrest Dr	12,000	20881 Shadow Rock Ln	6,435	20802 Shadow Rock Ln	5,610	1 Wakonda	4,400
21391 Birdhollow Dr	6,864	32602 Coppercrest Dr	7,875	20871 Shadow Rock Ln	6,490	20792 Shadow Rock Ln	5,900	3 Wakonda	4,905
21401 Birdhollow Dr	9,179	32622 Coppercrest Dr	7,519	20861 Shadow Rock Ln	7,200	20782 Shadow Rock Ln	5,650	5 Wakonda	4,815
21411 Birdhollow Dr	6,760	32632 Coppercrest Dr	7,446	20851 Shadow Rock Ln	6,000	20776 Shadow Rock Ln	6,695	9 Wakonda	5,100
21415 Birdhollow Dr	6,552	32642 Coppercrest Dr	7,800	20841 Shadow Rock Ln	6,000	20772 Shadow Rock Ln	6,600	11 Wakonda	5,300
21421 Birdhollow Dr	6,386	32662 Coppercrest Dr	8,000	20831 Shadow Rock Ln	6,000	20762 Shadow Rock Ln	7,280	13 Wakonda	4,704
21423 Birdhollow Dr	6,120	32682 Coppercrest Dr	7,500	20825 Shadow Rock Ln	6,000	20752 Shadow Rock Ln	7,700	15 Wakonda	4,900
21425 Birdhollow Dr	6,300	32692 Coppercrest Dr	6,283	20821 Shadow Rock Ln	6,060	20742 Shadow Rock Ln	7,490	17 Wakonda	5,824
21431 Birdhollow Dr	9,750	32702 Coppercrest Dr	6,313	20811 Shadow Rock Ln	6,060	20732 Shadow Rock Ln	8,800	19 Wakonda	6,384
21433 Birdhollow Dr	9,100	32712 Coppercrest Dr	6,490	20801 Shadow Rock Ln	8,000	20722 Shadow Rock Ln	6,215	21 Wakonda	6,325
21435 Birdhollow Dr	8,400	32722 Coppercrest Dr	6,380	20791 Shadow Rock Ln	5,656	20712 Shadow Rock Ln	6,325	25 Wakonda	5,928
21392 Silvertree Ln	9,800	32732 Coppercrest Dr	6,490	20781 Shadow Rock Ln	6,060	20702 Shadow Rock Ln	6,490	27 Wakonda	5,650
21402 Silvertree Ln	7,952	32742 Coppercrest Dr	5,940	20771 Shadow Rock Ln	6,060	20692 Shadow Rock Ln	6,435	29 Wakonda	4,972
21412 Silvertree Ln	8,008	32752 Coppercrest Dr	5,992	20761 Shadow Rock Ln	6,565	20672 Shadow Rock Ln	6,545	31 Wakonda	5,085
21422 Silvertree Ln	8,176	32756 Coppercrest Dr	6,160	20751 Shadow Rock Ln	6,060	20662 Shadow Rock Ln	6,720	33 Wakonda	5,175
21432 Silvertree Ln	8,880	32762 Coppercrest Dr	6,900	20741 Shadow Rock Ln	5,555	20652 Shadow Rock Ln	6,710	35 Wakonda	5,490
21452 Silvertree Ln	7,952	32766 Coppercrest Dr	7,150	20731 Shadow Rock Ln	5,606	20642 Shadow Rock Ln	6,820	37 Wakonda	5,850
21456 Silvertree Ln	7,840	32772 Coppercrest Dr	10,500	20721 Shadow Rock Ln	5,606	20632 Shadow Rock Ln	7,930	39 Wakonda	6,210
21462 Silvertree Ln	8,151	32780 Coppercrest Dr	8,050	20711 Shadow Rock Ln	5,555	20622 Shadow Rock Ln	7,700	41 Wakonda	5,850
21472 Silvertree Ln	8,140	21091 Shadow Rock Ln	5,225	20701 Shadow Rock Ln	5,555	20612 Shadow Rock Ln	7,280	43 Wakonda	6,100
