RANCHO PALOS VERDES
California

City of Rancho Palos Verdes

Engineer's Report

KLONDIKE CANYON GEOLOGIC HAZARD ABATEMENT DISTRICT

FISCAL YEAR 2023-24

LOS ANGELES COUNTY, CALIFORNIA

May 24, 2024

PREPARED BY

KCGHAD COMMISSION

UNDER REVIEW OF:

MR. TIM KELLY P.E.

ASSESSMENT ENGINEER

MPE NO. 25452

ENGINEER'S REPORT

Agency: Klondike Canyon Geologic Hazard Abatement District Board of Directors (KCGHAD)

Project: 2023-24 Abatement Activities Within the District

To: Board of Commission Directors and The City of Rancho Palos Verdes, State of California

Engineer's Report for Fiscal Year 2023-24

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CERTIFICATION

Agency: Klondike Canyon Geologic Hazard Abatement District Board of Directors (KCLAD)

Project: Abatement Activities Within the District

To: Klondike Canyon Geologic Hazard Abatement District Board of Directors and the City of Rancho Palos Verdes, State of California

Engineering Report for Fiscal Year 2023-24

The preparation of this Annual Engineering Report ("Report") is in conformance with the obligation of the Klondike Canyon Geologic Hazard Abatement (District), in the City of Rancho Palos Verdes, to levy assessments within the District to provide special services upon each lot or parcel of land in the District in proportions to the estimated special benefits to be received by each such lot or parcel of land for Fiscal Year 2023-24.

I, Tim Kelly, authorized representative of the District, the duly appointed Assessment Engineer submit the following Report which consists of the following four (4) parts and an Appendix.

PART I: Overview: Provides historical information about the District and the general scope and responsibilities of the District.

PART II: Financial performance of the District including the budget and proposed budget for FY 24/25.

PART III: Explanation of the Assessment apportionment process and an estimated cost of the improvements on each benefited lot or parcel of land within the Assessment District.

PART IV: Conclusion

Appendix 1 – Assessment Roll

In conclusion, it is my opinion that the costs and expenses of the District have been assessed to the lots and parcels within the boundaries of the District in proportion to the estimated special benefits to be received by each lot or parcel from the services provided.

DATED: May 24, 2024.

Time Kelly, P.E., Assessment Engineer, MPE No. 25452

Part I

History:

- In 1979-1982 geologic studies were done in and around what was then referred to as the Klondike Canyon Landslide which just began to show signs of land movement especially at the intersection of Dauntless/Exultant (head of slide).

- On the 16th day of March, 1982 an abatement district was formed as Klondike Canyon Geologic Hazard Abatement District with a map of the district that was based on data from a geologic investigation report prepared by Robert Stone & Associates dated January 12,1982. This report was prepared on behalf of the City of Rancho Palos Verdes (City), and the principal author of the report was Dr. Perry Ehling, the City's geologist. The boundaries of the District were documented by City resolution No. 82-17; City resolution No. 82-12 stated that the District is for the prevention, mitigation, abatement of control of the geological hazard (attachment A).

- In 1982 Sikand Engineering Company was hired to prepare hydrology and drainage studies of the landslide, in coordination with geologists, for purposes of making recommendations for the control of surface storm water runoff. The general geology of the Klondike Canyon landslide, including the history of intensive geologic investigation of the slide area, are summarized in a professional paper prepared in 1982 by Scott Kerwin.

- In May 1981 during planned drilling installation of an inclinometer to measure/monitor subsurface movement of the landslide in the beach area near the mouth of Klondike Canyon, an artesian groundwater condition was encountered in the borehole. This work was being performed on behalf of the City, and it was decided to abandon any attempts to install an inclinometer at that location in favor of creating an artesian dewatering well in the borehole. The initial flow from the well was approximately 150 gallons per minute (gpm), but after about a month, the flow decreased to a variable rate of about 20 to 40 gpm. Artesian flow from the well continued until 1987 when a nearby pumping well installed under the direction of the City's geologist, Dr. Ehling, depleted the artesian head.

- In 1987 pumping well in the beach area was drilled to a depth of about 150 feet, and is founded in the same fractured rock, artesian aquifer as the nearby artesian well. The 1987 pumping well is still in operation today, and the original artesian was redrilled in 1987 to install PVC well casing to a depth of 150 feet to act as a monitoring well and a back-up dewatering well.

- In the mid of 90's, a 48" storm drain pipe, with debris basin, was constructed in Klondike Canyon from the upstream side of PV drive South to outlet to the ocean. Around that same time other piping systems, suggested by Sikand Engineering report were temporary installed extending further upstream from-PVDS.

- The 1987 pumping well, with several pump exchanges, was sufficient to maintain the artesian groundwater head in the toe/ beach area of the Klondike Landslide to levels that were typically more than 60 to 70 feet below sea level. This dewatering effort resulted in minimal "creep" movement for more than 40 years with only minor accelerated movement during heavy rainfall years. However, the winter rains of 2023 and 2024, and associated breaks in the local water supply lines, recharged groundwater levels and accelerated movement of the landslide to the point that Federal, State, County, and City authorities declared emergency disasters.

A Word About Globel Positioned System (GPS) Surveys

- Fixed position GPS Survey monuments are positioned throughout the KCLAD Boundary areas. The City has these regularly monitored to determine vertical and horizontal movement of all the slides. Vector analysis maps are drawn from the information for a visual look at the amount of land movement. KCLAD regularly monitors these reports with our Geologists.

What Makes the Landslide Move

Simple answer to that is water. These last two years, 2023-24, The District and surrounding areas have had higher than annual rainfall. Accelerated movement associate with the heavy rainfall has broken underground utility lines at locations where extensional ground deformation has created fractures that extend deep into the landslide. Although accumulation of groundwater in the soil and in the bedrock fractures can increase the overall weight and decrease the strength the earth materials, the overwhelming destabilizing force of the groundwater is hydrostatic pressure, including artesian pressure trapped beneath the Portuguese Tuff in the toe/beach area of the landslide.

What KCLAD is Doing to Mitigate

KCLAD has prepared a 5-step program as follows (see attachment C for Geologist's letter and executive summary of 5-step plan):

Step 1 – Design and construct a storm drain piping system that runs from some 200ft, above the head of the slide to the inlet of the existing storm drain at PV Dr. South. Install a 16" flex-plastic pipe from the head of the slide to P.V. Drive South as a temporary measure.

Step 2 - Add (drill) 3 new dewatering wells at the base of the slide on the beach and a monitoring well at the Dauntless/Exultant Dr. intersection.

Step 3 – Grade a protective drainage swale along the area above the Seaview community to direct water runoff directly to Klondike Canyon. Fill fissures at the head of the slide and in the lower channel of the slide. Also, remove soil creating pressure from the PV slide along its East face where it's trying to join with KCLAD.

Step 4 – Design and built a storm drain system along the head of the Ancient Beach Club Slide, to avoid storm water runoff into the slide plane.

Step 5 – Provide for maintenance budgets to repair existing storm drain systems that have been damaged by the 2023-24 landslide activity.

In summary: the above 5-step mitigation plan is to keep as much water as possible out of the groundwater and, for that water that does get underground, pump it out with dewatering wells to the ocean. KCGHAD's 5-step plan of control for the prevention, mitigation, abatement and control of the geological hazard is our continued focus on the public health, safety and welfare of the District's community.

Cost of Mitigation and 5-Step Plan

The total estimate cost of the 5-step plan is estimated to be $5.4M. Funding requests are actively being perused by KCLAD with City of RPV, County, State and Federal agencies. We hope to be receiving some positive information in the near future.

City Funding: (for current critical needs)

In the interim, KCLAD has been working with the City of Rancho Palos Verdes on an approximate $1.9M loan as a "jump start" to fund a portion of the 5-step plan to move forward with the most critical parts of the construction work in order to avoid, as much as possible, the chance of extreme rains in 2025. Note that the terms of the loan are understood to be solely designated for the "project" improvements. Operational expenditures, including administrative costs, legal or litigation costs, and ongoing maintenance are not permitted uses of these funds. It is the purpose of the 2024-2025 increased assessments, of the members of the District, to fund that operational part of the project needs and to start the replacement of KCLADs reserve funds.

Those portions of the 5-step plan that KCLAD believed to be the most critical are as follows:

- Step 1: Installation of the 16" plastic flex pipe from the gabion wall, at the head of the slide, to channel the water runoff directly to the inlet structure at P.V. Drive South.
  This cost is estimated to be $150,000.00.

- Step 2: Installation of two (2) deep wells at the beach and an observation well at Dauntless/Exultant intersection; including power, pumps, etc.
  This cost is estimated to be $700,000.00

- Step 3: Grading of the protective swale north of the Seaview Community, filling of fissures thru the Canyon and at the head of the slide and removal of earth at the slide's intersect with the Portugues Bend landslide.
  This cost is estimated to be $1,050,000.00.

What KCLAD Has Already Accomplished in 2023-2024

- Videoed all storm drains and sewer to reduce water leaks.
- Worked with the City to clear all brush and trees from around the 48" pipe inlet, the canyon floor, the fishers at the head of the slide and the area around the head of the Ancient Beach Club Slide. The purpose is to provide continuous access and locate fissures.
- Worked with the City to install tarps and sandbags over fissures at the head of the slide.
- Provided for the drilling and installations of a new deep well (150 ft. deeps) and two shallow wells of about 20ft. deep at the toe of the landslide to relieve hydrostatic pressure.
- Worked with CalWater to get water lines moved above surface in areas of concern.
- Requested for reduction of landscape watering in the Portuguese Bend Beach Club and Seaview Tract with Owners.
- Provided weekly monitoring of pumping rates (4 pumps) and water table elevations at the beach wells. Currently pumping at over 200 GPM.
- Provided review and monitoring of GPS monument survey reports.
- Repair and replacement of beach dewatering wells and pump when needed.
- Removal of Portuguese Bend Landslide dirt having lateral forces against the Klondike slide.
- Added a force main system to the 4 pumps to take pumped water directly of the Ocean when beach uplift occurred making gravity pipe system inoperable.
- Repair and cleaning of storm drain system at beach for 48" Klondike drain which is being uplifted and broken by the recent vertical rising of the land at the beach.

Part II: Current Financial Status and Proposed FY 24/25 Budget

The KCLAD Board of Directors has been very focused on accelerating its efforts in the removal of ground water at the base of the landslide where the maximum artesian water pressure exists. In the past year we have drilled a new deep and two shallow wells and installed dewatering pumps in these wells. KCLAD provided constant maintenance to the previously existing pumping well and made attempts at refurbishing the original artesian well. New piping systems needed to be installed and repaired, with the rising beach and surf zone. At the geologist's recommendation, several thousand-cubic yards of earth were removed where the Portuguese Bend landslide is pushing towards the Klondike slide and attempting to become attached. All of the above efforts have reduced KCLAD's cash reserves on hand to approximately $319,000.00 with two months remaining in its fiscal year. (see 2023-24 budget on page 9 and the "KCLAD Reserve" sheet on page 10).

The much talked about 5-step plan (Attachment C), which is estimated at $5.4M, will require large funding sources and will produce a sustainable stabilization to the landslide into the future. The City "Jump Start" funding of $1.9M for immediate project work (see page 6) is intended to stabilize the landslide in the very short time frame between now and the possibility of heavywinter storms beginning at the end of 2024. All of these repayment costs are going to be significant but not nearly as much as the costs for the loss of homes. The only option for now is to get KCLAD in a financial position to provide the construction projects needed for the stabilization. Therefore, to stabilize the slide back to pre-2023 rain events conditions will demand an increase budget both now and into the future and an increase in District Assessments as needed.

The KCLAD Board is also working on grants and loans to make the future needed projects a reality. However, the Board is fully aware that money received from available government sources will solely cover designated projects and not operational expenditures such as administrative costs, legal and litigation costs and ongoing maintenance expenses.

Due to the depletion of KCLAD reserves, the large number of future stabilization projects and the limited allowances of expenditures from borrowed monies (most of which would need to be paid back), the new KCGHAD proposed 2024-2025 budget, shown on page 11, has been increased significantly. Note that budgets and assessments, that are regulated by Proposition 218, are required to be voted on every year when there is a change proposed. Also note that these two funding sources (assessments and government loans) must be viewed as complimentary and not overlapping.

Maintenance & Operations Budget, 2023-2024 Fiscal Year
Klondike Canyon Geologic Hazard Abatement District

