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OTAY RANCH VILLAGE 14
AND PLANNING AREAS 16/19
WATER CONSERVATION PLAN
Specific Plan, Appendix 6

February 2018

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OTAY RANCH VILLAGE 14
AND PLANNING AREAS 16/19
WATER CONSERVATION PLAN
Specific Plan, Appendix 6

February 2018

Prepared by:
Dexter Wilson Engineering, Inc.
2234 Faraday Avenue
Carlsbad, CA 92008

Job No. 820-007

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ABBREVIATIONS

ac -	acre
ac-ft -	acre-foot
AF-	Acre-Foot
BMPs-	Best Management Practices
cfd -	community facilities district
cfs -	cubic feet per second
gpd -	gallons per day
gpf -	gallons per flush
gpm -	gallons per minute
HOA-	homeowner's association
mgd -	million gallons per day
MF-	Multi-Family
MWD-	Metropolitan Water District
psi-	pounds per square inch
SDCWA-	San Diego County Water Authority
SF-	Single Family
UWMP-	Urban Water Management Plan

USEFUL CONVERSIONS

1 acre-foot	=	325,829 gallons
1 mgd	=	1,000,000 gallons/day
1 cfs	=	448.8 gpm
1 cubic foot	=	7.48 gallons
1 mgd	=	694.4 gpm

EXECUTIVE SUMMARY

This report reviews currently available water conservation technologies and practices in the residential development context and presents water conservation measures that will be incorporated into the planning and design of the Otay Ranch Village 14 and Planning Areas 16/19 (Proposed Project) by the project applicant, Jackson Pendo Development Company.

The Proposed Project development proposes a residential community of 1,022 dwelling units along with a mixed use site, a school site, parks, a site for public safety facilities, and open space/MSCP Preserve uses. A total of 897 residential units are proposed in Village 14 and 125 homes are proposed in Planning Areas 16/19. If the school is not developed at the Village 14 school site, then 97 additional residential units would be constructed and the total number of dwelling units would be 1,119.

The Otay Water District is the local water agency that will supply potable water to the Proposed Project. The total estimated average potable water use for the Proposed Project is 0.80 mgd. The use of recycled water is not being proposed for the Proposed Project due to its proximity relative to Upper Otay Reservoir and since recycled water facilities have not been extended to the area.

The State of California (Green Building Standards Code, 2016) County of San Diego (Water Conservation in Landscaping Ordinance, 2016) have mandated a number of water conservation measures that apply to the Proposed Project and will help to reduce the overall consumption of potable water. The focus of this study, however, is on the implementation of non-mandated water conservation measures, which are described later. Such measures would augment those required by law and would provide even greater water savings.

The Proposed Project would include installation of hot water pipe insulation, pressure reducing valves and water efficient dishwashers in single family and mixed use residential units. By complying with the model water use ordinance, outdoor water use demands at single family residences would also be reduced. In addition, the Proposed Project, where feasible, would provide graywater systems and rain water harvesting for residential units and would comply with water conservation measures in effect at the time of project approval. Hot water pipe insulation and pressure reducing valves would also be installed in non-residential development. At buildout of the Proposed Project, implementation of these additional non-mandated water conservation measures would result in an estimated water

savings of 47,444 gallons per day for the residential component of the Proposed Project[1] (2,831 gpd for higher density residential development of greater than 8 units per acre and 44,613 gpd for single family residential development of less than 8 units per acre). This does not include potential additional savings from graywater systems and rain water harvesting systems.

INTRODUCTION

In recent years, the subject of water conservation has been given increased public attention. The growing awareness of the need and value of water conservation has been sparked by local and regional water purveyors concerned about meeting the future water demands of their customers, particularly during drought conditions or due to reduced water supplies. Water conservation programs provide a mechanism for reducing the use of water demand for proposed urban development. The intent of water conservation is to manage water demand so that the customers receive adequate service but use less water.

Much has been done to educate consumers about limitations of water supply, the serious implications of a long-term drought, and the need for water conservation, but there is a practical limit to how much water use can be reduced in established communities. This limit is a result of the types of plumbing fixtures installed in existing homes as well as the difficulty in altering consumers' established patterns of water use. Any water conservation effort, voluntary or mandatory, requires the cooperation of the public. Public information should be utilized to inform and convince the consumer that a change in personal water use habits is in everyone's best interest.

In recent years, the private development sector has become more attuned to the concerns of water availability, and has recognized the value of addressing water conservation issues throughout planned development projects. By incorporating low water use plumbing fixtures, installing and promoting drought tolerant landscaping, and providing educational materials to home buyers, private developments can do much to cultivate an interest in water conservation and establish new patterns of water use. These efforts can have significant impacts with regard to reducing the need for securing and importing water for use in San Diego County.

[1] Although these measures are not mandated by state or local regulations, they will be mandatory components of the Proposed Project.

In 2006 the State repealed the Water Conservation in Landscaping Act and adopted a new Water Conservation in Landscaping Act, Government Code sections 65591 et seq. The new Act requires the Department of Water Resources to update the previously adopted model efficient landscape ordinance to provide for greater efforts at water conservation and more efficient use of water in landscaping. The County of San Diego has adopted an ordinance in 2010 that complies with the findings and declaration of the State's Water Conservation in Landscaping Act and is as effective as the State's updated model water efficient landscape ordinance. In response to the Governor's Executive Order B-29-15 issued in April 2015, the County of San Diego adopted an amended Water Conservation in Landscaping Ordinance in April 2016. This Water Conservation Plan (WCP) incorporates the requirements of the County's current ordinance.

PURPOSE

The State's Legislature determined in the Water Conservation in Landscaping Act that the State's water resources are in limited supply. The Legislature also recognized that while landscaping is essential to the quality of life in California, landscape design, installation, maintenance, and management must be water efficient. This Water Conservation Plan presents a review of available technologies and practices, both indoor and outdoor, which result in water conservation in primarily residential developments. The WCP also discusses water conservation measures that will be implemented in non-residential areas and the documents that will ensure that water conservation measures are incorporated into the landscaping systems in these areas.

The purpose of this Water Conservation Plan is to determine how these technologies and the implementation of the County Water Conservation in Landscaping Ordinance will impact water use within the Proposed Project. The water conservation measures presented in this Water Conservation Plan will be incorporated into the planning and design of the Proposed Project. The WCP also provides an estimate of the anticipated water savings from these measures. Although not covered in detail, there are several secondary benefits to conserving water that should be kept in mind when reviewing this plan. These benefits include reducing sewage flows, natural gas use, and electricity use. For example, using less water in the shower reduces the amount of water input into the sewer system and reduces the amount of energy required to heat the water.

OVERVIEW AND BACKGROUND

The Proposed Project (defined below) is part of the overall Otay Ranch, an approximately 23,000-acre master-planned community in southern San Diego County designed as a series of villages and planning areas. The Proposed Project addressed by this technical report is located within a portion of Otay Ranch Village 14 and Planning Areas 16/19 in the Proctor Valley area of Otay Ranch as shown on Figure 1.

The underlying purpose of the Proposed Project is to implement the adopted Otay Ranch General Development Plan/Subregional Plan, Volume II (County of San Diego 1993), ("Otay Ranch GDP/SRP") and complete the planned development within Jackson Pendo Development Company's ("Applicant") ownership of Village 14 and Planning Areas 16/19. The Otay Ranch GDP/SRP is a component part of the County General Plan (County of San Diego 2011) and allows for a total of 2,123 homes in Otay Ranch Village 14 and Planning Areas 16/19. The Proposed Project's 1,119 homes represent a portion of the total 2,123 homes originally authorized in the Otay Ranch GDP/SRP.

