Tree Tag #	To be Removed Per Current Site Plan	Author Recommends Removal Due to Very Poor Condition or Elevated Risk of Failure	Project Team Desires to Transplant	Trunk 1 (in.)	Trunk 2 (in.)	Trunk 3 (in.)	Trunk 4 (in.)	Trunk 5 (in.)	Trunk 6 (in.)	Adjusted Trunk Diameter Inches @ 54" A.G. (1+2+3)^2+4+5)	"Protected Tree" per City of Cupertino Ordinance (10.0" single stem, 20" multi, various specified native and non-native species)	Common Name	Scientific Name (*Genus, species*)	Height and Canopy Spread (ft.)	Health & Structural Ratings (0-100% each)	Overall Condition Rating (0-100%)	Live Twig Density (Very Poor, Poor, Mod, Good, Exc.)	Lopsided Canopy (Direction Noted)	Trunk Lean (Direction Noted)	Historical Stem Splitout Evidence (Note Elevation)	Topped or Severely Pruned in Past	Buried Root Crown (BRC) or Girdling Roots (GR)	Stem Decay (Note Elevation)	Codominant Mainstems with Severe Bark Inclusion(s) (Note Height)	Root Extension Restricted in Planter	Soil Moisture Deficit ("Drought Stress")	WLCA Notes from Spring 2015 Survey	Updated Overall Condition Ratings 12/2017 and 01/2018
766				18.5						18.5		Shamel ash	*Fraxinus uhdei*	50/30	40/40	40% poor	poor	E	E			GR				X		
767				18.8						18.8		Shamel ash	*Fraxinus uhdei*	60/30	35/45	40% poor	poor	E	E							X		
768		X		14.5						14.5		Shamel ash	*Fraxinus uhdei*	55/30	20/20	20% very poor	very poor	E	E							X	Roots damaged on grade.	
769				23.8						23.8		Shamel ash	*Fraxinus uhdei*	65/35	55/35	40% poor	moderate	E	E			serious girdling root		15		X		
770				16.3						16.3		Shamel ash	*Fraxinus uhdei*	55/25	30/30	30% poor	poor	E						10		X		
771				16.1						16.1		Shamel ash	*Fraxinus uhdei*	55/30	60/45	55% fair	moderate	E								X		
772				33.6						33.6		coast redwood	*Sequoia sempervirens*	75/20	70/70	70% good	moderate									X		75% overall condition "good".
773				16.4						16.4		coast redwood	*Sequoia sempervirens*	60/13	60/60	60% fair	moderate									X		50% overall condition "fair"
774				18.5						18.5		coast redwood	*Sequoia sempervirens*	60/15	75/60	67% fair	moderate									X		60% overall condition "fair"
775				10.7						10.7		coast redwood	*Sequoia sempervirens*	30/6	60/50	55% fair	moderate									X		40% overall condition "poor"
776				34.2						34.2		coast redwood	*Sequoia sempervirens*	75/25	70/70	70% good	moderate									X		75% overall condition "good".
777		X		7.8						7.8		coast redwood	*Sequoia sempervirens*	25/6	55/35	40% poor	moderate	W	W							X		20% overall condition "very poor"
778				28.8						28.8		coast redwood	*Sequoia sempervirens*	75/25	70/70	70% good	moderate									X		75% overall condition "good".

Tree Tag #	To be Removed Per Current Site Plan	Author Recommends Removal Due to Very Poor Condition or Elevated Risk of Failure	Project Team Desires to Transplant	Trunk 1 (in.)	Trunk 2 (in.)	Trunk 3 (in.)	Trunk 4 (in.)	Trunk 5 (in.)	Trunk 6 (in.)	Adjusted Trunk Diameter Inches @ 54" A.G. (1+2+3+4+5)	"Protected Tree" per City of Cupertino Ordinance (10.0" single stem, 20" multi, various specified native and non-native species)	Common Name	Scientific Name (*Genus, species*)	Height and Canopy Spread (ft.)	Health & Structural Ratings (0-100% each)	Overall Condition Rating (0-100%)	Live Twig Density (Very Poor, Poor, Mod, Good, Exc.)	Lopsided Canopy (Direction Noted)	Trunk Lean (Direction Noted)	Historical Stem Splitout Evidence (Note Elevation)	Topped or Severely Pruned in Past	Buried Root Crown (BRC) or Girdling Roots (GR)	Stem Decay (Note Elevation)	Codominant Mainstems with Severe Bark Inclusion(s) (Note Height)	Root Extension Restricted in Planter	Soil Moisture Deficit ("Drought Stress")	WLCA Notes from Spring 2015 Survey	Updated Overall Condition Ratings 12/2017 and 01/2018
779				16.8						16.8		coast redwood	*Sequoia sempervirens*	50/13	65/55	60% fair	moderate									X		75% overall condition "good".
780		X		7.0						7.0		coast redwood	*Sequoia sempervirens*	35/6	55/35	45% poor	moderate									X		28% overall condition "very poor"
781				21.6						21.6		coast redwood	*Sequoia sempervirens*	65/15	60/40	47% poor	moderate							15		X		30% overall condition "poor".
782				32.1						32.1		coast redwood	*Sequoia sempervirens*	35/20	70/70	70% good	moderate									X		75% overall condition "good".
783				26.0						26.0		coast redwood	*Sequoia sempervirens*	85/20	70/70	70% good	moderate									X		70% overall condition "good.
784				16.1						16.1		coast redwood	*Sequoia sempervirens*	75/15	70/65	70% good	moderate									X		50% overall condition "fair"
785				21.9						21.9		coast redwood	*Sequoia sempervirens*	75/15	70/70	70% good	moderate									X		60% overall condition "fair"
786		X		13.0						13.0		coast redwood	*Sequoia sempervirens*	50/8	50/35	40% poor	poor	W								X		25% overall condition "very poor".
787		X		17.8						17.8		coast redwood	*Sequoia sempervirens*	65/10	60/35	40% poor	poor	W								X		25% overall condition "very poor".
788				20.1						20.1		coast redwood	*Sequoia sempervirens*	90/15	60/60	60% fair	poor to mod									X		50% overall condition "fair"
789				23.4						23.4		coast redwood	*Sequoia sempervirens*	80/15	75/70	73% good	moderate		E							X		70% overall condition "good.
790				19.5						19.5		coast redwood	*Sequoia sempervirens*	80/18	75/75	75% good	moderate									X		60% overall condition "fair"
791				17.1	15.1					32.2		coast redwood	*Sequoia sempervirens*	70/20	70/60	65% fair								2		X		65% overall condition "fair".

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792				28.2						28.2		coast redwood	*Sequoia sempervirens*	90/20	70/70	70% good	moderate									X		70% overall condition "good.
793				21.9						21.9		coast redwood	*Sequoia sempervirens*	70/15	65/60	62% fair	moderate									X		58% overall condition "fair".
794		X		22.0						22.0		coast redwood	*Sequoia sempervirens*	50/15	60/40	47% poor	moderate						0 to 2			X	Apical stem splitout	27% overall condition "very poor".
795				24.0						24.0		coast redwood	*Sequoia sempervirens*	85/20	70/70	70% good	moderate									X		70% overall condition "good.
796				45.5						45.5		coast redwood	*Sequoia sempervirens*	90/30	75/75	75% good	good									X		78% overall condition "good".
797				14.8						14.8		coast redwood	*Sequoia sempervirens*	50/8	50/40	47% poor	moderate									X	Supressed in shade	35% overall condition "poor".
798				12.6						12.6		coast redwood	*Sequoia sempervirens*	60/12	60/40	48% poor	poor		E					20		X		25% overall condition "very poor".
799				22.6						22.6		coast redwood	*Sequoia sempervirens*	80/13	70/70	70% good	moderate									X		65% overall condition "fair".
800				21.8						21.8		coast redwood	*Sequoia sempervirens*	65/13	65/65	65% fair	moderate									X		65% overall condition "fair".
801				17.3						17.3		coast redwood	*Sequoia sempervirens*	55/9	50/50	50% fair	poor	W	W							X		30% overall condition "poor".
802				32.5						32.5		coast redwood	*Sequoia sempervirens*	90/25	50/50	50% fair	poor									X	Difficult to assess visually.	50% overall condition "fair"
803				15.0						15.0		coast redwood	*Sequoia sempervirens*	60/9	30/30	30% poor	poor									X		30% overall condition "poor".
804		X		32.4						32.4		coast redwood	*Sequoia sempervirens*	90/18	60/60	60% fair	poor to mod									X		20% overall condition "very poor"

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805				13.0						13.0		coast redwood	*Sequoia sempervirens*	50/5	40/40	40% poor	poor										X	S-trunk form	30% overall condition "poor".
806				16.8						16.8		coast redwood	*Sequoia sempervirens*	50/10	60/55	58% fair	moderate										X		40% overall condition "poor"
807		X		12.1						12.1		coast redwood	*Sequoia sempervirens*	60/12	50/55	53% fair	poor to mod										X		0% (Dead)
808		X		24.5						24.5		coast redwood	*Sequoia sempervirens*	90/20	40/30	33% poor	poor								55		X		5% overall condition (very poor)
809		X		11.0						11.0		coast redwood	*Sequoia sempervirens*	55/15	60/50	55% fair	poor to mod										X		37% overall condition (poor)
810		X		15.0						15.0		coast redwood	*Sequoia sempervirens*	75/8	10/10	10% very poor	very poor										X		0% (Dead)
811		X		5.6						5.6		coast redwood	*Sequoia sempervirens*	30/6	40/30	35% poor	poor										X		25% overall condition "very poor".
812		X		23.2						23.2		coast redwood	*Sequoia sempervirens*	80/20	0/0	0% dead	dead										X	S - trunk form.	0% (Dead)
813		X		13.3						13.3		coast redwood	*Sequoia sempervirens*	70/16	10/10	10% very poor	very poor										X		7% overall condition (very poor)
814		X		24.4						24.4		coast redwood	*Sequoia sempervirens*	85/20	0/0	0% dead	dead										X		0% (Dead)
815		X		9.0						9.0		coast redwood	*Sequoia sempervirens*	40/5	0/0	0% dead	dead										X		0% (Dead)
816		X		16.5						16.5		coast redwood	*Sequoia sempervirens*	80/12	50/50	50% fair	poor										X		20% overall condition "very poor".
817		X		11.9						11.9		coast redwood	*Sequoia sempervirens*	35/6	50/40	43% poor	poor										X		15% overall condition "very poor".

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818				25.4						25.4		coast redwood	*Sequoia sempervirens*	80/18	60/60	60% fair	moderate									X		60% overall condition "fair"
819				12.4						12.4		coast redwood	*Sequoia sempervirens*	55/13	50/40	45% poor	poor									X		30% overall condition "poor".
820				26.3						26.3		coast redwood	*Sequoia sempervirens*	90/25	55/60	58% fair	poor to mod									X		70% overall condition "good.
821		X		4.6						4.6		coast redwood	*Sequoia sempervirens*	30/3	0/0	0% dead	dead									X		12% overall condition "very poor".
822				23.4						23.4		coast redwood	*Sequoia sempervirens*	90/20	50/50	50% fair	poor							18		X		55% overall condition "fair"
823				17.9						17.9		coast redwood	*Sequoia sempervirens*	100/15	50/35	40% poor	poor							70		X		40% overall condition "poor"
824				29.3						29.3		coast redwood	*Sequoia sempervirens*	100/20	40/40	40% poor	poor to mod							25		X		75% overall condition "good".
825		X		7.8						7.8		coast redwood	*Sequoia sempervirens*	30/8	40/20	29% very poor	poor									X		18% overall condition "very poor"
826				11.1						11.1		coast redwood	*Sequoia sempervirens*	35/12	60/50	50% fair	poor to mod	E								X	Bow form trunk.	40% overall condition "poor"
827		X		10.7						10.7		coast redwood	*Sequoia sempervirens*	35/10	0/0	0% dead	dead									X	Bow form trunk.	0% (Dead)
828				11.7						11.7		coast redwood	*Sequoia sempervirens*	50/8	30/30	30% poor	poor							20		X		30% overall condition "poor".
829				27.2						27.2		coast redwood	*Sequoia sempervirens*	95/25	70/70	70% good	moderate									X		70% overall condition "good.
830				15.2						15.2		coast redwood	*Sequoia sempervirens*	40/16	45/30	37% poor	poor to mod							20		X		35% overall condition "poor".

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831				11.0						11.0		coast redwood	*Sequoia sempervirens*	40/8	30/40	37% poor	poor		SW							X		30% overall condition "poor".
832				13.0						13.0		coast redwood	*Sequoia sempervirens*	45/11	60/55	59% fair	moderate									X		30% overall condition "poor".
833				26.6						26.6		coast redwood	*Sequoia sempervirens*	70/30	70/65	69% fair	moderate							30		X		78% overall condition "good".
834		X		5.8						5.8		coast redwood	*Sequoia sempervirens*	30/5	20/20	20% very poor	very poor		SE							X		6% overall condition "very poor".
835				15.8	11.0					26.8		coast redwood	*Sequoia sempervirens*	85/18	60/50	55% fair	poor to mod							2		X		45% overall condition "poor".
836		X		9.8						9.8		coast redwood	*Sequoia sempervirens*	30/12	25/25	25% very poor	very poor		S							X		0% (Dead)
837				15.2						15.2		coast redwood	*Sequoia sempervirens*	45/10	50/40	45% poor	poor to mod	W	NW							X		30% overall condition "poor".
838				23.9						23.9		coast redwood	*Sequoia sempervirens*	85/20	45/45	45% poor	poor									X		60% overall condition "fair"
839				26.1						26.1		coast redwood	*Sequoia sempervirens*	90/25	60/60	60% fair	moderate									X		70% overall condition "good.
840		X		10.8	9.0					19.8		coast redwood	*Sequoia sempervirens*	60/8	35/35	35% poor	poor							20		X		20% overall condition "very poor".
841				21.2						21.2		coast redwood	*Sequoia sempervirens*	80/13	60/50	53% fair	poor to mod									X	Sweep form trunk. Apical meristem appears gone.	35% overall condition "poor".
842				27.2	8.5					35.7		coast redwood	*Sequoia sempervirens*	90/15	70/70	70% good	moderate									X		75% overall condition "good".
843	X	X		10.8						10.8		coast redwood	*Sequoia sempervirens*	55/4	10/10	10% very poor	very poor							15		X		40% overall condition "poor"

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844				16.4						16.4		coast redwood	*Sequoia sempervirens*	80/20	60/40	50% fair	poor to mod									X		75% overall condition "good".
845				28.2						28.2		coast redwood	*Sequoia sempervirens*	90/25	70/70	70% good	moderate									X		30% overall condition "poor".
846		X		14.7						14.7		coast redwood	*Sequoia sempervirens*	45/6	50/45	48% poor	poor to mod									X		25% overall condition "very poor".
847				11.5	9.5					21.0		coast redwood	*Sequoia sempervirens*	45/10	50/50	50% fair	poor to mod									X		35% overall condition "poor".
848				23.9						23.9		coast redwood	*Sequoia sempervirens*	90/20	50/50	50% fair	poor to mod									X		35% overall condition "poor".
849				20.5						20.5		coast redwood	*Sequoia sempervirens*	80/18	60/50	55% fair	poor to mod									X		55% overall condition "fair"
850				18.3						18.3		coast redwood	*Sequoia sempervirens*	80/15	55/50	54% fair	poor to mod		E							X		55% overall condition "fair"
851				24.5						24.5		coast redwood	*Sequoia sempervirens*	95/25	65/50	60% fair	moderate									X	Sweep form trunk.	30% overall condition "poor".
852		X		12.5	6.9					19.4		coast redwood	*Sequoia sempervirens*	55/18	60/50	50% fair	poor to mod							1		X		20% overall condition "very poor"
853		X		11.8	7.8					19.6		coast redwood	*Sequoia sempervirens*	35/18	15/15	15% very poor	very poor							2		X		15% overall condition "very poor".
854		X		18.5						18.5		coast redwood	*Sequoia sempervirens*	70/18	40/35	38% poor	poor							30		X		15% overall condition "very poor".
855		X		15.1						15.1		coast redwood	*Sequoia sempervirens*	70/18	55/50	53% fair	poor to mod									X		25% overall condition "very poor".
856		X		10.1						10.1		coast redwood	*Sequoia sempervirens*	45/9	40/35	40% poor	poor									X		25% overall condition "very poor".

Tree Tag #	To be Removed Per Current Site Plan	Author Recommends Removal Due to Very Poor Condition or Elevated Risk of Failure	Project Team Desires to Transplant	Trunk 1 (in.)	Trunk 2 (in.)	Trunk 3 (in.)	Trunk 4 (in.)	Trunk 5 (in.)	Trunk 6 (in.)	Adjusted Trunk Diameter Inches @ 54" A.G. (1+2+39+4+5)	"Protected Tree" per City of Cupertino Ordinance (10.0" single stem, 20" multi, various specified native and non-native species)	Common Name	Scientific Name (*Genus, species*)	Height and Canopy Spread (ft.)	Health & Structural Ratings (0-100% each)	Overall Condition Rating (0-100%)	Live Twig Density (Very Poor, Poor, Mod, Good, Exc.)	Lopsided Canopy (Direction Noted)	Trunk Lean (Direction Noted)	Historical Stem Splitout Evidence (Note Elevation)	Topped or Severely Pruned in Past	Buried Root Crown (BRC) or Girdling Roots (GR)	Stem Decay (Note Elevation)	Codominant Mainstems with Severe Bark Inclusion(s) (Note Height)	Root Extension Restricted in Planter	Soil Moisture Deficit ("Drought Stress")	WLCA Notes from Spring 2015 Survey	Updated Overall Condition Ratings 12/2017 and 01/2018
857				21.1						21.1		coast redwood	*Sequoia sempervirens*	85/25	55/50	50% fair	poor to mod										X		50% overall condition "fair"
858				19.5						19.5		coast redwood	*Sequoia sempervirens*	85/20	60/50	55% fair	moderate										X		55% overall condition "fair"
859				9.8						9.8		coast redwood	*Sequoia sempervirens*	50/10	40/35	38% poor	poor										X	Supressed in shade	45% overall condition "poor".
860				22.2						22.2		coast redwood	*Sequoia sempervirens*	85/20	60/60	60% fair	moderate										X		55% overall condition "fair"
861	X			25.0						25.0		coast redwood	*Sequoia sempervirens*	90/30	60/60	60% fair	moderate										X		65% overall condition "fair".
862				20.6						20.6		coast redwood	*Sequoia sempervirens*	80/25	60/60	60% fair	moderate										X		70% overall condition "good.
863				31.5						31.5		coast redwood	*Sequoia sempervirens*	90/20	75/75	75% good	good										X		78% overall condition "good".
864				23.8						23.8		coast redwood	*Sequoia sempervirens*	95/15	70/65	68% fair	moderate										X		50% overall condition "fair"
865	X			24.0						24.0		coast redwood	*Sequoia sempervirens*	90/15	60/40	47% poor	moderate	W									X	8-trunk form. Abnormal trunk cross section that is cankered.	50% overall condition "fair"
866	X			31.0	13.3					44.3		coast redwood	*Sequoia sempervirens*	95/28	60/50	55% fair	moderate	W							3		X		45% overall condition "poor".
867		X		6.5						6.5		coast redwood	*Sequoia sempervirens*	30/6	65/45	55% fair	moderate										X	Supressed in shade	25% overall condition "very poor".
868				16.3						16.3		coast redwood	*Sequoia sempervirens*	50/18	70/70	70% good	moderate										X		60% overall condition "fair"
869				16.0						16.0		coast redwood	*Sequoia sempervirens*	75/15	70/60	68% fair	moderate										X		40% overall condition "poor"

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870				27.6						27.6		coast redwood	*Sequoia sempervirens*	85/20	75/75	75% good	good									X		70% overall condition "good.
871				25.8						25.8		coast redwood	*Sequoia sempervirens*	95/25	75/75	75% good	good									X		70% overall condition "good.
872				23.7	15.6					39.3		coast redwood	*Sequoia sempervirens*	50/20	65/55	60% fair	moderate	E						2				
873		X		13.9						13.9		coast redwood	*Sequoia sempervirens*	65/12	25/25	25% very poor	poor											
874				10.5						10.5		coast redwood	*Sequoia sempervirens*	30/9	35/30	30% poor	poor											
875				14.1						14.1		coast redwood	*Sequoia sempervirens*	45/10	40/40	40% poor	poor											
876	Alt. Lot "West"	(START OF "ALTERNATE LOT WEST" SURVEY)		31.0						31.0		coast redwood	*Sequoia sempervirens*	75/18	70/70	70% good	moderate											
877	Alt. Lot "West"			23.7						23.7		coast redwood	*Sequoia sempervirens*	65/18	65/60	63% fair	poor to mod									X		
878	Alt. Lot "West"			19.2						19.2		coast redwood	*Sequoia sempervirens*	75/15	65/60	63% fair	poor to mod									X		
879	Alt. Lot "West"			22.8						22.8		coast redwood	*Sequoia sempervirens*	75/18	65/65	65% fair	moderate									X		
880	Alt. Lot "West"			20.5						20.5		coast redwood	*Sequoia sempervirens*	75/18	65/55	60% fair	moderate									X		
881	Alt. Lot "West"			20.8	11.9					32.7		coast redwood	*Sequoia sempervirens*	75/18	60/50	58% fair	moderate							3		X		
882	Alt. Lot "West"			33.3						33.3		coast redwood	*Sequoia sempervirens*	65/20	60/60	60% fair	moderate									X		

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883	Alt. Lot "West"			11.4						11.4		coast redwood	*Sequoia sempervirens*	30/8	30/35	33% poor	poor									X		
884	Alt. Lot "West"			31.5						31.5		coast redwood	*Sequoia sempervirens*	90/18	60/60	60% fair	poor to mod	W								X		
885	Alt. Lot "West"			32.1						32.1		coast redwood	*Sequoia sempervirens*	95/25	75/75	75% good	moderate									X		
886	Alt. Lot "West"			9.8						9.8		coast redwood	*Sequoia sempervirens*	45/6	30/30	30% poor	poor									X		
887	Alt. Lot "West"			25.5						25.5		coast redwood	*Sequoia sempervirens*	75/18	65/65	65% fair	poor to mod									X		
888	Alt. Lot "West"			29.0						29.0		coast redwood	*Sequoia sempervirens*	85/25	60/55	59% fair	poor to mod									X		
889	Alt. Lot "West"	?		15.3						15.3		coast redwood	*Sequoia sempervirens*	45/9	25/25	25% very poor	poor									X		
890	Alt. Lot "West"	X		16.9						16.9		coast redwood	*Sequoia sempervirens*	50/12	0/0	0% dead										X		
891	Alt. Lot "West"	X		29.5						29.5		coast redwood	*Sequoia sempervirens*	65/25	0/0	0% dead										X		
892	Alt. Lot "West"	X		8.6						8.6		coast redwood	*Sequoia sempervirens*	30/6	0/0	0% dead										X		
893	Alt. Lot "West"			26.4						26.4		coast redwood	*Sequoia sempervirens*	75/20	70/70	70% good	moderate									X		
894	Alt. Lot "West"			18.3						18.3		coast redwood	*Sequoia sempervirens*	65/12	40/30	35% poor	moderate									X	*Botryspheria* fungal infection noted as canker progression along trunk. Monitor progression over time.	
895	Alt. Lot "West"			29.4						29.4		Italian stone pine	*Pinus pinea*	45/30	85/75	79% good	good	E	E									

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896	Alt. Lot "West"			26.2						26.2		Italian stone pine	*Pinus pinea*	45/25	80/30	50% fair	good	E	E						18				
897	Alt. Lot "West"			9.6						9.6		coast redwood	*Sequoia sempervirens*	25/12	65/60	64% fair	moderate										X		
898	Alt. Lot "West"			17.8						17.8		coast redwood	*Sequoia sempervirens*	45/15	60/60	60% fair	poor to mod										X		
899	Alt. Lot "West"			11.4						11.4		coast redwood	*Sequoia sempervirens*	45/15	60/40	50% fair	moderate										X	Sweep-form trunk.	
900	Alt. Lot "West"			19.7						19.7		coast redwood	*Sequoia sempervirens*	60/16	35/35	35% poor	poor										X		
901	Alt. Lot "West"			4.1						4.1		coast redwood	*Sequoia sempervirens*	30/6	35/35	35% poor	moderate										X		
902	Alt. Lot "West"			9.5						9.5		coast redwood	*Sequoia sempervirens*	35/12	65/45	50% fair	moderate										X	Mainstem splitout.	
903	Alt. Lot "West"			14.7						14.7		coast redwood	*Sequoia sempervirens*	45/15	65/65	65% fair	moderate										X		
904	Alt. Lot "West"			12.9						12.9		coast redwood	*Sequoia sempervirens*	65/15	70/70	70% good	moderate										X		
905	Alt. Lot "West"			14.7						14.7		coast redwood	*Sequoia sempervirens*	55/20	65/70	68% fair	moderate										X		
906	Alt. Lot "West"			19.3						19.3		coast redwood	*Sequoia sempervirens*	70/20	70/70	70% good	moderate										X		
907	Alt. Lot "West"			16.0						16.0		coast redwood	*Sequoia sempervirens*	60/12	60/45	50% fair	poor	E									X		
908	Alt. Lot "West"			6.4						6.4		coast redwood	*Sequoia sempervirens*	25/10	70/40	50% fair	moderate	E									X		