Expenses

Account No.	Description	Adopted Budget	2023 July	2023 August	2023 Sept	2023 Oct	2024 Nov	2024 Dec	2024 Jan	2024 Feb	2024 Mar	2024 April	2024 May	2024 June	Annual Totals	Current Budget Balance
	Administration															
010	Exec. Director	$12,000.00	$1,000.00	$1,000.00	$1,000.00	$1,000.00	$1,000.00	$1,000.00	$1,000.00	$1,000.00	$1,000.00	$1,000.00			$10,000.00	$2,000.00
011	Legal Service/Consulting	$2,000.00		$360.00				$8,230.00							$8,590.00	($6,590.00)
013	Board Expense	$200.00				$156.65		$127.00							$283.65	($83.65)
014	Election Services	$1,200.00							$329.26						$329.26	$870.74
016	Admin. Consulting	$500.00													$0.00	$500.00
Total Administration		$15,900.00	$1,000.00	$1,360.00	$1,000.00	$1,156.65	$1,000.00	$9,357.00	$1,329.26	$1,000.00	$1,000.00	$1,000.00	$0.00	$0.00	$19,202.91	($3,302.91)
	Maint. & Operations															
202	Insurance	$5,000.00			$4,931.92										$4,931.92	$68.08
203	Office Expense	$760.00		$436.50		$252.08						$29.91			$718.49	$41.51
209	Well-Pipeline Maintenance	$30,740.00	$230.00	$19,725.00	$24,395.00	$14,881.25	$5,121.10	$12,175.00	$28,446.32	$6,575.00	$22,034.70	$43,346.05			$176,929.42	($146,189.42)
210	Extraordinary Repairs	$25,000.00													$0.00	$25,000.00
211	Electricity	$3,500.00	$290.00	$290.00	$290.00	$290.00	$290.00	$290.00	$290.00	$590.00	$440.00	$440.00				$0.00
212	Channel Maintenance Project	$100,000.00					$92,500.00									$7,500.00
213	Sub-slide Consulting	$10,000.00														$10,000.00
Total Maintenance & Operations		$175,000.00	$520.00	$20,451.50	$29,616.92	$15,423.33	$97,911.10	$12,465.00	$28,736.32	$7,165.00	$22,474.70	$43,815.96	$0.00	$0.00	$278,579.83	($103,579.83)
	Reserves & Contingency															
410	Contingency Fund	$5,540.00														
Total Warrants		$196,440.00	$1,520.00	$21,811.50	$30,616.92	$16,579.98	$98,911.10	$21,822.00	$30,065.58	$8,165.00	$23,474.70	$44,815.96	$0.00	$0.00	$201,782.74	($101,342.74)
Income																
	23/24Assessment	$86,440.00														
	23/24 Direct Payments (Rec.7/21)	$74,373.56														
	23/24 Tax Collector Pymts-req.	$12,066.44														
	23/24 Payments - (rec. later)		$505.20					$4,768.08	$1,206.64	$1,068.93		$3,154.34			$10,703.19	
	Channel Maint. Project - Reserves	$100,000.00								$165,089.49						
Balance Owed			$11,561.24													
Bank Activity																
	Transfers - savings to checking		$10,000.00	$20,000.00	$40,000.00		$100,000.00	$20,000.00	$50,000.00	$325,000.00					$565,000.00	
	Interest Savings/Savings		$22.05	$21.94	$20.20	$19.96	$19.10	$16.04	$14.71	$10.24	$3.38				$147.62	
	Interest CD - 11/7/00 $30,000														$0.00	
	Interest CD - 8/26/05 $60,000														$0.00	
	Bank charges/checking															
	Bank charges/savings															
Reserves																
	B of A Checking		$11,477.39	$9,665.89	$19,048.97	$2,468.99	$3,557.89	$1,735.89	$21,670.31	$173,415.82	$149,941.12	$105,125.16				
	B of A Savings		$647,660.74	$627,682.68	$587,702.88	$587,722.84	$487,741.94	$472,526.06	$423,747.41	$99,826.58	$99,829.96	$102,984.30				
	CD/Downey Savings $30,000		$39,512.08	$39,512.08	$39,512.08	$39,512.08	$39,512.08	$39,512.08	$39,512.08	$39,512.08	$39,512.08	$39,512.08				
	CD/Downey Savings $60,000		$71,269.33	$71,269.33	$71,269.33	$71,269.33	$71,269.33	$71,269.33	$71,269.33	$71,269.33	$71,269.33	$71,269.33				
Total Reserves	2023/2024		$769,919.54	$748,129.98	$717,533.26	$700,973.24	$602,081.24	$585,043.36	$556,199.13	$384,023.81	$360,552.49	$318,890.87	$0.00	$0.00		
Total Reserves	2022-2023		$708,342.02	$706,975.41	$705,361.78	$698,332.10	$696,881.07	$700,720.69	$700,597.85	$703,214.15	$701,183.38	$702,601.11	$769,763.41	$770,917.06		
Total Reserves	2021/2022		$676,171.11	$675,042.93	$669,010.02	$667,638.70	$656,016.60	$659,913.16	$646,389.86	$646,087.97	$644,715.57	$647,128.93	$716,381.58	$717,955.67		
Total Reserves	2020/2021		$569,607.78	$619,774.53	$614,080.66	$612,669.33	$605,920.73	$613,753.01	$613,980.59	$613,883.32	$612,370.20	$607,455.20	$607,536.03	$665,646.38		
Total Reserves	2019/2020		$655,863.32	$616,351.24	$649,289.31	$553,388.73	$551,969.13	$556,449.62	$556,436.07	$556,415.98	$555,010.88	$557,470.54	$557,253.75	$555,488.48		
Total Reserves	2018/2019		$614,856.93	$543,587.60	$608,470.31	$602,527.91	$601,462.00	$599,372.97	$586,422.61	$585,996.40	$584,623.12	$586,982.22	$646,687.64	$655,705.34		
Total Reserves	2017/2018		$559,260.67	-$50,847.97	$556,186.75	$554,309.17	$552,434.64	$552,913.86	$552,860.51	$553,669.61	$551,278.02	$552,341.27	$567,158.36	$615,254.10		
Total Reserves	2016/2017		$547,690.02	$559,021.46	$544,738.40	$543,363.99	$542,699.03	$508,604.68	$508,566.50	$507,514.71	$500,600.64	$500,830.93	$499,511.47	$560,046.67		
Total Reserves	2015/2016		$498,756.64	$497,187.50	$491,759.36	$491,222.30	$486,943.41	$490,004.26	$488,888.46	$488,080.38	$485,651.54	$482,341.98	$478,172.12	$548,845.89		
Total Reserves	2014/2015		$471,458.06	$469,703.75	$460,305.96	$458,926.35	$456,248.35	$459,913.42	$459,809.86	$437,661.56	$431,781.30	$429,255.06	$427,874.86	$499,254.32		
Total Reserves	2013/2014		$434,398.59	$432,853.26	$431,485.60	$426,738.87	$425,136.73	$428,848.16	$428,582.61	$418,334.69	$405,946.52	$406,223.77	$409,633.89	$417,037.00		
Total Reserves	2012/2013		$442,545.69	$438,145.61	$433,915.02	$432,404.93	$431,511.55	$435,140.89	$430,054.51	$430,431.80	$369,058.74	$362,376.88	$362,706.03	$430,573.81		
	* Estimated		*	*	*	*	*	*	*	*	*	*	*	*		

KCLAD RESERVE			
	Beginning	Ending	Gain/Loss
23-24	$769,919.54	$318,890.87	($451,028.67)
22-23	$708,342.02	$770,917.06	$62,575.04
21-22	$676,171.11	$717,955.67	$41,784.56
20-21	$569,607.78	$665,646.38	$96,038.60
19-20	$655,863.32	$555,488.48	($100,374.84)
18-19	$614,856.93	$655,705.34	$40,848.41
17-18	$559,260.67	$615,254.10	$55,993.43
16-17	$547,690.02	$560,046.67	$12,356.65
15-16	$498,756.64	$548,845.89	$50,089.25
14-15	$471,458.06	$499,254.32	$27,796.26
13-14	$434,398.59	$417,037.00	($17,361.59)
12-13	$442,545.69	$430,573.81	($11,971.88)

Klondike Canyon Geologic Hazard Abatement District
Proposed Operating Budget and Expenses
Fiscal Year 2024/2025

Account Description	Budget 2023/2024	Proposed Budget 2024/2025	Comments
Contract Administrative Services			
110 Executive-Administrative	12,000.00	12,000.00	same
111 Consulting Geologist/Legal Service	2,000.00	10,000.00	Geologist & Legal
113 Board Related Expenses	200.00	500.00	General cost increase
114 Election Related Services	1,200.00	1,200.00	same
116 Administration Consultation	500.00	500.00	same
Total Administrative Service	15,900.00	24,200.00	**Total Administrative**
Maintenance & Operations			
202 Insurance	5,000.00	7,500.00	Anticipate premium increase
203 Office Expense	760.00	1,000.00	General cost increase
207 Replacement Reserves		80,000.00	Spent $400,000 on improvements
208 Well Drilling costs		200,000.00	Need to continue well drilling
209 Well & Pipeline Maintenance Services	30,740.00	65,000.00	More pumps & piping
210 Extraordinary Repairs	25,000.00	25,000.00	same
211 Electricity	3,500.00	6,000.00	Increase due to pumps
212 Channel Maintenance Project	100,000.00	100,000.00	same - lifting ocean floor
213 Sub Slide Consulting-Beach Club Slide	10,000.00	10,000.00	same
Total Maintenance & Operations	175,000.00	494,500.00	**Total Maintenance & Operations**
410 Contingency	5,540.00	51,870.00	Contingency
Total Warrants	$196,440.00	$570,570.00	**Total Warrants**
			This is approx. 2.9% increase

Part III: Benefit Assessment

Method of apportionment of the Assessments: the method of apportionment of assessments indicated the proposed assessment of the net amount of the costs and expenses of the maintenance and/or servicing of the improvements to be assessed upon the lots and parcels of land within the Assessment District in proportion to the estimated special benefits to be received by such lots and parcels. The "proposed 2024-2025 Assessment Table" is presented on pages 14 and 15 and in Appendix 1 of this Engineer's report.

Within the assessment Engineer's report, the following has been identified:

1.) The specific services or improvements to be funded by the assessment;
2.) The special benefit that properties withing the proposed assessment district (KCLAD) will receive from those services or improvements.
3.) The estimate or calculations of the costs of the services or improvements;
4.) The direct connection of any proportionate costs of the special benefits received from the services or improvements to the specific assessed properties in relation to the entirety of the cost of the improvement or services.

Assessment Formula:

As defined by Division 17, Chapter 3, Article 1, Section 26572 of the Public Resources Code, a District "...is compromised of an area specially benefited by and subject to special assessment to pay the cost of an improvement." To pay the costs of such improvements, a District may use the Improvement Act of 1911 (Division 7 of the Streets and Highways Code).

To insure a fair and equitable means of levying such assessments, the following formula shall be used to determine the amount of each assessment and is shown on page 16 of this Engineer's report.

Part IV Conclusion:

The record two years of winter rains in 2023 and 2024 took everyone in the District by surprise and changed the Klondike Canyon Landslide from being relatively inactive, for over 40 years, into an extremely active slide that has reclassified the KCLAD (along with neighboring slides) as an emergency disaster area by Federal, State, County, and Local City Governments. With immediate assistance from the City of Rancho Palos Verdes and utility companies, KCGHAD Board started on action plans to start removing more water from the artesian area at the beach with more de-watering wells and pumps, exposing fissures that needed filing/covering at the head of the slide to avoid storm water going directly into the ground and working with geologists with the goal to stabilize the landslide to a pre-2023 condition.

As a result of the land movement, houses were becoming damaged (some worse than others), utilities were becoming broken and repaired on an almost daily basis, paved roads were being torn to pieces and the seashore was being elevated vertically by 6' to 7'. To combat these issues KCGHAD board was forced to reach into the District's reserve funds for more than double the 2023-2024 budget.

To overcome the financial burden placed on KCGHAD by the winter rains, the board set a much higher 2024-2025 budget, raised assessments in preparation for building sustainable projects and paying dept services and establishing a team to make applications to secure funds from Federal, State, County agencies and from the City of Rancho Palos Verdes.