The Proposed Project is designed to be consistent with the Otay Ranch GDP/SRP's Village Character Policy "to serve as a transitional area between urban densities to the west and Jamul to the east". The Proposed Project is therefore designed to provide a transitional village between the densities and character of eastern Chula Vista and the more rural community of Jamul. The Proposed Project proposes 1,119[1] homes of which 994 are in Village 14 and 125 homes in Planning Areas 16/19 as shown in Table 1 Site Utilization Plan Summary.

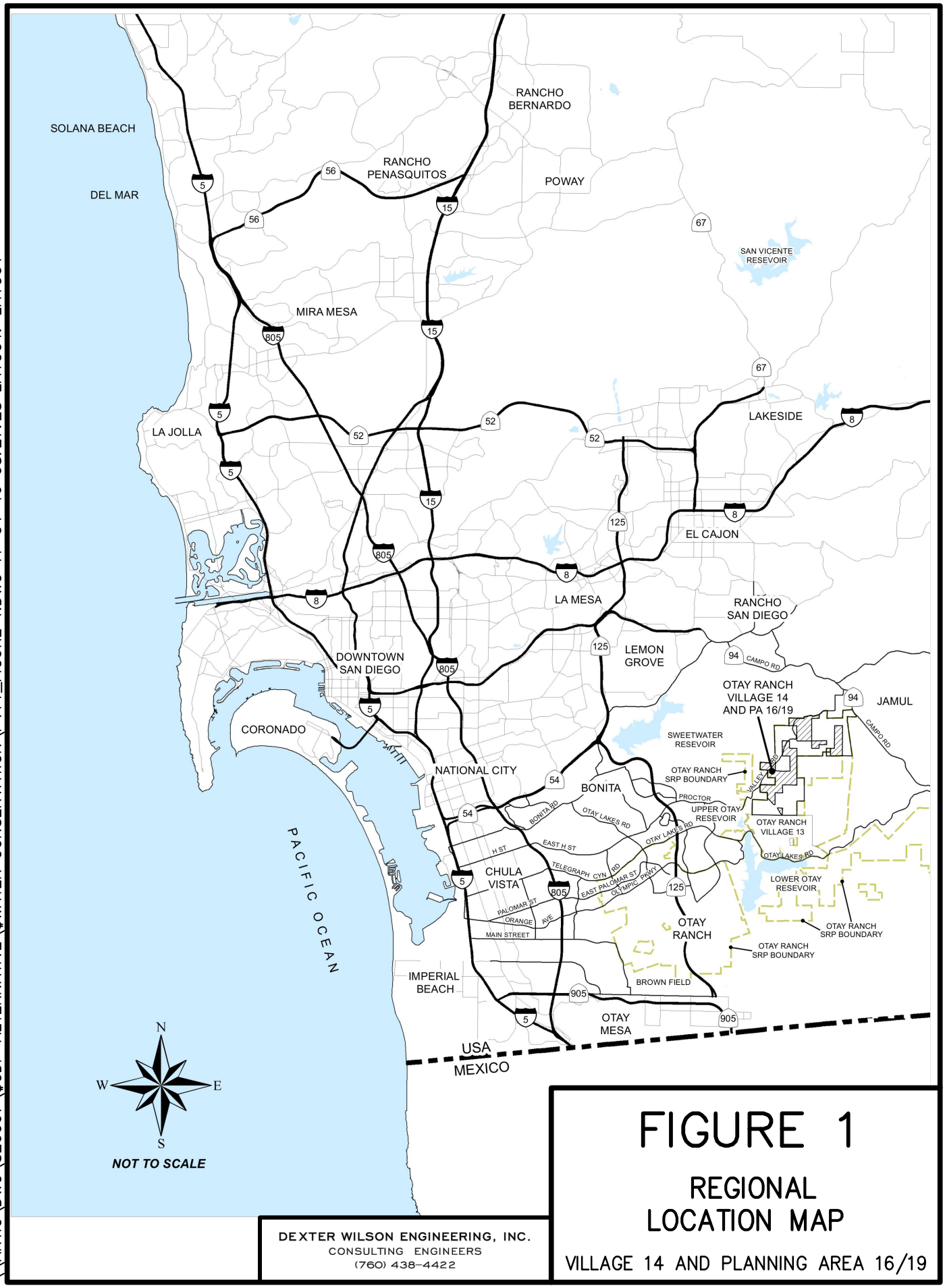
The following describes the major components and characteristics of the Proposed Project.

DEFINITIONS

"County" Defined: The "County" is the County of San Diego Jurisdiction.

"Project Area" Defined: The "Project Area" is the Applicant's ownership within Otay Ranch Village 14 and Planning Areas 16/19 in addition to certain off-site areas for infrastructure as

1 Includes 97 residential units allocated to school site at 10 DU per Acre per Otay Ranch GDP/SRP policies in the event the school is not constructed. Each technical report evaluates the Proposed Project's impact assuming the more conservative land use, (i.e. the greater impact), as either an elementary school or as underlying allocated residential units. Footnote will not be repeated.



\\ARTIC\DWG\820007\$GDP ALTERNATIVE\$WATER CONSERVATION\PV14_FIGURE 1.DWG 11-04-16 08:27:28 LAYOUT: LAYOUT

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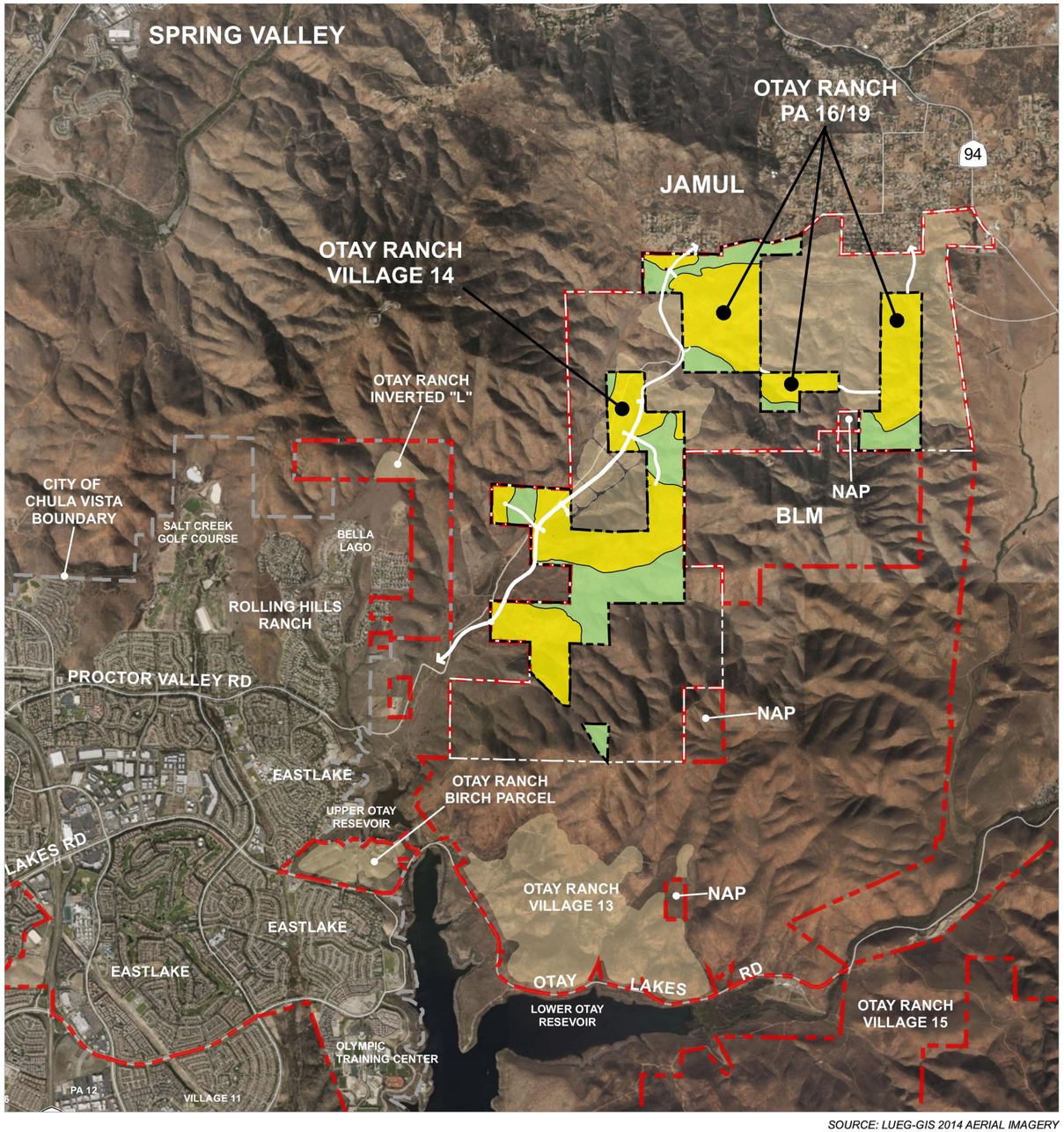
FIGURE 1