21476 Silvertree Ln	9,750	21085 Shadow Rock Ln	5,225	20681 Shadow Rock Ln	5,555	20606 Shadow Rock Ln	7,140	45 Wakonda	6,250
21401 Silvertree Ln	11,000	21081 Shadow Rock Ln	5,225	20671 Shadow Rock Ln	5,555	20602 Shadow Rock Ln	8,000	47 Wakonda	4,880
21411 Silvertree Ln	6,890	21071 Shadow Rock Ln	5,225	20661 Shadow Rock Ln	5,555	20702 Porter Ranch Rd	6,300	49 Wakonda	5,490
21421 Silvertree Ln	5,871	21061 Shadow Rock Ln	5,225	20651 Shadow Rock Ln	5,555	20692 Porter Ranch Rd	5,610	46 Wakonda	10,400
21431 Silvertree Ln	6,300	21051 Shadow Rock Ln	5,225	20641 Shadow Rock Ln	5,555	20682 Porter Ranch Rd	5,582	44 Wakonda	7,800
21441 Silvertree Ln	5,936	21041 Shadow Rock Ln	5,775	20635 Shadow Rock Ln	6,565	20662 Porter Ranch Rd	6,181	42 Wakonda	6,300
21451 Silvertree Ln	6,180	21031 Shadow Rock Ln	6,270	20631 Shadow Rock Ln	6,630	20656 Porter Ranch Rd	5,582	40Wakonda	4,725
21455 Silvertree Ln	5,555	21021 Shadow Rock Ln	5,712	20625 Shadow Rock Ln	6,630	20652 Porter Ranch Rd	5,582	38 Wakonda	4,950
21461 Silvertree Ln	5,880	21001 Shadow Rock Ln	6,650	20621 Shadow Rock Ln	6,695	20642 Porter Ranch Rd	5,577	36 Wakonda	5,040
21471 Silvertree Ln	6,600	20991 Shadow Rock Ln	5,795	20615 Shadow Rock Ln	6,760	20632 Porter Ranch Rd	5,577	34 Wakonda	5,085
21475 Silvertree Ln	6,600	20981 Shadow Rock Ln	5,890	20611 Shadow Rock Ln	7,000	20622 Porter Ranch Rd	5,577	32 Wakonda	4,995
21481 Silvertree Ln	7,150	20971 Shadow Rock Ln	5,700	20892 Shadow Rock Ln	6,825	20612 Porter Ranch Rd	5,582	30 Wakonda	4,950
21483 Silvertree Ln	6,825	20961 Shadow Rock Ln	5,700	20882 Shadow Rock Ln	5,995	20592 Porter Ranch Rd	7,000	28 Wakonda	5,500
21485 Silvertree Ln	6,050	20951 Shadow Rock Ln	5,700	20872 Shadow Rock Ln	5,995	20572 Porter Ranch Rd	6,630	26 Wakonda	5,250
21491 Silvertree Ln	6,325	20941 Shadow Rock Ln	5,700	20862 Shadow Rock Ln	6,105	20562 Porter Ranch Rd	5,665	24 Wakonda	5,200
21493 Silvertree Ln	5,940	20931 Shadow Rock Ln	5,700	20842 Shadow Rock Ln	7,150	20651 Porter Ranch Rd	6,600	22 Wakonda	5,565
21495 Silvertree Ln	6,325	20911 Shadow Rock Ln	6,840	20832 Shadow Rock Ln	7,280	20661 Porter Ranch Rd	6,600	20 Wakonda	5,940
21501 Silvertree Ln	6,600	20901 Shadow Rock Ln	6,325	20822 Shadow Rock Ln	7,215	20671 Porter Ranch Rd	6,545	18 Wakonda	5,886
21505 Silvertree Ln	8,000	20891 Shadow Rock Ln	6,380	20812 Shadow Rock Ln	6,825	20681 Porter Ranch Rd	6,545	16 Wakonda	5,040
Averages	7,382		6,571		6,256		6,533		5,595