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909	Alt. Lot "West"			27.0						27.0		coast redwood	*Sequoia sempervirens*	75/20	50/50	50% fair	poor									X		
910	Alt. Lot "West"			22.9						22.9		coast redwood	*Sequoia sempervirens*	75/18	65/65	65% fair	poor to mod									X		
911	Alt. Lot "West"			20.4						20.4		coast redwood	*Sequoia sempervirens*	75/20	70/70	70% good	moderate									X		
912	Alt. Lot "West"			25.5						25.5		coast redwood	*Sequoia sempervirens*	75/18	60/50	55% fair	poor to mod									X	S-form trunk.	
913	Alt. Lot "West"			20.2						20.2		coast redwood	*Sequoia sempervirens*	7/18	70/70	70% good	moderate									X		
914	Alt. Lot "West"			23.5						23.5		coast redwood	*Sequoia sempervirens*	70/18	50/60	54% fair	poor									X		
915	Alt. Lot "West"			14.8						14.8		coast redwood	*Sequoia sempervirens*	75/16	55/55	55% fair	poor									X		
916	Alt. Lot "West"			16.2	10.0					26.2		coast redwood	*Sequoia sempervirens*	55/16	75/70	70% good	moderate									X		
917	Alt. Lot "West"			14.5						14.5		coast redwood	*Sequoia sempervirens*	45/10	40/40	40% poor	poor									X		
918	Alt. Lot "West"			28.9						28.9		coast redwood	*Sequoia sempervirens*	80/15	40/40	40% poor	poor									X		
919	Alt. Lot "West"	X		17.2						17.2		coast redwood	*Sequoia sempervirens*	50/4	0/0	0% dead										X		
920	Alt. Lot "West"			24.4						24.4		coast redwood	*Sequoia sempervirens*	80/12	70/70	70% good	moderate	N								X		
921	Alt. Lot "West"			21.5						21.5		Italian stone pine	*Pinus pinea*	45/20	85/45	55% fair	good	E	E									

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922	Alt. Lot "West"			17.8						17.8		Italian stone pine	*Pinus pinea*	45/18	70/35	40% poor	good	E	E									
923	Alt. Lot "West"	X		12.2	9.1					21.3		coast redwood	*Sequoia sempervirens*	50/4	0/0	0% dead											X	
924	Alt. Lot "West"			12.1						12.1		coast redwood	*Sequoia sempervirens*	70/10	60/50	55% fair	moderate	N									X	
925	Alt. Lot "West"			20.8						20.8		coast redwood	*Sequoia sempervirens*	65/14	65/65	65% fair	moderate										X	
926	Alt. Lot "West"			7.5						7.5		coast redwood	*Sequoia sempervirens*	35/6	60/40	50% fair	moderate	S									X	
927	Alt. Lot "West"			11.2						11.2		coast redwood	*Sequoia sempervirens*	45/8	50/40	47% poor	poor to mod	S									X	
928	Alt. Lot "West"			18.7						18.7		coast redwood	*Sequoia sempervirens*	60/10	70/65	68% fair	moderate	S									X	
929	Alt. Lot "West"			25.4						25.4		coast redwood	*Sequoia sempervirens*	75/20	70/70	70% good	moderate										X	
930	Alt. Lot "West"			19.9						19.9		coast redwood	*Sequoia sempervirens*	75/18	70/70	70% good	moderate	E									X	
931	Alt. Lot "West"			15.2						15.2		coast redwood	*Sequoia sempervirens*	65/18	60/60	60% fair	poor to mod	E									X	
932	Alt. Lot "West"	X		14.2						14.2		coast redwood	*Sequoia sempervirens*	55/8	5/5	5% very poor	very poor										X	
933	Alt. Lot "West"	X		8.5						8.5		coast redwood	*Sequoia sempervirens*	30/5	0/0	0% dead											X	
934	Alt. Lot "West"			23.5						23.5		Monterey pine	*Pinus radiata*	55/25	60/45	50% fair	moderate	SW	SW								X	

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935	Alt. Lot "West"	X		13.2						13.2		coast redwood	*Sequoia sempervirens*	45/7	5/5	5% very poor	very poor		E								X		
936	Alt. Lot "West"			29.2						29.2		coast redwood	*Sequoia sempervirens*	70/20	70/70	70% good	moderate										X		
937	Alt. Lot "West"	X		6.0						6.0		coast redwood	*Sequoia sempervirens*	30/5	0/0	0% dead											X		
938	Alt. Lot "West"	X		15.3						15.3		coast redwood	*Sequoia sempervirens*	60/10	20/20	20% very poor	very poor										X		
939	Alt. Lot "West"			4.3						4.3		Shamel ash	*Fraxinus uhdei*	25/9	85/85	85% good	good										X		
940	Alt. Lot "West"			20.1						20.1		coast redwood	*Sequoia sempervirens*	65/12	40/50	45% poor	poor										X		
941	Alt. Lot "West"			20.0						20.0		coast redwood	*Sequoia sempervirens*	75/15	70/70	70% good	moderate										X		
942	Alt. Lot "West"	X		5.0						5.0		coast redwood	*Sequoia sempervirens*	65/13	0/0	0% dead											X		
943	Alt. Lot "West"			22.6						22.6		coast redwood	*Sequoia sempervirens*	65/15	60/50	55% fair	poor to mod										X		
944	Alt. Lot "West"			17.1						17.1		coast redwood	*Sequoia sempervirens*	60/13	70/70	70% good	moderate										X		
945	Alt. Lot "West"			19.4						19.4		coast redwood	*Sequoia sempervirens*	65/15	70/65	68% fair	moderate										X	Sweep-form trunk.	
946	Alt. Lot "West"			17.0						17.0		coast redwood	*Sequoia sempervirens*	65/12	30/30	30% poor	poor										X		
947	Alt. Lot "West"			7.8						7.8		coast redwood	*Sequoia sempervirens*	30/5	30/30	30% poor	poor										X		

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948	Alt. Lot "West"			23.0						23.0		Monterey pine	*Pinus radiata*	15/2	0/0	0% dead (STUMP)										X		
949	Alt. Lot "West"	X		12.2						12.2		coast redwood	*Sequoia sempervirens*	50/5	0/0	0% dead										X		
950	Alt. Lot "West"			16.6						16.6		coast redwood	*Sequoia sempervirens*	60/18	75/75	75% good	moderate									X		
951	Alt. Lot "West"			24.5						24.5		Italian stone pine	*Pinus pinea*	15/2	0/0	0% dead										X		
952	Alt. Lot "West"			19.5						19.5		Italian stone pine	*Pinus pinea*	30/20	60/30	40% poor	good	E	E								Severe lean.	
953	Alt. Lot "West"			22.7						22.7		coast redwood	*Sequoia sempervirens*	50/15	50/45	47% poor	poor to mod									X		
954	Alt. Lot "West"	X		8.7						8.7		coast redwood	*Sequoia sempervirens*	25/5	5/5	5% very poor	very poor									X		
955	Alt. Lot "West"	?		17.7						17.7		coast redwood	*Sequoia sempervirens*	40/18	25/25	25% very poor	very poor									X		
956	Alt. Lot "West"			25.9						25.9		coast redwood	*Sequoia sempervirens*	65/20	50/50	50% fair	poor to mod									X		
957	Alt. Lot "West"			14.0	13.8					27.8		coast redwood	*Sequoia sempervirens*	55/13	30/30	30% poor	poor							2		X		
958	Alt. Lot "West"	?		6.4						6.4		coast redwood	*Sequoia sempervirens*	40/4	5/5	5% very poor	very poor									X		
959	Alt. Lot "West"			21.4						21.4		coast redwood	*Sequoia sempervirens*	65/18	45/45	45% poor	poor									X		
960	Alt. Lot "West"			5.5						5.5		Shamel ash	*Fraxinus uhdei*	25/10	85/60	65% fair	good	S	S							X		

Tree Tag #	To be Removed Per Current Site Plan	Author Recommends Removal Due to Very Poor Condition or Elevated Risk of Failure	Project Team Desires to Transplant	Trunk 1 (in.)	Trunk 2 (in.)	Trunk 3 (in.)	Trunk 4 (in.)	Trunk 5 (in.)	Trunk 6 (in.)	Adjusted Trunk Diameter Inches @ 54" A.G. (1+2+3+4+5)	"Protected Tree" per City of Cupertino Ordinance (10.0" single stem, 20" multi, various specified native and non-native species)	Common Name	Scientific Name (*Genus, species*)	Height and Canopy Spread (ft.)	Health & Structural Ratings (0-100% each)	Overall Condition Rating (0-100%)	Live Twig Density (Very Poor, Poor, Mod, Good, Exc.)	Lopsided Canopy (Direction Noted)	Trunk Lean (Direction Noted)	Historical Stem Splitout Evidence (Note Elevation)	Topped or Severely Pruned in Past	Buried Root Crown (BRC) or Girdling Roots (GR)	Stem Decay (Note Elevation)	Codominant Mainstems with Severe Bark Inclusion(s) (Note Height)	Root Extension Restricted in Planter	Soil Moisture Deficit ("Drought Stress")	WLCA Notes from Spring 2015 Survey	Updated Overall Condition Ratings 12/2017 and 01/2018
961	Alt. Lot "West"			21.5						21.5		coast redwood	*Sequoia sempervirens*	60/18	30/30	30% poor											X		
962	Alt. Lot "West"			14.3						14.3		coast redwood	*Sequoia sempervirens*	35/14	30/30	30% poor											X		
963	Alt. Lot "West"			4.0						4.0		California pepper tree	*Schinus molle*	17/7	75/75	75% good	good												
964	Alt. Lot "West"	X		17.9						17.9		coast redwood	*Sequoia sempervirens*	40/6	0/0	0% dead											X		
965	Alt. Lot "West"			16.5						16.5		coast redwood	*Sequoia sempervirens*	55/15	30/30	30% poor											X		
966	Alt. Lot "West"	?		18.8						18.8		coast redwood	*Sequoia sempervirens*	50/5	25/25	25% very poor	poor										X		
967	Alt. Lot "West"			6.8	3.7					10.5		Shamel ash	*Fraxinus uhdei*	35/14	85/70	75% good	good										X		
968	Alt. Lot "West"	?		15.1						15.1		coast redwood	*Sequoia sempervirens*	35/4	0/0	0% dead											X		
969	Alt. Lot "West"			5.6						5.6		Shamel ash	*Fraxinus uhdei*	35/12	75/75	75% good	good										X		
970	Alt. Lot "West"	?		9.2						9.2		coast redwood	*Sequoia sempervirens*	40/8	5/5	5% very poor	very poor										X		
971	Alt. Lot "West"	?		7.7						7.7		coast redwood	*Sequoia sempervirens*	55/18	20/20	20% very poor	very poor										X		
972	Alt. Lot "West"			22.2						22.2		coast redwood	*Sequoia sempervirens*	65/20	65/65	65% fair	moderate										X		
973	Alt. Lot "West"			18.5						18.5		coast redwood	*Sequoia sempervirens*	65/20	40/40	40% poor	poor										X	Apical meristem has been split out.	

Tree Tag #	To be Removed Per Current Site Plan	Author Recommends Removal Due to Very Poor Condition or Elevated Risk of Failure	Project Team Desires to Transplant	Trunk 1 (in.)	Trunk 2 (in.)	Trunk 3 (in.)	Trunk 4 (in.)	Trunk 5 (in.)	Trunk 6 (in.)	Adjusted Trunk Diameter Inches @ 54" A.G. (1+2+3+4+5)	"Protected Tree" per City of Cupertino Ordinance (10.0" single stem, 20" multi, various specified native and non-native species)	Common Name	Scientific Name (*Genus, species*)	Height and Canopy Spread (ft.)	Health & Structural Ratings (0-100% each)	Overall Condition Rating (0-100%)	Live Twig Density (Very Poor, Poor, Mod, Good, Exc.)	Lopsided Canopy (Direction Noted)	Trunk Lean (Direction Noted)	Historical Stem Splitout Evidence (Note Elevation)	Topped or Severely Pruned in Past	Buried Root Crown (BRC) or Girdling Roots (GR)	Stem Decay (Note Elevation)	Codominant Mainstems with Severe Bark Inclusion(s) (Note Height)	Root Extension Restricted in Planter	Soil Moisture Deficit (*Drought Stress*)	WLCA Notes from Spring 2015 Survey	Updated Overall Condition Ratings 12/2017 and 01/2018
974	Alt. Lot "West"			19.4						19.4		coast redwood	*Sequoia sempervirens*	65/20	75/75	75% good	moderate									X		
975	Alt. Lot "West"			23.2						23.2		coast redwood	*Sequoia sempervirens*	65/16	65/65	65% fair	moderate	N								X		
976	Alt. Lot "West"			10.6						10.6		coast redwood	*Sequoia sempervirens*	55/12	70/65	68% fair	moderate									X		
977	Alt. Lot "West"			10.3						10.3		coast redwood	*Sequoia sempervirens*	55/12	65/65	65% fair	moderate									X		
978	Alt. Lot "West"			28.6						28.6		coast redwood	*Sequoia sempervirens*	70/15	70/70	70% good	moderate									X		
979	Alt. Lot "West"			23.8						23.8		coast redwood	*Sequoia sempervirens*	80/18	60/60	60% fair	poor to mod									X		
980	Alt. Lot "West"			20.5						20.5		coast redwood	*Sequoia sempervirens*	70/18	60/60	60% fair	poor to mod									X		
981	Alt. Lot "West"			20.9						20.9		coast redwood	*Sequoia sempervirens*	80/18	75/75	75% good	moderate									X		
982	Alt. Lot "West"			20.0						20.0		coast redwood	*Sequoia sempervirens*	70/15	45/40	43% poor	poor									X		
983	Alt. Lot "West"			16.2						16.2		coast redwood	*Sequoia sempervirens*	80/15	60/60	60% fair	poor to mod									X		
984	Alt. Lot "West"			23.0						23.0		coast redwood	*Sequoia sempervirens*	70/18	65/65	65% fair	moderate		NW							X	Sweep-form trunk.	
985	Alt. Lot "West"			28.8						28.8		coast redwood	*Sequoia sempervirens*	70/18	45/45	45% poor	poor									X		
986	Alt. Lot "West"			22.0	16.7					38.7		coast redwood	*Sequoia sempervirens*	70/18	45/45	45% poor	poor									X		

Tree Tag #	To be Removed Per Current Site Plan	Author Recommends Removal Due to Very Poor Condition or Elevated Risk of Failure	Project Team Desires to Transplant	Trunk 1 (in.)	Trunk 2 (in.)	Trunk 3 (in.)	Trunk 4 (in.)	Trunk 5 (in.)	Trunk 6 (in.)	Adjusted Trunk Diameter Inches @ 54" A.G. (1+2+39+4+5)	"Protected Tree" per City of Cupertino Ordinance (10.0" single stem, 20" multi, various specified native and non-native species)	Common Name	Scientific Name (*Genus, species*)	Height and Canopy Spread (ft.)	Health & Structural Ratings (0-100% each)	Overall Condition Rating (0-100%)	Live Twig Density (Very Poor, Poor, Mod, Good, Exc.)	Lopsided Canopy (Direction Noted)	Trunk Lean (Direction Noted)	Historical Stem Splitout Evidence (Note Elevation)	Topped or Severely Pruned in Past	Buried Root Crown (BRC) or Girdling Roots (GR)	Stem Decay (Note Elevation)	Codominant Mainstems with Severe Bark Inclusion(s) (Note Height)	Root Extension Restricted in Planter	Soil Moisture Deficit ("Drought Stress")	WLCA Notes from Spring 2015 Survey	Updated Overall Condition Ratings 12/2017 and 01/2018
987	Alt. Lot "West"			19.2						19.2		coast redwood	*Sequoia sempervirens*	55/12	60/50	55% fair	poor to mod										X		
988	Alt. Lot "West"			26.7						26.7		coast redwood	*Sequoia sempervirens*	70/15	45/45	45% poor	poor										X		
989	Alt. Lot "West"			10.2						10.2		coast redwood	*Sequoia sempervirens*	35/12	60/50	55% fair	moderate										X		
990	Alt. Lot "West"			27.3						27.3		coast redwood	*Sequoia sempervirens*	80/16	60/60	60% fair	poor to mod										X		
991	Alt. Lot "West"			25.0						25.0		coast redwood	*Sequoia sempervirens*	80/17	45/45	45% poor	poor										X		
992	Alt. Lot "West"			29.5						29.5		coast redwood	*Sequoia sempervirens*	80/18	45/50	48% poor	poor to mod										X		
993	Alt. Lot "West"			20.7						20.7		coast redwood	*Sequoia sempervirens*	75/12	30/30	30% poor	poor										X		
994	Alt. Lot "West"			33.3						33.3		coast redwood	*Sequoia sempervirens*	60/18	45/55	50% fair	poor to mod										X		
995	Alt. Lot "West"			16.1						16.1		coast redwood	*Sequoia sempervirens*	60/12	35/35	35% poor	poor										X	S-trunk form.	
996	Alt. Lot "West"			16.8						16.8		coast redwood	*Sequoia sempervirens*	65/16	55/55	55% fair	poor to mod										X		
997	Alt. Lot "West"			17.9						17.9		coast redwood	*Sequoia sempervirens*	65/14	60/60	60% fair	moderate								45		X		
998	Alt. Lot "West"			21.1						21.1		coast redwood	*Sequoia sempervirens*	65/15	65/65	65% fair	moderate										X	S-trunk form.	
999	Alt. Lot "West"			23.3						23.3		coast redwood	*Sequoia sempervirens*	65/18	60/60	60% fair	poor to mod										X		

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1000	Alt. Lot "West"			12.0						12.0		coast redwood	*Sequoia sempervirens*	60/16	65/65	65% fair	moderate									X		
1001	Alt. Lot "West"			12.7						12.7		coast redwood	*Sequoia sempervirens*	50/13	55/50	54% fair	poor to mod									X		
1002	Alt. Lot "West"			16.8						16.8		coast redwood	*Sequoia sempervirens*	60/15	45/50	48% poor	poor									X		
1003	Alt. Lot "West"			12.4	12.0	11.5				35.9		coast redwood	*Sequoia sempervirens*	65/15	65/60	65% fair	moderate									X		
1004	Alt. Lot "West"			20.7						20.7		coast redwood	*Sequoia sempervirens*	70/16	40/40	40% poor	poor								15		X		
1005	Alt. Lot "West"			13.0						13.0		coast redwood	*Sequoia sempervirens*	35/14	50/45	48% poor	moderate									X		
1006	Alt. Lot "West"			26.7						26.7		coast redwood	*Sequoia sempervirens*	75/18	30/30	30% poor	poor									X		
1007	Alt. Lot "West"			16.8						16.8		coast redwood	*Sequoia sempervirens*	65/18	30/30	30% poor	poor									X		
1008	Alt. Lot "West"			18.9						18.9		coast redwood	*Sequoia sempervirens*	70/18	60/60	60% fair	poor to mod									X		
1009	Alt. Lot "West"	?		16.6						16.6		coast redwood	*Sequoia sempervirens*	55/18	10/10	10% very poor	very poor									X	Apical meristem is gone.	
1010	Alt. Lot "West"	?		17.7						17.7		coast redwood	*Sequoia sempervirens*	65/15	15/15	15% very poor	very poor									X		
1011	Alt. Lot "West"	?		13.8						13.8		coast redwood	*Sequoia sempervirens*	65/15	25/25	25% very poor	very poor									X	Chain around trunk is girdling the tree, and must be removed ASAP in order to avoid the tree being	
1012	Alt. Lot "West"			21.7						21.7		coast redwood	*Sequoia sempervirens*	70/18	60/60	60% fair	poor to mod									X		
1013	Alt. Lot "West"			26.4						26.4		coast redwood	*Sequoia sempervirens*	75/18	30/30	30% poor	poor									X		
1014	Alt. Lot "West"	?		15.1						15.1		coast redwood	*Sequoia sempervirens*	70/13	20/20	20% very poor	very poor									X		
1015	Alt. Lot "West"	?		18.4						18.4		coast redwood	*Sequoia sempervirens*	65/14	25/25	25% very poor	very poor									X		
1016	Alt. Lot "West"			16.6						16.6		coast redwood	*Sequoia sempervirens*	70/16	40/35	38% poor	poor									X	Apical meristem deflected off from vertical.	

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1017	Alt. Lot "West"	?		13.1						13.1		coast redwood	*Sequoia sempervirens*	55/13	30/20	25% very poor	very poor										X		
1018	Alt. Lot "West"			16.9						16.9		coast redwood	*Sequoia sempervirens*	55/16	30/20	25% very poor	poor										X		
1019	Alt. Lot "West"			26.5						26.5		coast redwood	*Sequoia sempervirens*	75/18	65/75	70% good	moderate										X		
1020	Alt. Lot "West"	?		6.8						6.8		coast redwood	*Sequoia sempervirens*	20/4	30/20	25% very poor	poor										X		
1021	Alt. Lot "West"			9.7						9.7		coast redwood	*Sequoia sempervirens*	35/12	75/55	65% fair	moderate										X		
1022	Alt. Lot "West"			21.0						21.0		coast redwood	*Sequoia sempervirens*	55/13	35/40	38% poor	poor										X		
1023	Alt. Lot "West"			24.9						24.9		coast redwood	*Sequoia sempervirens*	75/20	55/65	60% fair	poor to mod										X		
1024	Alt. Lot "West"			17.7						17.7		coast redwood	*Sequoia sempervirens*	60/14	60/65	65% fair	moderate										X		
1025	Alt. Lot "West"			8.8						8.8		coast redwood	*Sequoia sempervirens*	35/10	60/45	53% fair	moderate										X		
1026	Alt. Lot "West"			16.5						16.5		coast redwood	*Sequoia sempervirens*	40/10	60/60	60% fair	moderate										X		
1027	Alt. Lot "West"			20.6						20.6		coast redwood	*Sequoia sempervirens*	65/14	70/70	70% good	moderate										X		
1028	Alt. Lot "West"			18.8						18.8		coast redwood	*Sequoia sempervirens*	60/14	55/45	50% fair	poor to mod										X		
1029	Alt. Lot "West"	?		16.4						16.4		coast redwood	*Sequoia sempervirens*	60/10	20/20	20% very poor	very poor										X	Apical stem is dead.	
1030	Alt. Lot "West"	?		17.5						17.5		coast redwood	*Sequoia sempervirens*	65/10	5/5	5% very poor	very poor										X		
1031	Alt. Lot "West"	?		21.0						21.0		coast redwood	*Sequoia sempervirens*	65/10	5/5	5% very poor	very poor										X		
1032	Alt. Lot "West"			29.7						29.7		coast redwood	*Sequoia sempervirens*	70/18	55/40	47% poor	poor to mod								40		X		
1033	Alt. Lot "West"			16.5						16.5		coast redwood	*Sequoia sempervirens*	55/13	65/65	65% fair	moderate										X		

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1034	Alt. Lot "West"			24.8						24.8		coast redwood	*Sequoia sempervirens*	70/15	70/70	70% good	moderate									X		
1035	Alt. Lot "West"			17.0						17.0		coast redwood	*Sequoia sempervirens*	75/14	70/35	50% fair	moderate							9		X		
1036	Alt. Lot "West"			30.4						30.4		coast redwood	*Sequoia sempervirens*	85/25	75/75	75% good	good									X		
1037	Alt. Lot "West"			23.3						23.3		coast redwood	*Sequoia sempervirens*	80/15	70/60	66% fair	moderate									X		
1038	Alt. Lot "West"			22.0						22.0		coast redwood	*Sequoia sempervirens*	70/15	60/50	55% fair	poor to mod									X	Apical stem missing (blown out).	
1039	Alt. Lot "West"			25.9						25.9		coast redwood	*Sequoia sempervirens*	90/20	70/70	70% good	moderate									X		
1040	Alt. Lot "West"			45.4						45.4		coast redwood	*Sequoia sempervirens*	80/20	70/67	70% good	moderate		S							X		
1041	Alt. Lot "West"			29.1						29.1		coast redwood	*Sequoia sempervirens*	80/15	70/70	70% good	moderate									X		
1042	Alt. Lot "West"			17.5						17.5		coast redwood	*Sequoia sempervirens*	80/10	70/60	65% fair	moderate									X		
1043	Alt. Lot "West"			36.5						36.5		coast redwood	*Sequoia sempervirens*	85/18	75/70	73% good	good									X		
1044	Alt. Lot "West"	?		11.5						11.5		coast redwood	*Sequoia sempervirens*	60/7	20/20	20% very poor	very poor									X		
1045	Alt. Lot "West"			33.7						33.7		coast redwood	*Sequoia sempervirens*	90/13	70/60	63% fair	moderate	E								X		
1046	Alt. Lot "West"			27.8						27.8		coast redwood	*Sequoia sempervirens*	90/12	65/50	57% fair	moderate	E						70		X		
1047	Alt. Lot "West"			21.0						21.0		coast redwood	*Sequoia sempervirens*	80/12	70/60	68% fair	moderate	E								X		
1048	Alt. Lot "West"			17.2						17.2		coast redwood	*Sequoia sempervirens*	60/12	70/60	67% fair	moderate	E								X		
1049	Alt. Lot "West"			43.9						43.9		coast redwood	*Sequoia sempervirens*	90/18	70/70	70% good	good	E								X		
1050	Alt. Lot "West"			26.8						26.8		coast redwood	*Sequoia sempervirens*	80/12	70/60	68% fair	good	W								X		