REGIONAL LOCATION MAP

VILLAGE 14 AND PLANNING AREA 16/19



SOURCE: LUEG-GIS 2014 AERIAL IMAGERY

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SCALE IN FEET

LEGEND

- OTAY RANCH GDP/SRP BOUNDARY
- PROPOSED SPECIFIC PLAN BOUNDARY
- OTAY V14 & PA16/19 VILLAGE BOUNDARY
- MUNICIPAL BOUNDARY
- V14 & PA16/19 DEVELOPMENT AREAS
- V14 & PA16/19 MSCP OPEN SPACE
- OTHER APPROVED DEVELOPMENT

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FIGURE 2

SURROUNDING LAND USES

VILLAGE 14 AND PLANNING AREA 16/19

depicted in Figure 2. The Project Area covers approximately 1,283.6 acres owned by the Applicant and approximately 85.4 acres of Off-site improvements described below, for a total of 1,369 acres.

"Proposed Project" Defined: The "Proposed Project" is the Applicant's ownership as depicted in Figure 3. The specific plan for the Proposed Project is titled "Otay Ranch Village 14 and Planning Areas 16/19 Specific Plan." The Proposed Project includes a Specific Plan, General Plan Amendments, EIR, Rezone, Tentative Map, and an Otay Ranch RMP Amendment. The Proposed Project is further defined in Section 1.0 of the EIR which is incorporated herein by reference. Except for the off-sites described below, the Proposed Project specifically excludes the State of California's ownership in Village 14 and Planning Areas 16, which remains approved for development per the County's General Plan and the Otay Ranch GDP/SRP. The underlying County General Plan and Otay Ranch GDP/SRP land uses on the State's property will remain unchanged. In addition, the "Inverted L" is excluded from this analysis as it is not owned by the Applicant and is in the City of Chula Vista, (the property is owned by Otay Water District and the United States Fish and Wildlife Service).

"Otay Ranch Village 14" Defined: "Otay Ranch Village 14" or "Village 14" as referred to herein is a discrete subset of the Proposed Project and reflects approximately 723.7 acres of the Applicant's ownership located exclusively within Village 14 as depicted in Figure 3. Approximately 994 homes are planned around a Village Core in this area, as shown in Table 2 Village 14 Site Utilization Plan Detail.

"Otay Ranch Planning Areas 16/19" Defined: "Otay Ranch Planning Areas 16/19" or "Planning Areas 16/19" is a discrete subset of the Proposed Project and reflects approximately 559.8 acres of the Applicant's ownership located exclusively within Planning Areas 16/19 as depicted in Figure 3. Approximately 125 homes are planned on one-acre and three-acre average lots in this area, as shown in Table 3 Planning Area 16/19 Site Utilization Plan Detail. 127.1 acres of Limited Development Area ("LDA"), defined below, is further described in Table 4 LDA Detail.

Limited Development Area ("LDA") Defined: LDA is a defined land use designation in the Otay Ranch GDP/SRP. "An open space easement will cover the areas designated as 'Limited Development Area'…These areas will be left as natural open space with the exception that roads and utilities are anticipated to cross or lie within these areas…LDAs may be included within private lots but would have the following set of restrictions. Removal of native vegetation would be prohibited except as necessary for construction of roads and utilities. There would be no buildings or other structure, agriculture, landscaping, livestock, grazing,

horses, trash disposal of fences allowed within these areas." Fuel modification is allowed in the LDA as "brushing for fire control zones would conform to the local fire district regulations". A total of 127.1 acres of LDA in Planning Areas 16/19 is further described in Table 4 LDA Detail. There is no LDA in Village 14.

"Otay Ranch RMP" and "MSCP Preserve" Defined: The Otay Ranch Resource Management Plan (RMP) provides for the conservation and management of the entire 11,375-acre Otay Ranch RMP Preserve. The MSCP County Subarea Plan Implementing Agreement describes the County's required contribution to the MSCP Preserve. The Implementing Agreement states that the required mitigation for Otay Ranch includes "protection of the areas identified as preserved in the boundaries of the Otay Ranch project including approximately 11,375 acres" of the Otay Ranch RMP Preserve. Therefore, the Otay Ranch RMP Preserve is a subset of the MSCP Preserve.

The portion of the Proposed Project's land use designated as Otay Ranch RMP Preserve, while considered a part of the MSCP County Subarea plan Preserve, is unique to Otay Ranch because it specifically mitigates for direct and cumulative impacts associated with implementation of the Otay Ranch GDP/SRP. The proposed Project includes 426.7 acres of Otay Ranch RMP preserve, of which 270.2 acres are in Village 14 and 156.5 acres are in Planning Areas 16/19.

"Preserve Conveyance Obligation" Defined: To satisfy assemblage of the 11,375-acre RMP (MSCP) Preserve ranch-wide, a "Preserve Conveyance Obligation" was prescribed in the Otay Ranch RMP. The Preserve Conveyance Obligation is 1.188 acre of Otay Ranch RMP (MSCP) Preserve conveyed per 1 acre of development, as further defined in the adopted Otay Ranch RMP. This obligation, which is the primary basis of Proposed Project's required mitigation, may be achieved through conveyance of either the Applicant's RMP (MSCP) Preserve ownership or through off-site acquisition within the 11,375 acres Otay Ranch RMP (MSCP) Preserve.

"Conserved Open Space" Defined: "Conserved Open Space" refers to those areas with an Otay Ranch GDP/SRP land use designation other than Otay Ranch RMP Preserve that will be preserved on site and which will either be added to the Otay Ranch RMP Preserve (through a future RMP Amendment), managed under a separate Resource Management Plan, or utilized to mitigate impacts to the City of San Diego MSCP Cornerstone Lands. The approximately 72.4 acres of Conserved Open Space is comprised of 31.9 acres within the 127.1 acres of LDA and 3.6 acres of residential land use designation in Planning Area 16/19 plus 36.9 acres of residential land use designation within Village 14. The Conserved Open Space

areas are located adjacent to Otay Ranch RMP Preserve and will be conserved by recording a biological open space easement over the land.