Average Size (195 Lots) 6,467 sf

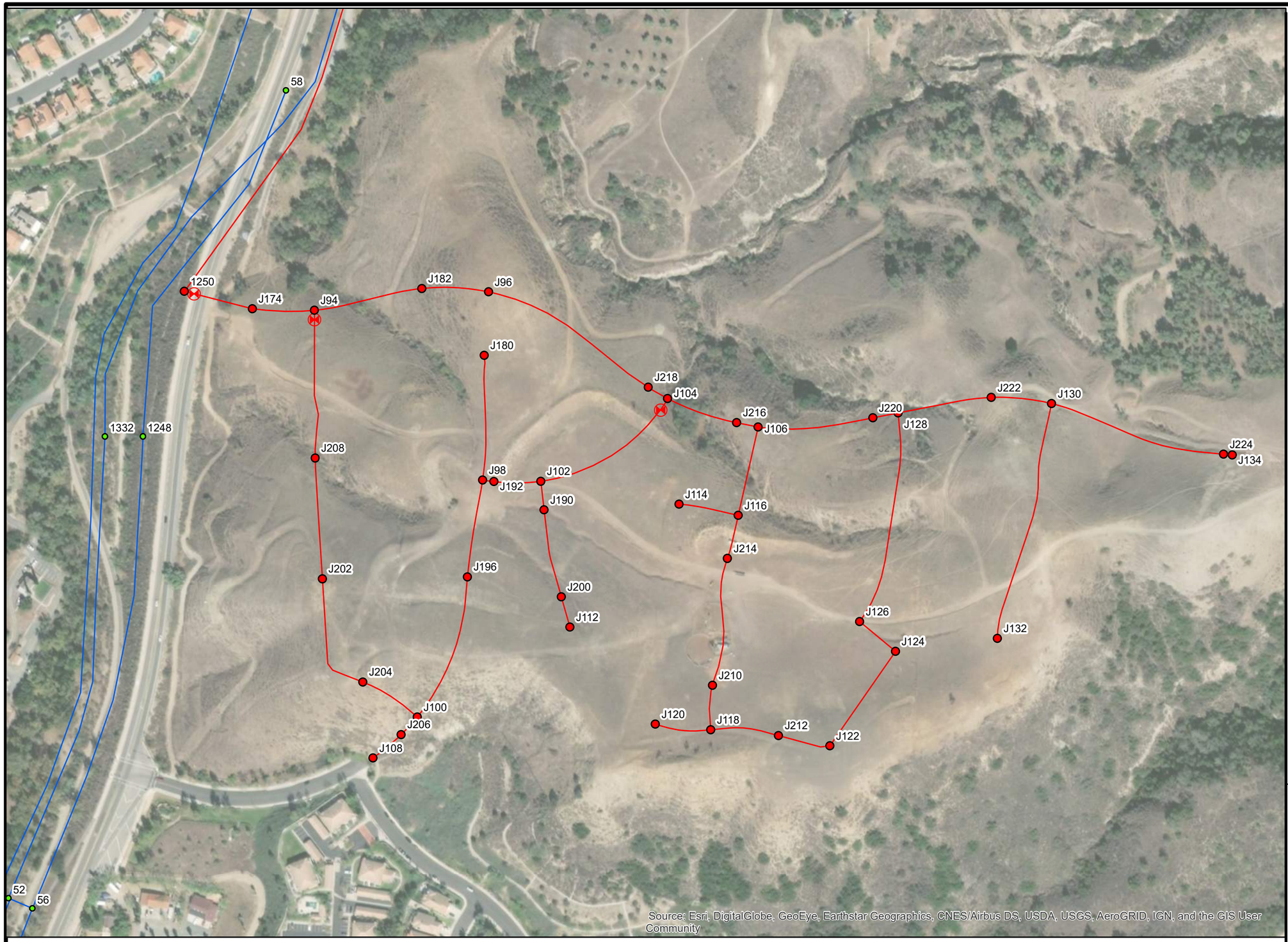
APPENDIX C

Storage Analysis Support Data

Production Aug 2018 (gallons)			
Day	**Dimension**	**SMWD (avg)**	**Total**
1	2,623,000	571,845	3,194,845
2	2,967,000	571,845	3,538,845
3	3,069,000	571,845	3,640,845
4	3,081,000	571,845	3,652,845
5	2,107,000	571,845	2,678,845
6	2,221,000	571,845	2,792,845
7	3,077,000	571,845	3,648,845
8	2,721,000	571,845	3,292,845
9	2,522,000	571,845	3,093,845
10	2,628,000	571,845	3,199,845
11	2,673,000	571,845	3,244,845
12	3,241,000	571,845	**3,812,845**
13	2,720,000	571,845	3,291,845
14	663,000	571,845	1,234,845
15	-	571,845	571,845
16	-	571,845	571,845
17	-	571,845	571,845
18	1,939,000	571,845	2,510,845
19	2,840,000	571,845	3,411,845
20	2,943,000	571,845	3,514,845
21	718,000	571,845	1,289,845
22	-	571,845	571,845
23	-	571,845	571,845
24	-	571,845	571,845
25	-	571,845	571,845
26	-	571,845	571,845
27	-	571,845	571,845
28	2,564,000	571,845	3,135,845
29	2,901,000	571,845	3,472,845
30	3,018,000	571,845	3,589,845
31	2,965,000	571,845	3,536,845
Average	1,812,935	571,845	2,384,781