Tree Tag #	To be Removed Per Current Site Plan	Author Recommends Removal Due to Very Poor Condition or Elevated Risk of Failure	Project Team Desires to Transplant	Trunk 1 (in.)	Trunk 2 (in.)	Trunk 3 (in.)	Trunk 4 (in.)	Trunk 5 (in.)	Trunk 6 (in.)	Adjusted Trunk Diameter Inches @ 54" A.G. (1+2+3)^2+4^2)	"Protected Tree" per City of Cupertino Ordinance (10.0" single stem, 20" multi, various specified native and non-native species)	Common Name	Scientific Name (*Genus, species*)	Height and Canopy Spread (ft.)	Health & Structural Ratings (0-100% each)	Overall Condition Rating (0-100%)	Live Twig Density (Very Poor, Poor, Mod, Good, Exc.)	Lopsided Canopy (Direction Noted)	Trunk Lean (Direction Noted)	Historical Stem Splitout Evidence (Note Elevation)	Topped or Severely Pruned in Past	Buried Root Crown (BRC) or Girdling Roots (GR)	Stem Decay (Note Elevation)	Codominant Mainstems with Severe Bark Inclusion(s) (Note Height)	Root Extension Restricted in Planter	Soil Moisture Deficit (*Drought Stress*)	WLCA Notes from Spring 2015 Survey	Updated Overall Condition Ratings 12/2017 and 01/2018
1051	Alt. Lot "West"			27.4						27.4		coast redwood	*Sequoia sempervirens*	90/12	70/80	70% good	good	W									X		
1052	Alt. Lot "West"			23.6						23.6		coast redwood	*Sequoia sempervirens*	80/12	70/80	64% fair	good	W									X		
1053	Alt. Lot "West"			23.2						23.2		coast redwood	*Sequoia sempervirens*	80/12	70/50	64% fair	good	S									X	Located on steep slope. Possible stability issues?	
1054	Alt. Lot "West"			24.6						24.6		coast redwood	*Sequoia sempervirens*	80/10	70/50	65% fair	good	S									X	Located on steep slope. Possible stability issues?	
1055	Alt. Lot "West"			27.8						27.8		coast redwood	*Sequoia sempervirens*	80/13	70/50	67% fair	good	S									X	Located on steep slope. Possible stability issues?	
1056	Alt. Lot "West"			25.9						25.9		coast redwood	*Sequoia sempervirens*	80/12	55/60	57% fair	poor to mod										X		
1057	Alt. Lot "West"			27.0						27.0		coast redwood	*Sequoia sempervirens*	75/15	70/70	70% good	good										X		
1058	Alt. Lot "West"			28.7						28.7		coast redwood	*Sequoia sempervirens*	75/18	70/70	70% good	good										X	S-trunk at 4-feet elevation.	
1059	Alt. Lot "West"			29.3	22.0					51.3		coast redwood	*Sequoia sempervirens*	80/18	70/60	68% fair	moderate to good								2		X		
1060	Alt. Lot "West"	X		7.6						7.6		white alder	*Alnus rhombifolia*	18/7	30/10	20% very poor	poor					X		lower trunk			X		
1061	Alt. Lot "West"			19.6						19.6		coast redwood	*Sequoia sempervirens*	60/12	70/55	63% fair	good	W									X	S-trunk form between zero and 15 feet.	
1062	Alt. Lot "West"			9.9						9.9		coast redwood	*Sequoia sempervirens*	45/9	70/65	70% good	good	S									X		
1063	Alt. Lot "West"			19.4						19.4		coast redwood	*Sequoia sempervirens*	60/12	70/65	68% fair	moderate to good										X		
1064	Alt. Lot "West"			12.2						12.2		Shamel ash	*Fraxinus uhdei*	35/30	50/50	50% fair	poor to mod	W									X		
1065	Alt. Lot "West"			12.0						12.0		Shamel ash	*Fraxinus uhdei*	35/25	60/60	67% fair	good	SW	SW								X		
1066	Alt. Lot "West"			32.2						32.2		Italian stone pine	*Pinus pinea*	30/40	75/45	58% fair	good	S							4			Requires endweight reduction pruning. Note trunk measured at narrow point below standard height.	
1067	Alt. Lot "West"			25.7						25.7		Italian stone pine	*Pinus pinea*	25/35	65/40	52% fair	moderate	S	S						6			Requires endweight reduction pruning. Note trunk measured at narrow point below standard height.	

Tree Tag #	To be Removed Per Current Site Plan	Author Recommends Removal Due to Very Poor Condition or Elevated Risk of Failure	Project Team Desires to Transplant	Trunk 1 (in.)	Trunk 2 (in.)	Trunk 3 (in.)	Trunk 4 (in.)	Trunk 5 (in.)	Trunk 6 (in.)	Adjusted Trunk Diameter Inches @ 54" A.G. (1+2+3)^2+4^2)	"Protected Tree" per City of Cupertino Ordinance (10.0" single stem, 20" multi, various specified native and non-native species)	Common Name	Scientific Name (*Genus, species*)	Height and Canopy Spread (ft.)	Health & Structural Ratings (0-100% each)	Overall Condition Rating (0-100%)	Live Twig Density (Very Poor, Poor, Mod, Good, Exc.)	Lopsided Canopy (Direction Noted)	Trunk Lean (Direction Noted)	Historical Stem Splitout Evidence (Note Elevation)	Topped or Severely Pruned in Past	Buried Root Crown (BRC) or Girdling Roots (GR)	Stem Decay (Note Elevation)	Codominant Mainstems with Severe Bark Inclusion(s) (Note Height)	Root Extension Restricted in Planter	Soil Moisture Deficit (*Drought Stress*)	WLCA Notes from Spring 2015 Survey	Updated Overall Condition Ratings 12/2017 and 01/2018
1068	Alt. Lot "West"			24.6						24.6		Italian stone pine	*Pinus pinea*	30/35	75/80	66% fair	good			12							Requires endweight reduction pruning. Note trunk measured at narrow point below standard height.	
1069	Alt. Lot "West"			24.2						24.2		Italian stone pine	*Pinus pinea*	30/35	75/80	68% fair	good	N		18							Requires endweight reduction pruning. Note trunk measured at narrow point below standard height.	
1070	Alt. Lot "West"	X		15.4						15.4		Monterey pine	*Pinus radiata*	20/20	30/20	25% very poor	poor	S						1			X		
1071	Alt. Lot "West"			9.0						9.0		honey locust	*Gleditsia triacanthos*	25/18	35/40	37% poor	poor										X		
1072	Alt. Lot "West"			8.3						8.3		honey locust	*Gleditsia triacanthos*	25/15	40/25	33% poor	poor	W									X		
1073	Alt. Lot "West"			8.9						8.9		honey locust	*Gleditsia triacanthos*	25/20	40/40	40% poor	poor										X		
1074	Alt. Lot "West"			8.2						8.2		honey locust	*Gleditsia triacanthos*	25/20	40/40	40% poor	poor										X		
1075	Alt. Lot "West"	X		7.6						7.6		evergreen pear	*Pyrus kawakamii*	16/13	25/25	25% very poor	very poor	W									X	Fireblight infection	
1076	Alt. Lot "West"	X		8.8						8.8		evergreen pear	*Pyrus kawakamii*	20/20	25/25	25% very poor	very poor		S								X	Fireblight infection	
1077	Alt. Lot "West"			12.9						12.9		evergreen pear	*Pyrus kawakamii*	30/30	30/40	35% poor	moderate										X	Fireblight infection	
1078	Alt. Lot "West"			9.2						9.2		honey locust	*Gleditsia triacanthos*	22/25	65/60	63% fair	moderate										X		
1079	Alt. Lot "West"			6.7						6.7		honey locust	*Gleditsia triacanthos*	18/15	65/55	60% fair	moderate										X		
1080	Alt. Lot "West"			8.5						8.5		honey locust	*Gleditsia triacanthos*	25/20	65/60	63% fair	moderate										X		
1081	Alt. Lot "West"			19.8						19.8		Italian stone pine	*Pinus pinea*	30/40	80/70	75% good	good		E									Will need endweight reduction pruning if retained.	
1082	Alt. Lot "West"			32.8						32.8		Italian stone pine	*Pinus pinea*	35/30	80/60	67% fair	good	S							15			Will need endweight reduction pruning if retained. Note: measured at 2 feet elevation.	
1083	Alt. Lot "West"			22.1						22.1		Italian stone pine	*Pinus pinea*	30/30	80/65	69% fair	good	N	N									Will need endweight reduction pruning if retained.	
1084	Alt. Lot "West"			23.9						23.9		Italian stone pine	*Pinus pinea*	25/25	75/45	55% fair	good	S							4			Note: measured at 3 feet elevation.	

Tree Tag #	To be Removed Per Current Site Plan	Author Recommends Removal Due to Very Poor Condition or Elevated Risk of Failure	Project Team Desires to Transplant	Trunk 1 (in.)	Trunk 2 (in.)	Trunk 3 (in.)	Trunk 4 (in.)	Trunk 5 (in.)	Trunk 6 (in.)	Adjusted Trunk Diameter Inches @ 54" A.G. (1+2+3)^2+4^2)	"Protected Tree" per City of Cupertino Ordinance (10.0" single stem, 20" multi, various specified native and non-native species)	Common Name	Scientific Name (*Genus, species*)	Height and Canopy Spread (ft.)	Health & Structural Ratings (0-100% each)	Overall Condition Rating (0-100%)	Live Twig Density (Very Poor, Poor, Mod, Good, Exc.)	Lopsided Canopy (Direction Noted)	Trunk Lean (Direction Noted)	Historical Stem Splitout Evidence (Note Elevation)	Topped or Severely Pruned in Past	Buried Root Crown (BRC) or Girdling Roots (GR)	Stem Decay (Note Elevation)	Codominant Mainstems with Severe Bark Inclusion(s) (Note Height)	Root Extension Restricted in Planter	Soil Moisture Deficit ("Drought Stress")	WLCA Notes from Spring 2015 Survey	Updated Overall Condition Ratings 12/2017 and 01/2018
1085	Alt. Lot "West"			18.4						18.4		Italian stone pine	*Pinus pinea*	28/30	80/50	65% fair	good	S							4			Note: measured at 3 feet elevation.	
1086	Alt. Lot "West"			17.6						17.6		Italian stone pine	*Pinus pinea*	30/25	80/85	75% good	good											8-trunk form.	
1087	Alt. Lot "West"			4.4						4.4		(dead standing tree)	*(dead standing tree)*	13/4	0/0	0% dead											X		
1088	Alt. Lot "West"			7.0	7.0	6.5				20.5		coast redwood	*Sequoia sempervirens*	25/10	80/80	80% good	good										X		
1089	Alt. Lot "West"			7.5						7.5		coast redwood	*Sequoia sempervirens*	25/10	80/80	80% good	good										X		
1090	Alt. Lot "West"			4.5						4.5		coast redwood	*Sequoia sempervirens*	18/8	80/80	80% good	good										X		
1091	Alt. Lot "West"			12.5						12.5		coast redwood	*Sequoia sempervirens*	30/10	70/70	70% good	good										X		
1092	Alt. Lot "West"			4.7	4.1					8.8		coast redwood	*Sequoia sempervirens*	20/13	80/80	80% good	good										X		
1093	Alt. Lot "West"			5.7	5.3					11.0		coast redwood	*Sequoia sempervirens*	25/12	80/80	80% good	good										X		
1094	Alt. Lot "West"			13.4						13.4		coast redwood	*Sequoia sempervirens*	30/11	70/60	66% fair	moderate										X		
1095	Alt. Lot "West"	X		42.0						42.0		Italian stone pine	*Pinus pinea*	25/30	80/0	20% very poor	good											Trunk diameter estimated. Tree has failed structurally, and is lying on the ground.	
1096	Alt. Lot "West"			31.8						31.8		Italian stone pine	*Pinus pinea*	25/25	80/55	64% fair	good	N	N									Trunk measured at 2 feet elevation.	
1097	Alt. Lot "West"	X		13.2						13.2		tulip tree	*Liriodendron tulipifera*	30/12	25/25	25% very poor	very poor										X		
1098	Alt. Lot "West"	?		12.6						12.6		tulip tree	*Liriodendron tulipifera*	25/10	40/30	30% poor	poor										X		
1099	Alt. Lot "West"			27.9						27.9		Italian stone pine	*Pinus pinea*	35/45	85/55	70% good	good	SW	SW	20								Needs endweight reduction pruning.	
1100	Alt. Lot "West"			26.0						26.0		Italian stone pine	*Pinus pinea*	20/35	0/0	0% dead												Trunk diameter estimated. Tree has failed structurally, and is lying on the ground as dead wood.	

Tree Tag #	To be Removed Per Current Site Plan	Author Recommends Removal Due to Very Poor Condition or Elevated Risk of Failure	Project Team Desires to Transplant	Trunk 1 (in.)	Trunk 2 (in.)	Trunk 3 (in.)	Trunk 4 (in.)	Trunk 5 (in.)	Trunk 6 (in.)	Adjusted Trunk Diameter Inches @ 54" A.G. (1+2+3+4+5)	"Protected Tree" per City of Cupertino Ordinance (10.0" single stem, 20" multi, various specified native and non-native species)	Common Name	Scientific Name (*Genus, species*)	Height and Canopy Spread (ft.)	Health & Structural Ratings (0-100% each)	Overall Condition Rating (0-100%)	Live Twig Density (Very Poor, Poor, Mod, Good, Exc.)	Lopsided Canopy (Direction Noted)	Trunk Lean (Direction Noted)	Historical Stem Splitout Evidence (Note Elevation)	Topped or Severely Pruned in Past	Buried Root Crown (BRC) or Girdling Roots (GR)	Stem Decay (Note Elevation)	Codominant Mainstems with Severe Bark Inclusion(s) (Note Height)	Root Extension Restricted in Planter	Soil Moisture Deficit ("Drought Stress")	WLCA Notes from Spring 2015 Survey	Updated Overall Condition Ratings 12/2017 and 01/2018
1101	Alt. Lot "West"	?		18.9						18.9		Italian stone pine	*Pinus pinea*	40/30	80/50	50% fair	good	NW	NW								Note: Italian stone pines appear to be failing in small diameter planter areas, due to their root development having been severely restricted in terms of lateral extension. The root	
1102	Alt. Lot "West"	?		38.3						38.3		Italian stone pine	*Pinus pinea*	40/28	80/47	50% fair	good	SW	SW								Same as 'notes' for tree #1101. Trunk diameter measured at 1 foot elevation.	
1103	Alt. Lot "West"	X		24.7						24.7		Italian stone pine	*Pinus pinea*	30/25	60/0	10% very poor	good	S	S								Same as 'notes' for tree #1101. Trunk diameter measured at 2 feet elevation.	
1104	Alt. Lot "West"	X		28.0						28.0		Italian stone pine	*Pinus pinea*	20/20	0/0	0% dead											Same as 'notes' for tree #1101. Trunk diameter measured at 2 feet elevation.	
1105	Alt. Lot "West"			5.0	4.5					9.5		river red gum	*Eucalytpus camaldulensis*	30/10	90/45	60% fair	good								1		X	Recommend remove one of two codominant mainstems at the fork at 1 foot elevation.	
1106				8.0						8.0		southern magnolia	*Magnolia grandiflora*	20/16	50/50	50% fair	poor to mod										X	Roots damaged on grade from mowing activities.	
1107				6.8						6.8		southern magnolia	*Magnolia grandiflora*	20/16	50/50	50% fair	poor to mod										X	Roots damaged on grade from mowing activities.	
1108				9.0						9.0		southern magnolia	*Magnolia grandiflora*	23/20	55/55	55% fair	poor to mod										X	Roots damaged on grade from mowing activities.	
1109	X			41.8						41.8		Shamel ash	*Fraxinus uhdei*	65/60	80/80	75% good	good		E								X	Roots damaged from recent curb replacement activities.	
1110	X			10.5						10.5		Shamel ash	*Fraxinus uhdei*	35/20	30/30	30% poor	poor	W			X	gr		6			X	Roots damaged from recent curb replacement activities.	
1111	X			14.7						14.7		Shamel ash	*Fraxinus uhdei*	40/20	30/30	30% poor	poor	E			X	gr		10			X	Roots damaged from recent curb replacement activities.	
1112	X			26.6						26.6		Shamel ash	*Fraxinus uhdei*	65/35	60/60	60% fair	moderate	SW				gr					X	Roots damaged from recent curb replacement activities.	
1113	X			33.5						33.5		Shamel ash	*Fraxinus uhdei*	70/70	65/55	60% fair	moderate			35		gr					X	High risk situation. Split "hanger" limb noted at 35 feet elevation on north side of canopy needs to be	
1114				19.2						19.2		Shamel ash	*Fraxinus uhdei*	35/35	85/85	75% good	good	S	S		X						X		
1115		(monitor the girdling root situation)		22.9						22.9		Shamel ash	*Fraxinus uhdei*	35/35	80/30	45% poor	good	E	E			serious girdling root					X	Roots damaged on grade. Note severe girdling root situation.	
1116				24.2						24.2		Shamel ash	*Fraxinus uhdei*	40/40	80/55	65% fair	good				X	gr					X	Roots damaged on grade from mowing activities.	

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1117				24.7						24.7		Shamel ash	*Fraxinus uhdei*	45/40	40/30	35% poor	poor		E				throughout canopy				Roots damaged on grade from mowing activities.	
1118				23.0						23.0		Shamel ash	*Fraxinus uhdei*	55/40	60/50	55% fair	moderate	W	W		X					X	Roots damaged on grade from mowing activities.	
1119		X		18.6						18.6		Shamel ash	*Fraxinus uhdei*	45/20	15/15	15% very poor	very poor				X	gr					Roots damaged on grade from mowing activities. Recommend remove tree due to very poor overall	
1120				26.7						26.7		Shamel ash	*Fraxinus uhdei*	50/40	75/65	70% good	good	N	E		X					X	Roots damaged on grade from mowing activities.	
1121				19.7						19.7		Shamel ash	*Fraxinus uhdei*	50/35	80/65	76% good	good	W	W		X					X	Roots damaged on grade from mowing activities.	
1122				21.4						21.4		Shamel ash	*Fraxinus uhdei*	60/35	40/40	40% poor	poor	W			X		0 to 2			X	Roots damaged on grade from mowing activities. Vehicle collision caused damage to trunk between zero and 2	
1123				18.5						18.5		Shamel ash	*Fraxinus uhdei*	55/30	65/55	58% fair	moderate	W			X	gr				X	Roots damaged on grade from mowing activities. Root plate upper surfaces are exposed.	
1124				15.5						15.5		Shamel ash	*Fraxinus uhdei*	30/18	40/30	35% poor	poor	W			X	gr				X	Roots damaged on grade from mowing activities. Root plate upper surfaces are exposed.	
1125				13.8						13.8		Shamel ash	*Fraxinus uhdei*	40/20	50/30	40% poor	moderate	W	S		X	serious girdling root				X	Roots damaged on grade from mowing. Note severe girdling root situation.	

Notes:

1. On-site survey trees include all existing specimens of tree species with at least one (1) mainstem measuring greater than or equal to 4 inches diameter at 4.5 feet above grade.

2. Trees were tagged with professional grade round-shaped aluminum tags numbering "1" through "999". For alternate lot west, and for N. Wolfe Road median trees, the tag run went over #999, which is the cutoff point for round tags. Tags numbering #1,000 and above are racetrack-shaped.

3. Heights of some trees were measured using a Nikon 550 Forestry Pro hypsometer. Diameters of all trees were measured at 4.5 feet or at a narrow point, using a forestry D-tape that converts circumference to an average diameter.

Protection and Maintenance Specifications:

RPZ: Root protection zone fence, chain link, with 2" diameter iron posts driven 24" into the ground, 6 to 8 feet on center max. spacing.
RB: Root buffer consisting of wood chip mulch lain over existing soil as a 12 inch thick layer, overlain with 1 inch or greater plywood strapped together with metal plates. This root buffer or soil buffer should be placed over the entire width of the construction corridor between tree trunks and construction.
RP: Root pruning. Prune woody roots measuring greater than or equal to 1 inch diameter by carefully back-digging into the soil around each root using small hand tools until an area is reached where the root is undamaged. Cleanly cut through the root at right angle to the root growth direction, using professional grade pruning equipment and/or a Sawzall with wood pruning blade. Backfill around the cut root immediately (same day), and thoroughly irrigate the area to saturate the uppermost 24 inches of the soil profile.
TB: Trunk buffer consists of 20-40 wraps of orange plastic snow fencing to create a 2 inch thick buffer over the lowest 8 feet of tree trunk (usually takes at least an entire roll of orange fencing). Lay 2X4 wood boards vertically, side by side, around the entire circumference of the trunk. Secure buffer using duct tape (not wires).
F: Fertilization with Greenbelt 22-14-14 tree formula.
M: 4-inch thick layer of wood chip mulch (Lyngso, self pickup). Do not use bark chips or shredded redwood bark.
W: Irrigate using various methods to be determined through discussion with General Contractor. Irrigation frequency and duration to be determined through discussion.
P: Pruning per specifications noted elsewhere. All pruning must be performed only under direct site supervision of an ISA Certified Arborist, or performed directly by an ISA Certified Arborist, and shall conform to all ANSI A300 standards.
MON: Project Arborist must be present to monitor specific work as noted in the notes box for each tree.

VALLCO
TOWN CENTER PROJECT

OWNER - VALLCO PROPERTY OWNER LLC.
965 PAGE MILL ROAD, PALO ALTO, CA 94304
T. 650-344-1500

ARCHITECTURE - RAFAEL VINOLY ARCHITECTS
50 VANDAM STREET, NEW YORK, NY 10013
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ARCHITECTURE - RAFAEL VINOLY ARCHITECTS
1033 N. WOLFE ROAD, CUPERTINO CA 95014
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LANDSCAPE ARCHITECTURE - OLIN PARTNERSHIP LTD.
150 S. INDEPENDENCE MALL W. SUITE 1123, PHILADELPHIA, PA 19106
T. 214-440-0030

CIVIL - SANDIS CIVIL ENGINEERS SURVEYORS PLANNERS, INC.
1700 S. WINCHESTER BLVD, SUITE 200, CAMPBELL, CA 95008
T. 408-636-0900

TRANSPORTATION ENGINEERING - ARUP NORTH AMERICA, LTD.
560 MISSION STREET SUITE 700 SAN FRANCISCO CA 94105
T. 415-957-9445

LEGEND

- EXISITNG TO REMAIN
- EXISITNG TO BE REMOVED
- EXISITNG TO BE RELOCATED

NOT FOR CONSTRUCTION

DISCLAIMER
THE ARCHITECT / ENGINEER SHALL HAVE NO RESPONSIBILITY FOR ANY LIABILITY, LOSS, COST, DAMAGE OR EXPENSE ARISING FROM OR RELATING TO ANY USE OF THIS DOCUMENT FOR ANY PURPOSE OTHER THAN ITS INTENDED PURPOSE ON THIS PROJECT. THIS DOCUMENT IS TO BE CONSIDERED IN CONJUNCTION WITH ALL RELATED DOCUMENTATION. ANY DISCREPANCIES IDENTIFIED IN THIS DOCUMENT MUST BE REPORTED IMMEDIATELY TO THE ARCHITECT BEFORE PROCEEDING. CONTRACTORS MUST VERIFY ALL DIMENSIONS PRIOR TO PROCEEDING WITH ANY WORK. ONLY FIGURED DIMENSIONS ARE TO BE USED FOR VERIFICATION.

DEVELOPMENT APPLICATION

REV	DESCRIPTION	DATE
REV-0	DEVELOPMENT APPLICATION	01/02/2018

KEY PLAN AND NORTH ARROW

ARCHITECTS PROJECT NUMBER 708011

PROJECT PHASE: DEVELOPMENT APPLICATION

IF THIS DRAWING IS NOT 36"x48" IT IS A REDUCED PRINT; REFER TO GRAPHIC SCALE

0 32' 64' 128' 192'

SCALE: 1/64"=1'-0"

TREE DISPOSITION PLAN - STREET LEVEL

SHEET TITLE:

P-0602

SHEET NUMBER:

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Fact Sheet ST-589
October 1994

Sequoia sempervirens Coast Redwood[1]

Edward F. Gilman and Dennis G. Watson[2]

INTRODUCTION

Sequoia sempervirens, the Coast Redwoods of California, are the tallest trees in the world (Fig. 1). They can vary greatly when grown from seed, but varieties are available now which have been vegetatively propagated and they retain true characteristics. Redwoods grow three to five feet per year and are remarkably pest-free. They live to be many hundreds of years old; some live to several thousand years. Bark is particularly beautiful, turning a bright orange on older trees. It may grow poorly in zones 9 and 10 in Florida.

GENERAL INFORMATION

Scientific name: *Sequoia sempervirens*
Pronunciation: see-KWOY-uh sem-per-VYE-renz
Common name(s): Coast Redwood
Family: *Taxodiaceae*
USDA hardiness zones: 7 through 10A (Fig. 2)
Origin: native to North America
Uses: screen; specimen; no proven urban tolerance
Availability: grown in small quantities by a small number of nurseries

DESCRIPTION

Height: 60 to 120 feet
Spread: 25 to 35 feet
Crown uniformity: symmetrical canopy with a regular (or smooth) outline, and individuals have more or less identical crown forms
Crown shape: pyramidal
Crown density: moderate

Figure 1. Mature Coast Redwood.

Growth rate: medium
Texture: fine

1. This document is adapted from Fact Sheet ST-589, a series of the Environmental Horticulture Department, Florida Cooperative Extension Service, Institute of Food and Agricultural Sciences, University of Florida. Publication date: October 1994.

2. Edward F. Gilman, associate professor, Environmental Horticulture Department; Dennis G. Watson, associate professor, Agricultural Engineering Department, Cooperative Extension Service, Institute of Food and Agricultural Sciences, University of Florida, Gainesville FL 32611.