anum	Lrel	map book	page	parcel	Fname	Lname	Address	CSZ	amount	old amount	plotal	Lot Sq.Ft.	Bldg. Sq.Ft.	Sq Ft of Public Hwys	Public Lands	Units of lot	Unit of Building	Units of Public Hwy	Units of Public Land	Parcel Ass'd Units	Proposed charge	% change	ramount
1		7564	001	916	Rancho Palos Verdes	City of	30940 Hawthorne Blvd.	Rancho P.V. Ca 90275	$ 5,981.16	$603.10				24,800.00		0.000	0.000	4.960	0.000	4.960	5,059.05	580%	$227.47
2		7564	002	001	Thomas	Berg	4353 Palos Verdes Dr. S.	Rancho P.V. CA 90275	$ 2,511.26	$360.45		13,000.00	1,799.00			0.301	1.799	0.000	0.000	2.090	2,130.81	580%	$213.19
3	x	7564	002	002	Paul	Gamsgaard	4343 P.V. Dr. South	Rancho P.V. CA 90275	$ 2,604.70	$379.46		10,600.00	1,843.00			0.241	1.843	0.000	0.000	2.084	2,125.24	580%	$212.53
4		7564	002	003	Steven	Montenberg	4329 P.V. Dr. South	Rancho P.V. CA 90275	$ 2,830.21	$426.77		10,580.00	2,112.00			0.243	2.112	0.000	0.000	2.355	2,401.44	580%	$240.37
5		7564	002	004	Charles F.	Stirling	4319 P.V. Dr. South	Rancho P.V. CA 90275	$ 2,961.11	$448.80		10,926.00	2,213.00			0.251	2.213	0.000	0.000	2.464	2,512.51	580%	$251.34
6		7564	002	005	Michael & Terri	Carman	4315 P.V. Dr. South	Rancho P.V. CA 90275	$ 2,448.46	$379.83		10,485.00	1,707.00			0.240	1.707	0.000	0.000	2.037	2,077.52	580%	$207.79
7	x	7564	002	025	Vincent J.	Iacono	4304 Admirable Dr.	Rancho P.V. CA 90275	$ 2,300.19	$348.47		10,580.00	1,671.00			0.243	1.671	0.000	0.000	1.914	1,951.72	580%	$195.24
8		7564	002	026	Ricardo & Sonia	Rivas	4312 Admirable Dr.	Rancho P.V. CA 90275	$ 2,603.74	$378.31		10,465.00	1,843.00			0.240	1.843	0.000	0.000	2.083	2,124.43	580%	$212.48
9	x	7564	002	027	Jerry Yutronich	% ReMax Realty	4007 Miraleste Dr.	Rancho P.V. CA 90275	$ 2,461.12	$371.42		10,880.00	1,797.00			0.243	1.797	0.000	0.000	2.040	2,080.20	580%	$208.09
10		7564	002	028	Robert	Loche	4332 Admirable Dr.	Rancho P.V. CA 90275	$ 2,862.65	$433.69		10,580.00	2,139.00			0.243	2.139	0.000	0.000	2.382	2,428.96	580%	$242.90
									$ -		$ 26,336.68												
11	x	7564	003	011	Jenichi	Kanuga	4334 Exultant Dr.	Rancho P.V. CA 90275	$ 2,874.20	$426.34		11,960.00	2,067.00			0.276	2.067	0.000	0.000	2.342	2,337.86	580%	$239.00
12	x	7564	003	012	Andrew C.	Derr	4338 Exultant Dr.	Rancho P.V. CA 90275	$ 3,098.21	$466.62		12,010.00	2,303.00			0.276	2.303	0.000	0.000	2.579	2,629.69	580%	$264.91
13	x	7564	003	013	Bussing	Family Trust	4348 Exultant Dr.	Rancho P.V. CA 90275	$ 2,336.89	$354.34		12,610.00	1,652.00			0.294	1.652	0.000	0.000	1.946	1,984.54	580%	$196.59
14		7564	003	014	Nagar & Donna B	Noushkam	4354 Exultant Dr.	Rancho P.V. CA 90275	$ 3,726.68	$466.67		12,080.00	2,407.00			0.277	2.407	0.000	0.000	2.684	2,736.91	580%	$273.78
15	x	7564	003	015	Lawrence & Christine	Williams	4362 Exultant Dr	Rancho P.V. CA 90275	$ 2,949.81	$446.90		12,000.00	2,179.00			0.275	2.179	0.000	0.000	2.454	2,503.01	580%	$256.33
16	x	7564	003	016	Mauricio Arregocea	Arregoces Family Trust	4380 Dauntless Dr.	Rancho P.V. CA 90275	$ 2,909.22	$440.74		12,050.00	2,144.00			0.277	2.144	0.000	0.000	2.421	2,469.46	580%	$246.86
17		7564	003	017	Frank S. & Lisa M.	Matsura	4394 Dauntless Dr.	Rancho P.V. CA 90275	$ 2,586.66	$391.87		13,470.00	1,843.00			0.309	1.843	0.000	0.000	2.152	2,194.78	580%	$210.52
18	x	7564	003	018	Frank & Karen	Kostrencich	4353 Admirable Dr.	Rancho P.V. CA 90275	$ 3,548.11	$537.53		12,250.00	2,671.00			0.281	2.671	0.000	0.000	2.952	3,010.88	580%	$216.60
19	x	7564	003	019	Michael	Bible	4336 Admirable Dr.	Rancho P.V. CA 90275	$ 2,492.87	$377.98		12,075.00	1,797.00			0.277	1.797	0.000	0.000	2.074	2,115.21	580%	$211.46
20		7564	003	020	Alfredo	Gomez	4327 Admirable Dr.	Rancho P.V. CA 90275	$ 2,316.98	$381.36		12,076.00	1,652.00			0.277	1.652	0.000	0.000	1.929	1,967.34	580%	$196.67
									$ -		$ 26,393.23												
21	x	7564	003	021	Carlos Cuervo	Vanessa Serrano	4319 Admirable Dr.	Rancho P.V. CA 90275	$ 2,574.60	$390.06		12,076.00	1,865.00			0.277	1.865	0.000	0.000	2.142	2,184.66	580%	$218.39
22		7564	003	022	David G.	French	4365 Admirable Dr.	Rancho P.V. CA 90275	$ 2,467.34	$378.53		10,350.00	1,632.00			0.238	1.632	0.000	0.000	2.070	2,110.51	580%	$214.62
23	x	7564	004	025	Derek & Connie	Anderson	4332 Dauntless Dr.	Rancho P.V. CA 90275	$ 3,188.21	$463.82		12,103.00	2,376.00			0.278	2.376	0.000	0.000	2.653	2,705.29	580%	$218.61
24	x	7564	004	026	Jonathan Orozco	Hugo Rolando Gutierrez	434 McDonald Ave	Wilmington, CA 90744	$ 2,581.82	$381.11		13,080.00	1,834.00			0.314	1.834	0.000	0.000	2.148	2,190.51	580%	$220.02
25		7564	004	027	David	Roth	5 Dogwood S.	Irvine, CA. 90275	$ 3,650.09	$562.96		17,340.00	2,630.00			0.398	2.630	0.000	0.000	3.037	3,097.11	580%	$0.00
26		7564	005	900	Rancho Palos Verdes	City of	30940 Hawthorne Blvd.	Rancho P.V. CA 90275	$ 4,134.34	$636.34			0.00		74,823.00	0.000	0.000	0.000	3.440	3.440	3,508.00	580%	$0.00
27	x	7564	005	002	Peter J & Kathy	Mirich	4342 Admirable Dr.	Rancho P.V. CA 90275	$ 2,451.87	$371.42		10,930.00	1,789.00			0.251	1.789	0.000	0.000	2.040	2,080.25	580%	$208.09
28		7564	005	003	Richard	Horton	4906 Via El Sereno	Torrance, CA 90505	$ 2,820.20	$427.25		10,740.00	2,100.00			0.247	2.100	0.000	0.000	2.347	2,392.95	580%	$239.41
29		7564	005	004	Mark Lloyd	Young	4384 Admirable Dr.	Rancho P.V. CA 90275	$ 2,573.56	$362.28		13,180.00	1,797.00			0.303	1.797	0.000	0.000	2.100	2,141.09	580%	$214.21
30		7564	005	005	Karen P.	Miller	4379 Admirable Dr.	Rancho P.V. CA 90275	$ 2,312.67	$360.36		11,880.00	1,852.00			0.272	1.852	0.000	0.000	1.924	1,962.31	580%	$199.28
									$		$ 28,724.20												
31		7564	005	006	Glenn R.	Streeter	4372 Admirable Dr.	Rancho P.V. CA 90275	$ 56.61	$9.98		2,048.00	0.00			0.047	0.000	0.000	0.000	0.047	47.98	580%	$0.00
32		7564	005	007	Glenn S.	Streeter	4372 Admirable Dr.	Rancho P.V. CA 90275	$ 6,718.79	$1,617.87		23,330.00	5,049.00			0.541	5.049	0.000	0.000	5.590	5,700.83	580%	$314.58
33	x	7564	005	008	Gregory & Sandra	Montgomery	4376 Admirable Dr.	Rancho P.V. CA 90275	$ 3,363.41	$599.86		16,628.00	2,417.00			0.382	2.417	0.000	0.000	2.799	2,853.86	580%	$285.41
34		7564	005	009	Patty	Perkinson, Trust	4385 Dauntless Dr.	Rancho P.V. CA 90275	$ 3,187.93	$482.56		12,220.00	2,372.00			0.281	2.372	0.000	0.000	2.653	2,704.97	580%	$270.62
35	x	7564	005	010	Nicolas & Alison	Grillo	4367 Dauntless Dr.	Rancho P.V. CA 90275	$ 2,578.20	$380.60		15,170.00	1,797.00			0.348	1.797	0.000	0.000	2.145	2,187.66	580%	$218.86
36		7564	005	011	Jack L.	Evenstan	4000 P.V. Drive N. St.200	Rolling Hills Est. CA 90274	$ 3,190.18	$483.31		23,540.00	2,114.00			0.540	2.114	0.000	0.000	2.654	2,706.87	580%	$270.72
37	x	7564	005	012	Mohammadriza & Delbar	Tahmasebi	4399 Dauntless Dr.	Rancho P.V. CA 90275	$ 4,293.33	$659.43		16,478.00	3,194.00			0.378	3.194	0.000	0.000	3.572	3,642.90	580%	$0.00
38		7564	005	013	Don & Vielka	Schmid	4361 Dauntless Dr.	Rancho P.V. CA 90275	$ 3,104.73	$470.38		12,210.00	2,303.00			0.280	2.303	0.000	0.000	2.583	2,634.37	580%	$263.48
39	x	7564	005	014	C. & D.	Helmer	4351 Dauntless Dr.	Rancho P.V. CA 90275	$ 7,569.89	$380.29		12,090.00	1,855.00			0.278	1.855	0.000	0.000	2.133	2,174.70	580%	$217.27
40		7572	001	907	Rancho Palos Verdes	City of	30940 Hawthorne Blvd.	Rancho P.V. CA 90275	$286,925.51	$38,325.60			0.00		4,602,283.20	0.000	0.000	0.000	215.440	215.440	219,698.91	580%	$0.00
									$ -		$ 297,991.85												
41		7572	006	018	Portuguese Bend Club	H.O.A.	4100 P. V. Dr. South	Rancho P.V. CA 90275	$ 26,128.11	$3,968.36		946,994.40				21.740	0.000	0.000	0.000	21.740	22,180.76	580%	$2,524.72
42		7572	006	020	Eric C.	Johnson	401 W. 9th St #300	San Pedro, CA 90731	$ 5,981.15	$903.10		218,057.60	0.00			4.960	0.000	0.000	0.000	4.960	5,058.05	580%	$505.05
43		7572	020	008	John	Hazard	44 Seawall Rd.	Rancho P.V. CA 90275	$ 1,731.86	$262.36		3,050.00	1,371.00			0.070	1.371	0.000	0.000	1.441	1,469.80	580%	$127.91
44		7572	020	009	Brando	Valencia	519 De Sales St. N	San Gabriel, CA 91775	$ 1,346.78	$204.34		4,280.00	1,024.00			0.098	1.024	0.000	0.000	1.122	1,144.44	580%	$114.45
45		7572	020	014	Robin	Pierson	1578 Dunning Dr.	Laguna Beach, CA 92651	$ 2,491.00	$372.83		19,305.00	1,805.00			0.443	1.805	0.000	0.000	2.048	2,088.67	580%	$208.80
46		7572	020	015	Joel	Dime	132 Sea Urchin Lane	Rancho P.V. CA 90275	$ 2,099.02	$316.00		8,296.00	1,558.00			0.190	1.558	0.000	0.000	1.748	1,781.02	580%	$146.56
47		7572	020	016	Dennis P.	Jaconi	133 Sea Urchin Lane	Rancho P.V. CA 90275	$ 1,717.27	$260.18		6,310.00	1,284.00			0.145	1.284	0.000	0.000	1.429	1,457.11	580%	$129.84
48		7572	020	017	Ben	Cheng	134 Seawall Road	Rancho P.V. CA 90275	$ 1,388.18	$210.31		6,100.00	1,015.00			0.140	1.015	0.000	0.000	1.155	1,177.67	580%	$117.82
49	x	7572	020	018	John	Wyrach	1243 E. Loren St	Springfield, MO 65804	$ 2,098.39	$316.08		3,920.00	1,646.00			0.090	1.646	0.000	0.000	1.736	1,770.31	580%	$103.84
50		7572	020	019	John C. & Anna D.	Hazard	44 Seawall Rd.	Rancho P.V. CA 90275	$ 79.44	$12.04		2,879.32	0.00			0.066	0.000	0.000	0.000	0.066	67.40	580%	$0.00
									$		$ 40,091.82												
51		7572	020	020	John Mu	Seawall Investments	486 N. California St.	San Gabriel, CA 91775	$ 2,343.00	$354.96		4,421.34	1,848.00			0.102	1.848	0.000	0.000	1.950	1,988.04	580%	$187.89
52		7572	020	021	Dr. John	Moeller	47 Seawall Rd.	Rancho P.V. CA 90275	$ 1,758.38	$266.09		4,068.00	1,368.00			0.093	1.368	0.000	0.000	1.461	1,490.28	580%	$114.96
53		7572	020	022	Michael & Honeya	Barth	48 Seawall Rd.	Rancho P.V. CA 90275	$ 1,882.44	$341.25		4,051.08	1,232.00			0.093	1.232	0.000	0.000	1.325	1,351.19	580%	$133.00
54		7572	020	023	Lucienne M.	Molinari	49 Seawall Rd.	Rancho P.V. CA 90275	$ 1,059.31	$190.46		3,720.02	796.00			0.085	0.796	0.000	0.000	0.881	898.83	580%	$88.71
55	x	7572	021	027	Robert H.	Scott	1100 P.V. Dr. W	P.V. Est. CA 90274	$ 1,986.12	$289.65		4,890.00	1,517.00			0.112	1.517	0.000	0.000	1.629	1,661.47	580%	$166.17
56		7572	021	028	Judith	Hotchkiss	84 Yacht Harbor Dr.	Rancho P.V. CA 90275	$ 1,657.68	$236.96		4,880.00	1,184.00			0.112	1.184	0.000	0.000	1.296	1,321.66	580%	$132.39
57		7572	021	029	Freeman Family	Trust	85 Yacht Harbor Dr.	Rancho P.V. CA 90275	$ 1,428.78	$216.16		5,060.00	1,071.00			0.116	1.071	0.000	0.000	1.187	1,210.63	580%	$0.00
58		7572	021	032	Portuguese Bend Club	H.O.A.	4100 P. V. Dr. South	Rancho P.V. CA 90275	$ 104.02	$15.76		3,770.00	0.00			0.087	0.000	0.000	0.000	0.087	88.28	580%	$8.68
59		7572	021	033	Portuguese Bend Club	H.O.A.	4100 P. V. Dr. South	Rancho P.V. CA 90275	$ 121.95	$18.46		4,420.00	0.00			0.101	0.000	0.000	0.000	0.101	103.47	580%	$10.41
60		7572	021	034	Randee	Wood	111 Spindrift Dr.	Rancho P.V. CA 90275	$ 1,161.92	$174.45		4,100.00	864.00			0.094	0.864	0.000	0.000	0.958	977.07	580%	$97.72
									$ -		$ 13,671.13												
61	x	7572	021	035	Andrew	Bly	112 Spindrift Dr.	Rancho P.V. CA 90275	$ 2,011.74	$304.77		3,218.00	1,600.00			0.074	1.600	0.000	0.000	1.674	1,708.97	580%	$114.66
62		7572	021	036	David A. Link	Lisa H. Link	696 Winthrop Rd.	San Marino, CA 91108	$ 2,780.31	$422.73		2,892.00	2,253.00			0.069	2.253	0.000	0.000	2.322	2,367.56	580%	$103.74
63		7572	021	039	Tashina	Hinchliffe	116 Spindrift Dr.	Rancho P.V. CA 90275	$ 1,777.04	$269.22		8,607.00	1,281.00			0.198	1.281	0.000	0.000	1.479	1,507.62	580%	$150.46
64		7572	021	040	David John	Alinowicz	4405 Red Maple Court	Concord, CA 94521	$ 2,186.01	$330.27		7,836.00	1,634.00			0.180	1.634	0.000	0.000	1.814	1,849.74	580%	$184.73
65		7572	021	041	William & Judith	Hassoldt	10 Pinetree Lane	Rolling Hills, CA 90274	$ 1,606.53	$243.23		5,440.00	1,211.00			0.125	1.211	0.000	0.000	1.336	1,362.30	580%	$102.81
66	x	7572	021	042	Steven H.	Yu	204 Seascape Rd.	Rancho P.V. CA 90275	$ 1,434.48	$217.32		3,640.00	1,110.00			0.084	1.110	0.000	0.000	1.194	1,217.16	580%	$88.91
67	x	7572	021	045	Jeffery	Hobbs	201 Seascape Rd	Rancho P.V. CA 90275	$ 1,597.23	$241.86		7,535.00	1,156.00			0.173	1.156	0.000	0.000	1.329	1,355.25	580%	$139.75
68		7572	021	050	Lora B.	Hester	205 Seascape Rd.	Rancho P.V. CA 90275	$ 1,365.09	$206.29		8,428.00	934.00			0.193	0.934	0.000	0.000	1.127	1,149.77	580%	$0.00
69		7572	021	051	Charles S.	Cummins	81 Yacht Harbor Dr.	Rancho P.V. CA 90275	$ 2,513.06	$366.87		5,540.63	2,047.00			0.127	2.047	0.000	0.000	2.174	2,217.18	580%	$127.61
70		7572	021	052	Stanley A.	Moore	2418 Via Anita	Palos Verdes, CA 90274	$ 1,531.15	$231.87		5,009.40	1,159.00			0.115	1.159	0.000	0.000	1.274	1,299.16	580%	$126.73
									$		$ 18,898.90												
71	x	7572	021	054	Jon	Roth	114 Spindrift Dr.	Rancho P.V. CA 90275	$ 3,306.07	$314.04		8,460.00	2,629.00			0.194	2.629	0.000	0.000	2.823	2,879.03	580%	$117.41
72		7572	021	055	Thomas & Andrea	MacMillan	201 Spindrift Dr.	Rancho P.V. CA 90275	$ 1,996.79	$302.61		7,627.36	1,488.00			0.175	1.488	0.000	0.000	1.663	1,696.96	580%	$114.25
73		7572	021	060	Charlotte	Pasewich	86 Yacht Harbor Dr.	Rancho P.V. CA 90275	$ 2,479.87	$374.33		5,179.28	1,937.00			0.119	1.937	0.000	0.000	2.056	2,096.54	580%	$176.16
74	x	7572	021	061	Lupe	Torricic	87 Yacht Harbor Drive	Rancho P.V. CA 90275	$ 1,634.15	$247.67		6,128.69	1,219.00			0.141	1.219	0.000	0.000	1.360	1,386.58	580%	$0.00
75					City of	Rancho Palos Verdes	30940 Hawthorne Blvd.	Rancho P.V. CA 90275	$ 66,604.89	$16,129.74				277,925.09		0.000	0.000	55.585	0.000	55.585	56,693.84	580%	$0.00
76	x	7572	022	026	James E.	Welsh	22 Empty Saddle	Rolling Hills Est. CA 90274	$ 2,020.00	$307.84		3,880.00	1,609.00			0.089	1.600	0.000	0.000	1.689	1,722.46	580%	$0.00
77	x	7572	022	027	Kevin & Allison	Wolcott	100 Spindrift Dr.	Rancho P.V. CA 90275	$ 1,100.41	$165.71		4,600.00	810.00			0.106	0.810	0.000	0.000	0.916	933.70	580%	$83.44