APPENDIX D

Model Output and Node Diagram



0 0.025 0.05 0.1 Miles

SADDLEBACK MEADOW WATER MODEL

TRACT NO 15230

JANUARY 2020

FIGURE 1

JUCTION REPORT AT PEAK HOUR (HOUR=6)

ID	Demand (gpm)	Elevation (ft)	Head (ft)	Pressure (psi)
1250	0.0	1,065.0	1,503.6	190.1
J174	0.0	1,067.3	1,429.6	157.0
J94	34.1	1,078.6	1,429.5	152.0
J182	0.0	1,105.0	1,429.3	140.5
J96	49.3	1,121.2	1,429.3	133.5
J218	0.0	1,168.7	1,429.1	112.8
J104	3.1	1,174.4	1,429.1	110.4
J108	29.1	1,086.5	1,339.7	109.7
J206	0.0	1,097.8	1,339.7	104.8
J216	0.0	1,193.0	1,429.1	102.3
J208	0.0	1,105.2	1,339.8	101.6
J202	17.4	1,105.2	1,339.8	101.6
J204	0.0	1,105.2	1,339.7	101.6
J100	24.8	1,105.2	1,339.7	101.6
J106	18.3	1,198.5	1,429.1	99.9
J116	6.2	1,215.8	1,429.1	92.4
J114	4.9	1,218.7	1,429.1	91.2
J214	0.0	1,221.6	1,429.1	89.9
J180	0.0	1,141.5	1,339.8	85.9
J220	0.0	1,231.2	1,429.1	85.7
J196	0.0	1,146.7	1,339.8	83.7
J210	0.0	1,238.4	1,429.1	82.6
J128	39.7	1,238.5	1,429.1	82.6
J118	5.0	1,244.2	1,429.0	80.1
J120	26.0	1,245.4	1,429.0	79.6
J212	0.0	1,246.1	1,429.0	79.3
J122	5.6	1,247.6	1,429.0	78.6
J222	0.0	1,261.6	1,429.1	72.6
J98	4.3	1,173.5	1,339.8	72.1
J192	0.0	1,174.3	1,339.8	71.7
J102	0.0	1,177.4	1,339.8	70.4
J190	0.0	1,181.4	1,339.8	68.6
J130	6.8	1,276.4	1,429.1	66.1
J126	0.0	1,280.7	1,429.1	64.3
J200	0.0	1,193.7	1,339.8	63.3
J124	14.0	1,286.4	1,429.0	61.8
J112	13.6	1,201.0	1,339.8	60.1
J132	20.4	1,302.7	1,429.0	54.7
J224	0.0	1,312.7	1,429.0	50.4
J134	28.3	1,314.4	1,429.0	49.7

PIPE REPORT AT PEAK HOUR (HOUR=6)