Figure 2. Shaded area represents potential planting range.

Foliage

Leaf arrangement: alternate; spiral
Leaf type: simple
Leaf margin: entire
Leaf shape: needle-like (filiform)
Leaf venation: none, or difficult to see; parallel
Leaf type and persistence: evergreen; needle leaf evergreen
Leaf blade length: less than 2 inches
Leaf color: green
Fall color: no fall color change
Fall characteristic: not showy

Flower

Flower characteristics: inconspicuous and not showy

Fruit

Fruit shape: oval; round
Fruit length: .5 to 1 inch
Fruit covering: dry or hard
Fruit color: brown
Fruit characteristics: does not attract wildlife; inconspicuous and not showy; no significant litter problem

Trunk and Branches

Trunk/bark/branches: droop as the tree grows, and will require pruning for vehicular or pedestrian clearance beneath the canopy; should be grown with a single leader; very showy trunk; no thorns
Pruning requirement: needs little pruning to develop a strong structure
Breakage: resistant
Current year twig color: brown; green
Current year twig thickness: medium; thin
Wood specific gravity: 0.35

Culture

Light requirement: tree grows in part shade/part sun; tree grows in full sun
Soil tolerances: clay; loam; sand; slightly alkaline; acidic; occasionally wet; well-drained
Drought tolerance: moderate

Other

Roots: surface roots are usually not a problem
Winter interest: tree has winter interest due to unusual form, nice persistent fruits, showy winter trunk, or winter flowers
Outstanding tree: not particularly outstanding
Invasive potential: little, if any, potential at this time
Ozone sensitivity: tolerant
Verticillium wilt susceptibility: not known to be susceptible
Pest resistance: long-term health usually not affected by pests

USE AND MANAGEMENT

Redwood maintains a pyramidal form and dark green foliage throughout the year. Planted in a row 15 to 20 feet apart they make a nice screen. In areas outside California and the Northwest, it is probably best used occasionally as a novelty specimen.

Redwood is tolerant of flooding, making best growth along stream banks and flood plains. Irrigation helps maintain a vigorous tree in other sites. Allow plenty of soil space for proper development.

Propagation is possible from seed and through vegetative propagation.

Pests

Few insects were noted for *Sequoia* species.

Diseases

No diseases are of major concern.

Sequoia sempervirens is resistant to oak root fungus.

Appendix F

Operational Health Risk Assessment

Prepared By:
Ramboll US Corporation
San Francisco, California

Date
March 2018

VALLCO TOWN CENTER PROJECT

OPERATIONAL HEALTH RISK ASSESSMENT TECHNICAL REPORT

CONTENTS

1. INTRODUCTION

Ramboll US Corporation ("Ramboll") prepared this Operational Health Risk Assessment (HRA) Technical Report to support the proposed Vallco Town Center/Community Park mixed-use development project in Cupertino, CA (the "Project"). This report analyzes the potential health risks associated with Project operations at offsite and onsite sensitive receptors. In the following sections, this report details the methodologies used to estimate Project operational emissions, model the air dispersion of those emissions to onsite and offsite locations, and estimate the potential health risk impacts associated with exposure to these emissions.

1.1 Project Understanding

The proposed Project is a Town Center/Community Park mixed-use development that covers a site area of approximately 50 acres in the City of Cupertino. The Project is bounded to the north by Highway I-280, bounded to the west by Perimeter Road, and bounded to the South by Stevens Creek Boulevard. North Wolfe Road runs through the Project area and is the eastern boundary on the southern portion of the site. For the northern parcel of the site, Vallco Parkway is the southern boundary and Perimeter Road is the eastern boundary. The Project area is currently developed with a shopping mall ("The Mall") of approximately 1.2 million square feet.

The new development plan contains approximately 2,402 residential units covering 4.7 million square feet, 400,000 square feet of retail, 1.81 million square feet of office space, 1.85 million square feet of parking internal to buildings, 3.21 million square feet of underground parking and 50,000 square feet of street parking. Project design features include two town squares and a 22.1-acre green roof. The Project full operational year is expected to be 2023 ("Project build-out"), assuming a four year construction period beginning in 2019.

2. EMISSIONS ESTIMATES

To estimate health risk impacts from Project operations, toxic air contaminant (TAC) emissions were calculated for the Project. The proposed Project is expected to contain two sources of TACs during operational years – emergency generators and on-road vehicles. Ramboll estimated TAC emissions for the proposed Project using methodologies detailed in the sections below and summarized in **Table HRA-1**.

2.1.1 Emergency Generator Emissions

The proposed Project includes fourteen 400 horsepower Tier 2 diesel-fueled emergency engines. These emergency generators are required to support life safety systems and emergency elevators for Project buildings and the green roof in the case of a power outage or other emergency.

The TACs of concern from emergency engines include diesel particulate matter (DPM), particulate matter with an aerodynamic diameter of less than 2.5 microns ($PM_{2.5}$), and speciated total organic gases (TOG). Only emissions from non-emergency operation of the generators are considered in this health risk assessment (i.e. non-emergency maintenance and testing hours) consistent with BAAQMD regulation 2 rule 5. More detail on chemical selection for the HRA can be found in Section 3 of this report.

DPM, $PM_{2.5}$ and TOG emissions from the fourteen diesel engines were estimated using Tier 2 ARB and USEPA off-road diesel emergency engine standards emission factors (ARB 2013 and USEPA 1996). Emission factors for TOG were converted from non-methane hydrocarbon (NMHC) values provided in the Tier standards using EPA hydrocarbon conversion factors (USEPA 2010). Detailed emergency engine emissions calculations can be found in **Table HRA-2**.

These emergency engines will be permitted with the BAAQMD as required and all sources are expected to comply with applicable Best Available Control Technology (BACT) and Best Available Control Technology for Toxics (TBACT) requirements. All emergency engines were assumed to be 400-horsepower engines with up to 12 hours per year of non-emergency maintenance and testing operations.

2.1.2 On-Road Mobile Source Emissions

The Project would generate vehicle trips from residents traveling to and from the site and non-residents traveling to and from the site for work or commercial purposes. To estimate health risk impacts from vehicle traffic, Ramboll estimated TAC emissions from roadways within 1,000 ft of the Project boundary for both a background traffic scenario and a post-project traffic scenario. The TACs considered include $PM_{2.5}$ from vehicle exhaust and brakewear and tirewear, DPM and speciated TOG in diesel exhaust, and speciated TOG from gasoline vehicles (exhaust and evaporation).

Health risks were estimated for both of these emissions scenarios, as described in Sections 3 and 4 of this report. Project-related health risks from on-road emissions were estimated as the difference between the background and the post-project scenario health risks. Health risk impacts from the existing traffic on nearby roadways were estimated based on the background traffic scenario. The methodologies used to estimate emissions for the background and post-project scenarios are described, below.

2.1.2.1 Background Mobile Source Emissions

To estimate background on-road vehicle TAC emissions, Ramboll relied on EMFAC2014 emission factors along with background surface street average annual daily traffic (AADT) estimates based on a transportation impact analysis (TIA) prepared for the Vallco Project, and 2015 highway AADT estimates from the CalTrans Traffic Census database (CDT 2015). The list of roadways that emissions were calculated for can be found in **Table HRA-3**. EMFAC2014 emission factors were gathered for the vehicle fleet mix in Santa Clara County based on the Project build-out year of 2023. TAC emissions estimated for the background traffic scenario can be found in **Table HRA-4**.

2.1.2.2 Post-Project Mobile Source Emissions

Post-project on-road vehicle TAC emissions were estimated using the same methodology as described above. However, the Project land-use conditions have changed since the original TIA was prepared, thus, expected trip generation rates from the Project and subsequent AADT on local surface streets will also change. To account for this, Ramboll used CalEEMod® 2016.3.2 default trip generation rates for Project land uses to estimate the total weekday trip generation rate for the Post-Project scenario. Scaled AADT estimates for the nearby roadways were then estimated based on the ratio of total expected weekday Project trip generation between the original TIA and the redesign analyzed in this report. The updated trip generation rates for the Project land uses can be found in **Table HRA-5**, and the TAC emissions estimated for the Post-project traffic scenario can be found in **Table HRA-6**.

3. ESTIMATED AIR CONCENTRATIONS

Toxic air contaminant (TAC) emissions, described in the above Section, from Project operational activities will be transported both inside and outside of the physical boundaries of the Project area, potentially impacting nearby residential areas or sensitive receptors. Methodologies used to estimate concentrations resulting from Project TAC emissions are provided below.

3.1 Chemical Selection

The cancer risk and chronic and acute hazard analyses in this HRA are based on TAC emissions from the proposed Project. Sources of TACs from the proposed Project include emergency engines and on-road gasoline and diesel engines. Accordingly, the chemicals evaluated in the health risk assessment are $PM_{2.5}$ in vehicle exhaust and brakewear and tirewear, DPM, $PM_{2.5}$ and speciated TOG in diesel exhaust, and $PM_{2.5}$ and speciated TOG from gasoline vehicles (exhaust and evaporation).

Diesel exhaust, a complex mixture that includes hundreds of individual constituents (Cal/EPA 1998), is identified by the State of California as a known carcinogen (Cal/EPA 2015b). Under California regulatory guidelines, DPM is used as a surrogate measure of carcinogen exposure for the mixture of chemicals that make up diesel exhaust as a whole (Cal/EPA 2015b). Cal/EPA and other proponents of using the surrogate approach to quantifying cancer risks associated with the diesel mixture indicate that this method is preferable to use of a component-based approach. A component-based approach involves estimating cancer risks for each of the individual components of a mixture. Critics of the component-based approach believe it will underestimate the risks associated with diesel as a whole mixture because the identity of all chemicals in the mixture may not be known and/or exposure and health effects information for all chemicals identified within the mixture may not be available. Furthermore, Cal/EPA has concluded that "potential cancer risk from inhalation exposure to whole diesel exhaust will exceed the multi-pathway cancer risk from the speciated components" (Cal/EPA 2003). The DPM analyses will be based on the surrogate approach for diesel exhaust from emergency engines and on-road vehicles, as recommended by Cal/EPA. In the absence of an acute toxicity value for diesel exhaust, speciated TOG will be used as a conservative estimate. Diesel TOG speciated chemicals are shown in **Table HRA-7**.

TOG emitted from gasoline vehicle exhaust and evaporative losses are composed of a number of toxic components such as benzene, naphthalene and acetaldehyde. Unlike DPM, no surrogate method is currently approved to estimate health impacts from TOG as a whole. Thus, TOG impacts must be calculated using a component based method. Total TOG emissions from roadways are split into individual toxic components using the Bay Area Air Quality Management District's recommended gasoline speciation, outlined in **Table HRA-7** (BAAQMD 2011).

$PM_{2.5}$ is one of six EPA "criteria" pollutants considered harmful to public health and the environment. A safe threshold for $PM_{2.5}$ has not been established and research indicates that health effects still exist at low concentrations (BAAQMD 2012b). In 2009, the EPA concluded that for both short-term and long-term exposure-there is a causal relationship between $PM_{2.5}$ concentrations and cardiovascular effects and mortality, and, a likely causal relationship between $PM_{2.5}$ concentrations and respiratory effects (USEPA 2009). In this health risk

assessments, consistent with BAAQMD guidance, $PM_{2.5}$ health risks are estimated as concentrations resultant from Project sources.

3.2 Project Sources

Near-field air dispersion modeling of Project operational sources was conducted using the USEPA AERMOD model, version 16216r. Project operational TAC sources are grouped into two types: emergency generators and on-road traffic. Emergency generators are modeled as point sources in appropriate locations based on information from Vallco Property Owners, LLC and on-road traffic sources are modeled as a series of adjacent volume sources following guidance for this type of activity (SCAQMD 2008). Traffic on roadways are modeled out to 1,000 feet from the project boundary (BAAQMD 2012a).

For each receptor location, the model generates air concentrations (or air dispersion factors as unit emissions will be modeled) that result from emissions from multiple sources. The receptor grid used in this HRA can be found in **Figure 1**, and the modeled source locations can be found in **Figure 2**.

The source parameters used for each modeled source can be found in **Table HRA-8**. Representative engine modeling parameters provided by BAAQMD are used for exhaust characteristics (STI 2011).

3.3 Off-site Sources

Sources located outside the Project Area may pose impacts upon the proposed residential areas. These sources include roadways (Highway I-280 and local surface streets), and a gas station (southwest corner of Stevens Creek Boulevard and North Wolfe Road). Ramboll modeled all surface streets and highways within 1,000 ft of the Project boundary using AERMOD. Methodologies for estimating health impacts from other offsite sources are discussed in more detail in the Risk Characterization section below.

3.4 Meteorological Data

Air dispersion modeling requires the use of meteorological data that ideally are spatially and temporally representative of conditions in the immediate vicinity of the site under consideration. Ramboll used surface meteorological data from the San Jose Airport for years 2009 through 2013, with upper air data collected at the Oakland Airport for the same time period. The BAAQMD provided Ramboll with processed meteorological data that can be used directly in AERMOD.

3.5 Terrain Considerations

Elevation and land use data were imported from the National Elevation Dataset (NED) maintained by the United States Geological Survey (USGS 2016). An important consideration in an air dispersion modeling analysis is the selection of whether or not to model an urban area. Here the model assumes an urban land use as has been done for similar projects in the area. Ramboll used 58,302, the 2010 population of the City of Cupertino, as the urban population in AERMOD (US Census Bureau 2010).

3.6 Emission Rates

Emissions from each source group are modeled using the χ/Q ("chi over q") method, such that each source has unit emission rates (i.e., 1 gram per second [g/s]), and the model estimates dispersion factors with units of $[\mu g/m^3]/[g/s]$.

For annual average ambient air concentrations, the estimated annual average dispersion factors are multiplied by the annual average emission rates. The emission rates will vary day to day, with some days having no emissions, for example emergency generators on days when testing is not conducted. For simplicity, the model will assume a constant emission rate during the entire year. For acute impacts, the maximum 1-hour ambient air concentrations are multiplied by the maximum hourly emission rate for a given activity.

Operational traffic emissions are modeled assuming emissions are not restricted and can occur over the course of 24 hours. Emissions are distributed over the hours of the day following the hour-of-day distribution in EMFAC2014 for Santa Clara County. Operational traffic emissions considered include running exhaust and running loss emissions, consistent with BAAQMD guidance (BAAQMD 2010).

As discussed in Section 2 of this report, consistent with BAAQMD regulation 2 rule 5, this health risk assessment only considers emissions from non-emergency operation of the generators (i.e. planned maintenance and testing hours). Thus, emergency generators are modeled assuming emissions will only occur between 6am and 4pm.

3.7 Receptors

Receptors are located both on residential sites of the Town Center/Community Park and on off-site areas within 1,000 feet of the Project area. Receptors are modeled on multiple floors at a height of 1.8 meters and 4.8 meters above terrain height within the Project area and at a height of 1.8 meters above terrain height on off-site areas as recommended in BAAQMD guidance (BAAQMD 2012a). Receptors are placed over all on-site residential areas with 10-meter spacing and along the boundaries of on-site residential areas. A receptor grid with 25-meter spacing was placed over all offsite locations out to 1,000 feet from the Project area. As discussed previously, average annual and 1-hour maximum dispersion factors are estimated for each receptor location. All receptor locations are shown in **Figure 1**.

4. RISK CHARACTERIZATION METHODS

Potential health impacts from the Project are evaluated both upon residents near the Project area ("off-site residents") as well as residents who will move into the residential areas of the Town Center/Community ("on-site residents"). This report assesses cancer risk to residential receptors using the 2015 California Environmental Protection Agency Office of Environmental Health Risk Assessment (OEHHA) guidance.

4.1 Potentially Exposed Populations

This HRA evaluates Project related operational cancer risk, chronic HI and PM2.5 concentrations at off-site and on-site residential locations, as these health impacts are understood to only occur after long-term exposures to chemical concentrations. Acute HI is estimated at all modeled receptors, as acute impacts occur after short-term (one hour) exposure to chemical concentrations, an exposure condition which could occur at any location surrounding the Project.

4.2 Cancer Risk Exposure Assumptions

Off-site and on-site residents were evaluated for the operational scenario, assuming that they would be present at one location for a 30-year period. The exposure parameters used to estimate excess lifetime cancer risks for residential receptors are based on the 2015 Hot Spots Guidance (Cal/EPA 2015a), unless otherwise noted, and are presented in **Table HRA-9**.

4.3 Cancer Risk Calculation of Intake

The dose estimated for each exposure pathway is a function of the concentration of a chemical and the intake of that chemical. The intake factor for inhalation, IF_{inh}, is calculated as follows:

$$IF_{inh} = \frac{DBR * FAH * EF * ED * CF}{AT}$$

Where:

IF_{inh}	=	Intake Factor for Inhalation (m^3/kg-day)
DBR	=	Daily Breathing Rate (L/kg-day)
FAH	=	Fraction of Time at Home (unitless)
EF	=	Exposure Frequency (days/year)
ED	=	Exposure Duration (years)
AT	=	Averaging Time (days)
CF	=	Conversion Factor, 0.001 (m^3/L)

The chemical intake or dose is estimated by multiplying the inhalation intake factor, IF_{inh}, by the chemical concentration in air, C_i.

4.4 Toxicity Assessment

The toxicity assessment characterizes the relationship between the magnitude of exposure and the nature and magnitude of adverse health effects that may result from such exposure. This HRA evaluated theoretical exposures to TACs for two categories of potential adverse

health effects, cancer and non-cancer endpoints. Toxicity values used to estimate the likelihood of adverse effects occurring in humans at different exposure levels are identified as part of the toxicity assessment component of a risk assessment.

Excess lifetime cancer risk and chronic hazard quotient (HQs) calculations for Project operation utilized the toxicity values for DPM and for TACs from speciated gasoline total organic gases (TOGs). For on-road traffic, the TOG speciation for gasoline engine exhaust is different from the TOG speciation for gasoline evaporative losses, so two gasoline TOG speciation profiles were used. Acute HQ calculations utilized the toxicity values for TACs from both speciated diesel TOG for all source categories and TOGs from on-road gasoline-powered vehicles (Cal/EPA 2015b). Excess lifetime cancer risks[1] were estimated as the upper-bound incremental probability that an individual will develop cancer over a lifetime as a direct result of exposure to potential carcinogens. The estimated risk is expressed as a unitless probability. The cancer risk attributed to a chemical is calculated by multiplying the chemical intake or dose at the human exchange boundaries (e.g., lungs) by the chemical-specific cancer potency factor (CPF).

Speciation profiles used in this analysis are provided in **Table HRA-7**. Toxicity values are as presented in **Table HRA-10**. Ramboll included toxicity for DPM and organic gases from on-road gasoline-powered vehicles, and acute toxicity values for speciated diesel TOG for all source categories (Cal/EPA 2015b). Ramboll also included speciated gasoline evaporative emissions from on-road vehicles.

4.5 Age Sensitivity Factors

The estimated excess lifetime cancer risks for residents were adjusted using the age sensitivity factors (ASFs) recommended in the Cal/EPA OEHHA Hot Spots Guidance (Cal/EPA 2015a). This approach accounts for an "anticipated special sensitivity to carcinogens" of infants and children. Cancer risk estimates are weighted by a factor of 10 for exposures that occur from the third trimester of pregnancy to two years of age and by a factor of three for exposures that occur from two years through 15 years of age. No weighting factor (i.e., an ASF of one, which is equivalent to no adjustment) is applied to ages 16 and above. Table **HRA-11** shows the ASFs used for the residents.

4.6 Estimation of Cancer Risks

Excess lifetime cancer risks are estimated as the upper-bound incremental probability that an individual will develop cancer over a lifetime as a direct result of exposure to potential carcinogens. The estimated risk is expressed as a unitless probability. The cancer risk attributed to a chemical is calculated by multiplying the chemical intake or dose at the human exchange boundaries (e.g., lungs) by the chemical-specific CPF.

The equation used to calculate the potential excess lifetime cancer risk for the inhalation pathway is as follows:

$$Risk_{inh} = C_i \times CF \times IF_{inh} \times CPF \times ASF$$

Where:

[1] Excess cancer risk as a result of the proposed project is the risk generated by that project that exceeds the risk that would otherwise exist.

$Risk_{inh}$ = Cancer Risk; the incremental probability of an individual developing cancer as a result of inhalation exposure to a particular potential carcinogen (unitless)

C_i = Annual Average Air Concentration for chemical i ($\mu g/m^3$)

CF = Conversion Factor (mg/µg)

IF_{inh} = Intake Factor for Inhalation (m^3/kg-day)

CPF_i = Cancer Potency Factor for chemical i (mg chemical/kg body weight-day)$^{-1}$

ASF = Age Sensitivity Factor (unitless)

4.7 Estimation of Chronic and Acute Noncancer Hazard Indices

Chronic HQ

The potential for exposure to result in adverse chronic noncancer effects is evaluated by comparing the estimated annual average air concentration (which is equivalent to the average daily air concentration) to the noncancer chronic reference exposure level (cREL) for each chemical. When calculated for a single chemical, the comparison yields a ratio termed a hazard quotient (HQ). To evaluate the potential for adverse chronic noncancer health effects from simultaneous exposure to multiple chemicals, the chronic HQs for all chemicals are summed, yielding a chronic HI.

$$HQ_i = C_i / cREL$$

Where:

HQ_i = Chronic hazard quotient for chemical i

HI = Hazard index

C_i = Annual average concentration of chemical i ($\mu g/m^3$)

$cREL_i$ = Chronic noncancer reference exposure level for chemical i ($\mu g/m^3$)

Acute HI

The potential for exposure to result in adverse acute effects is evaluated by comparing the estimated one-hour maximum air concentration of chemical to the acute reference exposure level (aREL) for each chemical evaluated in this analysis. When calculated for a single chemical, the comparison yields an HQ. To evaluate the potential for adverse acute health effects from simultaneous exposure to multiple chemicals, the acute HQs for all chemicals are summed, yielding an acute HI.

$$HQ_i = C_i / aREL$$

Where:

HQ_i = Acute hazard quotient for chemical i

HI = Hazard index

Ci = One-hour maximum concentration of chemical i ($\mu g/m^3$)

$aREL_i$ = Acute reference exposure level for chemical i ($\mu g/m^3$)

4.8 Off-site Source Screening

Sources within 1,000 feet of the Project boundary were evaluated for potential cumulative health risk impacts upon the planned on-site residential areas and the Project's maximally exposed offsite resident. These sources include background traffic on roadways (Highway I-280 and local surface streets), and any stationary sources within 1,000ft of the Project.

As described in Section 3, above, health risks from local surface streets and highways surrounding the Project were modeled using AERMOD and emissions calculated based on traffic counts from the original TIA and the CalTrans Traffic Census database for 2015 (CDT 2015).

Based on the BAAQMD Stationary Source Screening Analysis Tool published May 2012a, the stationary sources within 1,000 feet are two dry cleaners and one gas station. The dry cleaners are not included in this risk assessment as the BAAQMD has indicated they are no longer sources of risks. In addition, under the Dry Cleaning Air Toxics Control Measure, perchloroethylene will be phased out as a dry cleaning solvent by 2023, reducing cancer risk from dry cleaners. Ramboll requested additional information on these sources from BAAQMD and used BAAQMD-provided tools[2] to estimate impacts from the stationary sources upon the planned residential areas and the maximally exposed offsite resident receptor.

[2] For gas stations, BAAQMD provides a screening tool to scale reported maximum impacts to those at other locations. Available online at: http://www.baaqmd.gov/plans-and-climate/california-environmental-quality-act-ceqa/ceqa-tools

5. RESULTS

5.1.1 Operational HRA

Tables HRA-12 and **HRA-13** show the Project-related human health endpoints from operational sources such as Project-generated traffic and emergency generators. Table **HRA-12** shows impacts at existing offsite residential areas and **Table HRA-13** shows at future residential areas proposed as part of the Project. The estimated incremental excess cancer risks, chronic HIs, acute HIs, and $PM_{2.5}$ concentrations from Project TAC emissions do not exceed the BAAQMD thresholds at either existing offsite residential areas or at future residential areas proposed as part of the Project.

Tables HRA-14 and **HRA-15** show the cumulative human health endpoints from Project operational sources and off-site sources within 1,000 feet of the Project. The off-site sources include a gas station and background traffic, and Project sources include Project-generated traffic and emergency generators. Acute HI has no cumulative BAAQMD threshold, thus is not analyzed in this report. **Table HRA-14** shows impacts at existing offsite residential areas and **Table HRA-15** shows impacts at future residential areas proposed as part of the Project. The estimated cumulative excess cancer risks, chronic HIs, and $PM_{2.5}$ concentrations do not exceed the BAAQMD thresholds at either existing offsite residential areas or at future residential areas proposed as part of the Project.

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TABLES

Table HRA-1
Emissions Calculations Methodology for Operational Health Risk Assessment
Vallco Town Center
Cupertino, California

Type	Source	Methodology and Formula	Reference
Operational On-Road Mobile Sources[1]	Running Exhaust and Running Losses	$E_R = \Sigma(EF_R * VMT * C)$, where VMT = Trip Length * Trip Number	EMFAC2014
Operational Stationary Sources	Generators[2]	E = EF * HP * Hr	USEPA AP-42 and ARB/USEPA Off-Road Engine Standards

Notes:

1 On-road mobile sources include truck and passenger vehicle trips. TAC emissions associated with mobile sources were calculated using the above formula for exhaust and evaporative losses.
E_R: running exhaust and running losses emissions (lb).
EF_R: running emission factor (g/mile). From EMFAC2014.
VMT: vehicle miles traveled
C: unit conversion factor

2 E: generator engine emissions
EF: compression-ignition (diesel) engine emission factor. ARB/USEPA engine PM standard based on engine tier will be used.