78		7572	022	026	Hoffman	Trust	101 Spindrift Dr.	Rancho P.V. CA 90275	$ 2,959.53	$445.23		2,625.00	2,385.00		0.060	2.385	0.000	0.000	2.445	2,403.60	560%	$130.03	
79		7572	022	029	Joseph Lay	Lynda Lins	102 Spindrift Dr.	Rancho P.V. CA 90275	$ 2,302.91	$346.57		2,660.00	1,665.00		0.061	1.665	0.000	0.000	1.918	1,663.94	560%	$102.98	
80		7572	022	030	Portuguese Bend Club	H.O.A.	4100 Palos Verdes Dr. S.	Rancho P.V. CA 90275	$ 77.06	$11.67		2,793.00	0.00		0.064	0.000	0.000	0.000	0.064	65.39	560%	$5.53	
81	x	7572	022	031	Ann	Linsberger	104 Spindrift Dr.	Rancho P.V. CA 90275	$		$ 84,780.57																
82	x	7572	022	032	Jerry	Schwartz	105 Spindrift Dr.	Rancho P.V. CA 90275	$ 1,940.90	$248.89		3,150.00	1,293.80		0.072	1.293	0.000	0.000	1.365	1,302.81	560%	$139.24	
83		7572	022	033	Portuguese Bend Club	H.O.A.	4100 Palos Verdes Dr. S.	Rancho P.V. CA 90275	$ 1,508.94	$241.84		8,096.00	1,024.60		0.140	1.024	0.000	0.000	1.164	1,107.00	560%	$118.74	
84		7572	022	036	Portuguese Bend Club	H.O.A.	4100 Palos Verdes Dr. S.	Rancho P.V. CA 90275	$ 87.19	$13.21		3,150.00	0.00		0.073	0.000	0.000	0.000	0.073	73.98	560%	$7.45	
85		7572	022	037	Richard	Worick	1406 El Vago St.	La Canada, CA 91011	$ 207.43	$31.42		7,518.00	0.00		0.173	0.000	0.000	0.000	0.173	176.01	560%	$17.24	
86		7572	022	043	Betty	Helford	127 Spindrift Dr.	Rancho P.V. CA 90275	$ 2,166.31	$312.98		4,700.00	1,644.00		0.108	1.644	0.000	0.000	1.752	1,786.53	560%	$168.00	
87		7572	022	044	Betty	Helford	127 Spindrift Dr.	Rancho P.V. CA 90275	$ 1,079.69	$163.56		4,700.00	780.00		0.100	0.780	0.000	0.000	0.898	915.04	560%	$91.60	per Charlotte 4/2024
88	x	7572	022	045	Kirk	Ajami	122 Spindrift Dr.	Rancho P.V. CA 90275	$ 2,799.32	$422.12		5,679.00	2,188.00		0.139	2.188	0.000	0.000	2.316	2,364.20	560%	$231.96	
89		7572	022	046	William N.	Willens	120 Spindrift Dr.	Rancho P.V. CA 90275	$ 1,080.18	$163.84		5,130.00	781.00		0.116	0.781	0.000	0.000	0.899	915.64	560%	$91.70	
90		7572	022	047	Carlos	Booth	98 Yacht Harbor Dr.	Rancho P.V. CA 90275	$ 1,777.92	$269.29		7,197.00	1,314.00		0.165	1.314	0.000	0.000	1.479	1,506.23	560%	$150.56	
									$ 144.86	$21.94		5,250.00	0.00		0.121	0.000	0.000	0.000	0.121	122.91	560%	$12.38	
91		7572	022	048	Eric C.	Johnson	481 W. 6th St. St.300	San Pedro, CA 90731	$		$ 12,308.43																
92		7572	022	049	Eric C.	Johnson	481 W. 6th St. St.300	San Pedro, CA 90731	$ 148.32	$19.44		4,650.00	0.00		0.107	0.000	0.000	0.000	0.107	108.86	560%	$10.02	
93		7572	022	050	Eric C.	Johnson	481 W. 6th St. St.300	San Pedro, CA 90731	$ 703.13	$92.39		5,550.00	0.00		0.127	0.000	0.000	0.000	0.127	129.03	560%	$12.08	
94		7572	022	051	Eric	Johnson	481 W. 6th St. St.300	San Pedro, CA 90731	$ 265.54	$38.98		6,000.00	0.00		0.138	0.000	0.000	0.000	0.138	140.46	560%	$14.08	
95		7572	022	052	Stephen	Hinchliffe	128 Spindrift Lane	Rancho P.V. CA 90275	$ 206.98	$31.84		7,570.00	0.00		0.174	0.000	0.000	0.000	0.174	177.22	560%	$17.75	
96		7572	022	053	Ace or Alan	Johnson	131 Spindrift Lane	Rancho P.V. CA 90275	$ 2,529.64	$363.84		3,737.45	2,019.00		0.089	2.019	0.000	0.000	2.105	2,148.40	560%	$0.00	
97		7572	022	058	Portuguese Bend Club	H.O.A.	4100 Palos Verdes Dr. South	Rancho P.V. CA 90275	$ 1,897.92	$277.62		2,981.00	1,464.00		0.061	1.464	0.000	0.000	1.525	1,555.34	560%	$121.98	
98	x	7572	022	059	Fred	Lee	92 Yacht Harbor Dr.	Rancho P.V. CA 90275	$ 102.68	$15.47		3,700.00			0.085	0.000	0.000	0.000	0.085	86.62	560%	$7.25	
99	x	7572	022	060	William D.	Silverthorn	4914 Fargo Ave.	San Diego, CA 92117	$ 2,236.63	$338.84		5,357.88	1,738.00		0.123	1.738	0.000	0.000	1.861	1,897.78	560%	$187.19	
100		7572	022	065	Portuguese Bend Club	H.O.A.	4100 Palos Verdes Dr. South	Rancho P.V. CA 90275	$ 1,072.65	$162.80		2,992.00	853.00		0.060	0.853	0.000	0.000	0.913	910.15	560%	$91.08	
									$ 157.43	$23.86		4,800.00			0.110	0.000	0.000	0.000	0.110	112.57	560%	$12.55	
101		7572	022	066	Grace	Peterson	96 Yacht Harbor Dr.	Rancho P.V. CA 90275	$		$ 3,882.18																
102		7572	022	067	Carlos	Booth	98 Yacht Harbor Dr.	Rancho P.V. CA 90275	$ 3,379.00	$511.31		8,025.00	2,691.00		0.207	2.691	0.000	0.000	2.808	2,869.69	560%	$128.58	
103	x	7572	022	072	Robert	Bogdanovich	100 Spindrift Dr.	Rancho P.V. CA 90275	$ 1,429.83	$216.71		7,871.29	1,004.00		0.151	1.004	0.000	0.000	1.155	1,208.12	560%	$119.86	
104		7572	022	073	Ralph	Black	36 Saddleback Rd.	Rolling Hills, CA 90274	$ 2,084.94	$317.38		3,227.00	1,569.00		0.074	1.569	0.000	0.000	1.743	1,777.56	560%	$126.98	
105		7572	022	074	Edlenn M.	Fabian	134 Spindrift Dr.	Rancho P.V. CA 90275	$ 1,598.16	$388.90		3,360.00	1,575.00		0.079	1.575	0.000	0.000	1.653	1,685.28	560%	$166.41	
106		7572	022	080	Michael	La Barbera	125 Spindrift Dr.	Rancho P.V. CA 90275	$ 2,085.91	$317.60		2,450.00	1,688.00		0.055	1.688	0.000	0.000	1.744	1,778.72	560%	$161.28	
107	x	7572	022	081	Martin	Vincent	126 Spindrift Dr.	Rancho P.V. CA 90275	$ 834.97	$121.95		4,085.00	578.00		0.094	0.578	0.000	0.000	0.672	683.02	560%	$0.00	
									$ 1,874.99	$284.06		4,980.00	1,460.00		0.100	1.460	0.000	0.000	1.560	1,580.93	560%	$143.79	
											$ 13,859.59																
									$570,570.00	$86,440.02		1,953,152.94	950,252.00	302,725.00	4,767,706.20	45.066	150.282	60.545	218.860		570,570.00					

Total Operating Cost of the District	570,570.00
Total Units of Assessment	474.75
Assessment / Unit	1,201.85

The Benefit Assessment Formula

To insure a fair and equitable means of levying assessments, the following formula has been adopted by the Board of Directors.

Type of Property	Units of Assessment
1. Land (improved & unimproved)	@ 1 unit per acre
2. Habitable area*	@ 1 unit per each 1,000 sq.ft. of improvements
3. Public highways	@ 1 unit per 5,000 sq.ft. of public roads
4. Public Use	@ 2 units per acre

* Improvements are limited to habitable living quarters on the property.

EXAMPLE:
If ……..Your parcel equals .300 acres
And…..Your house contains 2,175 square feet

Then… .300 acres = .300 units
2,175 sq.ft. = 2.175 units
Total Units 2.475

Determining the Assessment Per Unit of Benefit

To determine the assessment per unit, the number of units per parcel must first be calculated. The total number of units in each category of property may then be determined; the sum of which is the grand total of units within the district. The total dollar assessment for the district may then be divided by the grand total of units, the result being the dollar assessment per unit. The following formula may be used to determine the assessment per unit:

$$C = A$$
$$U$$

Where: C = Total operating cost of district
U = Total units within district
A = Assessment per unit

EXAMPLE:

Assume:
1. Total operating cost of district (C) equals $21,000
2. Total units in district (U) equals 217.5

Then: $C = A = \frac{\$21,000}{217.5} = \$96.55$
U

Determining Your Benefit Assessment

The dollar assessment per unit should be multiplied by the total number of units for a particular parcel to determine the dollar assessment for that parcel. The following formula may be used:

$$(A) \times (U) = B$$

Where: A = Assessment per unit
U = Total units for individual property
B = Individual property assessment

EXAMPLE:

Assume:
1. Assessment per unit (A) equals $96.55
2. Units of individual property (U) equals 2.475

Then: (A) X (U) = B = ($96.55) (2.475) = $238.96

NOTE: The unit values and cost figures used above are for example only and do not represent actual assessments.

Appendix 1:

KCGHAD ASSESSMENTS BY APN

anum	Lrel	map book	page	parcel	Fname	Lname	Address	CSZ	aamount	old amount	ptotal	Lot Sq.Ft.	Bldg. Sq.Ft.	Sq Ft of Public Hwys	Public Lands	Units of lot	Unit of Building	Units of Public Hwy	Units of Public Land	Parcel Ass'd Units	Proposed change	% change	ramount
1		7564	001	915	Rancho Palos Verdes	City of	30940 Hawthorne Blvd.	Rancho P.V. CA 90275	$ 5,961.15	$903.10				24,600.00		0.000	0.000	4.960	0.000	4.960	5,058.05	560%	$227.47
2		7564	002	001	Thomas	Berg	4353 Palos Verdes Dr. S.	Rancho P.V. CA 90275	$ 2,511.26	$380.45		13,090.00	1,789.00			0.301	1.789	0.000	0.000	2.090	2,130.81	560%	$213.19
3	x	7564	002	002	Poul	Gamsgaard	4343 P.V. Dr. South	Rancho P.V. CA 90275	$ 2,504.70	$379.46		10,500.00	1,843.00			0.241	1.843	0.000	0.000	2.084	2,125.24	560%	$212.58
4		7564	002	003	Steven	Morenberg	4329 P.V. Dr. South	Rancho P.V. CA 90275	$ 2,830.21	$428.77		10,580.00	2,112.00			0.243	2.112	0.000	0.000	2.355	2,401.44	560%	$240.37
5		7564	002	004	Charles F.	Stirling	4319 P.V. Dr. South	Rancho P.V. CA 90275	$ 2,961.11	$448.60		10,925.00	2,213.00			0.251	2.213	0.000	0.000	2.464	2,512.51	560%	$251.34
6		7564	002	005	Michael & Terri	Carman	4315 P.V. Dr. South	Rancho P.V. CA 90275	$ 2,448.45	$370.93		10,465.00	1,797.00			0.240	1.797	0.000	0.000	2.037	2,077.52	560%	$207.79
7	x	7564	002	025	Vincent J.	Iacono	4304 Admirable Dr.	Rancho P.V. CA 90275	$ 2,300.19	$348.47		10,580.00	1,671.00			0.243	1.671	0.000	0.000	1.914	1,951.72	560%	$195.24
8		7564	002	026	Ricardo & Sonia	Rivas	4312 Admirable Dr.	Rancho P.V. CA 90275	$ 2,503.74	$379.31		10,465.00	1,843.00			0.240	1.843	0.000	0.000	2.083	2,124.43	560%	$212.48
9	x	7564	002	027	Jerry Yutronich	% ReMax Realty	4007 Miraleste Dr.	Rancho P.V. CA 90275	$ 2,451.62	$371.42		10,580.00	1,797.00			0.243	1.797	0.000	0.000	2.040	2,080.20	560%	$208.09
10		7564	002	028	Robert	Locke	4332 Admirable Dr.	Rancho P.V. CA 90275	$ 2,862.65	$433.69		10,580.00	2,139.00			0.243	2.139	0.000	0.000	2.382	2,428.96	560%	$242.98
									$ -		$ 29,335.08												
11	x	7564	003	011	Junichi	Kasuga	4334 Exultant Dr.	Rancho P.V. CA 90275	$ 2,814.20	$426.34		11,960.00	2,067.00			0.275	2.067	0.000	0.000	2.342	2,387.86	560%	$239.00
12	x	7564	003	012	Andrew C.	Derr	4338 Exultant Dr.	Rancho P.V. CA 90275	$ 3,099.21	$469.52		12,010.00	2,303.00			0.276	2.303	0.000	0.000	2.579	2,629.69	560%	$264.81
13	x	7564	003	013	Buesing	Family Trust	4348 Exultant Dr.	Rancho P.V. CA 90275	$ 2,338.88	$354.34		12,810.00	1,652.00			0.294	1.652	0.000	0.000	1.946	1,984.54	560%	$198.50
14		7564	003	014	Negar & Donna B	Noushkam	4354 Exultant Dr.	Rancho P.V. CA 90275	$ 3,225.58	$488.67		12,060.00	2,407.00			0.277	2.407	0.000	0.000	2.684	2,736.91	560%	$273.78
15	x	7564	003	015	Lawrence & Christine	Williams	4362 Exultant Dr	Rancho P.V. CA 90275	$ 2,949.91	$446.90		12,000.00	2,179.00			0.275	2.179	0.000	0.000	2.454	2,503.01	560%	$250.33
16	x	7564	003	016	Mauricio Arregoces	Arregoces Family Trust	4380 Dauntless Dr.	Rancho P.V. CA 90275	$ 2,909.22	$440.74		12,050.00	2,144.00			0.277	2.144	0.000	0.000	2.421	2,468.48	560%	$246.96
17		7564	003	017	Frank S. & Lisa M.	Matura	4394 Dauntless Dr.	Rancho P.V. CA 90275	$ 2,586.65	$391.87		13,470.00	1,843.00			0.309	1.843	0.000	0.000	2.152	2,194.78	560%	$219.52
18	x	7564	003	018	Frank & Karen	Kostrencich	4353 Admirable Dr.	Rancho P.V. CA 90275	$ 3,548.11	$537.53		12,250.00	2,671.00			0.281	2.671	0.000	0.000	2.952	3,010.58	560%	$218.90
19	x	7564	003	019	Michael	Bible	4335 Admirable Dr.	Rancho P.V. CA 90275	$ 2,492.87	$377.66		12,075.00	1,797.00			0.277	1.797	0.000	0.000	2.074	2,115.21	560%	$211.46
20		7564	003	020	Alfredo	Gomez	4327 Admirable Dr.	Rancho P.V. CA 90275	$ 2,318.60	$351.26		12,075.00	1,652.00			0.277	1.652	0.000	0.000	1.929	1,967.34	560%	$196.67
									$ -		$ 28,283.23												
21	x	7564	003	021	Carlos Cuervo	Vanessa Serrano	4319 Admirable Dr.	Rancho P.V. CA 90275	$ 2,574.60	$390.05		12,075.00	1,865.00			0.277	1.865	0.000	0.000	2.142	2,184.55	560%	$218.39
22		7564	003	022	David G.	French	4305 Admirable Dr.	Rancho P.V. CA 90275	$ 2,487.34	$376.83		10,350.00	1,832.00			0.238	1.832	0.000	0.000	2.070	2,110.51	560%	$214.52
23	x	7564	004	025	Derek & Connie	Anderson	4332 Dauntless Dr.	Rancho P.V. CA 90275	$ 3,188.31	$483.02		12,103.00	2,375.00			0.278	2.375	0.000	0.000	2.653	2,705.29	560%	$218.81
24	x	7564	004	026	Jonathan Orozco	Hugo Rolando Gutterrez	434 McDonald Ave	Wilmington, CA 90744	$ 2,581.62	$391.11		13,680.00	1,834.00			0.314	1.834	0.000	0.000	2.148	2,190.51	560%	$220.02
25		7564	004	027	David	Roth	5 Dogwood S.	Irvine, CA. 90275	$ 3,650.09	$552.98		17,340.00	2,639.00			0.398	2.639	0.000	0.000	3.037	3,097.11	560%	$0.00
26		7564	005	900	Rancho Palos Verdes	City of	30940 Hawthorne Blvd.	Rancho P.V. CA 90275	$ 4,134.34	$626.34			0.00		74,923.00	0.000	0.000	0.000	3.440	3,440	3,508.00	560%	$0.00
27	x	7564	005	002	Peter J & Kathy	Mirich	4342 Admirable Dr.	Rancho P.V. CA 90275	$ 2,451.67	$371.42		10,930.00	1,789.00			0.251	1.789	0.000	0.000	2.040	2,080.25	560%	$208.09
28		7564	005	003	Richard	Horton	4906 Via El Sereno	Torrance, CA 90505	$ 2,820.20	$427.25		10,740.00	2,100.00			0.247	2.100	0.000	0.000	2.347	2,392.95	560%	$239.41
29		7564	005	004	Mark Lloyd	Young	4364 Admirable Dr.	Rancho P.V. CA 90275	$ 2,523.36	$382.28		13,180.00	1,797.00			0.303	1.797	0.000	0.000	2.100	2,141.08	560%	$214.21
30		7564	005	005	Karen P.	Miller	4370 Admirable Dr.	Rancho P.V. CA 90275	$ 2,312.67	$350.36		11,860.00	1,652.00			0.272	1.652	0.000	0.000	1.924	1,962.31	560%	$196.26
									$ -		$ 28,724.20												
31		7564	005	006	Glenn S.	Streeter	4372 Admirable Dr.	Rancho P.V. CA 90275	$ 56.51	$8.56		2,048.00	0.00			0.047	0.000	0.000	0.000	0.047	47.95	560%	$0.00
32		7564	005	007	Glenn S.	Streeter	4372 Admirable Dr.	Rancho P.V. CA 90275	$ 6,718.70	$1,017.87		23,580.00	5,049.00			0.541	5.049	0.000	0.000	5.590	5,700.83	560%	$314.58
33	x	7564	005	008	Gregory & Sandra	Montgomery	4378 Admirable Dr.	Rancho P.V. CA 90275	$ 3,363.41	$509.55		16,620.00	2,417.00			0.382	2.417	0.000	0.000	2.799	2,853.86	560%	$285.41
34		7564	005	009	Patty	Perkinson, Trust	4393 Dauntless Dr.	Rancho P.V. CA 90275	$ 3,187.93	$482.96		12,220.00	2,372.00			0.281	2.372	0.000	0.000	2.653	2,704.97	560%	$270.62
35	x	7564	005	010	Nicolas & Allson	Grillo	4387 Dauntless Dr.	Rancho P.V. CA 90275	$ 2,578.26	$390.60		15,170.00	1,797.00			0.348	1.797	0.000	0.000	2.145	2,187.66	560%	$218.80
36		7564	005	011	Jack I.	Esensten	4000 P.V. Drive N. St.200	Rolling Hills Est. CA 90274	$ 3,190.18	$483.31		23,540.00	2,114.00			0.540	2.114	0.000	0.000	2.654	2,706.87	560%	$270.72
37	x	7564	005	012	Mohammadriza & Delbar	Tahmasebi	4369 Dauntless Dr.	Rancho P.V. CA 90275	$ 4,293.33	$650.43		16,478.00	3,194.00			0.378	3.194	0.000	0.000	3.572	3,642.90	560%	$0.00
38		7564	005	013	Don & Vielka	Schmid	4361 Dauntless Dr.	Rancho P.V. CA 90275	$ 3,104.73	$470.36		12,210.00	2,303.00			0.280	2.303	0.000	0.000	2.583	2,634.37	560%	$263.48
39	x	7564	005	014	C. & D.	Heimer	4351 Dauntless Dr.	Rancho P.V. CA 90275	$ 2,562.99	$388.29		12,090.00	1,855.00			0.278	1.855	0.000	0.000	2.133	2,174.70	560%	$217.37
40		7572	001	007	Rancho Palos Verdes	City of	30940 Hawthorne Blvd.	Rancho P.V. CA 90275	$258,925.51	$39,226.60			0.00		4,692,283.20	0.000	0.000	0.000	215.440	215.440	219,698.91	560%	$0.00
									$ -		$ 287,981.55												
41		7572	006	018	Portuguese Bend Club	H.O.A.	4100 P. V. Dr. South	Rancho P.V. CA 90275	$ 26,128.11	$3,958.35		946,994.40				21.740	0.000	0.000	0.000	21.740	22,169.76	560%	$2,524.72
42		7572	006	020	Eric C.	Johnson	461 W. 6th St #300	San Pedro, CA 90731	$ 5,961.15	$903.10		216,057.60	0.00			4.960	0.000	0.000	0.000	4.960	5,058.05	560%	$505.95
43		7572	020	008	John	Hazard	44 Seawall Rd.	Rancho P.V. CA 90275	$ 1,731.88	$262.38		3,050.00	1,371.00			0.070	1.371	0.000	0.000	1.441	1,469.50	560%	$127.51
44		7572	020	009	Brando	Valencia	518 De Sales St. N	San Gabriel, CA 91775	$ 1,348.78	$204.34		4,280.00	1,024.00			0.098	1.024	0.000	0.000	1.122	1,144.44	560%	$114.45
45		7572	020	014	Robin	Pierson	1370 Dunning Dr.	Laguna Beach, CA 92651	$ 2,461.60	$372.93		19,305.00	1,605.00			0.443	1.605	0.000	0.000	2.048	2,088.67	560%	$208.60
46		7572	020	015	Joel	Dime	132 Sea Urchin Lane	Rancho P.V. CA 90275	$ 2,099.02	$318.00		8,298.00	1,556.00			0.190	1.556	0.000	0.000	1.746	1,781.02	560%	$146.58
47		7572	020	016	Dennis P.	Jaconi	133 Sea Urchin Lane	Rancho P.V. CA 90275	$ 1,717.27	$260.16		6,310.00	1,284.00			0.145	1.284	0.000	0.000	1.429	1,457.11	560%	$129.04
48		7572	020	017	Ben	Cheng	134 Seawall Road	Rancho P.V. CA 90275	$ 1,388.18	$210.31		6,100.00	1,015.00			0.140	1.015	0.000	0.000	1.155	1,177.87	560%	$117.82
49	x	7572	020	018	John	Wyrsch	1243 E. Loren St	Springfield, MO 65804	$ 2,086.39	$316.08		3,920.00	1,646.00			0.090	1.646	0.000	0.000	1.736	1,770.31	560%	$103.84
50		7572	020	019	John C. & Anna D.	Hazard	44 Seawall Rd.	Rancho P.V. CA 90275	$ 79.44	$12.04		2,879.32	0.00			0.066	0.000	0.000	0.000	0.066	67.40	560%	$0.00
									$ -		$ 45,001.82												
51		7572	020	020	John Mu	Seawall Investments	458 N. California St.	San Gabriel, CA 91775	$ 2,343.00	$354.96		4,421.34	1,848.00			0.102	1.848	0.000	0.000	1.950	1,988.04	560%	$197.59
52		7572	020	021	Dr. John	Moeller	47 Seawall Rd.	Rancho P.V. CA 90275	$ 1,756.36	$266.08		4,068.00	1,368.00			0.093	1.368	0.000	0.000	1.461	1,490.28	560%	$114.96
53		7572	020	022	Michael & Honeya	Barth	48 Seawall Rd.	Rancho P.V. CA 90275	$ 1,592.44	$241.25		4,051.08	1,232.00			0.093	1.232	0.000	0.000	1.325	1,351.19	560%	$132.00
54		7572	020	023	Lucianna M.	Molinari	49 Seawall Rd.	Rancho P.V. CA 90275	$ 1,059.31	$160.48		3,720.02	796.00			0.085	0.796	0.000	0.000	0.881	898.83	560%	$86.71
55	x	7572	021	027	Robert H.	Scott	1109 P.V. Dr. W	P.V. Est. CA 90274	$ 1,958.12	$296.65		4,890.00	1,517.00			0.112	1.517	0.000	0.000	1.629	1,661.47	560%	$166.17
56		7572	021	028	Judith	Hotchkiss	84 Yacht Harbor Dr.	Rancho P.V. CA 90275	$ 1,557.63	$235.98		4,880.00	1,184.00			0.112	1.184	0.000	0.000	1.296	1,321.65	560%	$132.20
57		7572	021	029	Freeman Family	Trust	85 Yacht Harbor Dr.	Rancho P.V. CA 90275	$ 1,426.78	$216.15		5,060.00	1,071.00			0.116	1.071	0.000	0.000	1.187	1,210.63	560%	$0.00
58		7572	021	032	Portuguese Bend Club	H.O.A.	4100 P. V. Dr. South	Rancho P.V. CA 90275	$ 104.02	$15.76		3,770.00	0.00			0.087	0.000	0.000	0.000	0.087	88.26	560%	$8.88
59		7572	021	033	Portuguese Bend Club	H.O.A.	4100 P. V. Dr. South	Rancho P.V. CA 90275	$ 121.95	$18.48		4,420.00	0.00			0.101	0.000	0.000	0.000	0.101	103.47	560%	$10.41
60		7572	021	034	Randee	Wood	111 Spindrift Dr.	Rancho P.V. CA 90275	$ 1,151.52	$174.45		4,100.00	864.00			0.094	0.864	0.000	0.000	0.958	977.07	560%	$97.72
									$ -		$ 13,071.13												
61	x	7572	021	035	Andrew	Ely	112 Spindrift Dr.	Rancho P.V. CA 90275	$ 2,011.74	$304.77		3,218.00	1,600.00			0.074	1.600	0.000	0.000	1.674	1,706.97	560%	$114.55
62		7572	021	036	David A. Link	Lisa H. Link	880 Winthrop Rd.	San Marino, CA 91108	$ 2,790.31	$422.73		2,992.00	2,253.00			0.069	2.253	0.000	0.000	2.322	2,367.58	560%	$103.74
63		7572	021	038	Tashina	Hinchliffe	116 Spindrift Dr.	Rancho P.V. CA 90275	$ 1,777.04	$269.22		8,607.00	1,281.00			0.198	1.281	0.000	0.000	1.479	1,507.82	560%	$150.46
64		7572	021	040	David John	Afinowicz	4408 Red Maple Court	Concord, CA 94521	$ 2,180.01	$330.27		7,836.00	1,634.00			0.180	1.634	0.000	0.000	1.814	1,849.74	560%	$184.73
65		7572	021	041	William & Judith	Hassoldt	10 Pinetree Lane	Rolling Hills, CA 90274	$ 1,605.53	$243.23		5,440.00	1,211.00			0.125	1.211	0.000	0.000	1.336	1,362.30	560%	$102.31
66	x	7572	021	042	Steven H.	Yu	204 Seascape Rd.	Rancho P.V. CA 90275	$ 1,434.48	$217.32		3,640.00	1,110.00			0.084	1.110	0.000	0.000	1.194	1,217.16	560%	$86.91
67	x	7572	021	045	Jeffery	Hobbs	201 Seascape Rd	Rancho P.V. CA 90275	$ 1,597.23	$241.98		7,535.00	1,156.00			0.173	1.156	0.000	0.000	1.329	1,355.25	560%	$139.75
68		7572	021	050	Lora B.	Hester	205 Seascape Rd.	Rancho P.V. CA 90275	$ 1,355.06	$205.29		8,428.00	934.00			0.193	0.934	0.000	0.000	1.127	1,149.77	560%	$0.00
69		7572	021	051	Charles S.	Cummins	81 Yacht Harbor Dr.	Rancho P.V. CA 90275	$ 2,613.05	$395.87		5,540.83	2,047.00			0.127	2.047	0.000	0.000	2.174	2,217.18	560%	$127.81
70		7572	021	052	Stanley A.	Moore	2416 Via Anita	Palos Verdes, CA 90274	$ 1,531.15	$231.97		5,009.40	1,159.00			0.115	1.159	0.000	0.000	1.274	1,299.18	560%	$128.73
									$ -		$ 18,895.60												
71	x	7572	021	054	Jon	Roth	114 Spindrift Dr.	Rancho P.V. CA 90275	$ 3,393.07	$514.04		8,460.00	2,629.00			0.194	2.629	0.000	0.000	2.823	2,879.03	560%	$117.41
72		7572	021	055	Thomas & Andrea	MacMillan	201 Spindrift Dr.	Rancho P.V. CA 90275	$ 1,998.79	$302.81		7,627.36	1,488.00			0.175	1.488	0.000	0.000	1.663	1,695.98	560%	$114.25
73		7572	021	060	Charlotte	Pesusich	86 Yacht Harbor Dr.	Rancho P.V. CA 90275	$ 2,470.87	$374.33		5,179.28	1,937.00			0.119	1.937	0.000	0.000	2.056	2,096.54	560%	$176.16
74	x	7572	021	061	Lupe	Tomicic	87 Yacht Harbor Drive	Rancho P.V. CA 90275	$ 1,634.15	$247.57		6,128.89	1,219.00			0.141	1.219	0.000	0.000	1.360	1,386.58	560%	$0.00
75					City of	Rancho Palos Verdes	30940 Hawthorne Blvd.	Rancho P.V. CA 90275	$ 66,804.58	$10,120.74				277,925.09		0.000	0.000	55.585	0.000	55.585	56,683.84	560%	$0.00
76	x	7572	022	026	James E.	Welsh	22 Empty Saddle	Rolling Hills Est. CA 90274	$ 2,030.00	$307.54		3,880.00	1,600.00			0.089	1.600	0.000	0.000	1.689	1,722.46	560%	$0.00
77	x	7572	022	027	Kevin & Allison	Wolcott	100 Spindrift Dr.	Rancho P.V. CA 90275	$ 1,100.41	$166.71		4,600.00	810.00			0.106	0.810	0.000	0.000	0.916	933.70	560%	$93.44