ID	From Node	To Node	Length (ft)	Diameter (in)	Flow (gpm)	Velocity (ft/s)
70	1460	1250	1,534.2	12	350.8	1.0
P121	J94	J174	160.4	12	-350.8	1.0
P123	J96	J182	173.0	12	-281.8	0.8
P125	J100	J204	167.7	8	-17.6	0.1
P127	J100	J196	389.7	8	-36.3	0.2
P129	J102	J192	121.5	8	40.6	0.3
P131	J98	J180	321.5	8	0.0	0.0
P133	J96	J218	484.7	12	232.5	0.7
P135	J104	V8018	34.5	8	54.2	0.4
P137	J106	J216	56.4	12	-175.2	0.5
P139	J108	J206	94.2	8	-29.1	0.2
P143	J112	J200	81.1	8	-13.6	0.1
P145	J106	J116	232.8	8	41.0	0.3
P147	J116	J114	155.4	8	4.9	0.0
P149	J116	J214	114.4	8	29.9	0.2
P151	J118	J120	145.2	8	26.0	0.2
P153	J118	J212	177.0	8	-1.0	0.0
P155	J128	J126	554.7	8	20.6	0.1
P157	J126	J124	120.0	8	20.6	0.1
P159	J132	J130	623.2	8	-20.4	0.1
P161	J106	J220	298.2	12	115.9	0.3
P163	J128	J222	244.2	12	55.5	0.2
P165	J130	J224	465.0	8	28.3	0.2
P167	1250	V8020	25.9	12	350.8	1.0
P169	J94	V8016	23.2	8	35.0	0.2
P171	V8018	J102	368.5	8	54.2	0.4
P179	J182	J94	282.9	12	-281.8	0.8
P181	J190	J102	74.0	8	-13.6	0.1
P183	J192	J98	29.4	8	40.6	0.3
P185	J196	J98	252.3	8	-36.3	0.2
P187	J200	J190	228.7	8	-13.6	0.1
P189	J202	J208	311.3	8	-35.0	0.2
P191	J204	J202	323.5	8	-17.6	0.1
P193	J206	J100	61.6	8	-29.1	0.2
P195	V8016	J208	358.3	8	35.0	0.2
P197	J210	J118	115.3	8	29.9	0.2
P199	J212	J122	136.5	8	-1.0	0.0
P201	J214	J210	332.7	8	29.9	0.2
P203	J216	J104	189.1	12	-175.2	0.5
P205	J218	J104	57.9	12	232.5	0.7
P207	J220	J128	66.2	12	115.9	0.3
P209	J222	J130	156.7	12	55.5	0.2
P211	J224	J134	22.4	8	28.3	0.2
P213	V8020	J174	155.2	12	350.8	1.0
P215	J122	J124	295.7	8	-6.6	0.0

VALVE REPORT AT PEAK HOUR (HOUR=6)

ID	Elevation (ft)	Upstream Pressure (psi)	Downstream Pressure (psi)	Flow (gpm)	Velocity (ft/s)	Headloss (ft)
V8016	1079.0	151.9	113.0	35.0	0.2	89.7
V8018	1174.0	110.5	71.9	54.2	0.4	89.3
V8020	1065.0	190.1	158.0	350.8	2.2	74.0

MDD PLUS FF JUNCTION REPORT - PZ 1430

ID	Demand (gpm)	Elevation (ft)	Head (ft)	Pressure (psi)
1250	0.0	1,065.0	1,479.3	179.5
J94	34.1	1,078.6	1,425.8	150.4
J96	49.3	1,121.2	1,420.5	129.7
J98	2.5	1,173.5	1,339.8	72.1
J100	18.4	1,105.2	1,339.8	101.6
J102	0.0	1,177.4	1,339.8	70.4
J104	1.8	1,174.4	1,414.5	104.1
J106	17.2	1,198.5	1,412.0	92.5
J108	29.1	1,086.5	1,339.8	109.7
J112	7.8	1,201.0	1,339.8	60.2
J114	3.1	1,218.7	1,411.6	83.6
J116	3.5	1,215.8	1,411.6	84.8
J118	2.8	1,244.2	1,410.6	72.1
J120	24.6	1,245.4	1,410.6	71.6
J122	3.2	1,247.6	1,410.2	70.5
J124	12.4	1,286.4	1,409.9	53.5
J126	0.0	1,280.7	1,409.7	55.9
J128	35.7	1,238.5	1,409.1	73.9
J130	3.9	1,276.4	1,405.4	55.9
J132	18.0	1,302.7	1,405.4	44.5
J134	1,527.0	1,314.4	1,373.7	25.7
J174	0.0	1,067.3	1,427.7	156.2
J180	0.0	1,141.5	1,339.8	85.9
J182	0.0	1,105.0	1,422.5	137.6
J190	0.0	1,181.4	1,339.8	68.7
J192	0.0	1,174.3	1,339.8	71.7
J196	0.0	1,146.7	1,339.8	83.7
J200	0.0	1,193.7	1,339.8	63.3
J202	9.9	1,105.2	1,339.8	101.6
J204	0.0	1,105.2	1,339.8	101.6
J206	0.0	1,097.8	1,339.8	104.8
J208	0.0	1,105.2	1,339.8	101.7
J210	0.0	1,238.4	1,410.8	74.7
J212	0.0	1,246.1	1,410.4	71.2
J214	0.0	1,221.6	1,411.4	82.2
J216	0.0	1,193.0	1,412.6	95.2
J218	0.0	1,168.7	1,415.2	106.8
J220	0.0	1,231.2	1,409.6	77.3
J222	0.0	1,261.6	1,406.9	62.9
J224	0.0	1,312.7	1,375.2	27.1