HP: generator horsepower.
Hr: generator hours. Assume 12 hours of operation annually.

Abbreviations:

ARB: California Air Resources Board
EF: Emission Factor
EMFAC: EMission FACtor Model
g: gram
HP: horsepower
lb: pound
mi: mile
USEPA: United States Environmental Protection Agency
VMT: vehicle miles traveled

References:

ARB/USEPA. 2013. Table 1: ARB and USEPA Off-Road Compression-Ignition (Diesel) Engine Standards. Available online at: http://www.arb.ca.gov/msprog/ordiesel/documents/Off-Road_Diesel_Stds.xls
ARB. 2014. EMission FACtors Model, 2014 (EMFAC2014). Available online at: http://www.arb.ca.gov/emfac/2014/

Table HRA-2
Emergency Generator Emissions, Project Operations
Vallco Town Center
Cupertino, California

Generator	Generator Size (hp)	Permitted Non-Emergency Hours (hrs/year)	Engine Tier	Engine Emission Factors[1] (g/bhp-hr)			Annual Emissions[2] (ton/yr)		
				TOG	DPM	$PM_{2.5}$	TOG	DPM	$PM_{2.5}$
Block 1	400	12	Tier 2	0.26	0.15	0.15	0.0014	7.9E-04	7.9E-04
Block 2	400	12	Tier 2	0.26	0.15	0.15	0.0014	7.9E-04	7.9E-04
Block 3	400	12	Tier 2	0.26	0.15	0.15	0.0014	7.9E-04	7.9E-04
Block 4	400	12	Tier 2	0.26	0.15	0.15	0.0014	7.9E-04	7.9E-04
Block 5	400	12	Tier 2	0.26	0.15	0.15	0.0014	7.9E-04	7.9E-04
Block 6	400	12	Tier 2	0.26	0.15	0.15	0.0014	7.9E-04	7.9E-04
Block 7N	400	12	Tier 2	0.26	0.15	0.15	0.0014	7.9E-04	7.9E-04
Block 8N	400	12	Tier 2	0.26	0.15	0.15	0.0014	7.9E-04	7.9E-04
Block 7S	400	12	Tier 2	0.26	0.15	0.15	0.0014	7.9E-04	7.9E-04
Block 8S	400	12	Tier 2	0.26	0.15	0.15	0.0014	7.9E-04	7.9E-04
Block 11 (North)	400	12	Tier 2	0.26	0.15	0.15	0.0014	7.9E-04	7.9E-04
Block 11 (South)	400	12	Tier 2	0.26	0.15	0.15	0.0014	7.9E-04	7.9E-04
Green Roof Engine 1	400	12	Tier 2	0.26	0.15	0.15	0.0014	7.9E-04	7.9E-04
Green Roof Engine 2	400	12	Tier 2	0.26	0.15	0.15	0.0014	7.9E-04	7.9E-04

Notes:

[1] Engine emission factors for PM_{10} and $PM_{2.5}$ (assumed all engines are diesel fueled, and that all PM_{10} is diesel particulate matter) based on ARB Tier 2 standards for 400-hp engines. Emission factors for TOG were converted from NMHC values provided in the Tier standards using EPA hydrocarbon conversion factors.

[2] Emissions for emergency generators are calculated assuming each engine is 400 hp and operates for the specified hours/year of non-emergency testing. Below is the calculation methodology:
E = EF * HP * Hr
Where:
E = generator engine emissions
EF = compression-ignition engine emission factor
HP = generator horsepower
Hr = generator hours

Abbreviations:

ARB: [California] Air Resources Board
LPG: Liquefied Petroleum Gas
NOx: nitrogen oxides

PM: particulate matter
ROG: reactive organic gases
USEPA: United States Environmental Protection Agency

References:

USEPA. 1996. AP 42, Volume I, Fifth Edition (1996). §3.3 Gasoline And Diesel Industrial Engines. Available online at:
USEPA. 2010. Conversion Factors for Hydrocarbon Emission Components, NR-002d. EPA-420-R-10-015. July. Available

Table HRA-3
Modeled Roadway Sources
Vallco Town Center
Cupertino, California

Source Group (SRCGRP)	Description	Source Type	Length (meters)
SCBF	Stevens Creek	roadway	288
SCBE		roadway	72
SCBD		roadway	96
SCBC		roadway	96
SCBB		roadway	192
SCBA		roadway	96
NWOLFA	North Wolfe Road / Miller Avenue	roadway	240
NWOLFB		roadway	240
NWOLFC		roadway	96
NWOLFD		roadway	96
NWOLFE		roadway	168
NWOLFF		roadway	120
NWOLFG		roadway	288
VPKWYD	Vallco Parkway	roadway	312
VPKWYC		roadway	72
VPKWYB		roadway	168
VPKWYA	4th Street	roadway	96
FINCH	Finch Avenue	roadway	240
PDRW	Perimeter Road	roadway	195
PDRE		roadway	555
AVEA	Avenue A	roadway	768
AVEB	Avenue B	roadway	636
DRIVEWYE	Wolfe Road / Vallco Driveway 2 East	roadway	12
DRIVEWYW	Wolfe Road / Vallco Driveway 2 West	roadway	12
SIXTHA	Wolfe Road/6th Street (Proposed)	roadway	168
SIXTHB		roadway	96
FIRST	Wolfe Road/Vallco Driveway 3	roadway	252
AVED	Vallco Parkway/Vallco Driveway 4	roadway	336
ONRE	I-280 S On Ramp, from S-bound Wolfe Road	roadway	702
CLVRE	I-280 S from S-bound Wolfe Road	roadway	894
OFFRE	Wolfe Road from I-280 S	roadway	348
OFFRW	Wolfe Road from I-280 N	roadway	654
CLVRW	I-280 N On Ramp from N-bound Wolfe Rd	roadway	414
ONRW	I-280 N On Ramp from S-bound Wolfe Rd	roadway	84
PORTN	North Portal Avenue	roadway	730
PORTS	South Portal Avenue	roadway	210
ESTATE	East Estates Drive	roadway	300
AVEDX	Avenue D - Offsite Driveway	roadway	36
PDREX	Perimeter Road Offsite Driveway	roadway	30
I280W	I-280 North (I-280 West)	roadway	819
I280E	I-280 South (I-280 East)	roadway	882

Table HRA-4
Background Traffic Mobile TAC Emissions
Vallco Town Center
Cupertino, California

Link	Weekday Daily Traffic[1,3]	Link Length (meters)	Link Length (miles)	Miles/Day	Running Exhaust + Brakewear and Tirewear Emissions, All Vehicles	Running Exhaust Emissions, GAS Vehicles Only	Running Exhaust Emissions, DSL Vehicles Only	Running Exhaust Emissions, DSL Vehicles Only[2]	Running Loss Emissions, Gas Vehicles Only
					[grams/day]	[grams/day]	[grams/day]	[grams/day]	[grams/day]
					$PM_{2.5}$	TOG	TOG	PM_{10}	TOG
SCBF	41,371	288	0.18	7,402	147	635	17	3.8	550
SCBE	46,938	72	0.04	2,099	42	180	4.9	1.1	156
SCBD	47,076	96	0.06	2,807	56	241	6.5	1.4	209
SCBC	46,779	96	0.06	2,790	55	239	6.5	1.4	207
SCBB	45,658	192	0.12	5,446	108	467	13	2.8	405
SCBA	44,386	96	0.06	2,647	52	227	6.1	1.3	197
NWOLFA	53,383	240	0.15	7,959	158	683	18	4.0	592
NWOLFB	50,117	240	0.15	7,472	148	641	17	3.8	555
NWOLFC	48,017	96	0.06	2,864	57	246	6.6	1.5	213
NWOLFD	49,938	96	0.06	2,978	59	256	6.9	1.5	221
NWOLFE	40,940	168	0.10	4,273	85	367	10	2.2	318
NWOLFF	39,904	120	0.07	2,975	59	255	6.9	1.5	221
NWOLFG	23,922	288	0.18	4,280	85	367	10	2.2	318
VPKWYD	17,330	312	0.19	3,359	67	288	7.8	1.7	250
VPKWYC	18,645	72	0.04	834	17	72	1.9	0.42	62
VPKWYB	19,171	168	0.10	2,001	40	172	4.6	1.0	149
VPKWYA	3,406	96	0.06	203	4.0	17	0.47	0.10	15
FINCH	6,036	240	0.15	900	18	77	2.1	0.46	67
PDRW	3,747	195	0.12	454	9.0	39	1.1	0.23	34
PDRE	4,173	555	0.35	1,440	29	124	3.3	0.73	107
AVEA	2,363	768	0.48	1,127	22	97	2.6	0.57	84
AVEB	0	636	0.40	0	0	0	0	0	0
DRIVEWYE	713	12	0.01	5	0.11	0.46	0.012	0.0027	0.40
DRIVEWYW	447	12	0.01	3	0.066	0.29	0.0077	0.0017	0.25
SIXTHA	2,608	168	0.10	272	5.4	23	0.63	0.14	20
SIXTHB	3,758	96	0.06	224	4.4	19	0.52	0.11	17
FIRST	5,035	252	0.16	788	16	68	1.8	0.40	59
AVED	3,449	336	0.21	720	14	62	1.7	0.37	54
ONRE	6,877	702	0.44	2,999	59	257	7.0	1.5	223
CLVRE	31,014	894	0.56	17,224	342	1,478	40	8.8	1,280
OFFRE	31,014	348	0.22	6,705	133	575	16	3.4	498
OFFRW	26,497	654	0.41	10,765	213	924	25	5.5	800
CLVRW	26,497	414	0.26	6,815	135	585	16	3.5	507
ONRW	9,868	84	0.05	515	10	44	1.2	0.26	38
PORTN	4,474	730	0.45	2,029	40	174	4.7	1.0	151
PORTS	2,917	210	0.13	380	7.5	33	0.88	0.19	28
ESTATE	3,215	300	0.19	599	12	51	1.4	0.30	45
AVEDX	3,208	36	0.02	72	1.4	6.2	0.17	0.036	5.3
PDREX	128	30	0.02	2	0.047	0.20	0.0055	0.0012	0.18
I280W	80,500	819	0.51	40,977	813	3516	95	21	3046
I280E	80,500	882	0.55	44,130	875	3787	102	22	3280
				Total Emissions	3,996	17,295	467	102	14,981

Notes:

1 Weekday daily traffic on each modeled roadway link was calculated by Ramboll based on Project vicinity roadway Annual Average Daily Traffic (AADT) and turning volume estimates provided in the Traffic Impact Analysis (TIA).

2 All PM_{10} emitted from diesel vehicles is assumed to be diesel particulate matter.

3 Weekday daily traffic for I280W and I280E was obtained from the Caltrans Traffic Census database for 2015. Available online at: http://www.dot.ca.gov/hq/tsip/gis/datalibrary/Metadata/AADT.html. Accessed February 14th, 2018.

Table HRA-5

Weekday Trip Generation, Project Land Uses

Vallco Town Center

Cupertino, California

Land Use[1]	Size	Units	Weekday Trip Generation[2]
Project Conditions			
Office	1,810,000	sf	19,964
Retail	400,000	sf	17,080
Green Roof (Park)	22	Acres	42
Residential	2,402	Units	15,973
		Total Weekday Project Trips	**53,059**

Notes:

[1] Land uses analyzed for trip generation estimations based on Project square footages provided by the client.

[2] Trip generation estimates are based on weekday trip rate estimates from CalEEMod® 2016.3.2 for different land uses. Available online at: http://www.aqmd.gov/docs/default-source/caleemod/05_appendix-d2016-3-2.pdf?sfvrsn=4.

Abbreviations:

CalEEMod® - CALifornia Emissions Estimator Model

Table HRA-6
Post-Project Traffic Mobile TAC Emissions
Vallco Town Center
Cupertino, California

Original Traffic Impact Analysis Weekday Trip Generation: 56,985
Project Weekday Trip Generation: 53,059

Link	Original Weekday Daily Traffic[1,4]	Scaled Weekday Daily Traffic[2]	Link Length (meters)	Link Length (miles)	Miles/Day	Running Exhaust + Brakewear and Tirewear Emissions, All Vehicles	Running Exhaust Emissions, GAS Vehicles Only	Running Exhaust Emissions, DSL Vehicles Only	Running Exhaust Emissions, DSL Vehicles Only[3]	Running Loss Emissions, Gas Vehicles Only
						[grams/day]	[grams/day]	[grams/day]	[grams/day]	[grams/day]
						$PM_{2.5}$	TOG	TOG	PM_{10}	TOG
SCBF	46,118	45,791	288	0.18	8,193	162	703	19	4.2	609
SCBE	54,972	54,419	72	0.045	2,434	48	209	5.6	1.2	181
SCBD	55,375	54,803	96	0.060	3,268	65	280	7.6	1.7	243
SCBC	54,440	53,912	96	0.060	3,215	64	276	7.5	1.6	239
SCBB	57,044	56,259	192	0.12	6,710	133	576	16	3.4	499
SCBA	55,541	54,772	96	0.060	3,266	65	280	7.6	1.7	243
NWOLFA	63,754	63,040	240	0.15	9,399	186	807	22	4.8	699
NWOLFB	69,659	68,313	240	0.15	10,185	202	874	24	5.2	757
NWOLFC	66,603	65,322	96	0.060	3,896	77	334	9.0	2.0	290
NWOLFD	61,618	60,814	96	0.060	3,627	72	311	8.4	1.8	270
NWOLFE	50,312	49,666	168	0.10	5,183	103	445	12	2.6	385
NWOLFF	45,593	45,201	120	0.075	3,370	67	289	7.8	1.7	250
NWOLFG	26,310	26,146	288	0.18	4,678	93	401	11	2.4	348
VPKWYD	17,325	17,325	312	0.19	3,358	67	288	7.8	1.7	250
VPKWYC	17,106	17,212	72	0.045	770	15	66	1.8	0.39	57
VPKWYB	18,923	18,941	168	0.10	1,977	39	170	4.6	1.0	147
VPKWYA	2,810	2,851	96	0.060	170	3.4	15	0.39	0.086	13
FINCH	6,036	6,036	240	0.15	900	18	77	2.1	0.46	67
PDRW	13,997	13,291	195	0.12	1,611	32	138	3.7	0.82	120
PDRE	5,599	5,501	555	0.35	1,898	38	163	4.4	0.96	141
AVEA	2,640	2,621	768	0.48	1,250	25	107	2.9	0.64	93
AVEB	1,384	1,289	636	0.40	509	10.1	44	1.2	0.26	38
DRIVEWYE	6,919	6,492	12	0.0075	48	0.96	4.2	0.11	0.025	3.6
DRIVEWYW	9,681	9,045	12	0.0075	67	1.3	5.8	0.16	0.034	5.0
SIXTHA	3,566	3,500	168	0.10	365	7.2	31	0.85	0.19	27
SIXTHB	11,134	10,626	96	0.060	634	13	54	1.5	0.32	47
FIRST	1,223	1,485	252	0.16	233	4.6	20	0.54	0.12	17
AVED	596	793	336	0.21	165	3.3	14	0.38	0.08	12
ONRE	11,901	11,555	702	0.44	5,039	100	432	12	2.6	375
CLVRE	38,192	37,698	894	0.56	20,936	415	1,797	49	11	1,556
OFFRE	38,192	37,698	348	0.22	8,150	162	699	19	4.1	606
OFFRW	35,344	34,735	654	0.41	14,112	280	1,211	33	7.2	1,049
CLVRW	35,344	34,735	414	0.26	8,933	177	767	21	4.5	664
ONRW	9,868	9,868	84	0.052	515	10	44	1.2	0.26	38
PORTN	4,474	4,474	730	0.45	2,029	40	174	4.7	1.0	151
PORTS	2,917	2,917	210	0.13	380	7.5	33	0.88	0.19	28
ESTATE	4,173	4,107	300	0.19	765	15	66	1.8	0.39	57
AVEDX	3,280	3,275	36	0.022	73	1.5	6.3	0.17	0.037	5.4
PDREX	0	0	30	0.019	0	0	0	0	0	0
I280W	80,500	80,500	819	0.51	40977	813	3516	95	21	3046
I280E	80,500	80,500	882	0.55	44130	875	3787	102	22	3280
					Total Emissions	**4,509**	**19,516**	**527**	**116**	**16,906**

Notes:

1 Weekday daily traffic on each modeled roadway link was calculated by Ramboll based on Project vicinity roadway Annual Average Daily Traffic (AADT) and turning volume estimates provided in the Traffic Impact Analysis (TIA). Highway traffic change due to Project is expected to be negligible compared to total AADT, thus no Project impacts were estimated on the highway.

2 Post-project vehicle traffic on each roadway was scaled based on the ratio of total expected weekday Project trip generation between the original Vallco Project, and the redesign analyzed in this report.

3 All PM_{10} emitted from diesel vehicles is assumed to be diesel particulate matter.

4 Weekday daily traffic for I280W and I280E was obtained from the Caltrans Traffic Census database for 2015. Available online at: http://www.dot.ca.gov/hq/tsip/gis/datalibrary/Metadata/AADT.html. Accessed February 14th, 2018.

Table HRA-7
Speciation Values
Vallco Town Center
Cupertino, California

Source	Emission Type	Fraction	Chemical[1]
Diesel Generators	**Exhaust PM**	1.0	Diesel PM
	Exhaust TOG	0.0019	1,3-Butadiene
		0.074	Acetaldehyde
		0.020	Benzene
		0.0031	Ethylbenzene
		0.15	Formaldehyde
		0.0016	n-Hexane
		3.0E-04	Methanol
		0.015	Methyl Ethyl Ketone
		9.0E-04	Naphthalene
		0.026	Propylene
		6.0E-04	Styrene
		0.015	Toluene
		0.0061	m-Xylene
		0.0034	o-Xylene
		0.0010	p-Xylene
Diesel Roadway Traffic	**Exhaust PM**	1.0	Diesel PM
	Exhaust TOG	0.16	Acetaldehyde
		0.010	Benzene
		0.085	Formaldehyde
		0.029	Methyl Ethyl Ketone
		0.015	Toluene
		0.0032	o-Xylene
		0.0089	m- & p-Xylenes

Table HRA-7
Speciation Values
Vallco Town Center
Cupertino, California

Source	Emission Type	Fraction	Chemical[1]
Gasoline Roadway Traffic	Exhaust TOG	0.0055	1,3-Butadiene
		0.0028	Acetaldehyde
		0.0013	Acrolein
		0.025	Benzene
		0.011	Ethylbenzene
		0.016	Formaldehyde
		0.016	Hexane
		0.0012	Methanol
		2.0E-04	Methyl Ethyl Ketone
		5.0E-04	Naphthalene
		0.031	Propylene
		0.0012	Styrene
		0.058	Toluene
		0.048	Xylenes
	Evaporative TOG	0.0036	Benzene
		0.0012	Ethylbenzene
		0.015	Hexane
		0.017	Toluene
		0.0058	Xylenes

Note:

[1] Compounds presented in this table are only those air toxic contaminants with toxicity values from Cal/EPA (2015) evaluated in the health risk assessment. Speciation profiles presented in this table are from the following sources:

Diesel offroad exhaust, TOG: ARB 818 / EPA 3161
Diesel onroad exhaust, TOG: EPA 4674
Gasoline onroad exhaust/evaporative, TOG: BAAQMD 5/2011 Guidance

Abbreviations:

ARB: Air Resources Board
BAAQMD: Bay Area Air Quality Management District
EPA: Environmental Protection Agency
PM: particulate matter
TOG: total organic gas

References:

ARB. Speciation Profiles Used in ARB Modeling. Available online at: http://www.arb.ca.gov/ei/speciate/speciate.htm#specprof
BAAQMD. 2011. Recommended Methods for Screening and Modeling Local Risks and Hazards. May.
Cal/EPA. 2015. OEHHA/ARB Consolidated Table of Approved Risk Assessment Health Values. May 13.
USEPA. SPECIATE 4.3. Available online at: http://cfpub.epa.gov/si/speciate/

Table HRA-8
Modeling Parameters
Vallco Town Center
Cupertino, California

Period	Source	Source Type	Release Height (m)	Exit Temperature (K)	Exit Velocity (m/s)	Exit Diameter (m)	Initial Vertical Dimension (m)	Initial Lateral Dimension (m)
Operation	On-Road Fleet[1]	Adjacent Volume	0.6	--	--	--	0.14	Variable
	Back-Up Generators[2]	Point	3.66	739.8	45.3	0.18	--	--

Notes:

1 Release parameters for the on-road fleet were selected based on communication with ARB. The initial lateral dimension for adjacent volume sources is calculated as the width of the roadway divided by 2.15 per USEPA AERMOD User's Guide Table 3-1. The initial vertical dimension for the adjacent volume sources is calculated as the release height divided by 4.3 based on Table 3-2 of the AERMOD User's Guide.

2 With no specific details on the back-up generators that will be deployed, release parameters used are the "median" values for diesel engines in the BAAQMD Sonoma Technology Memo (STI 2011).

Abbreviations:

K: Kelvin
m: meter
s: second

References:

Sonoma Technology, Inc. 2011. Memo to BAAQMD Re: Default Modeling Parameters for Stationary Sources. April 1.
USEPA. 2004. User's Guide for the AMS/EPA Regulatory Model - AERMOD. September.
Available online at: http://www.epa.gov/scram001/dispersion_prefrec.htm.

Table HRA-9
Exposure Parameters, 2015 OEHHA Methodology
Vallco Town Center
Cupertino, California

Period	Receptor Age Group	Exposure Parameters					
		Daily Breathing Rate (DBR)[1] (L/kg-day)	Exposure Duration (ED)[2] (years)	Fraction of Time at Home (FAH)[3] (unitless)	Exposure Frequency (EF)[4] (days/year)	Averaging Time (AT) (days)	Intake Factor, Inhalation (IF_{inh}) (m^3/kg-day)
Operation	3rd Trimester	361	0.25	1	350	25,550	0.0012
	Age 0-<2 Years	1,090	2	1	350	25,550	0.030
	Age 2-<16 Years	572	14	1	350	25,550	0.11
	Age 16-30 Years	261	14	0.73	350	25,550	0.037

Notes:

[1] Daily breathing rates reflect default breathing rates from OEHHA 2015 as follows: 95th percentile for 3rd trimester and age 0-<2 years; 80th percentile for ages 2-<9 years, 2-<16 years, and 16-30 years.

[2] The total exposure duration for operation reflects the default residential exposure duration from Cal/EPA 2015.

[3] Fraction of time at home was conservatively assumed to be 1 for age groups younger than 16 years old (100%). The FAH of 0.73 for age group 16 and above reflects the default value from Cal/EPA 2015.

[4] Exposure frequency reflects default exposure frequency for residents from Cal/EPA 2015.

Calculation:

Resident:

IF_{inh} = DBR * ED * FAH * EF * CF / AT

CF = 0.001 (m^3/L)

Abbreviations:

Cal/EPA: California Environmental Protection Agency
L: liter
kg: kilogram
m^3: cubic meter

Reference:

Cal/EPA. 2015. Air Toxics Hot Spots Program. Risk Assessment Guidelines. Guidance Manual for Preparation of Health Risk Assessments. Office of Environmental Health Hazard Assessment (OEHHA). February.
Available online at: http://oehha.ca.gov/air/hot_spots/hotspots2015.html.

Table HRA-10
Toxicity Values
Vallco Town Center
Cupertino, California

Chemical[1]	Cancer Potency Factor $(mg/kg\text{-}day)^{-1}$	Chronic REL ($\mu g/m^3$)	Acute REL ($\mu g/m^3$)
Diesel PM	1.1	5	-
Acetaldehyde	0.01	140	470
Acrolein	-	0.35	2.5
Benzene	0.1	3	27
1,3-Butadiene	0.6	2	660
Chlorine	-	0.2	210
Copper	-	-	100
Ethylbenzene	0.0087	2,000	-
Formaldehyde	0.021	9	55
n-Hexane	-	7,000	-
Manganese	-	0.09	-
Methanol	-	4,000	28,000
Methyl Ethyl Ketone	-	-	13,000
Naphthalene	0.12	9	-
Nickel	0.91	0.014	0.2
Propylene	-	3,000	-
Styrene	-	900	21,000
Toluene	-	300	37,000
Xylenes	-	700	22,000

Note:

[1] Chemicals presented in this table reflect air toxic contaminants in the proposed fuel types that are expected from on-road truck trips, automobile traffic, and diesel generators.

Abbreviations:

-: not available or not applicable
$\mu g/m^3$: micrograms per cubic meter
ARB: Air Resources Board
Cal/EPA: California Environmental Protection Agency
$(mg/kg\text{-}day)^{-1}$: per milligram per kilogram-day
OEHHA: Office of Environmental Health Hazard Assessment
PM: particulate matter
REL: reference exposure level

Reference:

Cal/EPA. 2015. OEHHA/ARB Consolidated Table of Approved Risk Assessment Health Values. May 13.

Table HRA-11
Age Sensitivity Factors
Vallco Town Center
Cupertino, California

Receptor Age Group	Age Sensitivity Factor[1] (ASF)
3rd Trimester	10
Age 0-<2 Years	10
Age 2-<16 Years	3
Age 16-30 Years	1

Note:

[1] Based on Cal/EPA 2015.

Abbreviation:

Cal/EPA: California Environmental Protection Agency

References:

Cal/EPA. 2015. Air Toxics Hot Spots Program. Risk Assessment Guidelines. Guidance Manual for Preparation of Health Risk Assessments. Office of Environmental Health Hazard Assessment (OEHHA). February.
Available online at: http://oehha.ca.gov/air/hot_spots/hotspots2015.html.