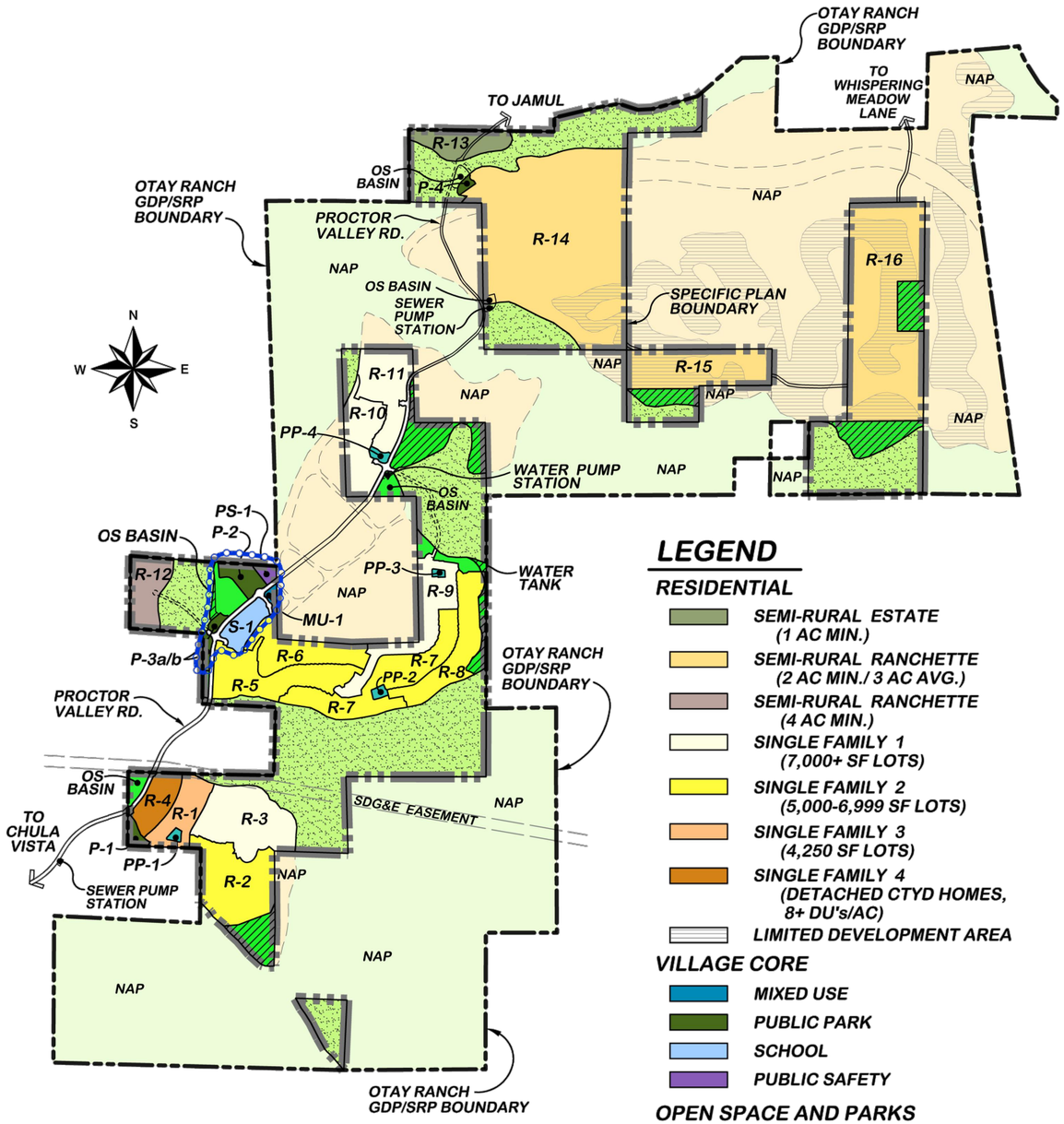
"Development Footprint" Defined: The Development Footprint includes areas where there will either be permanent or temporary ground disturbance. The Development Footprint includes: all on-site development; Off-site improvements; graded LDA; and impacts resulting from infrastructure and other allowable uses within the MSCP Preserve per Section 1.9.3 of the MSCP County Subarea Plan.

"Off-site Improvements" Defined: "Off-site Improvements" total approximately 85.4 acres of both temporary and permanent impacts as shown in Table 5 Off-Site Improvements and include the following: Proctor Valley Road, including related wet and dry utilities, drainage facilities and trails; access roads in Planning Area 16; an off-site sewer pump station in the southern reach of Proctor Valley Road and off-site sewer facilities to connect to the Salt Creek Interceptor as planned since 1994.

Proctor Valley Road improvements include: South Proctor Valley Road (0.25 mile in the City of Chula Vista land and 0.2 acres privately owned in the County); South and Central Proctor Valley Road (1.5 miles in City of San Diego Cornerstone land); Central Proctor Valley Road (0.4 mile in CDFW Otay Ranch Village 14 land); and North Proctor Valley Road (0.75 mile in CDFW Otay Ranch land between Village 14 and Planning Area 16/19).

Proctor Valley Road Central and South are proposed to be improved and classified as a two-lane-with-median light collector with a width ranging from 68 to 74 feet, plus an additional 20-foot-wide fuel modification/construction easement on each side. Proctor Valley Road north is a two-lane interim road with a paved width of 28 feet in a 40-foot-side right-of-way. Improvements in Proctor Valley Road would include those typically in roadways, including wet and dry utilities, a sewer pump station, drainage, landscape, culverts, and trails. Proctor Valley Road is an approved County General Plan mobility element road and an approved facility in the MSCP County Subarea Plan.

In addition, there are three public off-site roads within Planning Area 16. These roads are located primarily within CDFW managed lands and are approved in the Otay Ranch GDP/SRP as facilities within designated development or LDA land use, (and are also approved facilities per the MSCP County Subarea Plan Section 1.9.3.3). Improvements in these off-site roads would include those typically in roadways, including wet and dry utilities, drainage, landscape, culverts, and trails.



LEGEND

RESIDENTIAL

- SEMI-RURAL ESTATE (1 AC MIN.)
- SEMI-RURAL RANCHETTE (2 AC MIN./ 3 AC AVG.)
- SEMI-RURAL RANCHETTE (4 AC MIN.)
- SINGLE FAMILY 1 (7,000+ SF LOTS)
- SINGLE FAMILY 2 (5,000-6,999 SF LOTS)
- SINGLE FAMILY 3 (4,250 SF LOTS)
- SINGLE FAMILY 4 (DETACHED CTYD HOMES, 8+ DU's/AC)
- LIMITED DEVELOPMENT AREA