MDD PLUS FF PIPE REPORT - PZ 1430

ID	From Node	To Node	Length (ft)	Diameter (in)	Flow (gpm)	Velocity (ft/s)
70	1460	1250	1,534.2	12	1,804.1	5.1
P167	1250	V8020	25.9	12	1,804.1	5.1
P213	V8020	J174	155.2	12	1,804.1	5.1
P133	J96	J218	484.7	12	1,697.1	4.8
P205	J218	J104	57.9	12	1,697.1	4.8
P163	J128	J222	244.2	12	1,548.9	4.4
P209	J222	J130	156.7	12	1,548.9	4.4
P165	J130	J224	465.0	8	1,527.0	9.8
P211	J224	J134	22.4	8	1,527.0	9.8
P161	J106	J220	298.2	12	1,416.3	4.0
P207	J220	J128	66.2	12	1,416.3	4.0
P145	J106	J116	232.8	8	217.8	1.4
P149	J116	J214	114.4	8	211.3	1.4
P197	J210	J118	115.3	8	211.3	1.4
P201	J214	J210	332.7	8	211.3	1.4
P153	J118	J212	177.0	8	183.8	1.2
P199	J212	J122	136.5	8	183.8	1.2
P215	J122	J124	295.7	8	180.7	1.2
P135	J104	V8018	34.5	8	43.9	0.3
P171	V8018	J102	368.5	8	43.9	0.3
P129	J102	J192	121.5	8	36.2	0.2
P183	J192	J98	29.4	8	36.2	0.2
P151	J118	J120	145.2	8	24.6	0.2
P169	J94	V8016	23.2	8	23.7	0.2
P195	V8016	J208	358.3	8	23.7	0.2
P147	J116	J114	155.4	8	3.1	0.0
P131	J98	J180	321.5	8	0.0	0.0
P143	J112	J200	81.1	8	-7.8	0.1
P181	J190	J102	74.0	8	-7.8	0.1
P187	J200	J190	228.7	8	-7.8	0.1
P125	J100	J204	167.7	8	-13.8	0.1
P191	J204	J202	323.5	8	-13.8	0.1
P159	J132	J130	623.2	8	-18.0	0.1
P189	J202	J208	311.3	8	-23.7	0.2
P139	J108	J206	94.2	8	-29.1	0.2
P193	J206	J100	61.6	8	-29.1	0.2
P127	J100	J196	389.7	8	-33.7	0.2
P185	J196	J98	252.3	8	-33.7	0.2
P155	J128	J126	554.7	8	-168.2	1.1
P157	J126	J124	120.0	8	-168.2	1.1
P137	J106	J216	56.4	12	-1,651.4	4.7
P203	J216	J104	189.1	12	-1,651.4	4.7
P123	J96	J182	173.0	12	-1,746.4	5.0
P179	J182	J94	282.9	12	-1,746.4	5.0
P121	J94	J174	160.4	12	-1,804.1	5.1