Table HRA-12
Project-Related Operational Health Risk Impacts to Existing Residential Areas
Vallco Town Center
Cupertino, California

Emission Source	Cancer Risk Impact (in one million)	Chronic Non-Cancer Hazard Index	Acute Non-Cancer Hazard Index	Annual $PM_{2.5}$ Concentration (ug/m^3)
Mobile	4.0	0.0087	0.025	0.105
Emergency Generators	0.72	1.9E-04	0.20	0.0010
Project Operational Total	**4.7**	**0.0089**	**0.23**	**0.11**
BAAQMD Significance Threshold	10	1	1	0.3

Notes:

[1] Evaluated project operational activities include new traffic associated with the Vallco Project, and 14 planned emergency generators.

[2] The existing residential locations experiencing maximum project impacts are:

	UTMx	UTMy
Cancer, Chronic HI, $PM_{2.5}$	587360.20	4131425.31
Acute HI	587136.15	4131681.82

Abbreviations:

BAAQMD: Bay Area Air Quality Management District
HI: health index
ug/m^3: micrograms per cubic meter
UTM: Universal Transverse Mercator coordinate system

Table HRA-13
Project-Related Operational Health Risk Impacts to Proposed Residential Areas
Vallco Town Center
Cupertino, California

Emission Source	Cancer Risk Impact (in one million)	Chronic Non-Cancer Hazard Index	Acute Non-Cancer Hazard Index	Annual $PM_{2.5}$ Concentration (ug/m^3)
Mobile	6.5	0.014	0.030	0.17
Emergency Generators	0.23	6.1E-05	0.66	3.0E-04
Project Operational Total	**6.7**	**0.014**	**0.69**	**0.17**
BAAQMD Significance Threshold	10	1	1	0.3

Notes:

[1] Evaluated project operational activities include new traffic associated with the Vallco Project, and 14 planned emergency generators.

[2] The proposed residential locations experiencing maximum project impacts are:

	UTMx	UTMy
Cancer, Chronic HI and $PM_{2.5}$	587087.72	4131178.60
Acute HI	587214.75	4131206.19

Abbreviations:

BAAQMD: Bay Area Air Quality Management District
HI: health index
ug/m^3: micrograms per cubic meter
UTM: Universal Transverse Mercator coordinate system

Table HRA-14
Summary of Cumulative Health Risk Impacts to Existing Residential Areas
Vallco Town Center
Cupertino, California

Emission Source	Cancer Risk Impact (in one million)	Chronic Non-Cancer Hazard Index	Annual $PM_{2.5}$ Concentration (ug/m^3)
Existing Stationary Sources			
76 Gas Station (BAAQMD Permit G9315)	0.32	3.85E-04	n/a
Background Surface Street and FreewayTraffic	25	0.053	0.64
Subtotal	**25**	**5.32E-02**	**0.64**
Project Traffic	4.0	0.0087	0.105
Project Generators	0.72	1.9E-04	0.0010
Total Cumulative Impact	**30**	**0.062**	**0.75**
BAAQMD Significance Threshold	100	10	0.8

Notes:

[1] Stationary source impacts were obtained from a data request to the BAAQMD. BAAQMD stated one dry cleaners located within 1,000 ft of the project no longer creates risks to nearby residents, thus that source is not included here. The only remaining source within 1,000 ft of the property is a gas station. The screening risk and chronic HI estimates provided by BAAQMD were scaled at the maximally impacted existing offsite residential area (approximately 970 ft) with the BAAQMD's Gasoline Dispensing Facility Distance Multiplier Tool. The cancer risk has also been adusted for the 2015 OEHHA guidelines.

[2] The existing residential locations experiencing maximum project impacts are:

	UTMx	UTMy
Cancer, Chronic HI, $PM_{2.5}$	587360.20	4131425.31

[3] The BAAQMD has no cumulative threshold for Acute HI, thus this health endpoint was not analyzed.

Abbreviations:

BAAQMD: Bay Area Air Quality Management District
HI: health index
ug/m^3: micrograms per cubic meter
UTM: Universal Transverse Mercator coordinate system

Table HRA-15
Summary of Cumulative Health Risk Impacts to Proposed Residential Areas
Vallco Town Center
Cupertino, California

Emission Source	Cancer Risk Impact (in one million)	Chronic Non-Cancer Hazard Index	Annual $PM_{2.5}$ Concentration (ug/m^3)
Existing Stationary Sources			
76 Gas Station (BAAQMD Permit G9315)	0.53	6.43E-04	n/a
Background Surface Street and FreewayTraffic	19	0.040	0.49
Subtotal	**19**	**0.041**	**0.49**
Project Traffic	6.5	0.014	0.17
Project Generators	0.23	6.1E-05	3.0E-04
Total Cumulative Impact	**26**	**0.055**	**0.66**
BAAQMD Significance Threshold	100	10	0.8

Notes:

[1] Stationary source impacts were obtained from a data request to the BAAQMD. BAAQMD stated one dry cleaners located within 1,000 ft of the project no longer creates risks to nearby residents, thus that source is not included here. The only remaining source within 1,000 ft of the property is a gas station. The screening risk and chronic HI estimates provided by BAAQMD were scaled at the maximally impacted proposed onsite residential area (approximately 710 ft) with the BAAQMD's Gasoline Dispensing Facility Distance Multiplier Tool. The cancer risk has also been adusted for the 2015 OEHHA guidelines.

[2] The proposed residential locations experiencing maximum project impacts are:

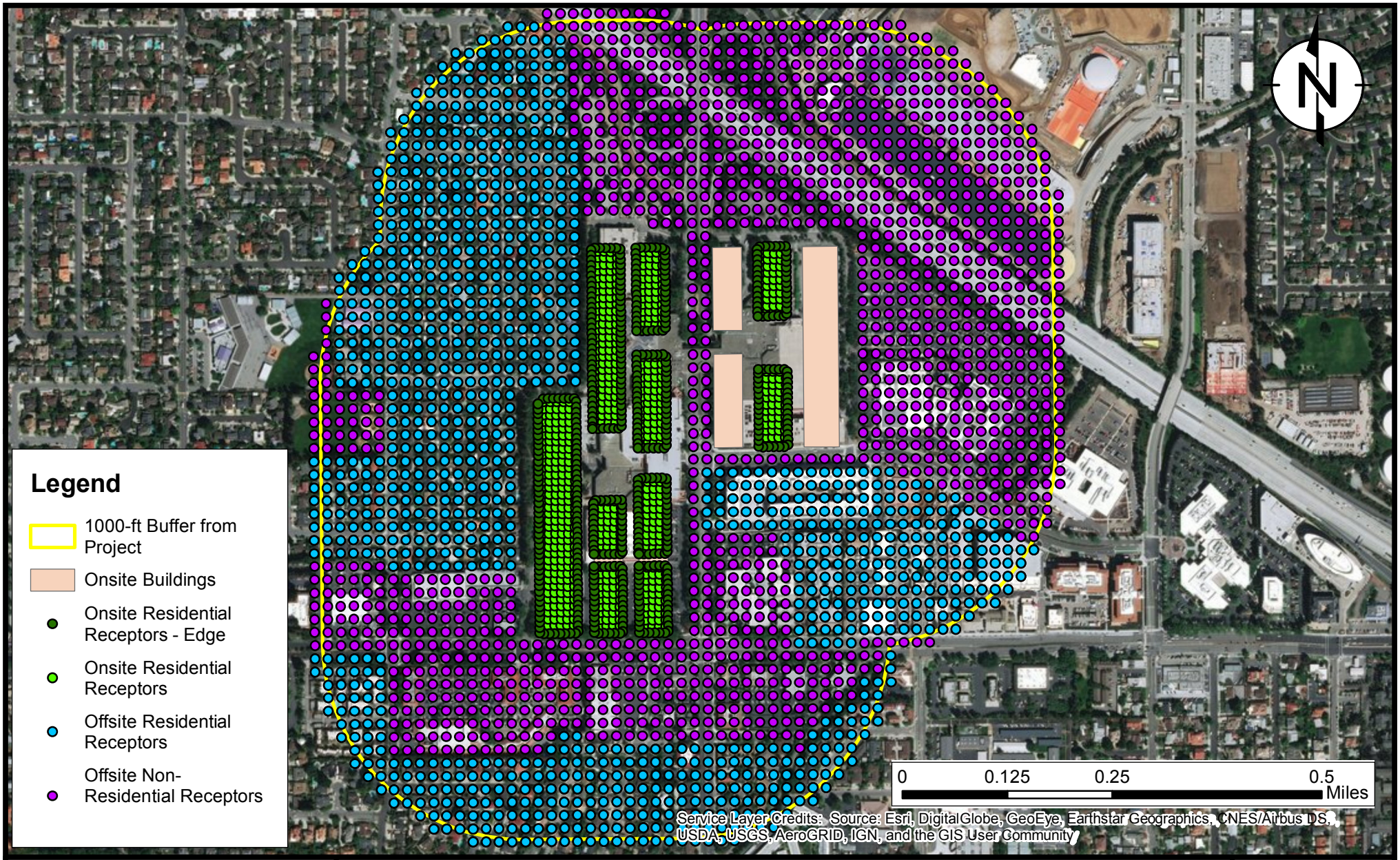
	UTMx	UTMy
Cancer, Chronic HI and $PM_{2.5}$	587087.7161	4131178.601

[3] The BAAQMD has no cumulative threshold for Acute HI, thus this health endpoint was not analyzed.

Abbreviations:

BAAQMD: Bay Area Air Quality Management District
HI: health index
ug/m^3: micrograms per cubic meter
UTM: Universal Transverse Mercator coordinate system

FIGURES

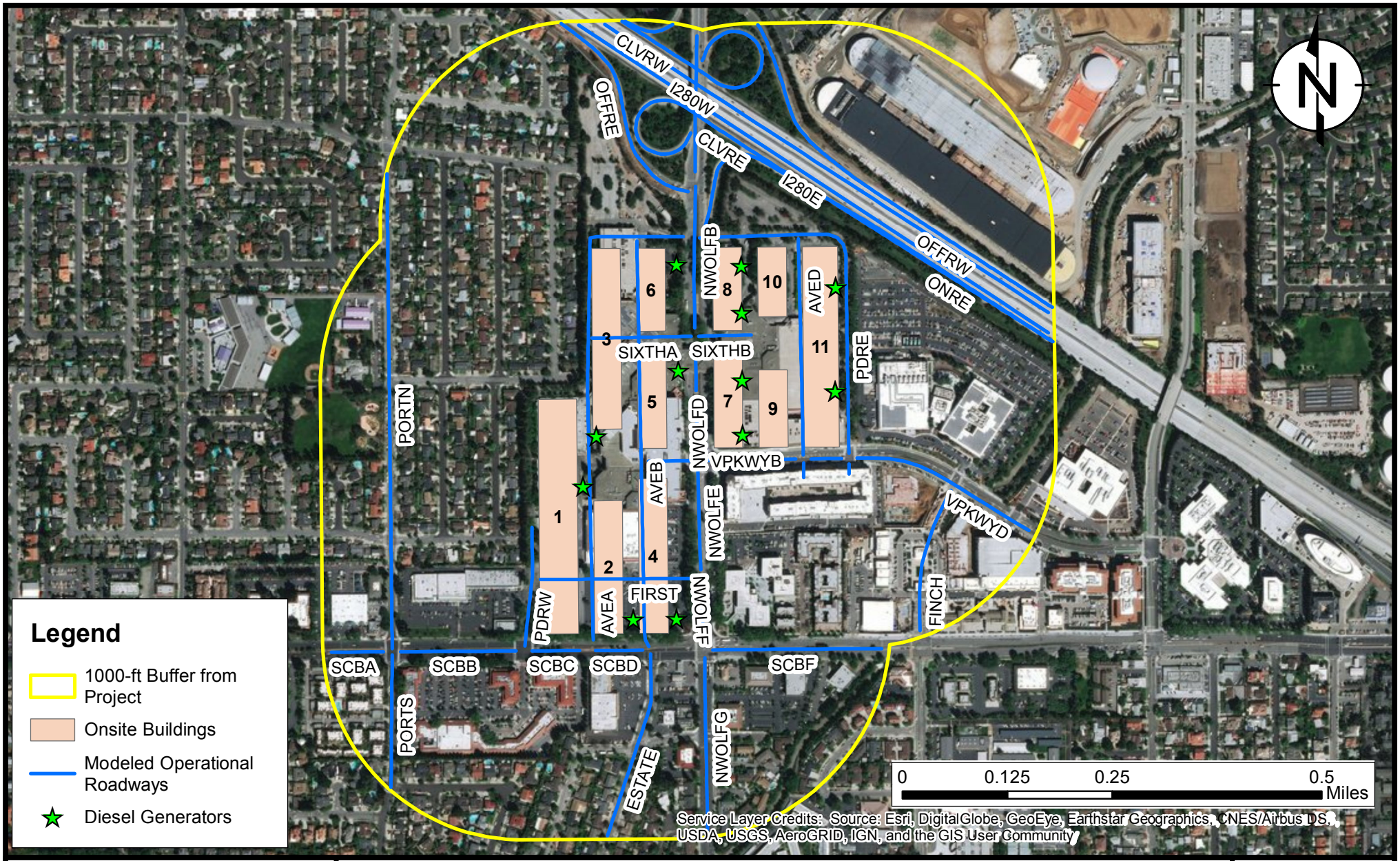


RAMBOLL

Vallco
Operational Receptors
Onsite and Offsite
Cupertino, California

FIGURE
1

DRAFTED BY: AW | DATE: 2018-02-20 | PROJECT: 1690006518



RAMBOLL

DRAFTED BY: AW | DATE: 2018-02-20

Vallco
Operational Emission Sources
Traffic and Generators
Cupertino, California

FIGURE
2

PROJECT: 1690006518

Appendix G

Water Demand Assessment

LUK AND ASSOCIATES

Project Report

Project Name: Vallco Town Center Project 50% BMR – Water Demand Assessment

Prepared By:

Document Owner(s)	Project/Organization Role
Manish Dalia	Luk and Associates

TABLE OF CONTENTS

0 Project Report Purpose

Luk and Associates has been contracted to analyze the proposed Vallco Town Center Project – 50% BMR ("Project") program and evaluate the water demands of the Project.

This report is a study based on existing information, project program provided by the owner, and information from projects in the area.

1 Project Program

The Project Program analyzed is as follows:

Table 1-1 – The Project and Population Estimate

Vallco Town Center Project	Program (sqft)	Units	People/ Employee	Men	Woman	Notes
Office	1,810,000		11,000	5,500	5,500	1 employee per 250 sqft Assumed to have separate fitness facilities and cafeteria
Residential	4,700,000	2,402	6,005	3,003	3,003	2.5 people per unit
Entertainment	120,000		480			1 employee per 250 sqft
Restaurant/Food and Beverage	147,000		588			1 employee per 250 sqft
Retail	133,000		532			1 employee per 250 sqft
Existing Retail	1,200,000					

Table 1-2 – Landscaping Program

Landscape Type	Acreage
Roof - Oak Chaparral	17.87
Roof - Valley Meadow	5.26
Roof - Olive Grove	1.04
Roof - Vineyard	3.98
Roof - Orchard/Understory	2.16
Roof - Lawn and Turf	0.14
Ground - Trees	5.07
Ground - Ground Cover	4.05
Ground - Lawn and Turf	1.01
Total	40.59

2 Water Demand

The most significant water demand categories for the project are as follows:

- Indoor fixtures in the commercial, residential and retail components of the project (toilets, urinals, sinks, drinking fountains, showers, water for cooking and cleaning, etc.)
- Process water for mechanical cooling systems
- Landscape irrigation

Two scenarios have been investigated: Typical Development and the Project. The Typical Development scenario uses the Project program and baseline demand rates and assumptions typical of a project built in Silicon Valley today. The Project Design assumes water-efficient design. This design considers the implementation of water-efficiency measures for indoor, outdoor, and cooling systems.

The Project is committed to constructing a dual plumbing system if recycled water is available for Project use. This commitment will reduce the amount of domestic water use. Toilet flushing, cooling, and limited landscape irrigation demands can potentially be met using recycled water, assuming acceptable level of quality. Thus, the Project water demands will be classified as typical development, domestic and potential recycled water use.

2.1 Indoor Water Demand

The Typical Development water demand uses current industry standard demand assumptions for fixtures. These uses include toilets, urinals, sinks, drinking fountains, and showers. Typical Office Development demand estimates are based on the number of employees, the expected usage of facilities (bathrooms, gym showers, drinking fountains, etc.) and the fixture flows and durations. 20% of employees are assumed to use the gym each day, and 80% are assumed to eat the office cafeteria.

Indoor fixtures for sinks, drinking fountains, showers, etc. require potable water. Toilets, urinals, and building cooling systems can use alternative non-potable water sources, if available and of acceptable quality.

Indoor water demands can be reduced by improving the efficiency of the fixtures beyond the minimum code requirements. Examples of fixture efficiency measures are as follows:

- Reduce toilet flushing from 1.6 gallons per flush to 1.28 (CALGreen requirement is 1.28 gpf)
- Reduce urinal flushing from 1 gallon per flush to 0.125 (CALGreen requirement is 0.6 gpf)
- Reduce shower flow rates from 2.5 gallons per a minute to 1.5 (CALGreen requirement is 2 gpm)
- Reduce kitchen sink flow rates (CALGreen requirement is 1.8 gpm)
- Reduce lavatory faucets from 1.5 gallons per minute to 0.5 (CALGreen requirement is 0.5)

Combined, these efficiency measures result in a fixture water demand reduction of approximately 35%. These measures also meet the CALGreen requirements if recycled water is not provided to the Project.

Table 2-1 – Indoor Water Demands Office

Use Type	Number of People	Daily Occupant use per day	Durations (seconds)	Typical Flowrate (GPM) or Gallons Per use	Typical Demand (gallons)	Project Flowrate (GPM) or Gallons Per use	Project Demand (gallons)	Notes/ Assumptions	
Men - Toilet	5,500	1	60	1.6	8,800	1.28	7,040		
Men - Urinal	5,500	2	60	1	11,000	0.13	1,375		
Woman - Toilet	5,500	1	60	1.6	8,800	1.28	7,040		
Woman - Dual Flush Toilet	5,500	2	60	1.6	17,600	1.00	11,000		
Drinking Fountain	11,000	1	5	1	917	1	917		
Bathroom Faucet	11,000	3	15	0.5	4,125	0.5	4,125		
Bathroom Faucet	11,000	3	15	0.5	4,125	0.5	4,125		
Showers Gym	2,200	1	300	2.5	27,500	1.5	16,500	20%	20% of employees use the showers in the building and/or at the gym
Gym Bathroom Faucet	2,200	1	15	0.5	275	0.5	275	20%	20% of employees use the bathroom faucet in the building and/or at the gym
Kitchen Sink	11,000	1	15	2.2	6,050	1.5	4,125		
Cafeteria	2,200	1	N/A	6	10,560	6	10,560	6	Office Cafeteria approximated 6 gallons per employee eating (80%), per day
Daily demand (gallons)					99,752		67,082		
Annual demand (acre-feet)					76.8		51.6	251	Work Days
Daily demand (gallons/SF)					0.06		0.04		
Daily demand (gallons/employee)					9.07		6.10		
Annual demand recycled water (acre-feet)					35.5		20.4		

Table 2-2 – Indoor Water Demands Residential

Use Type	Number of People	Daily Occupant use per day	Durations (seconds)	Typical Flowrate (GPM) or Gallons Per use	Typical Demand (gallons)	Project Flowrate (GPM) or Gallons Per use	Project Demand (gallons)	Notes/ Assumptions	
Toilet	6,005	1	60	1.6	9,608	1.28	7,686		
Dual Flush Toilet	6,005	3	60	1	18,015	0.13	2,252		
Bathroom Faucet	6,005	6	15	0.5	4,504	0.5	4,504		
Bathroom Faucet	6,005	6	15	0.5	4,504	0.5	4,504		
Showers	6,005	1	300	2.5	75,063	1.5	45,038		
Kitchen Sink	6,005	3	15	2.2	9,908	1.5	6,756		
Dishwasher	6,005	0.33	60	6	11,890	4	7,927		
Laundry	6,005	0.33	60	8	15,853	6	11,890		
Daily demand (gallons)					149,344		90,555		
Annual demand (acre-feet)					160.4		97.3	350	Live Days
Daily demand (gallons/person)					24.87		15.08		
Daily demand (gallons/unit)					62.18		37.70		
Annual demand recycled water (acre-feet)					29.7		10.7		

Table 2-3 – Indoor Water Demands Retail

Program Type	Program (sqft)	Typical Water demand (gallons per SF)	Typical Demand (gallons)	Project Water demand (gallons per SF)	Project Demand (gallons)	Notes/ Assumptions	
Entertainment	120,000	0.25	29,760	0.17	20,013	6	Times Retail
Restaurant/Food and Beverage	147,000	0.62	91,141	0.42	61,291	15	Times Retail
Retail	133,000	0.04	5,497	0.03	3,697		Similar to office space without cafeteria
Daily demand (gallons)			126,398		85,001		
Annual demand (acre-feet)			141.6		95.2	365	Work Days
Approximate eating customers per day (people)					10,215	6	Office Cafeteria approximated 6 gallons per employee eating, per day
Annual demand recycled water (acre-feet)			7.1		4.8	5%	Percentage of Potable Water Use to estimate recycled water use

The water usage rates have been assumed to be different for entertainment, restaurant/food and beverage and retail. These rates should be confirmed by Cal Water.

2.2 Process Water for Mechanical Cooling Systems

The Typical Development water demand uses industry-standard demand assumptions for the mechanical cooling system. The baseline assumptions are the provision of direct potable makeup water and chemical treatment for system protection. This information, combined with the project program, is used to estimate the water that a typical project would use.

Process water for the building cooling systems is the largest water demand. Because of this, it is desirable for the cooling towers to run on recycled water. Towers are anticipated to use slightly more water overall with recycled water due to elevated chloride concentrations. Three cycles of concentration is assumed for process water demand using a blend of domestic and recycled water. Operating cooling towers at higher cycles of concentration results in makeup water savings, as fresh water is less frequently used to charge the towers. A non-chemical treatment system ensures that corrosion and bacterial/microbial growth are mitigated, while allowing slightly higher cycles of concentration than chemical treatment. Treatment type is yet to be confirmed.

Total consumption is still in development for recycled water and may vary based on final building design and programming, as well as available quality. Final quality requirements are subject to change, confirmation of requirements to follow review and acceptance by selected equipment vendors. It is expected that the recycled water quality will improve in the future and the amount of recycled water use would increase.

The estimate for cooling tower demand for office/retail spaces is as follows:

Table 2-4 – Cooling Towers Water Demands

Baseline Cooling Demand	70	acre-feet
Hybrid Cooling Savings	15.12	acre-feet
Geothermal/Ice Savings	15.12	acre-feet
Shift Cooling load to Ice Overnight	10.08	acre-feet
Cooling Tower Water Demand	29.68	acre-feet

Cooling Tower Assumptions - Typical Development Covering all Demand

Makup Water Chloride Concentration (PPM)	Water Type	Chloride Concentration Limit (PPM)	Cycles of Concentration	Annual Water Demand (acre-feet)	Potable Water Demand (acre-feet)	Recycled Water Demand (acre-feet)
145	Recycled Water from Sunnyvale (Blending at Sunnyvale Wastewater Treatment Plant to obtain 500 TDS limit)	250	1.7	123		123
110	50/50 Blend Recycled/Potable Water	250	2.3	88	44	44
75	Potable Water	250	3.3	70	70	

Cooling Tower Assumptions - 2,800 tons of remaining cooling demand

Makup Water Chloride Concentration (PPM)	Water Type	Chloride Concentration Limit (PPM)	Cycles of Concentration	Annual Water Demand (acre-feet)	Potable Water Demand (acre-feet)	Recycled Water Demand (acre-feet)
145	Recycled Water from Sunnyvale (Blending at Sunnyvale Wastewater Treatment Plant to obtain 500 TDS limit)	250	1.7	52		52
110	50/50 Blend Recycled/Potable Water	250	2.3	37	19	19
75	Potable Water	250	3.3	29.68	29.68	

2.3 Landscape Irrigation

The Water Use Classifications of Landscape Species (WUCOLS) Landscape Coefficient Method was used to develop the typical demand for the landscaping irrigation system. This method, combined with the preliminary landscape plan, is used to estimate the water a typical commercial development of this scale would use. The factors that are considered for landscape water demands are climate, planting type, planting density, and irrigation efficiency.

Adjustments to the landscape irrigation demand assumptions significantly impact the water estimate. Irrigation demand is reduced by using plants that consume less water and by increasing the efficiency of the irrigation systems. It is currently assumed that at least 50% of the landscape irrigation needs can be met with recycled water. When Sunnyvale improves the quality of recycled water in the future, a majority of landscape irrigation demands can be met by recycled water.