VILLAGE CORE

- MIXED USE
- PUBLIC PARK
- SCHOOL
- PUBLIC SAFETY

OPEN SPACE AND PARKS

- PUBLIC PARK
- PRIVATE PARK
- OPEN SPACE
- OPEN SPACE PRESERVE
- CONSERVED OPEN SPACE
- OWNERSHIP OTHER THAN APPLICANT

ALL UNDERLYING OTAY RANCH SRP/GDP LAND USES REMAIN UNCHANGED

- SPECIFIC PLAN BOUNDARY
- OTAY RANCH GDP/SRP BOUNDARY
- OTAY RANCH GDP/SRP DEVELOPMENT LIMITS
- VILLAGE CORE

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FIGURE 3

SITE UTILIZATION PLAN

VILLAGE 14 AND PLANNING AREA 16/19

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PROPOSED SPECIFIC PLAN

Summary

The adopted Otay Ranch GDP/SRP requires the preparation of a Specific Plan, which includes a Site Utilization Plan to describe the land uses for the Proposed Project. Figures 2 and 3 depict the proposed Site Utilization Plan. Tables 1 to 5 quantify the proposed land uses. Approximately 994 homes are planned in Village 14, set in three distinct areas (referred to herein as the South, Central and North Village 14). 878 of these homes will be single-family homes located in gated enclaves and 116 will be detached courtyard homes. Twelve neighborhoods are planned with approximate densities ranging from 0.2 to 10.0 dwelling units per acre. Otay Ranch Village 14 is planned around a "Village Core", centrally located in the heart of the village. The Village Core is comprised of a 9.7-acre elementary school; a 7.2-acre Village Green (public park); a 1.7-acre Mixed Use Site with up to 10,000 square feet of commercial/retail uses; and a 2.3-acre public safety site for a fire station and satellite sheriff's facility. Additional public and private parks, swim clubs, trails and recreational facilities will be situated throughout South, Central and North Village 14. See Table 2 for detailed land uses in Village 14.

In addition to the homes in Village 14, there are 13 one-acre average sized estate lots proposed in Planning Area 19 and 112 three-acre average sized ranchettes proposed in Planning Area 16. Planning Area 16/19 neighborhoods will not be gated. The Limited Development Area may include public infrastructure, and/or be included in the private lots with a conservation easement. See Tables 1-3 and 1-4 for detailed land uses in Planning Area 16/19.

The Proposed Project's Specific Plan is designed around an active lifestyle and wellness recreation theme and includes a park and recreation system including four public parks totaling approximately 15.2 acres. The remaining private recreation facilities include three private swim clubs, and numerous pocket parks totaling approximately 9.5 acres. An approximately 4.5 mile, 10-foot wide decomposed granite Community Pathway is proposed along Proctor Valley Road from Chula Vista to Jamul. The Proposed Project includes approximately 27.9 acres of open space, (exclusive of the 110.1 acres of open space included in the residential gross acres),127.1 acres of LDA and 426.7 acres of Otay Ranch RMP Preserve within the Applicant's ownership. Of note, there is approximately 72.4 acres of Conserved Open Space within the proposed Project that will be conserved by recording a biological open space easement.

Table 1
Village 14 and Planning Areas 16/19
Site Utilization Plan Summary
January 9, 2018

Description	Village 14		Planning Area 16/19		Total Proposed Project	
	Gross Acres *(1,2)*	Target Units *(3)*	Gross Acres *(4,5)*	Target Units	Gross Acres	Target Units
Residential Subtotal	344.2	897.0	363.6	125	707.7	1,022
Residential Use on School Site (9.7 acres) *(3)*		97				97
Non-Residential Uses						
Mixed Use *(6)*	1.7				1.7	
Public Parks	13.8		1.4		15.2	
Private Parks/Recreation *(2)*	4.5				4.5	
Public Safety Site	2.3				2.3	
Elementary School Site *(3)*	9.7				9.7	
Open Space	27.6		2.1		29.7	
Conserved Open Space	36.9		35.5		72.4	
Otay Ranch RMP Preserve	270.2		156.5		426.7	
Circulation	12.7		0.8		13.6	
Non-Residential Uses Subtotal	379.5	-	196.3		575.8	-
Total Proposed Project	**723.7**	**994**	**559.8**	**125**	**1283.5**	**1,119**

Notes

(1) Residential gross acres in Village 14 includes 96.0 acres of related internal slopes, fuel modification and/or preserve edge.

(2) Village 14 has 5.0 acres of private pocket parks included in the residential acreage; therefore the subtotal including PPP is 9.5 acres.

(3) Units allocated to school site at 10 DU/ac per the Otay Ranch GDP/SRP policies. Should school site not be needed, 97 units may be built. Should the school site be needed, the Total Target Units is 897 in Village 14 and 1,022 total.

(4) Residential gross acres in Planning Area 16/19 includes 14.1 acres of related private lift and pump stations.

(5) Residential gross acres in Planning Area 16/19 includes 127.1 acres of limited development area (LDA). See Table 4 for details.

(6) Village 14 Mixed Use acreage includes 10,000 sf of commercial use.

(7) 85.4 acres of offsite impacts are in excluded from the acreage above. See Table 5 for details.

Table 2
Village 14
Site Utilization Plan Detail
January 9, 2018

Description		Gross Acres (1,2)	Target Units	Density
Single Family Residential				
R-1	50*85	18.0	81	4.5
R-2	60*100	38.5	82	2.1
R-3	71*100	41.1	73	1.8
R-4	Courtyard	13.8	116	8.4
R-5	50*100	35.1	103	2.9
R-6	60*100	25.7	71	2.8
R-7	60*85	40.7	108	2.7
R-8	60*100	28.7	75	2.6
R-9	75*100	30.0	74	2.5
R-10	70*85	25.1	49	1.9
R-11	80*100	28.6	61	2.1
R-12	4 ac min	18.9	4	0.2
Single Family Residential Subtotal		**344.2**	**897**	**2.6**
Residential Use on School Site (9.7 acres) *(3)*			97	
Non-Residential Uses				
Mixed Use *(4)*	MU - C	1.7		
Public Parks				
P-1	South Park	2.9		
P-2	Village Green Park	7.2		
P-3	Scenic Park	3.7		
Public Parks Subtotal		13.8		
Private Parks & Recreation				
PP-1	South	1.0		
PP-2	Central	1.2		
PP-3	Private Park	0.7		
PP-4	North	1.5		
PPP *(4)*	Various	0.0		
Private Parks/Recreation Subtotal		4.5		
Public Safety Site		2.3		
Elementary School Site *(3)*		9.7		
Open Space		27.6		
Conserved Open Space		36.9		
Otay Ranch RMP Preserve		270.2		
Circulation - Arterial		12.7		
Non-Residential Uses Subtotal		**379.5**		
Village 14 Subtotal		**723.7**	**994**	**1.4**

Notes

(1) Residential gross acres includes 96.0 acres of related internal slopes, fuel modification and/or preserve edge open space lots.

(2) Village 14 has 5.0 acres of private pocket parks included in the residential acreage; therefore the subtotal including PPP is 9.5 acres. built.

Should the school site be needed, the Total Target Units is 897.

(4) Village 14 Mixed Use acreage includes 10,000 sf of commercial use.

(5) Off-site impacts are in excluded from the acreage above. See Table 5 for details.

Table 3
Planning Areas 16/19
Site Utilization Plan Detail
January 9, 2018

Description		Gross Acres (1,2)	Target Units	Density
Residential Uses				
R-13	Estates 1/2 acre min	13.4	13	1.0
R-14	Ranchettes 2 acre min	192.0	71	0.4
R-15	Ranchettes 2 acre min	41.9	11	0.3
R-16	Ranchettes 2 acre min	116.3	30	0.3
Residential Subtotal		**363.55**	**125**	**0.3**
Non-Residential Uses				
Public Park P-4	Northern Park	1.4		
Open Space		2.1		
Conserved Open Space		35.5		
Otay Ranch RMP Preserve		156.5		
Circulation Arterial		0.8		
Non-Residential Uses Subtotal		**196.3**		
Planning Area 16/19 Subtotal		**559.8**	**125.0**	**0.2**

Notes

(1) Gross acres includes 127.1 acres of limited development area (LDA). See Table 4 for details.