78		7572	022	028	Hoffman	Trust	101 Spindrift Dr.	Rancho P.V. CA 90275	$ 2,938.83	$445.23		2,625.00	2,385.00		0.060	2.385	0.000	0.000	2.445	2,493.60	560%	$139.03	
79		7572	022	029	Joseph Lay	Lynda Lima	102 Spindrift Dr.	Rancho P.V. CA 90275	$ 2,302.81	$348.87		2,660.00	1,855.00		0.061	1.855	0.000	0.000	1.916	1,953.94	560%	**$146.99**	
80		7572	022	030	Portuguese Bend Club	H.O.A.	4100 Palos Verdes Dr. S.	Rancho P.V. CA 90275	$ 77.06	$11.67		2,793.00	0.00		0.064	0.000	0.000	0.000	0.064	65.39	560%	$6.53	
81	x	7572	022	031	Ann	Lineberger	104 Spindrift Dr.	Rancho P.V. CA 90275	$ 1,640.90	$248.59	$ 84,750.57	3,150.00	1,293.00		0.072	1.293	0.000	0.000	1.365	1,392.31	560%	**$139.24**	
82	x	7572	022	032	Jerry	Schwartz	105 Spindrift Dr.	Rancho P.V. CA 90275	$ 1,398.94	$211.94		6,098.00	1,024.00		0.140	1.024	0.000	0.000	1.164	1,187.00	560%	$118.74	
83		7572	022	033	Portuguese Bend Club	H.O.A.	4100 Palos Verdes Dr. S.	Rancho P.V. CA 90275	$ 87.19	$13.21		3,160.00	0.00		0.073	0.000	0.000	0.000	0.073	73.98	560%	$7.45	
84		7572	022	036	Portuguese Bend Club	H.O.A.	4100 Palos Verdes Dr. S.	Rancho P.V. CA 90275	$ 207.43	$31.42		7,518.00	0.00		0.173	0.000	0.000	0.000	0.173	176.01	560%	$17.24	
85		7572	022	037	Richard	Weirick	1406 El Vago St.	La Canada, CA 91011	$ 2,105.51	$318.98		4,700.00	1,644.00		0.108	1.644	0.000	0.000	1.752	1,786.53	560%	**$168.00**	
86		7572	022	040	Betty	Helford	127 Spindrift Dr.	Rancho P.V. CA 90275	$ 1,079.59	$163.55		4,760.00	789.00		0.109	0.789	0.000	0.000	0.898	916.04	560%	$91.60	per Charlotte 4/2024
87		7572	022	044	Betty	Helford	127 Spindrift Dr.	Rancho P.V. CA 90275	$ 2,786.32	$422.12		5,679.00	2,188.00		0.130	2.188	0.000	0.000	2.318	2,364.20	560%	$231.96	
88	x	7572	022	045	Kirk	Ayers	122 Spindrift Dr.	Rancho P.V. CA 90275	$ 1,080.18	$163.64		5,130.00	781.00		0.118	0.781	0.000	0.000	0.899	916.54	560%	$91.70	
89		7572	022	046	William N.	Willens	130 Spindrift Dr.	Rancho P.V. CA 90275	$ 1,777.52	$269.29		7,187.00	1,314.00		0.165	1.314	0.000	0.000	1.479	1,508.23	560%	$150.56	
90		7572	022	047	Curtice	Booth	98 Yacht Harbor Dr.	Rancho P.V. CA 90275	$ 144.65	$21.94		5,250.00	0.00		0.121	0.000	0.000	0.000	0.121	122.91	560%	**$12.35**	
91		7572	022	048	Eric C.	Johnson	461 W. 6th St. St.300	San Pedro, CA 90731	$ 128.30	$19.44	$ 12,308.43	4,650.00	0.00		0.107	0.000	0.000	0.000	0.107	108.86	560%	$10.92	
92		7572	022	049	Eric C.	Johnson	461 W. 6th St. St.300	San Pedro, CA 90731	$ 153.13	$23.20		5,550.00	0.00		0.127	0.000	0.000	0.000	0.127	129.93	560%	$12.96	
93		7572	022	050	Eric C.	Johnson	461 W. 6th St. St.300	San Pedro, CA 90731	$ 165.54	$25.08		6,000.00	0.00		0.138	0.000	0.000	0.000	0.138	140.46	560%	$14.08	
94		7572	022	051	Eric	Johnson	461 W. 6th St. St.300	San Pedro, CA 90731	$ 208.86	$31.64		7,570.00	0.00		0.174	0.000	0.000	0.000	0.174	177.22	560%	$17.75	
95		7572	022	052	Stephen	Hinchliffe	120 Sprindrift Lane	Rancho P.V. CA 90275	$ 2,529.64	$383.24		3,737.45	2,019.00		0.086	2.019	0.000	0.000	2.105	2,146.40	560%	**$0.00**	
96		7572	022	053	Ann or Alan	Johnson	121 Spindrift Lane	Rancho P.V. CA 90275	$ 1,832.92	$277.68		2,661.00	1,464.00		0.061	1.464	0.000	0.000	1.525	1,555.24	560%	**$121.59**	
97		7572	022	058	Portuguese Bend Club	H.O.A.	4100 Palos Verdes Dr. South	Rancho P.V. CA 90275	$ 102.09	$15.47		3,700.00			0.085	0.000	0.000	0.000	0.085	86.62	560%	$7.25	
98	x	7572	022	059	Fred	Lee	92 Yacht Harbor Dr.	Rancho P.V. CA 90275	$ 2,236.63	$338.84		5,357.88	1,738.00		0.123	1.738	0.000	0.000	1.861	1,897.79	560%	$187.18	
99	x	7572	022	060	William D.	Silverthorn	4614 Fargo Ave.	San Diego, CA 92117	$ 1,072.65	$162.50		2,592.00	833.00		0.060	0.833	0.000	0.000	0.893	910.15	560%	**$91.09**	
100		7572	022	065	Portuguese Bend Club	H.O.A.	4100 Palos Verdes Dr. South	Rancho P.V. CA 90275	$ 132.43	$20.06		4,800.00			0.110	0.000	0.000	0.000	0.110	112.37	560%	$12.65	
101		7572	022	066	Grace	Petterson	96 Yacht Harbor Dr.	Rancho P.V. CA 90275	$ 3,375.00	$511.31	$ 8,562.19	9,025.00	2,601.00		0.207	2.601	0.000	0.000	2.808	2,863.69	560%	$128.53	
102		7572	022	067	Curtice	Booth	98 Yacht Harbor Dr.	Rancho P.V. CA 90275	$ 1,423.83	$215.71		7,871.29	1,004.00		0.181	1.004	0.000	0.000	1.185	1,208.12	560%	**$119.35**	
103	x	7572	022	072	Robert	Bogdonovich	108 Spindrift Dr.	Rancho P.V. CA 90275	$ 2,094.94	$317.38		3,227.80	1,669.00		0.074	1.669	0.000	0.000	1.743	1,777.56	560%	**$125.98**	
104		7572	022	073	Ralph	Black	36 Saddleback Rd.	Rolling Hills, CA 90274	$ 1,986.16	$300.90		3,380.00	1,575.00		0.078	1.575	0.000	0.000	1.653	1,685.26	560%	$168.41	
105		7572	022	074	Edison M.	Fabian	124 Spindrift Dr.	Rancho P.V. CA 90275	$ 2,096.31	$317.59		2,450.00	1,688.00		0.056	1.688	0.000	0.000	1.744	1,778.72	560%	$181.26	
106		7572	022	080	Michael	La Barbera	125 Spindrift Dr.	Rancho P.V. CA 90275	$ 804.97	$121.95		4,085.00	576.00		0.094	0.576	0.000	0.000	0.670	683.02	560%	**$0.00**	
107	x	7572	022	081	Martin	Vincent	126 Spindrift Dr.	Rancho P.V. CA 90275	$ 1,874.99	$284.06		4,360.00	1,460.00		0.100	1.460	0.000	0.000	1.560	1,590.93	560%	**$149.75**	
											$ 13,656.20												
									$570,570.00	$86,440.02		1,963,162.94	150,252.00	302,725.09	4,767,206.20	45.068	150.252	60.545	218.880		570,570.00		

Total Operating Cost of the District	570,570.00
Total Units of Assesment	474.75
Assesment / Unit	1,201.85

ATTACHMENT A

OFFICIAL PUBLIC NOTICE

A PUBLIC HEARING

FORMATION OF KLONDIKE CANYON GEOLOGIC HAZARD ABATEMENT DISTRICT

WHEN: Tuesday, March 16, 1982 - 8:00 P.M.

WHERE: City Council Chambers, 30940 Hawthorne Blvd., Rancho Palos Verdes

PURPOSE: To finance improvements necessary to eliminate further movement of the Klondike Canyon Landslide, it is proposed that the Klondike Canyon Geologic Hazard Abatement District be formed. Immediate formation of the District is necessary to begin a program of preventive measures.

DISTRICT PLAN: A plan of control describing the geologic hazard, its location and the area affected and a plan for the prevention, mitigation, abatement or control of the hazard is available for review and/or purchase at the office of Community Services.

Briefly, the plan consists of the following documents:

1. Results of Subsurface Geological Investigation - Seaview Area, Robert Stone & Associates, January 21, 1982.
2. Investigation of Surface Deformation, Seaview Area, Robert Stone & Associates, September 15, 1980.
3. Addendum to Report on Surface Deformation, Klondike Canyon, December 10, 1980.
4. Ordinance No. 139U of the City of Rancho Palos Verdes, establishing a building moratorium, adopted February 3, 1981.
5. Landslide Moratorium - Requests for Exclusions Procedure, City of Rancho Palos Verdes, June 11, 1979.

OBJECTIONS: At any time not later than the time set for hearing objections to the proposed formation at the public hearing March 16, 1982, any owner of real property within the proposed district may make a written objection to the formation. Such objection shall be in writing, shall contain a description of the land by the assessor's description (book, page and parcel numbers) and shall be signed by such owner. The address where objections to the proposed formation may be mailed or otherwise delivered:

HAZARD ABATEMENT DISTRICT
30940 HAWTHORNE BLVD.
RANCHO PALOS VERDES, CA. 90274

PROPOSED DISTRICT BOUNDARIES:

ATTACHMENT A

RESOLUTION NO. 82-12

A RESOLUTION OF THE CITY COUNCIL OF THE CITY OF RANCHO PALOS VERDES INITIATING PROCEEDINGS FOR THE FORMATION OF THE KLONDIKE CANYON GEOLOGIC HAZARD ABATEMENT DISTRICT

The City Council of the City of Rancho Palos Verdes hereby resolves as follows:

Section 1. The City Council of the City of Rancho Palos Verdes hereby elects to proceed under and pursuant to the provisions of Division 17 (commencing with Section 26500) of the Public Resources Code of the State of California.

Section 2. The City Council has been presented with and has received a plan of control for the prevention, mitigation, abatement, or control of the geologic hazard and has determined that the public health, safety and welfare require formation of the Klondike Canyon Geologic Hazard Abatement District.

Section 3. A public hearing shall be held on such formation on March 16, 1982, at 8:00 p.m. at the Rancho Palos Verdes Council Chambers located at the Palos Verdes Unified School District Building, 30942 Hawthorne Boulevard, Rancho Palos Verdes, California. Objections to the formation of such district shall be in the form described by Section 26564 of the Public Resources Code.

Section 4. Notice of the hearing shall be prepared and distributed pursuant to the provisions of Sections 26561 - 26563 of the Public Resources Code.

PASSED, APPROVED AND ADOPTED this 16 day of February, 1982.

/s/ JACKI BACHARACH
MAYOR

ATTEST:

/s/ MARY JO LOFTHUS
CITY CLERK

I HEREBY CERTIFY that the foregoing is a true and correct copy of Resolution No. 82-12 approved and adopted by the City Council of the City of Rancho Palos Verdes at a meeting thereof held on the 16 day of February, 1982.

/s/ MARY JO LOFTHUS
CITY CLERK

RESOLUTION NO. 82-17

A RESOLUTION OF THE CITY COUNCIL OF THE CITY OF RANCHO PALOS VERDES ORDERING THE FORMATION OF THE KLONDIKE CANYON GEOLOGIC HAZARD ABATEMENT DISTRICT

The City Council of the City of Rancho Palos Verdes hereby resolves as follows:

Section 1. The City Council of the City of Rancho Palos Verdes passed Resolution No. 82-12 on February 16, 1982, initiating proceedings for the formation of a landslide abatement district. Said resolution established March 16, 1982 as the date for a public hearing on formation of the landslide abatement district. The City Council finds and determines that notice of said hearing was properly sent out to all property owners in compliance with Section 26561, et seq., of the Public Resources Code.

Section 2: The City Council of the City of Rancho Palos Verdes held a public hearing on the formation of the landslide abatement district on March 16, 1982 for the purpose of receiving objections to the proposed formation from owners of real property within the proposed district wishing to make objections. After reviewing said objections the City Council hereby finds and determines that objections were received from owners of less than 50% of the assessed valuation of property within the proposed district. Since such objections were received from owners of less than 50% of the assessed valuation, the City Council may proceed with the formation of a landslide abatement district.

Section 3: The City Council hereby orders the formation of the Klondike Canyon Geologic Hazard Abatement District pursuant to the provisions of Division 17 of the Public Resources Code of the State of California.

Section 4: The following five owners of real property within the proposed district are hereby named to the initial Board of Directors of the Klondike Canyon Geologic Hazard Abatement District for the terms indicated:

1. Ken Dyda, 2 years
2. Monte Brower 2 years
3. Ludwig Zelt 4 years
4. John McCarthy 4 years
5. Jeffrey Younggren 4 years

After the initial term, each term will be for a four (4) year period.

PASSED, APPROVED AND ADOPTED this 16th day of March, 1982.

Jacki Bacharach
MAYOR

ATTEST:

Mary Jo Lofthus
CITY CLERK

I HEREBY CERTIFY that the foregoing is a true and correct copy of Resolution No. 82-17 approved and adopted by the City Council of the City of Rancho Palos Verdes at a meeting thereof held on the 16th day of March, 1982.

Mary Jo Lofthus 5/13/2024
CITY CLERK
CITY CLERK

ATTACHMENT B

[illegible] "Landslides and Landslide Abatement, Palos Verdes Peninsula, Southern California", [illegible] Geological Society of America, Cordilleran Section, April 1982.

LAND STABILITY IN THE KLONDIKE CANYON AREA

Scott T. Kerwin
Moore & Taber
4530 E. La Palma Avenue
Anaheim, California 92807

ABSTRACT

Evidence of recent ground movement in the Seaview Tract in the vicinity of Klondike Canyon adjacent to the active Portuguese Bend Landslide has generated concern for the stability of the area and has precipitated an intensive and cooperative program of investigation by consultants for the City of Rancho Palos Verdes and large private landowners. Extensive subsurface exploration has determined the general geologic structure, stratigraphy and delineation of the boundaries of an apparent reactivated ancient landslide. The depth of the slide and the cause and mechanism of movement are still items of concern and under study. Methods of dealing with the potential problem, liabilities, and procedures to minimize further movement are addressed.

INTRODUCTION

The apparent stability of the seaward dipping bedrock exposed in Klondike Canyon has been a question in the minds of many geologists since reactivation of the nearby Portuguese Bend Landslide in 1956. Evidence of recent ground movement in the existing Seaview Tract and on the ridge separating Klondike Canyon from the active slide has precipitated a relatively intensive program of investigations to evaluate the gross stability of the area. Exploration funded by Palos Verdes Properties (the major landholder in the area) and the City of Rancho Palos Verdes included: excavation and logging of 66 borings and 14 trenches, installation of 4 inclinometers to monitor possible slide movement, and the fortuitous establishment of an artesian dewatering well. Much of the information gathered is still being analyzed, but a number of conclusions and recommendations have been made.

Exploration was carried out under fairly unique circumstances in that four consulting firms each concentrated their efforts in four relatively distinct areas around Klondike Canyon. Data (boring logs, etc.) have been freely exchanged and a high degree of cooperation (location of borings for sections, scheduling of drill rigs, etc.) has been maintained both during the field work and the subsequent evaluation of the data.

Robert Stone and Associates (RSA) is the geological consultant for the City of Rancho Palos Verdes. In addition to the review of all geology reports submitted to the City, they are responsible for the bulk of the investigation performed in the Seaview Tract (residential development). Concurrent investigations for Palos Verdes Properties were undertaken on Parcels 11, 12 and 15 by Lindvall, Richter and Associates (LRA); Converse Ward Davis Dixon (CWDD); and Moore & Taber (M&T), respectively (see Geologic Map, Plate I).