The assumptions for each factor in the landscape water demand are shown, and the average use estimates for each type of planting under the Typical Commercial Development and Project are as follows:

Table 2-5 – Irrigation Water Demands

Landscape Type	Acreage	Typical Demand Rate (acre-feet/acre)	Typical Annual Demand (acre-feet)	Project Demand Rate (acre-feet/acre)	Project Annual Demand (acre-feet)	Notes/ Assumptions	
Roof - Oak Chaparral	17.87	2.94	52.6	1.57	28.1		
Roof - Valley Meadow	5.26	4.12	21.6	2.35	12.4		
Roof - Olive Grove	1.04	4.12	4.3	2.35	2.5		
Roof - Vineyard	3.98	4.39	17.5	2.97	11.8		
Roof - Orchard/Understory	2.16	8.24	17.8	6.06	13.1		
Roof - Lawn and Turf	0.14	5.88	0.8	4.12	0.6		
Ground - Trees	5.07	2.94	14.9	1.57	8.0		
Ground - Ground Cover	4.05	4.12	16.7	2.35	9.5		
Ground - Lawn and Turf	1.01	5.88	6.0	4.12	4.2		
Total	40.59	3.75	152.2	2.22	90.1		
Annual demand recycled water (acre-feet)			76		45	50%	Recycled Water Ratio

Table 2-6 – Detailed Irrigation Water Demands Calculations with WUCOLS methodology

		Typical Project						Vallco Town Center					
Landscape Type	Acreage	Plant Species Factor (ks)	Density Factor (kd)	Microclimate Factor (kmc)	Landscape/ crop coefficient (Kc) or (Kl)	Irrigation efficiency (%)	Annual Water Demand (feet)	Plant Factor	Density Factor	Microclimate Factor	Landscape/ crop coefficient	Irrigation efficiency	Annual Water Demand (feet)
Roof - Oak Chaparral	17.87	0.5	1	1	0.5	70%	2.94	0.4	0.9	0.9	0.324	85%	1.57
Roof - Valley Meadow	5.26	0.7	1	1	0.7	70%	4.12	0.6	0.9	0.9	0.486	85%	2.35
Roof - Olive Grove	1.04	0.7	1	1	0.7	70%	4.12	0.6	0.9	0.9	0.486	85%	2.35
Roof - Vineyard	3.98				0.8	75%	4.39				0.65	90%	2.97
Roof - Orchard/Understory	2.16				1.4	70%	8.24				1.25	85%	6.06
Roof - Lawn and Turf	0.14				1	70%	5.88				0.85	85%	4.12
Ground - Trees	5.07	0.5	1	1	0.5	70%	2.94	0.4	0.9	0.9	0.324	85%	1.57
Ground - Ground Cover	4.05	0.7	1	1	0.7	70%	4.12	0.6	0.9	0.9	0.486	85%	2.35
Ground - Lawn and Turf	1.01				1	70%	5.88				0.85	85%	4.12

The establishment period is expected to be within the first 10 years after planting. For some plant species it may be shorter. During the establishment period, an additional 20% of the annual irrigation demand should be included for each plant type.

3 Water Demand Summary

The following is a summary of the water demands for the Project, with or without recycled water:

Table 3-1 – Water Demand Summary using all Potable Water

Water Demands Using All Potable Water	Typical Annual Demand (acre-feet)	Project Annual Demand (acre-feet)
Indoor - Office	77	52
Indoor - Residential	160	97
Indoor - Retail	142	95
Cooling Towers	70	30
Irrigation	152	90
Total	601	364

Table 3-2 – Water Demand Summary using Potable Water and Recycled Water

Water Demands with Recycled Water Use	Typical Annual Potable Demand (acre-feet)	Typical Annual Recycled Demand (acre-feet)	Project Annual Potable Demand (acre-feet)	Project Annual Recycled Demand (acre-feet)
Indoor - Office	41	36	31	20
Indoor - Residential	131	30	87	11
Indoor - Retail	135	7	90	5
Cooling Towers	44	44	19	19
Irrigation	76	76	45	45
Total		618		371
	426	192	272	99
Percentage of Total	69%	31%	73%	27%

Recycled water would be used for non-potable needs such as toilet flushing, cooling demands, and a portion of irrigation requirements. These demands constitute 27% of the Project demand, equivalent to 99 ac-ft/yr. On-site rainwater reuse and greywater treatment systems are being investigated to limit the amount of water used as well.

The water consumption records for the existing buildings (1.2 M SF retail) will be studied by Cal Water as part of the EIR's Water Supply Assessment. The existing use records will be compared to the future demand to evaluate the impact of the Project in the Water Supply Assessment (WSA).

Appendix H

Recycled Water Pipeline Extension Report

LUK AND ASSOCIATES

Project Report

Project Name: **Vallco Town Center Project 50% BMR - Recycled Water Pipeline Extension**

Owner: **Vallco Property Owner, LLC**

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0 Project Report Purpose

Luk and Associates has been contracted by Vallco Property Owners, LLC to analyze the proposed Vallco Town Center Project ("Project") program and evaluate the options to extend recycled water service to the Project.

This report is based on existing information, the Vallco Town Center Specific Plan Initiative submitted in March 2016, and information from projects in the area, mainly Apple Campus 2. The majority of the information is with regards to the Apple Campus 2 Project and the partnership between City of Sunnyvale, Santa Clara Valley Water District, California Water Company (Cal Water), and Apple for the Wolfe Road Pipeline Extension.

1 Wolfe Road Pipeline Extension Project - SCVWD, Sunnyvale, Apple, and Cal Water

In 2013 the City of Sunnyvale, Santa Clara Valley Water District (SCVWD), Apple, and Cal Water entered into a partnership to extend recycled water service in the City of Sunnyvale south to the Apple Campus 2 Project. The role of each partner is as follows:

- City of Sunnyvale – Recycled Water Producer
- Santa Clara Valley Water District - Wholesaler
- Cal Water – Retailer
- Apple - Customer

The Wolfe Road Pipeline Extension Project is a short term expansion of Sunnyvale/SCVWD's facilities and part of a greater masterplan to expand recycled water use into the west-side of Santa Clara County. The following images show the proposed pipeline extension to Apple, the associated improvements, and potential long term customers.

Figure 1-1 – Wolfe Pipeline Extension Project – From City of Sunnyvale / Hydro Science

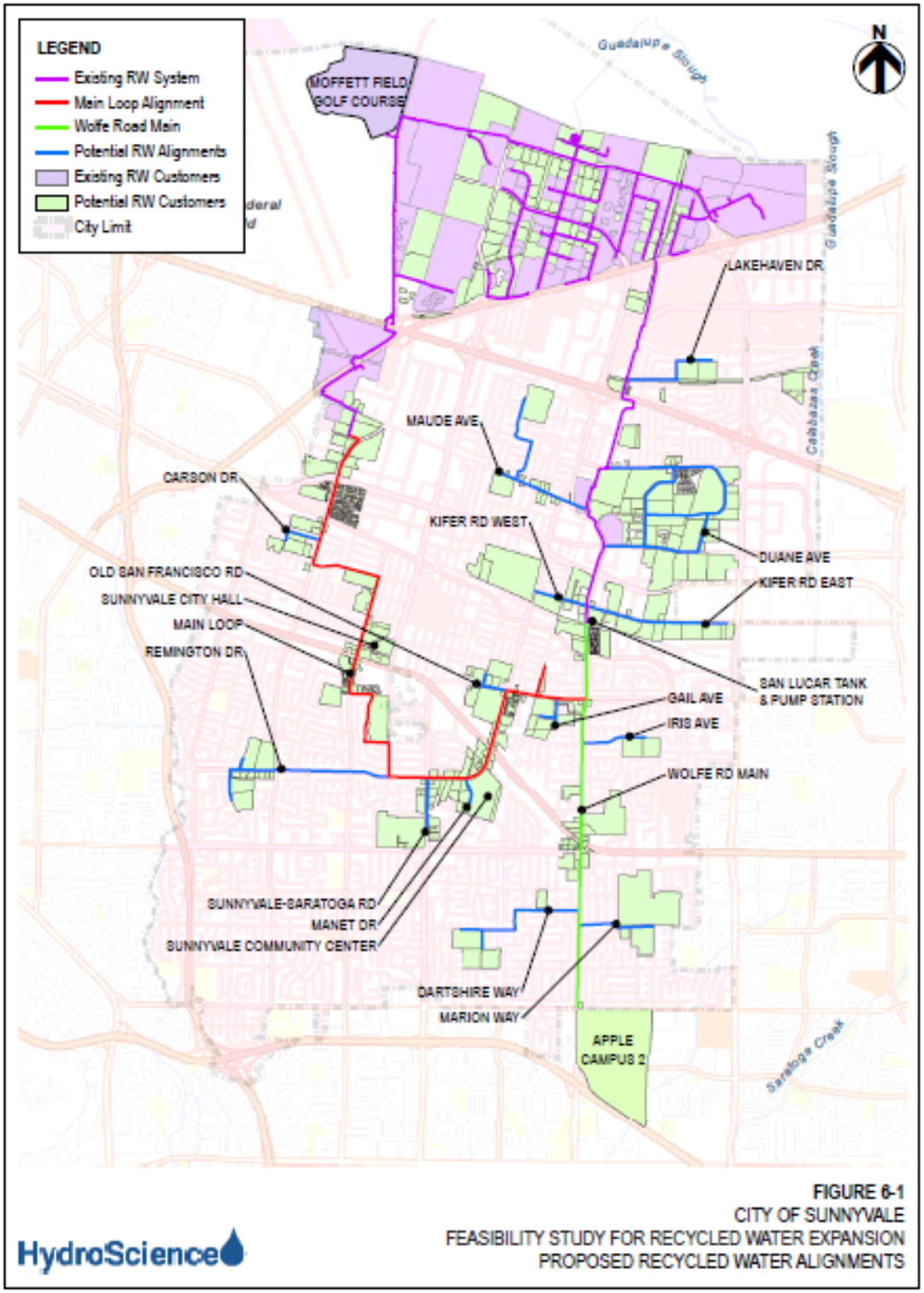
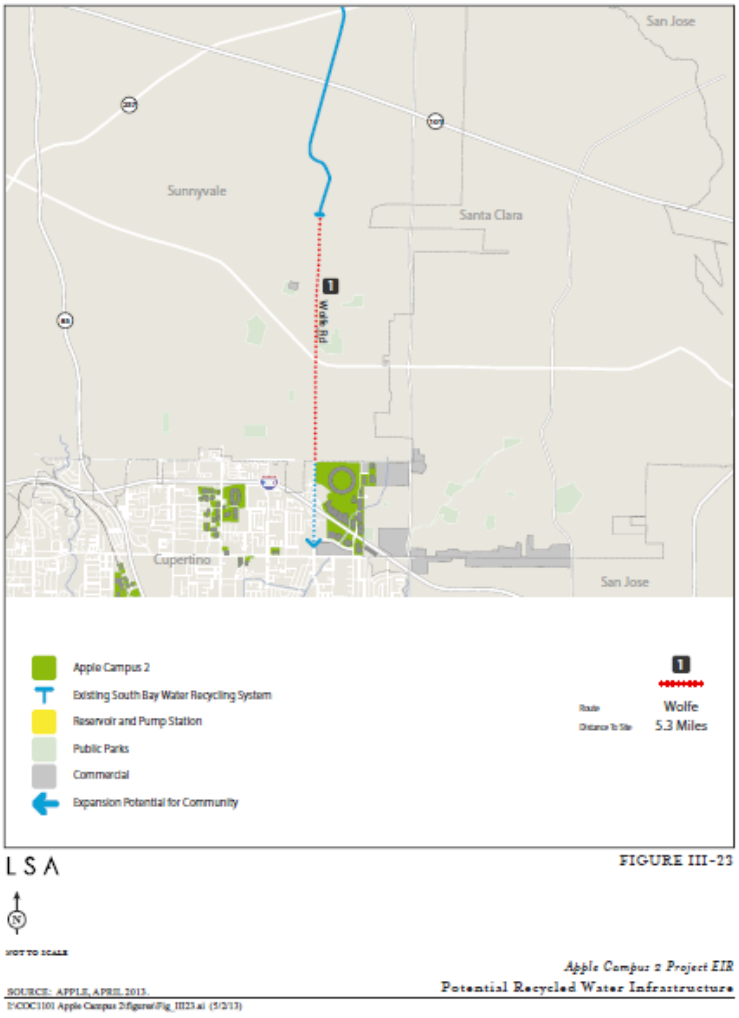


Figure 1-2 – Wolfe Pipeline Extension Project – From City of Cupertino / LSA

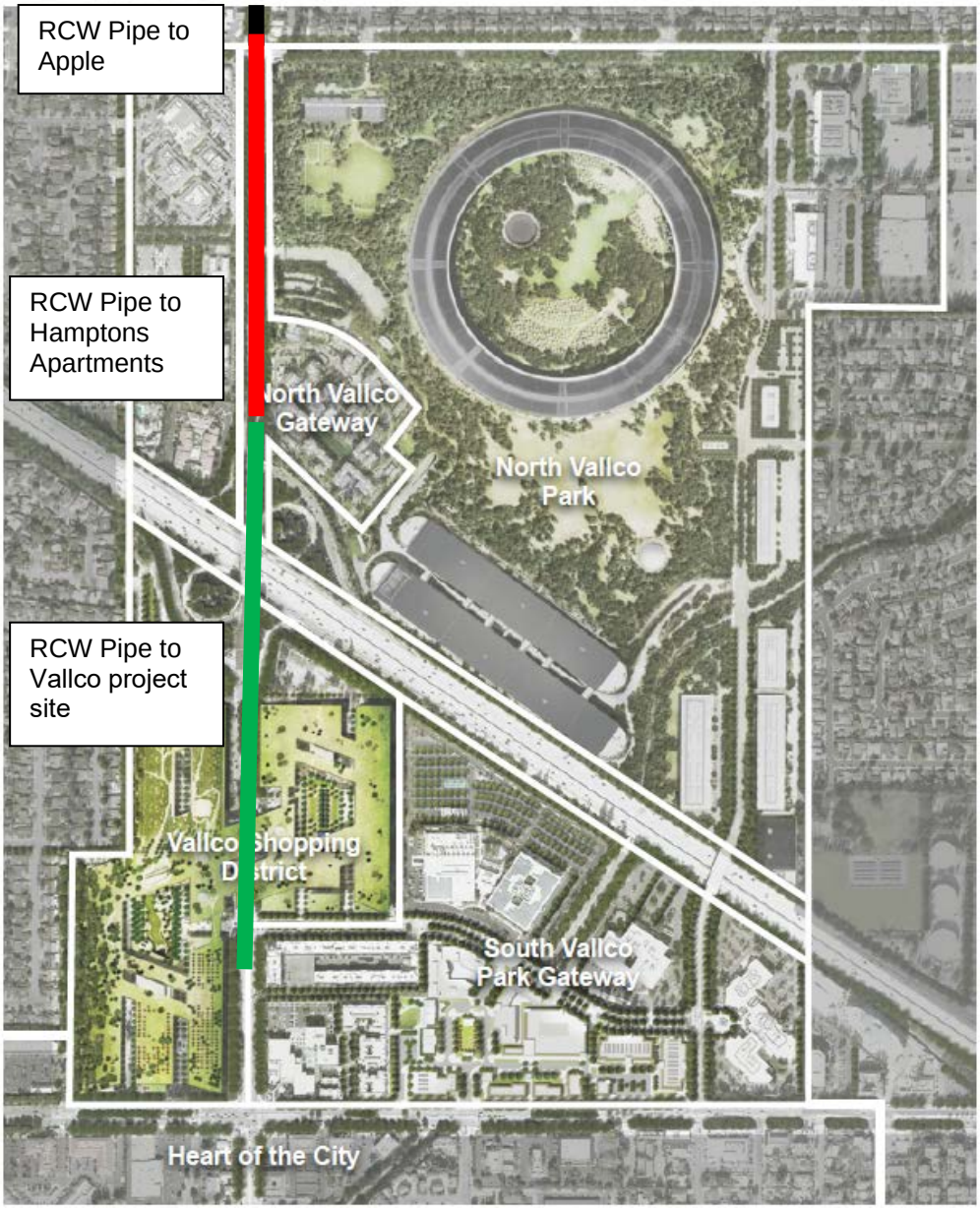


The major components and attributes of this pipeline extension project are as follows:

- 13,200 linear feet (approximately 2.5 miles) of 24-inch pipe
- 1 million gallons per day (MGD) Booster Pump Station
- Cost is approximated at $17.5M for design and construction (approximately $1,250/linear-feet, ($16.2M design/construction for pipeline only))
- 40 PSI pressure (30 to 35 PSI after meter) will be provided to Apple Campus 2
- Water quality provided to Apple is expected to be approximately 500 mg/l (Total Dissolved Solids (TDS))
- City of Sunnyvale is undertaking Wastewater treatment upgrades to provide higher quality of recycled water per Apple's requirements under Sunnyvale's Master Plan for Water Pollution Control Plant. City of Sunnyvale has stated that there is sufficient water that can be treated at the wastewater treatment plant and recycled water can be available for the City of Cupertino and future projects.

The pipeline extension to the Vallco Specific Plan area would be approximately 4,200 linear feet (0.8 miles), and can be considered as two separate segments as shown below:

Figure 1-3 – Sunnyvale/SCVWD - Extension to the Project



The Wolfe Road connection is the preferred option, and a route supported by the City of Cupertino, Santa Clara Valley Water District, and the City of Sunnyvale based on preliminary discussion and feedback from the agencies. The City of Cupertino would like to see this pipe reach Stevens Creek Blvd so recycled water can be connected to other areas of the City.

2 Recycled Water Demand Analysis

The recycled water demand analysis per the proposed Project program is categorized in detail in the Water Demand Assessment.

The following is a summary of the recycled water demands for the Project:

- Toilet Flushing – 36 acre-feet
- Cooling Towers – 19 acre-feet
- Irrigation – 45 acre-feet
- **Total – 99 acre-feet**

2.1 Hamptons Apartments Upgrade - Recycled Water Demands

The Irvine Company has the potential Hamptons Apartments development project, which is also considering connecting to an extended recycled water line as part of its proposed redevelopment project.

Table 2-1 – Hamptons Apartments Upgrade Program

Hamtons Project Program	Program (sqft)	Units	Size Per Unit (sqft)	People
Residential	942,000	942	1,000	1,884
Existing Residential	342,000	342	1,000	684

The following is a summary of the recycled water demands for the Project. These should be confirmed by the Hamptons Project team:

- Toilet Flushing – 7 acre-feet
- Cooling Towers – 25 acre-feet
- Irrigation – 4 acre-feet
- **Total – 36 acre-feet**

3 Wolfe Road Pipeline Extension Feasibility Study

The main components for the Wolfe pipeline extension are as follows:

3.1 Wolfe Road adjacent to Apple Campus 2

Per the cross sections below, the majority of the existing and recently installed utilities are under the north bound lanes, as shown on the right side of the graphics below. The graphics are a bit outdated, as the 27-inch sanitary sewer was actually installed in the south bound lane adjacent to the median. Regardless, there should be ample space along the south bound lanes to install a recycled water pipe with the necessary clearances from the recently installed sanitary sewer pipe and the existing potable water line in the landscape area under the curb.

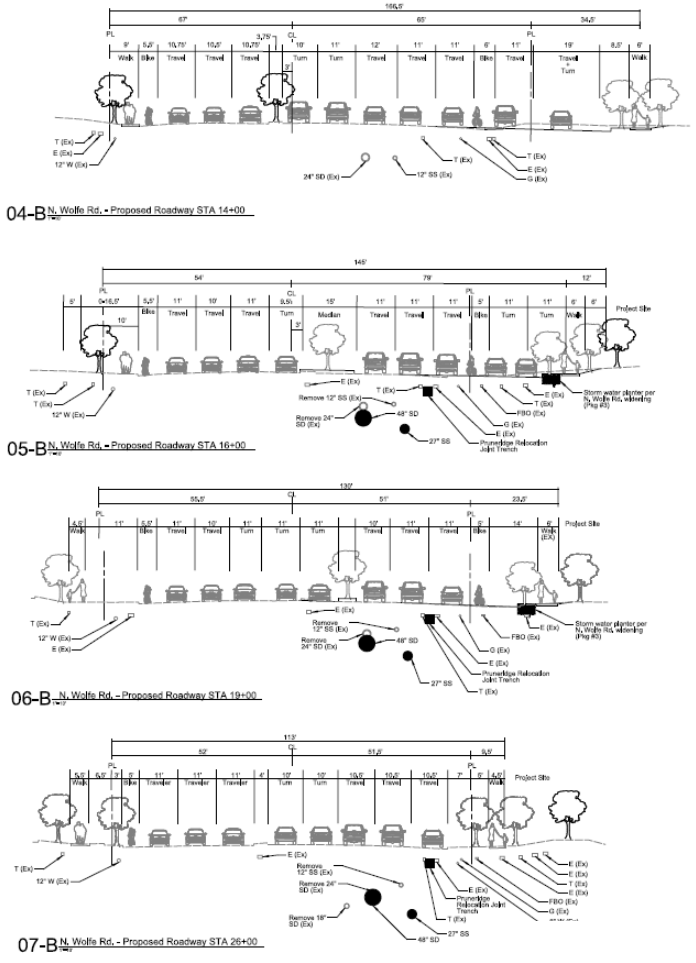


Figure 3-1 – Wolfe Utility Cross Sections adjacent to Apple (04 south to 07 north)

3.2 Wolfe Road and I-280 Overpass

When examining Apple's mitigation work at the Wolfe I-280 interchange, the drawings show an existing gas line that is located on the east side of the street (north bound lanes) that continues in the overpass. The PG&E Maps show that this 8-inch gas line is installed in a 12-inch casing for the overpass. Google Earth/Maps do not show this gas line hung off the side of the overpass so it is likely that is buried in the roadway/structural section. Google Earth/Maps also shows the roadway structural section in a box configuration with the sidewalk cantilevered.

There could be an opportunity to bury the recycled water pipe in the street/roadway section, or perhaps hang it from the underside of the cantilevered sidewalk. Other utility work will need to be completed at this crossing, so the recycled water pipeline could be located within a utility corridor. Further coordination between Caltrans and the City will determine a feasible strategy at the overcrossing.

Figure 3-2 – View of west side (Wolfe southbound lanes) of Wolfe overpass from I-280

3.3 Wolfe Road adjacent to the Project

From Apple's mitigation work at Wolfe/Stevens Creek Blvd it seems as though there is a storm drain in the center of the street, and sanitary sewer in the western most lane (southbound Wolfe). The east side of the street (northbound Wolfe) seems to be congested with several other utilities. It seems likely that the recycled water could run on the west side of the street under the Wolfe southbound lanes.

3.4 Pumping - Other Considerations

Storage and Pumping impacts of the pipeline extension are provided as follows, but detailed analysis for these systems will need to be provided in future studies.

Considering the low flow rate of approximately 50 to 75 GPM and only 15 feet of vertical elevation difference from Wolfe/Homestead to the Project, the additional head on the system is nominal considering 250 feet of Total Dynamic Head for the Wolfe Pipeline Extension. Any additional pumping system upgrades are expected to be nominal.

4 Preliminary Cost Estimate

The following is a summary of the cost discussion:

4.1 Unit Costs Discussion

The costs of the Wolfe Pipeline extension project for design, permitting and construction have been approximated at $1,250 per linear foot of 24-inch pipe in 2015 dollars. The majority of the costs are in traffic control, excavation, trenching, and not the pipe material/size itself. When considering the cost estimate for the Wolfe Pipeline extension a cost of $1,250 per linear foot is reasonable for a pipe size from 24-inch to 12-inches, with a likely variation of 20% to 30%.

4.2 Inflation/Construction Costs rising

With the amount of construction going on in the Bay Area, construction costs have been steadily rising. The past two years costs have been going up 5% each year and that trend is likely to continue. It is assumed that construction of the pipeline extension to the Project would not be until 2021, which would correlate to an increase of roughly 30%.

4.3 Cost Summary and Other Factors

Considering these factors a cost of $1,600 per linear foot of 24-inch pipe is likely to be viable in 2019, expected date of construction after entitlements for the Project. The approximate costs are as follows, broken out by project phase:

1. Homestead to Pruneridge – $2.4 M- 1,500 linear feet
2. Pruneridge to Vallco – $5.1M - 3,200 linear feet
3. Vallco to SCB – $1.6M - 1,000 linear feet

Total – $9.1M - 5,700 linear feet of pipe

With new pipeline extension initial capital projects this cost savings may not be available. For example Apple has agreed to pay the same price for recycled water as potable water for Apple Campus 2. This water rate structure was required by Cal Water, Sunnyvale, and SCVWD to generate a level of revenue to make the deal economically viable.

It is expected that all three phases will be implemented as part of the same project.

5 References (in order of most current)

The Hills at Vallco Planning Submission, Vallco Property Owners, LCC. September 2015
http://www.cupertino.org/index.aspx?page=1178

SCVWD Board Agenda Memo, March 24th 2015 by SCVWD –
http://cf.valleywater.org/About_Us/Board_of_directors/Board_meetings/_2015_Published_Meetings/MG56773/AS56779/AS56780/AI56799/DO56832/1.PDF

Wolfe Road Recycled Water Facilities Engineer's Report, January 2015 by SCVWD Water Utility Capital Division –
http://www.valleywater.org/WorkArea/linkit.aspx?LinkIdentifier=id&ItemID=12247

SCVWD Board Agenda Memo, September 23rd 2014 by SCVWD –
http://cf.valleywater.org/About_Us/Board_of_directors/Board_meetings/_2014_Published_Meetings/MG55338/AS55344/AS55346/AI55398/DO55502/1.PDF

Apple Campus 2 DEIR, October 2013, by City of Cupertino/LSA
http://www.cupertino.org/index.aspx?page=1178

Draft Mitigated Negative Declaration, September 24th 2013 by City of Sunnyvale, http://sunnyvale.ca.gov/Portals/0/Sunnyvale/CouncilReports/2013/13-226.pdf

City of Sunnyvale Feasibility Study for Recycled Water Expansion, June 2013 by City of Sunnyvale/Hydro Science – Volume 1
http://sunnyvale.ca.gov/Portals/0/Sunnyvale/ESD/Water/Recycled%20Water%20Expansion%20Report/Recycled_Water_Feasibility%20Study_Part1.pdf

City of Sunnyvale Feasibility Study for Recycled Water Expansion, June 2013 by City of Sunnyvale/Hydro Science – Volume 2 http://sunnyvale.ca.gov/Portals/0/Sunnyvale/ESD/Water/Recycled%20Water%20Expansion%20Report/Recycled_Water_Feasibility%20Study_Part2.pdf

Appendix I

Sanitary Sewer Capacity Study

LUK AND ASSOCIATES

Project Report

Project Name: Vallco Town Center Project 50% BMR – Sanitary Sewer Capacity Study

Prepared By:

Document Owner(s)	Project/Organization Role
Manish Dalia	Luk and Associates

TABLE OF CONTENTS

0 Executive Summary

The Proposed Project will require upgrade of the existing sanitary sewer systems to support the additional loads. This can either be replacement of the existing 15-inch line at 0.5% slope with 21-inch line at 0.4% slope on the north side of Wolfe Road. Alternatively an additional 18-inch pipe can be installed at 0.45% slope with the existing 15-inch pipe remaining.