(2) Residential gross acres includes 14.1 acres of related private lift and pump stations open space lots.

(3) Off-site impacts are in excluded from the acreage above. See Table 5 for details.

Table 4
Planning Areas 16/19
Limited Development Area (LDA) Detail
January 9, 2018

Description		Component Acres LDA	Component Acres Other	Acres Total
Residential Uses				
R-13	Estates 1 acre avg	0.0	13.4	13.4
R-14	Ranchettes 3 acre avg	17.3	174.7	192.0
R-15	Ranchettes 3 acre avg	27.1	14.8	41.9
R-16	Ranchettes 3 acre avg	50.9	65.4	116.3
Residential Subtotal *(5)*		**95.3**	**268.3**	**363.6**
Non-Residential Uses				
Public Park P Northern Park			1.4	1.4
Open Space			2.1	2.1
Conserved Open Space		31.9	3.6	35.5
MSCP Preserve			156.5	156.5
Circulation Arterial			0.8	0.8
Non-Residential Uses Subtotal		**31.9**	**164.4**	**196.3**
Planning Area 16/19 Subtotal		**127.1**	**432.7**	**559.8**

Table 5
Village 14 and Planning Areas 16/19
Off-Site Infrastructure (Temporary + Permanent)
January 9, 2018

Off-site *(1)*	Location	Acres		
		ROW	Temporary	Total
Proctor Valley Road - MSCP Planned Facility *(2)*				
South	City of Chula Vista	2.3	2.8	5.1
South	City of San Diego	10.1	17.6	27.7
Central	City of San Diego	2.8	4.3	7.1
Central	State	4.1	8.6	12.7
North	State	3.6	13.2	16.8
North	County of SD Easement	0.1	0.2	0.3
PA 16 Access Roads - MSCP Allowed Facility *(2)*				
R-14 to R-15	State	0.3	1.0	1.3
R-15 to R-16	State	1.6	7.2	8.8
R-16 to Whispering Meadows	State	1.5	4.2	5.7
Sewer Trunk Line to Salt Creek Interceptor *(3)*	City of Chula Vista	--	--	--
Total		**26.4**	**59.0**	**85.4**

Notes

(1) Off-sites include all road improvements, sewer, water, drainage and related utilities.

(2) See section 1.9.3 of the MSCP for planned and allowed facilities.

(3) In existing improved Proctor Valley Road to approximate tie in at Hunte Parkway

WATER SERVICE AND SUPPLY

The Otay Water District is the local water agency that will supply potable water to the Proposed Project and it relies solely on the San Diego County Water Authority (SDCWA) for its potable water supply. The SDCWA is the largest of 27 member agencies of the Metropolitan Water District of Southern California (MWD), which is the primary importer of potable water to Southern California. The February 2018 Overview of Water Service for the project provides a detailed discussion of water supply to the project.

PROJECTED WATER USE

Potable Water Demand

Water use is affected by, among other things, climate and the type of development. In California, recent trends toward the construction of multi-unit housing, the general reduction in residential lot size, and a number of local agency water conservation programs, are tending to reduce per capita water consumption.

Potable water demands were projected by taking the total development for each land use and multiplying by water use factors. Table 6 provides the projected potable water demand for the Proposed Project. This information is from the February 2018 Overview of Water Service for the Otay Ranch Village 14 and Planning Areas 16/19. The total estimated potable water use is 0.80 mgd. Potable water use factors were taken from the 2015 Otay Water District Water Master Plan. No recycled water use is assumed for the project because the City of San Diego does not allow recycled water to be used on properties that are tributary to their reservoirs. Although the City of San Diego does not allow recycled water use on properties tributary to their reservoirs, recycled water could be considered in the future if the City of San Diego changes their policy.

TABLE 6
PROJECTED POTABLE WATER DEMANDS
OTAY RANCH VILLAGE 14 AND PLANNING AREA 16/19

Land Use	Quantity	Unit Demand	Average Day Demands, gpd
SF Residential (<1 DU/AC)	129 units	1,000 gpd/unit	129,000
SF Residential (1-3 DU/AC)	696 units	700 gpd/unit	487,200
Residential (3-10 DU/AC)	197 units	435 gpd/unit	85,695
MU – Commercial	1.7 ac	1,785 gpd/ac	3,035
Parks	24.6 ac	1,900 gpd/ac	46,740
Public Safety	2.3 ac	1,785 gpd/ac	4,105
School Site (Residential)	9.7 ac/97 units[1]	435 gpd/unit	42,195
TOTAL			**797,970**

[1] Units allocated to school site at 10 DU/ac per Otay Ranch GPD/SRP policies. Water demands were projected based on the residential unit allocation to be conservative (42,195 gpd as residential allocated units versus 9.7 ac x 1,785 gpd/ac = 17,315 gpd as school).

MANDATED WATER CONSERVATION MEASURES

The State of California and County of San Diego have mandated a number of water conservation measures. Table 7 summarizes the conservation measures that are mandated by the State of California and also provides the requirements of the 2016 California Green Building Standards Code that went into effect January 1, 2017. The County of San Diego amended the Water Conservation Plan in Landscaping Ordinance in April 2016. These measures will apply to both residential and non-residential land uses being proposed by the project.

TABLE 7 MANDATED WATER CONSERVATION DEVICES		
Device	**Baseline Requirement**	**2016 Green Building Code Requirements**
Showerheads	2.5 gpm	2.0 gpm
Lavatory Faucets	2.2 gpm	1.2 gpm
Sink Faucets	2.2 gpm	1.8 gpm
Metering Faucets in Public Restrooms	0.25-0.75 gal/cycle	0.25 gal/cycle
Residential Water Closets	1.6 gpf	1.28 gpf
Flushometer Valves	1.6 gpf	1.28 gpf
Commercial Water Closets	1.6 gpf	1.28 gpf
Urinals	1.0 gpf	0.125/0.5 gpf[1]

[1] Wall mounted urinals shall not exceed 0.125 gpf. All other urinals shall not exceed 0.5 gpf.

NON-MANDATED WATER CONSERVATION MEASURES

The following non-mandated water conservation measures are recommended for the Proposed Project.

Residential Measures

1. Hot Water Pipe Insulation. Hot water pipes shall be insulated and hot and cold water piping shall be separated, resulting in annual savings of 2,400 gallons per residential unit.

2. Pressure Reducing Valves. The maximum service pressure shall be set to 60 psi to reduce any potential leakage present and prevent excessive flow of water from appliances and fixtures, resulting in annual water savings of 1,800 gallons per residential unit.

3. Water Efficient Dishwashers. Water efficient dishwashers that carry the Energy Star label shall be installed in residential units, resulting in an estimated annual water savings of 650 gallons per residential unit.

4. Residential Landscaping. Residential landscaping shall comply with the Model Water Efficient Landscape Ordinance, California Code of Regulations Title 23, Division 2, Chapter 2.7 (Section 490 et seq.). By complying with this ordinance, it is estimated by the landscape architect for the Proposed Project

that outdoor water use at single family residences will be reduced by approximately 10 percent. Residential water use can vary widely based on the size of the lots; however, based on OWD factors for the Proposed Project, estimated water use for a typical single family home is 435 gpd for densities of 3.0 to 10 units per acre, 700 gpd for densities of 1.0 to 3.0 units per acre, and 1,000 gpd for densities of less than 1.0 units per acre. With an estimated 50 percent of this water used outdoors, the estimated annual water savings is 7,940 gallons per single family residence where densities are from 3.0 to 10 units per acre 12,775 gallons per single family residence where densities are from 1.0 to 3.0 units per acre, and 18,250 gallons per single family residence where densities are less than 1.0 units per acre based on these assumptions. While the potential savings can vary based on lot size and product type, this estimate is considered to be a representative average of water savings per single family residential unit.