Topographic Setting

In general, the ground surface consists of a gently sloping terrace which rises to the northeast and terminates at the base of two prominent ridges. Klondike Canyon trends approximately perpendicular to the ocean shoreline and has been downcut through the terrace level and between these ridges. In the eastern portion of the area, the seaward extent of the terrace abruptly terminates at a sea cliff approximately 170 feet above the present shoreline. In the central portion, the limits of an ancient landslide ("Beach Club Landslide") are marked by a well defined scarp resembling a large bite out of the topography. The terrace level terminates to the west at the easterly side scarp of the active Portuguese Bend Landslide. The natural topography has been modified by cut and fill operations associated with the construction of Yacht Harbor Drive and Palos Verdes Drive South, and the development of the Seaview Tract; but relatively minor amounts of material were redistributed during grading.

RECENT SITE HISTORY

Following is a chronology of the pertinent events leading up to the present status of investigations within the area; it results from information obtained from the referenced geologic and geotechnical reports, comparison of aerial photographs dating back to 1921, and personal communication with local residents and the other consultants.

1927 - Yacht Harbor Drive was constructed (see photograph, Plate III).

1935-37 - Palos Verdes Drive South was constructed; the alignment was widened at a later date.

Late 1940's - Residential development began on the "Beach Club Landslide" and some of the adjacent subsidiary slides; approximately 50 small cottages and homes occupy this area at present.

August, 1956 - Portuguese Bend Landslide reactivated.

Late 1956 - Grading for residential development of the Seaview Tract was completed.

January, 1977 - Geotechnical investigations began for the Portuguese Bend Club area (Parcel 15). Studies included preliminary soils and geologic investigations and later

Prominent Marker Units

Three other prominent mappable units having distinctive characteristics are present in the area. The "Sandy Tuff" is exposed in the sea cliff and consists of 10-foot thick bed of weathered Tuff. This unit is typically overlain by a discontinuous. irregular bed of well cemented fine silty sandstone. Based on structural relationships, the "Sandy Tuff" occurs approximately 220 feet stratigraphically above the Portuguese Tuff.

Marker Bed No. 1 is a 2.5 to 3.5-foot thick, thinly laminated siliceous siltstone (dolomitic?) that is predominantly exposed on the sea cliff and at three locations in the intertidal zone. Two similar, but thinner, siliceous layers occur approximately 11 feet above and below Marker Bed No. 1; the relative thicknesses, spacing and resistance to weathering (hardness) make these beds easily distinguishable. Marker Bed No. 1 occurs approximately 35 feet stratigraphically below the "Sandy Tuff" and, accordingly, 185 feet above the Portuguese Tuff.

An unnamed interval of altered tuff with a composition and thickness similar to the "Sandy Tuff" occurs intermediate to Marker Bed No. 1 and the top of the Portuguese Tuff. This unit was exposed in borings at the top of the sea cliff north of the axis of the "Drainline Monocline-Anticline," and is about 80 to 120 feet above the Portuguese Tuff.

The "Volcanics" is 6 to 10-foot thick basalt sill exposed in Klondike Canyon and in Borings RPV-2, 3, 4, and F-5. The "Volcanics" is located below the Portuguese Tuff; inspection of the boring logs shows a relatively consistent interval of about 40 feet between the base of the Tuff and the base of the "Volcanics." Petrographic thin sections of this interval from Borings RPV-3 and F-5 were described by Karl Vonder Linden as basalt, but some field descriptions of this unit have referred to it as an altered tuff because of its high degree of weathering. Very similar, distinctive profiles in gamma logs of the borings confirm the continuity of this interval over much of the area.

The major conduit for the artesian flow noted in Boring RPV-1 appears to be a 5 to 10-foot thick sandy or granular interval immediately above the "Volcanics." Thin section examination of this sandy interval from samples in RPV-1 determined that this unit is equivalent to the subfeldspathic lithic wacke described by Karl Vonder Linden.

The apparent close association of granular clastic material with the intervals of tuff and basalt may be related to the environments of deposition and intrusion of these units. A period of volcanic activity and, possibly associated local uplift, may have resulted in deposition of granular clastic sediments and/or fracturing of lithified sediments. In the case of the intrusions, it seems likely that fluids and gases associated with an intrusion would have a tendency to follow an unconsolidated or only partially lithified sediment. The existence of conduits or reservoirs for groundwater in the bedrock may have a relation to the genesis of landslides in the area.

Unconformably overlying the bedrock in most of the area are uplifted, largely non-marine terrace deposits. These terrace materials were deposited on a number of wave-cut benches in the bedrock. The lowest part of the terrace section is typically comprised of a relatively thin fossiliferous marine deposit containing numerous rounded cobbles. The present shoreline and intertidal zone is an analogous surface of marine erosion.

Portuguese Tuff

The existence of the Portuguese Tuff within the subject area is important not only because it is a distinctive mappable unit for structural interpretation, but also because it is directly related to large landslides in the area. This association with large failures is due primarily to its structural attitude (unsupported beds dipping seaward). The relative weakness of the altered tuff beds (bentonite) prevalent in the stratigraphic interval bordering the Tuff is also an important factor. Under conditions of high moisture content and previous shearing (flexural slip or landsliding?) the shear strength of these bentonite layers decreases significantly.

Other probable factors in the development of these large landslides are the expansive and essentially impermeable characteristics of the bentonite. Volume changes associated with intermitten wetting and drying of these clay layers could create distinct planes of weakness in the bedrock interval. The relatively large thickness of the Portuguese Tuff acts as an effective groundwater barrier. In addition to the decrease in shear strengths generally commensurate with high moisture content, trapped groundwater (RPV-1) in seaward-dipping strata below the Tuff would create hydrostatic forces which could significantly affect the stability of the overlying bedrock. Perched groundwater in the stratigraphic interval immediately above the Tuff would create similar forces and conditions.

Maritime Sill

The abrupt termination of the "Maritime Sill" at the apex of the "Maritime Anticline" was the subject of investigation during work in the area (see Geologic Map and Sections). No basalt is evident on the north flank of the anticline, but the marker beds immediately above it are apparently continuous across the fold, and symmetrical relative to the axis of the anticline.

The sill appears to have been intruded at an interval occupied by an approximately 2-foot thick bed of fine silty sandstone which has been silicified to variable degress depending upon its proximity to the basalt. Adjacent to (stratigraphically below) this sandstone bed, on the north limb of the anticline, a prominent outcrop of "siliceous breccia" is exposed in the intertidal zone. This unit is cherty, very hard and black, with thin dark gray laminations. Large portions of this rock are composed of randomly oriented lithic fragments in a matrix of the same composition. Similar lithologic units are exposed on Inspiration Point, closely associated with a large basalt sill.

Structural relationships indicate the "Maritime Sill" is located at approximately the same stratigraphic horizon as the basalt sill on Inspiration and Portuguese Points. These points appear to be

stabilization recommendations for the "Beach Club Landslide."

September, 1979 - First indication of movement noted in Seaview Tract as evidenced by fracturing and slight subsidence of the pavement at the intersection of Dauntless and Exultant Drives. The small displacements observed were attributed to possible creep of the roadway.

August 13, 1980 - Report by RSA outlining apparent movement in the westerly portion of the Seaview Tract. The most obvious feature was a broad band of pavement about 50 feet wide at the intersection of Dauntless and Exultant which appeared to have sunk 2 or 3 inches. The edges of this zone were marked by parallel sets of en echelon fractures. Similar single sets of en echelon cracks were noted on Dauntless Drive, Admirable Drive, and the frontage road for Palos Verdes Drive South. Cracks possibly related to the movement were noted in the west corner of the house on Lot 3. These displacements could have resulted from localized conditions, but it was concluded by RSA that "the apparent existence of potentially unstable geologic structure beneath the subject area raises the possibility that the deformation is related to landsliding." A specific preliminary program of subsurface exploration was recommended to determine the cause of the movement.

August, 1980 to January, 1982 - Various geotechnical investigations conducted by M&T, RSA, CWDD, and LRA to determine subsurface geologic conditions, slide(?) geometry and limits, relationship to active sliding, and structure and lateral extent of the Portuguese Tuff.

GEOLOGY

In 1946, the USGS published Professional Paper 207, "Geology and Paleontology of Palos Verdes Hills, California" by W. P. Woodring, M. N. Bramlette, and W. S. W. Kew. Field work for the publication was initiated by Kew in 1921 and was substantially supplemented by Woodring and Bramlette during the 1930's. Formational names and stratigraphic nomenclature in general use by geologists presently working in the area are taken from this paper.

Stratigraphy

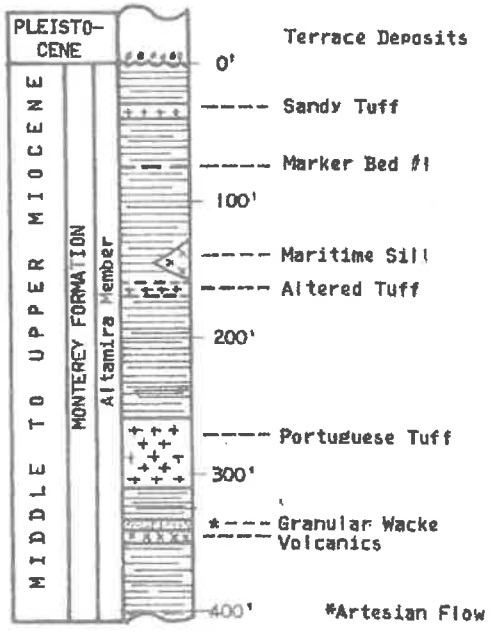
Bedrock underlying the Klondike Canyon area primarily consists of siltstone, shale, tuff and minor sandstone of the Altamira Shale member of the Monterey Formation. Also evident in the area are a few small sill-like bodies of basalt (including the "Maritime Sill") which may be directly associated with the intrusion of a relatively large body of basalt exposed in Livingston Quarry (Parcel 12).

Lithofacies in the area are interbedded and interfingered. The basalt occurs in sills which have been injected into unconsolidated or only partially lithified marine sediments. These intrusions may have created localized relief of the depositional surface by deforming the overlying sediments. These injected bodies, localized facies changes, and possibly small scale submarine slumping, may account for the observed interfingering of lensing of shale, siltstone and sandstone. Silicification (hydrothermal alteration?) of portions of the sedimentary section adjacent to the intrusives has further complicated local stratigraphy.

In spite of this apparent variability, inspection of a number of bedrock exposures, core samples, bucket auger borings and boring logs in the Klondike Canyon area has shown that the local stratigraphy is generally consistent and a few horizons can be correlated across the area. Correlations based on geophysical logging (primarily Gamma - natural radiation) of several borings has significantly simplified bedrock descriptions in the logs by softening the effects of weathering, poor sample recovery (cuttings in rotary borings), slight facies changes, etc.

Descriptions given below are not in stratigraphic order. For proper sequence, refer to the stratigraphic column, Fig. 1.

The Portuguese Tuff is the most prominent and distinctive unit in the area, and is often used as a reference point in discussing the stratigraphy. The type section for the Portuguese Tuff, as described by Woodring, et. al. (1946), is exposed in Klondike Canyon adjacent to Palos Verdes Drive South. Locally, the Portuguese Tuff shows a fairly consistent thickness of 45 to 50 feet. It is composed primarily of dense bentonite and bentonitic tuff, except for an approximately 10-foot thick interval that is highly silicified, which is present near the center of the unit.



STRATIGRAPHIC SECTION

FIG. 1

"islands" of stable bedrock within the unstable masses of the Portuguese Bend Landslide complex. Stability of these areas is likely due to these large basalt sills. Beds at the heel of these points are upturned at steep to near vertical angles. It has been suggested by some that this deformation may have resulted from "bulldozing" of these beds by the Portuguese Bend Landslide as it toed-out at the beach and sheared across overlying seaward dipping beds.

Similarly the "Maritime Sill," being a relatively more competent unit, may have acted as a locus for folding. Gravity folding (resulting from local uplift or deformation) grossly contemporaneous to the intrusion of basalt in the area may have resulted in the structural and stratigraphic configuration at the axis of the "Maritime Anticline."

Structure

The gross structure of the Palos Verdes Hills is that of a doubly plunging anticline with an axis near the crest of the hills trending northwest (approximately N60W). Fold axes within the Klondike Canyon area appear to show three general trends: N50-70W, N30-50E, and east-west.

1. Folds trending N50-70W parallel the gross anticlinal structure of the Palos Verdes Hills and tend to be broad, step-like flexures which dictate the regional dip to the southwest. Evidence of these flexures is apparent in the cascade-like topography of the Portuguese Bend Landslide mass.

2. Approximately perpendicular to these seaward dipping flexures are a number of trough and ridge-like folds showing a general seaward plunge. A small body of water near the eastern edge of the active Portuguese Bend slide known as "Lake Ishibashi" presently occupies a topographic low which overlies one of these structure troughs.

3. The most pronounced folding within the area trends approximately east-west. This trend is askew to the gross structure and for this reason, appears to be the least influenced by the general seaward (southwest) dip of the strata on the south side of the Palos Verdes Hills. The major folds exposed in the intertidal zone of Parcel 15 show this east-west orientation.

Bedrock structure in the area is a complex combination of these three basic trends. Folds appear to either be accentuated of flattened in those areas where these trends converge.

Orientation of bedrock strata in the Klondike Canyon area, including that underlying the active Portuguese Bend Landslide, generally shows a regional dip to the southwest at low to moderate angles, averaging about 15 degrees. There are significant departures from this regional dip, however, within the Klondike Canyon area.

The "Borderline Monocline" (trending N30-50E) is generally well defined north of Palos Verdes Drive South, and this abrupt change from the regional dip has limited the easterly extent of the active Portuguese Bend Landslide. Bedrock structure between the "Borderline Monocline" and the easterly portion of Parcel 15 generally conforms to the regional dip, with only subtle folding or warping of the bedrock.

Three major folds underlie the eastern portion of Parcel 15 and show a marked departure from the regional dip much like that of the "Borderline Monocline." These three, the Drainline Monocline-Anticline, Seaview Syncline, and Maritime Anticline have essentially parallel fold axes which trend in an east-west direction. The beds which form these folds are prominently exposed in the intertidal zone at the base of the sea cliff, particularly south of the jetty. Inland, the folds have been generally confirmed by borings and geologic mapping of exposures east of the Seaview Tract (east of Forrestal Drive and north of Palos Verdes Drive South). The seaward extension of the "Seaview Syncline" is well-defined in a number of airphotos by underwater exposures of Marker Bed No. 1. These exposures suggest an eastward plunge of the fold and possibly a closed structural basin offshore.

East of the "Maritime Anticline" two small, well-defined folds are evident in the sea cliff and intertidal zone. These folds are significant because they illustrate the complexity of structure where general trends of the folding overlap. Both folds trend approximately N30-50E and show a moderate (20-25 degrees) plunge to the southwest between the sea cliff and shoreline. At the shoreline, the axes of these folds abruptly flatten or show no plunge where they cross a broad flexure which approximately parallels the shoreline (N50-70W). 100 to 150 feet seaward from the shoreline, the axes once again plunge to the southwest at moderate angles, illustrating the step-like, seaward sloping structure of much of the strata in the area.