1 Project Report Purpose

Luk and Associates has been contracted to analyze the proposed Vallco Town Center Project ("Project") program and evaluate the capacity of the sanitary sewer system in the surrounding area and potential Project impacts.

This report is a study based on existing information, a City application in September 2015, and public information from projects in the area. This report summarizes the items related to the sanitary sewer design upgrades required to facilitate the Project development, and other future development in the Cupertino area.

2 Background and Overview

Luk and Associates met with the Cupertino Sanitary Sewer District (CSD) to discuss the existing system and the proposed Project. The majority of the existing buildings on the Project site discharge to the 15-inch main sewer flowing north on Wolfe Road. This 15-inch line services a large portion of the City of Cupertino, and is at capacity (assuming half full flow) for dry weather flow.

The 15-inch sewer system, connects to the recently installed 27-inch at Wolfe/Pruneridge that ultimately discharges to the San Jose/Santa Clara Water Pollution Control Plant via the City of Santa Clara system.

The Cupertino Sanitary Sewer District noted that inflow and infiltration of stormwater into the sanitary sewer system is an issue, and is usually evident 12 to 24 hours after a storm.

As part of the development agreement of the Rose Bowl Development Project (south east corner of N. Wolfe Road and Vallco Pkwy.) a 15-inch sewer pipe was installed along Wolfe from the Project Area, to the perimeter road tunnel.

3 Capacity Analysis

The preliminary study of the flow capacity for the existing sanitary sewer network is based on the network geometry. The calculations assume the following:

- Manning's equation is used to calculate the flow capacity. Upstream flows, infiltration, etc flows have not been considered
- All existing pipes are VCP and their Mannings "n" coefficient is 0.012
- Design capacity for 15-inch pipes and smaller is (0.5D) and for 18-inch pipes and larger is (0.66D or 77.3% of full flow capacity). Depths are expressed in terms of d/D, where "d" is the flow depth and "D" is the diameter

The (4) segments of the sewer system were analyzed, these lines are defined as follows:

- Existing 15-inch pipe @ 0.5% on the west side of Wolfe to Vallco Parkway
- Recently Installed 15-inch pipe @ 1% slope on the east side of Wolfe to Vallco Parkway
- Existing 8-inch overflow pipe @ 0.5% slope from the Norwich Drive Residential Area
- Existing 15-inch pipe @ 0.5% slope from Wolfe near I-280 southbound off-ramp running north

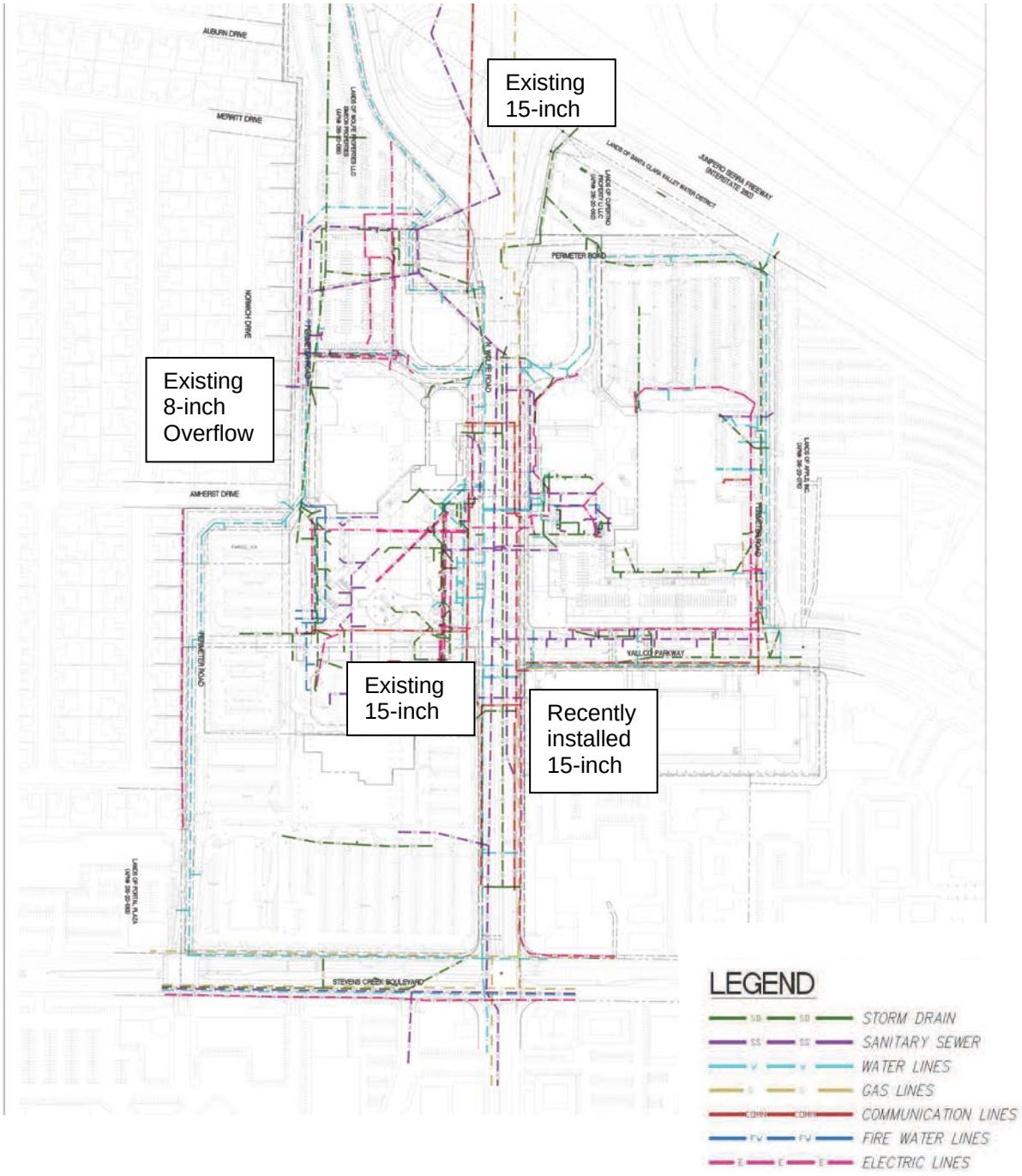
Field verification of existing pipe sizes/slopes is required.

The flow capacity for these (4) segments of the system are as follows:

- Existing 15-inch pipe on the west side of Wolfe - Qd = 2.48 cfs
- Recently Installed 15-inch pipe on the east side of Wolfe - Qd = 3.51 cfs
- Existing 8-inch overflow pipe from the Norwich Drive Residential Area - Qd = 0.46 cfs
- Existing 15-inch pipe from Wolfe near I-280 southbound off-ramp running north - Qd = 2.48 cfs

As a result, the maximum capacity of the existing pipes entering the project area is 6.45 cfs. The capacity of the pipe going north on Wolfe across Interstate 280 (I-280) is 2.48 cfs. In preliminary meetings with CSD they indicate this pipe is undersized for the existing conditions and future development. CSD should provide historical flow data if available, to be included in the analysis.

Figure 2-1 - Existing Utilities Map and Critical Pipe Segments (from Planning Documents)



4 Catchment Analysis

4.1 Existing catchment analysis

The existing mall/retail is approximately 1.2 M sqft. It is assumed that 400,000 sqft is east of Wolfe Road and 800,000 sqft is on the west side of Wolfe Road.

4.2 Proposed Catchment Analysis

The sanitary sewer systems from the Project will discharge to 2 discreet areas, west of Wolfe Road and East of Wolfe Road. These areas are based on the utility relocations required in Wolfe/Vallco, see civil drawings from the Planning Application. Proposed project will intercept the SS line at the intersection of Wolfe/Vallco and redirect east and around the perimeter road to the Caltrans connection point.

The east of Wolfe Road catchment will consist of approximately 1,810,000 sqft of mixed use office/commercial, the cooling towers, and 1,043,00 residential. The cooling towers may move locations in the future, and if it does the analysis will be updated accordingly. The flow from this area will be conveyed in a relocated line from Wolfe/Vallco intersection to Vallco/Perimeter to Wolfe near I-280 southbound off-ramp.

The west of Wolfe Road catchment will consist of approximately 1,807,000 sqft of residential and approximately 400,000 sqft of retail/entertainment. The flow from this area will be conveyed in a new line from the south end of Perimeter Road near Stevens Creek Blvd, around Perimeter Road, to Wolfe near I-280 southbound off-ramp.

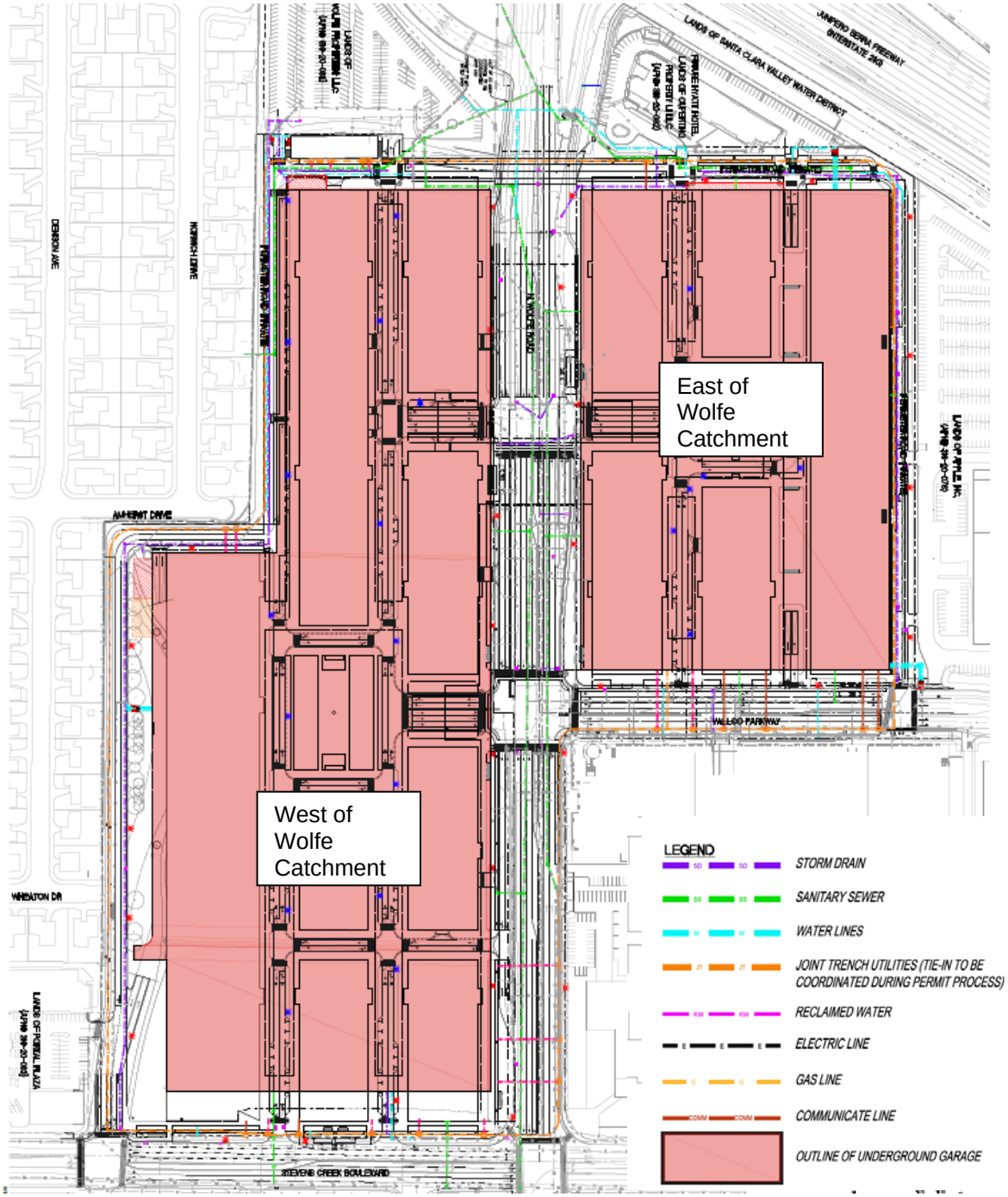
4.3 Existing & Proposed Catchment Comparison

Comparing the proposed and existing catchments, the difference in areas can be used to help determine a relocation strategy along Wolfe/Perimeter Roads. The differences are summarized as follows:

- East of Wolfe Catchment decrease of 400,000 sqft of retail and increase of 1,810,000 sqft of commercial and 1,043,000 increase of residential
- West of Wolfe Catchment decrease of 400,000 sqft of retail and increase of 1,807,000 sqft of residential

Since the land uses are different, the catchment comparison does not provide an accurate means of assessing sewer capacity upgrades.

Figure 3-1 – Proposed Utility Relocation and Catchment Map (from Sandis)



5 Flow Projections Analysis

5.1 Existing average daily flow analysis

The existing average daily flow dry weather is assessed based on the existing water use records. The existing water demand will be obtained from Cal Water's Water Supply Analysis (WSA) from the EIR. Per Industry Standards, 90% of the indoor potable water demand is assumed to flow to the sewer system.

5.2 Proposed average daily flow

The proposed average dry weather daily flows are based on the proposed annual water demand assessment (WDA) prepared by Luk for the WSA/EIR. 90% of the indoor potable water demand is assumed to flow to the sewer system.

The following table illustrates the projected dry weather flows:

Table 4-1 - Proposed Project Sewer Flows

Water Demands with Recycled Water Use	Project Annual Water Use (acre-feet)	Sanitary Sewer Flows %	Project Daily Sewer Flows (CFS)	Project Daily Sewer Flows (MGD)
Indoor - Office	52	90%	0.06	0.04
Indoor - Cooling Towers	37	90%	0.05	0.03
Indoor - Residential	97	90%	0.12	0.08
Indoor - Retail	95	90%	0.12	0.08
Total	**281**		**0.35**	**0.23**
West of Wolfe - Total			**0.15**	**0.10**
East of Wolfe - Total			**0.19**	**0.13**

It should be noted that recycled water is planned to be used to meet demands for toilet flushing and a portion of the cooling tower demand. If recycled water is used or not, it will not impact the overall sanitary sewer flow projections.

5.3 Existing & Proposed Average Daily Flow Comparison

Comparing the proposed and existing average daily flow, the difference can be used to determine the impact of the Project. The differences will be accounted for when the existing water use information is available from Cal Water.

5.4 Existing & Proposed Flow Comparison per General Plan Update

The Cupertino Sanitary District provided a letter to the City of Cupertino, projecting sewer flows based on the General Plan Update. Within this letter CSD provided sewer rates based on program that should be used to estimate flows. The existing and proposed flow comparison per the General Plan Update is as follows:

Table 4-2 - Proposed Project and Existing Sewer Flows per General Plan Update

Program (sqft)	Residential Occupancy	Sewer Flow Rate (gpd/sf)	Project Daily Sewer Flows (mgd)
1,810,000		0.15	0.27
4,700,000	6,000	94.00	0.56
120,000		0.10	0.01
147,000		0.10	0.01
133,000		0.10	0.01
5,060,000			**0.88**
1,200,000		0.10	(0.12)
-			**0.76**

The existing retail component of the site (approx. 1.2 million sqft of retail) was considered as a credit to calculate the additional sewer flows attributed to the Project.

The rates used in the general plan update (total sewer flow of 0.88 MGD) are conservative considering that the total sewer flow attributed to the Project is more than three times greater than the projected sewer flow from the Water Demand Analysis (total sewer flow of 0.26 MGD). When sizing the improvements in this area, the sewer flows based on the Water Demand Assessment should be used.

6 Peaking Factors

Cupertino Sanitary District contracted a consultant to perform a capacity analysis and flow monitoring study for the proposed sanitary sewer relocation associated with a previously approved project. The Technical Memorandum is titled *Cupertino Sanitary District – Pruneridge Trunk Sewer Rerouting Project: Capacity Analysis for a 10-Year, 24 Hour Rainfall Event* and was prepared by V&A on July 12th, 2013.

The analysis used flow monitoring data from November 2012, December 2012 and March 2013. The dry weather flow was separated from the infiltration/inflow associated with rainfall events. A capacity calculation was performed using the 10-YR, 24-hour storm event to approximate inflow and infiltration for the system.

Considering the flow analysis information around the area, the following are the peaking factors for the system and the projected flows:

- Dry Weather Peaking Factor = 1.65 (Peak Dry Weather flow / Average Flow)
- Wet Weather Peaking factor = 4.68 (Peak Flow / Average Flow)

Table 5-1 - Proposed Project Sewer Flows with Peaking Factors

Water Demands with Recycled Water Use	Project Annual Water Use (acre-feet)	Sanitary Sewer Flows %	Project Daily Sewer Flows (CFS)	Project Daily Sewer Flows (MGD)	Project Daily Sewer Flows with Peaking Factor (CFS)	Project Daily Sewer Flows with Wet Weather Peaking Factor (CFS)
Indoor - Office	52	90%	0.06	0.04	0.11	0.30
Indoor - Cooling Towers	37	90%	0.05	0.03	0.08	0.22
Indoor - Residential	97	90%	0.12	0.08	0.20	0.57
Indoor - Retail	95	90%	0.12	0.08	0.20	0.55
Total	**281**		**0.35**	**0.23**	**0.58**	**1.64**
West of Wolfe - Total			**0.15**	**0.10**	**0.25**	**0.72**
East of Wolfe - Total			**0.19**	**0.13**	**0.32**	**0.91**

6.1 Relocation Capacity

To optimize the existing system, the relocation capacity should be equal to the capacity of the incoming pipes, and the project flows considering the wet weather peaking factor.

- East of Wolfe Catchment = Project Flows with Wet Weather Peaking Factor + Capacity Existing 15-inch pipe on the west side of Wolfe + Capacity of Recently Installed 15-inch pipe on the east side of Wolfe
    - East of Wolfe Catchment = 0.91+2.48+3.51
    - 6.90 cfs (approximately a 21-inch pipe @0.3%)

- West of Wolfe Catchment = Project Flows with Wet Weather Peaking Factor + Existing 8-inch overflow pipe from the Norwich Drive Residential Area
    - West of Wolfe Catchment = 0.72 + 0.46
    - 1.18 cfs (approximately a 12-inch pipe @0.4%)

- Additional Capacity north of Wolfe = East of Wolfe Catchment + West of Wolfe Catchment - Capacity of Existing 15-inch pipe from Wolfe near I-280 southbound off-ramp running north
    - Additional Capacity north of Wolfe = 6.90 + 1.18 – 2.48
    - Additional Capacity north of Wolfe = 5.60
        - Replacing existing 15-inch line at 0.5% slope with 21-inch line at 0.4% slope
        - Install parallel 18-inch line at 0.45% slope

The Project should anticipate funding its fair share of improvements to accommodate its development program, net of existing flow demands, if any. The cost of upgrading the system existing conditions as a result of previous should be shared between CSD, the Project, and other new/future Projects in the area that would benefit with the improvements to the system. We recommend further coordination with CSD on sanitary sewer design, and field verification of all existing pipe sizes/slopes should be confirmed prior to final design of the improvements. .

Appendix J

Project Background

APPENDIX J: PROJECT BACKGROUND

In the 1960s, a group of Cupertino families and property owners came together to launch the overall scheme for the larger approximately 300-acre Vallco Park, whose name was constructed from the first initials of each of the primary developers. Ten years later, the mall was established as a retail component within Vallco Park.

In 1973, the City pursued the regional shopping center on the edge of the City and rezoned the South Vallco district for a new mall (Mall). The Mall opened in 1976 and, at that time, was one of the largest shopping centers in the Silicon Valley, drawing visitors from throughout the region.

Challenges

By the mid-1980s, however, the Mall began to suffer from an inherent inability to respond to the ever-changing demands of consumers and markets. Constraining factors included:

- Fragmented ownership between several different property owners, including multiple retail stores.
- An Operation and Reciprocal Easement Agreement signed onto by the various owners at the outset, which handcuffed the Mall owner from pursuing improvements without unanimous consent.
- Increasing competition for local customers due to the revitalization of nearby downtown shopping districts in neighboring cities.
- Outdated infrastructure in combination with a confusing and inefficient parking layout that began to take its toll.
- Demand for mid-market mass merchandizers, such as the Mall's department stores, began not only to decrease but to plummet throughout the nation, ultimately resulting in the closure of thousands of former anchor stores for malls.
- Regional competition from Valley Fair and Stanford Shopping Center and other sub-regional malls began to shift regional shoppers away from the Mall.
- Changes in consumer purchasing patterns such as online shopping and other retail options.

Regional Competition

Since the 1980s, regional shopping mall competition has only increased. Two of the top performing, super-regional malls in the San Francisco Bay Area located near the Vallco Shopping District are the Stanford Shopping Center and Valley Fair. Today, both shopping centers are thriving and expanding and are two of the most successful shopping malls in the country. Not only is it difficult for flagship retailers who have become tenants at these two

other malls to justify an additional location in the Vallco Shopping District, many are prohibited from doing so due to lease radius restrictions. The Vallco Shopping District also competes with more than a dozen other shopping districts, revitalized malls and walkable downtown neighborhoods including Palo Alto, Los Gatos, Mountain View, Los Altos, and Campbell.

Failed Redevelopment Efforts

Ownership within the Vallco Shopping District has turned over many times since the original developers, with multiple foreclosures and a bankruptcy, staggered between efforts to redevelop the aging Mall. Occupancy began to deteriorate at an accelerated rate in the 1990s. Mall tenancy continued its steady decline into the mid-2000s.

In 2005, two of the Mall's levels were shuttered, leaving the focus on the second floor, and an ambitious plan began to focus on entertainment by adding two new parking structures, multi-screen movie theater, a food court, and a bowling alley. Unfortunately, in September 2008, before the new parking, theaters, food court and bowling were opened, the combined effect of the cost of the renovation and the national financial crisis resulted in the owners filing for bankruptcy.

In September 2009, the Mall was sold again. The Mall further languished and was subsequently resold a few years later. From approximately 2010 to 2014, Mall occupancy had reduced to approximately 82%, which is less than other regional malls, and rents have been heavily discounted. By 2018, Mall occupancy had reduced to 15%, with AMC Theaters, the mall's top anchor terminating its lease and departing in March 2018. The remaining bowling, ice skating and fitness tenants along with a few restaurants cannot attract new tenants or support 1.2 million square feet of retail space.

In contrast, the Stanford Shopping Center thrives with 140 stores, 1.4 million square feet and 98% occupancy. Valley Fair has increased to 273 stores, 1.5 million square feet, and 96% occupancy, and is expanding by another 650,000 sf square feet over next few years for a future total of ±2.1 million square feet.

Community Engagement Efforts

Both the City of Cupertino and VPO have engaged in extensive and ongoing community outreach related to the planning and future of Vallco for nearly six years. From 2012-2014, the City of Cupertino conducted a multi-year General Plan Amendment community outreach effort which included multi-day charrettes, surveys, public hearings, public meetings, and related analysis and environmental review. This process included adoption of a new vision for Vallco as mixed-use town center for the community.

2012- 2015 - Citywide General Plan Update

After acquiring the property in late 2014, VPO conducted an extensive outreach effort with the primary goal of responding affirmatively to the desired vision articulated by the Cupertino General Plan, the Cupertino community and the larger region as a whole. Before hiring an architect, and before even putting pen to paper to develop future plans for Vallco's revitalization, VPO personally engaged nearby neighbors, residents throughout the city and local businesses to introduce themselves as the new owner and to update the community on the status of Vallco. During 2015, VPO sought feedback about what Cupertino residents and businesses liked and didn't like about Vallco, what they wanted to see in a revitalized Vallco, and any concerns.

In February 2015, VPO launched www.vallcovision.com, a community portal for the revitalization of Vallco. The website provided the history of Vallco, a Question/Feedback Page, News, Resources, and updates on proposed revitalization plans.

During the first half of 2015, VPO sought input from the entire Cupertino community, encouraging residents and businesses to **"Chime In"** and share their thoughts on the future revitalization of Vallco. More than 50,000 invitations and mail requests for residents join the community conversation were made to every home and business in Cupertino and included postage-paid Response Cards for community comments and questions, as well as offering a variety of ways to get involved. VPO also placed **"Chime In"** newspaper ads in various newspapers to make residents aware of the redevelopment of Vallco and requesting input from the community.