Non-Residential Measures

The non-residential uses for this project may include schools, park restrooms, commercial and retail shops, fire station, etc. These land uses should consider incorporating these measures within the design.

1. Hot Water Pipe Insulation. Hot water pipes shall be insulated and hot and cold water piping shall be separated.

2. Pressure Reducing Valves. The maximum service pressure shall be set to 60 psi to reduce any potential leakage present and prevent excessive flow of water from appliances and fixtures.

3. Landscaping. As discussed in the Water Conservation Implementation section of this report, landscaped areas within the Proposed Project must comply with Development Regulations, the County's Water Conservation in Landscaping Ordinance, the Fire Protection Plan, and the Preserve Edge Plan, as applicable.

In addition to the measures recommended above, a number of other measures have been considered. These include new groundwater supplies, water supply offsets, graywater systems, and storm water harvesting, which are analyzed below. Of these potential

measures, all were considered to be feasible for the Proposed Project except for new groundwater supplies, as discussed below.

New Groundwater Supply

One way to reduce potable water use is the development of new groundwater wells. Groundwater wells were evaluated for the Proposed Project, but dismissed due to predicted low yields in this basin and to avoid impacts to existing adjacent properties, particularly in the Jamul area that are supplied by wells.

Water Supply Offsets

In the event that the drought conditions become so severe that OWD declares a Drought Level 3 emergency, it is recommended that the Proposed Project offset its projected water use by contributing to the cost of or actually constructing offsite improvements. These offsite improvements would be designed to reduce existing potable water use and typically consist of retrofitting older buildings with newer fixtures that are more water efficient. Since the time Executive Order B-29-15 was issued by the Governor on April 1, 2015, statewide water conditions have improved. Mandatory water use reductions that were in effect in 2015 and the early part of 2016 have been lifted and OWD is in a Level 1 drought condition which encourages voluntary cutbacks to water use.

Graywater

Graywater pursuant to California Health and Safety Code Section 17922.12 means untreated wastewater that has not been contaminated by any toilet discharge, has not been affected by infectious, contaminated, or unhealthy bodily wastes, and does not present a threat from contamination by unhealthful processing, manufacturing, or operating wastes. Graywater includes wastewater from bathtubs, showers, bathroom washbasins, clothes washing machines, and laundry tubs, but does not include wastewater from kitchen sinks or dishwashers. Graywater system requirements are also provided in the 2016 California Plumbing Code, which went into effect on January 1, 2017.

Graywater systems necessitate additional plumbing onsite at each residence in order to send the wastewater from graywater acceptable sources to the graywater system. The graywater

system then distributes the graywater through a subsurface irrigation system. Some of the requirements and considerations for residential gray water systems are summarized as follows:

- All graywater systems shall be designed with a diverter valve to allow flows to be sent to the sewer system
- Water used to wash diapers or similarly soiled garments shall be diverted by the homeowner to the sewer system
- Graywater shall not be allowed to be used for spray irrigation, shall not be allowed to pond, and shall not be allowed to runoff the site
- Human contact with soil irrigated by graywater shall be minimized and avoided where possible
- The discharge of graywater shall be in a subsurface irrigation system that is covered by a minimum of 2 inches of rock, soil, mulch, or a solid shield
- Graywater systems require operation and maintenance by the homeowner to work properly
- Graywater may not be used for irrigation of edible food crops
- The homeowner shall be responsible to ensure that graywater does not include hazardous chemicals

Some agencies, such as the City of Chula Vista, require new homes to be plumbed for graywater collection, but leave it up to the homeowner whether or not to install a graywater system. It is recommended that, where feasible, the Proposed Project provide the plumbing for residential graywater systems. The actual implementation of a graywater system by the homeowner would need to comply with the Uniform Plumbing Code and would require approval from the County of San Diego Building Department.

Rain Water Harvesting

Harvest and use (aka, Rainwater Harvesting) BMPs (Best Management Practices) are LID BMPs that capture and store storm water runoff for later use. These BMPs are engineered to store a specified volume of water and have no design surface discharge until this volume is exceeded. Harvest and use BMPs include both above-ground and below-ground cisterns. Examples of uses for harvested water include irrigation, toilet and urinal flushing, vehicle washing, evaporative cooling, industrial processes and other non-potable uses.

For a project to be considered "feasible" to implement harvest and use BMPs, there must be enough water demands to utilize the rain water during both dry and wet seasons. The irrigation demand is typically calculated using the Modified Estimated Total Water Usage (ETWU) method. More details on the Modified ETWU can be found in Appendix B.3 in Section B.3.2.2.1 of the Model BMP Design Manual San Diego Region Appendices.

Harvest and use BMPs are sized to drain the cistern in 36 hours following the end of a rainfall event. The size of the BMP tank or cistern is dependent on the calculated water demand and the systems are designed to capture at least 80% of the average annual (long term) runoff volume. Pre-treatment BMPs are typically included in harvest and use BMP design to maintain the functionality of the cisterns.

It is recommended that the Proposed Project include rainwater cisterns as an optional BMP that could be installed by the home builder or individual home owner on a case by case basis for irrigation demands.

Drainage/Site Design

Drainages and swales are designed to County of San Diego standards and aren't directly applicable to residential water conservation, other than to collect, clean, and return runoff to natural drainages. Site Low Impact Development (LID) measures which will promote water conservation are included in the design including draining rooftops and impervious areas to landscaped areas and landscaping with native or drought tolerant species.

WATER CONSERVATION ESTIMATED SAVINGS

The estimated water savings for water conservation measures are based on the estimates provided previously in this Plan. The potential water savings varies widely based on land use types. Multi-family residential units, for example, have much less opportunity to implement additional water saving measures than low density single family residential units.

It is recommended that the Proposed Project incorporate a number of non-mandatory water conservation measures in mixed use attached residential and single-family residential units. Tables 8 and 9 summarize the total estimated water savings for the Proposed Project based on these recommended measures. Based on 213 residential units (>8 DU/ac) and 906 single family units (<8 du/ac) within the Proposed Project at buildout (assuming no school

developed), implementation of the measures in Tables 8 and 9 would result in estimated average water savings of 47,444 gallons per day for the residential portion of the project. These savings represent approximately 5.9 percent of the total project water use and will help lower per capita water use within the OWD.

In addition to the water savings above, water savings from graywater systems and rain water harvesting systems are also anticipated. It is not possible to quantify the savings from these other measures at this level of planning since it is unknown how many of the residential units on the project will implement these measures. Some general findings on the potential water savings associated with these measures are provided below.

The amount of water savings with a graywater system depends on a number of factors including soil type, quantity and types of landscaped areas, homeowners operation and maintenance of the system, and type of graywater system. The potential water savings for graywater systems are up to 100 gpd per household, but most landscape systems are not operated at 100 percent efficiency. A more typical range of actual water savings for a graywater system is 25 to 50 gpd per home.

The amount of water savings associated with rain water harvesting also depends on a number of factors including catchment area, storage capacity, annual rainfall, and the seasonality of rainfall. A 1,500 square foot roof will collect 934 gallons of water during a 1-inch rain event. Based on average rainfall in this area, the resulting potential water capture for re-use would be approximately 10,000 gallons per year. The actual amount of re-use could be substantially lower than this, however, due to the seasonality of rain in the area. On an annual average basis, the typical actual savings would likely be 10 to 15 gpd per household.