MDD PLUS FF JUNCTION REPORT - PZ 1340

ID	Demand (gpm)	Elevation (ft)	Head (ft)	Pressure (psi)
1250	0.0	1,065.0	1,479.3	179.5
J94	34.1	1,078.6	1,425.8	150.4
J96	49.3	1,121.2	1,422.7	130.7
J98	2.5	1,173.5	1,327.7	66.8
J100	18.4	1,105.2	1,331.4	98.0
J102	0.0	1,177.4	1,326.8	64.8
J104	1.8	1,174.4	1,419.3	106.1
J106	17.2	1,198.5	1,419.3	95.7
J108	29.1	1,086.5	1,331.4	106.1
J112	1,507.8	1,201.0	1,302.5	44.0
J114	3.1	1,218.7	1,419.3	86.9
J116	3.5	1,215.8	1,419.3	88.2
J118	2.8	1,244.2	1,419.3	75.9
J120	24.6	1,245.4	1,419.3	75.3
J122	3.2	1,247.6	1,419.3	74.4
J124	12.4	1,286.4	1,419.3	57.6
J126	0.0	1,280.7	1,419.3	60.0
J128	35.7	1,238.5	1,419.3	78.3
J130	3.9	1,276.4	1,419.3	61.9
J132	18.0	1,302.7	1,419.3	50.5
J134	27.0	1,314.4	1,419.3	45.4
J174	0.0	1,067.3	1,427.7	156.2
J180	0.0	1,141.5	1,327.7	80.7
J182	0.0	1,105.0	1,423.9	138.2
J190	0.0	1,181.4	1,322.1	61.0
J192	0.0	1,174.3	1,327.5	66.4
J196	0.0	1,146.7	1,329.2	79.1
J200	0.0	1,193.7	1,307.6	49.4
J202	9.9	1,105.2	1,334.9	99.5
J204	0.0	1,105.2	1,332.6	98.5
J206	0.0	1,097.8	1,331.4	101.2
J208	0.0	1,105.2	1,337.2	100.5
J210	0.0	1,238.4	1,419.3	78.4
J212	0.0	1,246.1	1,419.3	75.0
J214	0.0	1,221.6	1,419.3	85.7
J216	0.0	1,193.0	1,419.3	98.1
J218	0.0	1,168.7	1,419.7	108.7
J220	0.0	1,231.2	1,419.3	81.5
J222	0.0	1,261.6	1,419.3	68.3
J224	0.0	1,312.7	1,419.3	46.2

MDD PLUS FF PIPE REPORT - PZ 1340

ID	From Node	To Node	Length (ft)	Diameter (in)	Flow (gpm)	Velocity (ft/s)
70	1460	1250	1,534.2	12	1,804.1	5.1
P121	J94	J174	160.4	12	-1,804.1	5.1
P123	J96	J182	173.0	12	-1,299.9	3.7
P125	J100	J204	167.7	8	-460.3	2.9
P127	J100	J196	389.7	8	412.8	2.6
P129	J102	J192	121.5	8	-410.3	2.6
P131	J98	J180	321.5	8	0.0	0.0
P133	J96	J218	484.7	12	1,250.6	3.6
P135	J104	V8018	34.5	8	1,097.4	7.0
P137	J106	J216	56.4	12	-151.4	0.4
P139	J108	J206	94.2	8	-29.1	0.2
P143	J112	J200	81.1	8	-1,507.8	9.6
P145	J106	J116	232.8	8	32.9	0.2
P147	J116	J114	155.4	8	3.1	0.0
P149	J116	J214	114.4	8	26.3	0.2
P151	J118	J120	145.2	8	24.6	0.2
P153	J118	J212	177.0	8	-1.1	0.0
P155	J128	J126	554.7	8	16.7	0.1
P157	J126	J124	120.0	8	16.7	0.1
P159	J132	J130	623.2	8	-18.0	0.1
P161	J106	J220	298.2	12	101.3	0.3
P163	J128	J222	244.2	12	48.9	0.1
P165	J130	J224	465.0	8	27.0	0.2
P167	1250	V8020	25.9	12	1,804.1	5.1
P169	J94	V8016	23.2	8	470.2	3.0
P171	V8018	J102	368.5	8	1,097.4	7.0
P179	J182	J94	282.9	12	-1,299.9	3.7
P181	J190	J102	74.0	8	-1,507.8	9.6
P183	J192	J98	29.4	8	-410.3	2.6
P185	J196	J98	252.3	8	412.8	2.6
P187	J200	J190	228.7	8	-1,507.8	9.6
P189	J202	J208	311.3	8	-470.2	3.0
P191	J204	J202	323.5	8	-460.3	2.9
P193	J206	J100	61.6	8	-29.1	0.2
P195	V8016	J208	358.3	8	470.2	3.0
P197	J210	J118	115.3	8	26.3	0.2
P199	J212	J122	136.5	8	-1.1	0.0
P201	J214	J210	332.7	8	26.3	0.2
P203	J216	J104	189.1	12	-151.4	0.4
P205	J218	J104	57.9	12	1,250.6	3.6
P207	J220	J128	66.2	12	101.3	0.3
P209	J222	J130	156.7	12	48.9	0.1
P211	J224	J134	22.4	8	27.0	0.2
P213	V8020	J174	155.2	12	1,804.1	5.1
P215	J122	J124	295.7	8	-4.3	0.0