TABLE 8
RESIDENTIAL (>8 DU) PROPOSED
WATER CONSERVATION MEASURES

Measure	Location	Yearly Water Savings, gpy/unit	Daily Water Savings, gpd/unit	Percentage of Total Usage[1]	Project Total Water Savings[2], gpd
Hot Water Pipe Insulation	Indoor	2,400	6.58	1.5	1,402
Pressure Reducing Valves	Indoor	1,800	4.93	1.1	1,050
Water Efficient Dishwashers	Indoor	650	1.78	0.4	379
TOTAL		**4,850**	**13.29**	**3.1**	**2,831**

[1]Based on 435 gpd/unit average usage.
[2]Based on 213 Residential (>8 DU/ac), including units allocated for the school site.

TABLE 9
SINGLE-FAMILY RESIDENTIAL
WATER CONSERVATION MEASURES

Measure	Location	Yearly Water Savings, gpy/unit	Daily Water Savings, gpd/unit	Percentage of Total Usage[1]	Project Total Water Savings[2], gpd
SF Residential (3 – 8 DU/ac)					
Hot Water Pipe Insulation	Indoor	2,400	6.58	1.5	533
Pressure Reducing Valves	Indoor	1,800	4.93	1.1	399
Water Efficient Dishwashers	Indoor	650	1.78	0.4	144
Residential Landscaping	Outdoor	9,125	21.75	5.0	1,762
Subtotal		**12,790**	**35.04**	**8.1**	**2,838**
SF Residential (1 – 3 DU/ac)					
Hot Water Pipe Insulation	Indoor	2,400	6.58	0.9	4,580
Pressure Reducing Valves	Indoor	1,800	4.93	0.7	3,431
Water Efficient Dishwashers	Indoor	650	1.78	0.3	1,239
Residential Landscaping	Outdoor	12,775	35.00	5.0	24,360
Subtotal		**17,625**	**48.29**	**6.9**	**33,610**
SF Residential (<1 DU/ac)					
Hot Water Pipe Insulation	Indoor	2,400	6.58	1.3	849
Pressure Reducing Valves	Indoor	1,800	4.93	1.0	636
Water Efficient Dishwashers	Indoor	650	1.78	0.4	230
Residential Landscaping	Outdoor	18,250	50.00	5.0	6,450
Subtotal		**23,100**	**63.29**	**6.3**	**8,165**
TOTAL					**44,613**

[1]Based on 435 gpd/unit for 3-8 DU/Ac, 700 gpd/unit for 1-3 DU/Ac, and 1,000 gpd/unit for <1 DU/Ac

[2]Based on 81 SF Units (3-8 DU/Ac), 696 SF Units (1-3 DU/Ac), and 129 SF Units (<1 DU/Ac).

WATER CONSERVATION IMPLEMENTATION

The Proposed Project is a primarily residential community with approximately 90 percent of the total projected water use being utilized in residential neighborhoods. As a result, the focus of this Water Conservation Plan is on residential water conservation measures. The Proposed Project will, however, achieve water conservation in common landscaped areas by complying with the County's Water Conservation in Landscaping Ordinance and taking other steps as detailed further below.

Landscaped areas within the Proposed Project must comply with Development Regulations, the County's Water Conservation in Landscaping Ordinance, the Fire Protection Plan, and the Preserve Edge Plan, as applicable. Areas that will be subject to County approval at the implementation stage of the project include residential front yard and side yard setback areas, parks, parkway landscaping, HOA maintained irrigated open space areas, the public safety site, and mixed use commercial site.

The HOA will enforce state and county landscape regulations for individual residential landscapes as it relates to the efficient use of water. State law and the County Water Conservation in Landscaping Ordinance requires that prior to issuance of a building permit, any property with 500 square feet of landscape area will need to submit a landscape plan to establish a water budget in setting a maximum applied water allowance as an upper limit for water use and reduce water use to the lowest practical amount. The County has created a streamlined approach to builders applying for building permits for tract homes within a residential subdivision for landscaped areas between 500-2500 sq. ft. The developer shall prepare a Water Use Exhibit for all residential lots within the subdivision using the Prescriptive Compliance Option (PCO) requirements to establish water budgets for each lot. Developer is required to sign the Exhibit acknowledging that they will provide each homeowner with a copy of the water budget and the restrictions upon their landscaping based on the PCO. The Project's HOA will be responsible for verifying that water budgets proposed by an individual homeowner match with what the County approved water budget for their individual lot. If the homeowner chooses to exceed their approved water budget, they will be required to submit plans to the County in order to modify their water budget. Adherence to the PCO requirements will ensure the use of drought tolerant species, however, the Project's HOA, enforced through the CC&Rs and implemented through the HOA's Architectural and Landscape Committee, would be responsible for enforcing the approved documents associated with Village 14 and Planning Areas 16/19, as well as the County Water Conservation in Landscaping Ordinance.

Development Regulations will require residential front yard landscaping to meet County requirements which includes high efficiency irrigation equipment, low water use plants, and limiting natural turf to no more than 30 percent of the outdoor open space. (This standard shall apply unless water conservation technologies, strategies, and/or regulations change from time to time). The Master Homeowners Association, through the Landscape and Architectural Committee, will be responsible to review and approve landscape plans on private lots, including water conservation.

An Approved Plant List for the Proposed Project, including areas adjacent to the MSCP Preserve is provided in the Village 14 Design Plan and Planning Areas 16/19 Design Guidelines. The water conservation approach for these areas includes implementation of drought tolerant landscaping, hydrozones, and efficient and temporary irrigation systems, pursuant to the Fire ProtectionPlan requirements.

All areas of the Proposed Project, including common areas of commercial sites, parks, median islands, buffer areas,[SN1] interior HOA maintained slopes, etc. will comply with the Water Conservation in Landscaping Ordinance and must comply with the Approved Plant List (refer to Village 14 Design Plan, Attachment A, Approved Plant List and Planning Areas 16/19 Design Guidelines, Attachment A, Approved Plant List).

For all of the residential front yard landscaping installed by individual homebuilders and common areas landscaping installed by the Master Developer or individual homebuilders described above, either the County or the homeowners association will ensure all required water conservation measures are implemented by reviewing the landscape improvement plans and residential development regulations. This review and approval will ensure that all applicable requirements for water conservation measures in landscape systems are being implemented throughout the Proposed Project.

REFERENCES

The following documents were used or relied on as references in preparing this report and are incorporated by this reference:

1. Bahman Sheikh, Water Use Efficiency, Strategies for Proposed Residential Developments, September 2001.

2. County of San Diego Water Conservation in Landscaping Ordinance, 2016.

3. San Diego County Water Authority, *2015 Urban Water Management Plan*.

4. Metropolitan Water District of Southern California. *The Regional Urban Water Management Plan for the Metropolitan Water District of Southern California,* 2015.

5. Otay Water District, 2015 Water Resources Master Plan.

6. Otay Water District 2015 Urban Water Management Plan

7. County of San Diego/ City of Chula Vista. *Otay Ranch General Development Plan/ Sub regional Plan (GDP/SRP),* adopted October 1993.

8. Dexter Wilson Engineering, Overview of Water Service for Otay Ranch Village 14 and Planning Areas 16/19, February 2018.

9. 2016 California Green Building Standards Code, effective January 2017.