Groundwater

Boring RPV-1 was drilled May 6, 1981 by M&T for the City as part of a limited program of subsurface exploration and to install an inclinometer. At a depth of approximately 66 feet (base of the Portuguese Tuff), an artesian condition was encountered while drilling. Measurements at this time showed a flow of approximately 10 gpm (gallons per minute) at a depth of 80 feet. At a depth of 96 feet (in fine-grained sandstone equivalent to "lithic wacke"), the flow abruptly increased to approximately 150 gpm. A dewatering well was established by casing the upper 15.5 feet of the boring with 6-inch diameter PVC pipe and connecting a 4-inch diameter PVC line to carry the water over the ground surface between the well and the ocean shoreline. Periodic measurements are made of the flow from the well. A plot of the rate of flow versus time is a relatively smooth curve that was initially very steep, but has flattened to a nearly horizontal line, reflecting a relatively consistent flow of approximately 19 gpm between November, 1981 and February, 1982.

Analysis of the well water showed a coliform content of less than 2.2 MPN/100 ml in accordance with drinking water standards established by the State of California. Chemical analysis showed a relatively high sulphate content (nearly 5000 ppm), and high concentrations of bicarbonate, magnesium, and iron.

Nearly constant surface flow has been noted in

Klondike Canyon by long-time residents for at least 50 years. In spite of its clear and clean appearance, horses would not drink the water and apparently it was never utilized as a domestic water source. The undesirability of the water may be due to high concentrations of dissolved minerals and salts possibly resulting from flow over and through the large body of basalt exposed in Klondike Canyon northwest of Livingston Quarry.

The primary source of this water appears to be some small springs up the canyon near the boundary between the cities of Rancho Palos Verdes and Rolling Hills (RSA, April 17, 1981). Three culverts carry this surface water under the road fills for a small dirt road north of the Seaview Tract, for Palos Verdes Drive South and for Yacht Harbor Drive. In the beach area the water runs across Seawall Road and empties onto the beach. Measurements taken on February 11, 1981 showed flow from the culvert under the upper road fill at a rate of approximately 12 gpm, 4 gpm from the culvert under Palos Verdes Drive South, and no flow across Seawall Road. On August 13, 1981, flow from the culvert under the upper road rill was measured at 15 gpm. No measurements were taken at Palos Verdes Drive, and no flow was observed crossing Seawall Road. Since the last measurement, the upper road fill and culvert have been removed.

Although covered by alluvium and fill in many areas, bedrock below the Portuguese Tuff is exposed in most of the canyon bottom from the source of the water to a point near the Yacht Harbor Drive road fill. Based on observations by the maintenance men for the Portuguese Bend Club, significant flow across Seawall Road occurs only during, or shortly after periods of rainfall. The above information suggests that surface and subsurface flow in Klondike Canyon is one of the sources, if not the primary source, of groundwater emmanating from the well.

Definitive information on groundwater elsewhere in the area is limited. Slight seepage was noted in some deep rotary borings (RPV-2, RPV-4, and RA-1), but its significance and relation to a static groundwater level in the area is uncertain.

With the exception of brackish water encountered in the beach deposits at or very near sea level in borings on Seawall Road, no free water was apparent in any of the other borings within the Klondike Canyon area.

Landslides

The controlling factor of most of the large scale landsliding within the Portuguese Bend area is the regional seaward dip of the beds. It appears the major sliding has occurred along unsupported bedding planes undercut by erosion of the bedrock at the base of wave-cut terraces, including the present sea cliff. Numerous zones or planes or relative weakness are present in the bedrock of the area because much of the tuffaceous material has been altered to bentonite. The bentonite is characteristically subject to volume change with increased moisture content and typically has low shear strength, especially in previously sheared material under conditions of high moisture content. Consequently, high moisture content and the presence of bentonite layers in the bedrock are also factors contributing to the development of landslides in the area.

Beach Club Landslide

Eleven borings have been drilled within the well defined bowl-shaped feature of the "Beach Club Landslide". Contouring of the shear surface and inspection of the boring logs has revealed some interesting information.

Correlation of bedrock units above the shear surface in two borings indicates horizontal displacement of perhaps 175 feet. Assuming a planar shear surface with a dip of 13 degrees, this is equivalent to a vertical displacement of about 40 feet. Inspection of aerial photos predating the construction of Palos Verdes Drive South shows a small topographic high on the slide mass which presently underlies the fill for the road (see photo, Plate III). This small rise was probably the headward portion of the actual slide mass, and its former position suggests a horizontal displacement of about 140 feet.

Reconstruction of the topography indicates, conservatively, at least a 40-foot thickness of the slide mass had been eroded away from the headward portion of the slide before placement of the fill. Erosion is even more pronounced near the toe where the shear plane is only 5 or 10 feet below the present ground surface and daylights in the small bluff above the beach at about elevation 50 feet. This high degree of erosion and the well consolidated nature of infill behind the slide mass probably indicates it is an ancient feature.

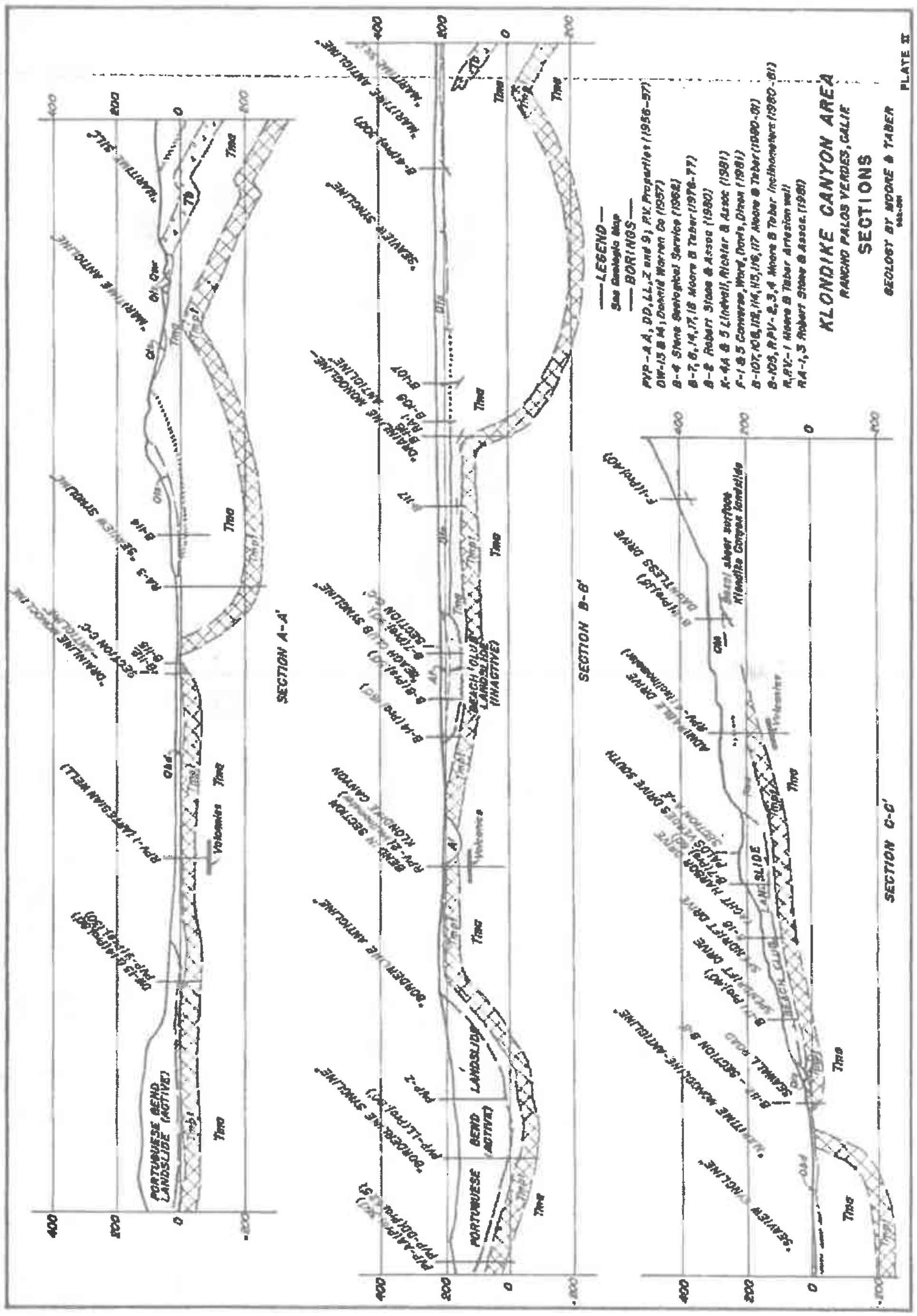
The slide is underlain by a relatively subtle, seaward plunging syncline or trough in the structure ("Beach Club Syncline"). It appears the failure surface is contiguous with the base of the terrace deposits along at least a portion of both sides of the slide. This probably defined the lateral limits of the movement and consequently the landward extent. It is interesting to note that a projection of the shear surface along bedding in Section C-C' daylights into the Terrace deposits near the previously mentioned fractures in Admirable Drive.

A maximum thickness of 13 feet of displaced bedrock was observed in the borings near the axis of the syncline. The interface between the bedrock and the Terrace deposits sometimes acts as a conduit for groundwater, especially in those areas where the sandy marine deposits are present. Weathering of the upper portion of the bedrock and possibly high moisture conditons in this structural trough may have been factors in the genesis of the slide in addition to those previously discussed.

Klondike Canyon Landslide

The existence of the ancient Klondike Canyon Landslide was documented by RSA in 1980. This conclusion was based on subsurface investigation of ground cracks and fissuring in the Seaview Tract and adjacent undeveloped land. The evidence of movement appears to be centered about Klondike Canyon north of Palos Verdes Drive South and is most noticeable near the head of the slide.

Photos predating the grading of the Seaview Tract show a relatively prominent drainage channel crossing the northwest portion of the tract (see



ATTACHMENT B

PORTUGUESE BEND AREA — NOVEMBER 28, 1931

Approximate Extent of Klondike Canyon Landslide
Photo courtesy of Spence Air Photo Collection - Dept. of Geography - U.C.L.A.

PLATE III

geologic map and photo). This gully is essentially straight (discounting the redirection of the drainage associated with the construction of Yacht Harbor Drive) and proceeds in a northeasterly direction to a point approximately under the present location of Lot No. 107 in the Seaview Tract. At this point, the channel is less distinct, becoming more of a drainage swale which turns relatively sharply to the northwest (passing approximately under the intersection of Dauntless and Exultant Drives) before becoming indistinguishable at the edge of Klondike Canyon. Northwest across Klondike Canyon from this point, small but relatively distinct arcuate grade breaks are evident crossing the two knobs of the adjacent ridge (Parcel 11).

Adjacent to the landward side of Palos Verdes Drive South, a smaller parallel arcuate drainage course branches off of the previously mentioned northeast trending drainage. This swale or slight depression trends in a north to northwesterly direction, passing through the approximate present locations of Lots 2, 3, 27, 28 and 29 in the Seaview Tract. This shallow drainage becomes indistinguishable near the scarp of the "Beach Club Landslide."

The relatively recent tension cracks and minor house distress noted in the Seaview Tract and on Parcel 11 are in those areas formerly bounded by these arcuate drainages. It appears that the drainage in this area may have been locally controlled by landslide-related features; both by the actual "break" in the topography (scarps) created by landslide movement, and the tendency of the surface water to create drainage paths in the less resistant landslide disturbed material (tension cracks, shear zones, etc.).

The seaward extension of the previously mentioned drainage gully cut a deep ravine in the face of the sea cliff which was filled for the construction of Yacht Harbor Drive. Marker Bed No. 1 is prominently exposed immediately southeast of this fill. The continuity of this outcrop with exposures of the same bed extending hundreds of feet from the shoreline indicates these beds are "in place".

The axis of the "Drainline Monocline-Anticline" marks the relatively abrupt departure of the underlying structure from that of the regional geology. The area of this abrupt change is very similar to structural and stratigraphic conditions in the axial region of the "Borderline Monocline" north of Palos Verdes Drive South. Steeply dipping beds in the downturned limb of this latter fold appear to structurally control the easterly extent of the adjacent active slide. In a similar fashion, this fold on the west and the "Drainline Monocline-Anticline" on the east, would limit the lateral extent of any landsliding in the seaward dipping bedrock of the Klondike Canyon area.

No surficial expression of recent movement related to the Klondike Canyon Landslide is apparent seaward of Palos Verdes Drive. An exact determination of the eastern boundary condition using stability analyses is probably not possible due to the complexity of the parameters involved. Based on the information above, and the absence of slide related features further east on the terrace level, the easterly extent of the ancient Klondike Canyon Landslide is considered marked by the natural course of the aforementioned drainage channel.

Although information is limited, it appears the "Borderline Monocline" would structurally limit the western extent of the Klondike Canyon Landslide. It has been suggested by others that an ancestral Portuguese Bend Landslide may have included both the active slide area and the Klondike Canyon Landslide. The present data indicates this would require that the shear surface not only conform to a very abrupt structural change, but also break across bedding through strata in excess of 100 feet thick. However, it should be noted that much of this thickness includes the Portuguese Tuff which probably has the lowest cross-bedding shear strength of any stratigraphic interval in the immediate area. It is probable the two landslides are associated in some way because of their proximity, but because recent surficial expression of movement appears to die out in the western portion of Parcel 11, it is unlikely that recent ground movements noted in the Klondike Canyon area are directly related to the continuing movement of the Portuguese Bend Landslide.

Information on the location and depth of the slide surface is limited to three borings (B-2, RSA; F-5, CWDD; K-5, LRA) and an exploratory trench by LRA in the headward portion of the Klondike Canyon Landslide. A two dimensional projection of the lowest (basal) shear surface noted in these borings is a nearly horizontal straight line between the borings. Projection and correlation of the "Volcanics" in RPV-3 (K-4A) to an equivalent horizon in F-5 shows this shear surface would be located approximately 67 feet stratigraphically below the base of the Portuguese Tuff. In the toe area of the slide, the equivalent horizon is approximately 124, 107 and 308 feet below sea level at locations RPV-1, B-112 and RA-3, respectively. This projection appears to be an improbable depth for an active failure surface.

There is much speculation concerning the seaward extension of the basal shear surface, but two basic hypotheses seem to have evolved. One suggests that the failure surface crosses bedding and is stratigraphically higher at the toe. The other suggests that the slide surface follows essentially the same stratigraphic horizon, and displacements at the head of the slide have resulted from compression and super hydrostatic uplift and deformation of bedrock in the toe area. Much of the information gathered is still under study, but it is likely that unless a significant displacement is noted in one of the inclinometers, or extensive and rigorous subsurface exploration is undertaken in the beach area, the seaward configuration of the landslide will remain unresolved.

Landslide Abatement

The Portuguese Bend and Abalone Cove Landslides are good examples of the marginal stability of some ancient slides. Under these conditions, man's impact on the immediate environment can be the difference between a split level home with an ocean view and one in which the levels keep splitting.

Grading has probably had a negligible effect on the stability of the Klondike Canyon Landslide because relatively minor amounts of material were redistributed. However, the road fill for Palos Verdes Drive South could have an adverse effect on the stability of the "Beach Club Landslide" because it was built across the remnant head of the slide mass. A jetty constructed at the south end of the

beach on Parcel 15 has caused an increasing amount of beach deposits to build up near the toe area of both slides. The net effect of these deposits on the mass of the toe area may be insignificant, but the increased beach area serves as protection against further erosion.

Hydrostatic forces and the decrease in shear strengths, generally commensurate with high moisture content, can have a profound effect on the stability of these large masses. Controlling the amount of water that enters the subsurface appears to be the most efficient and reasonable means of limiting slide movement, short of massive stabilization methods.

There are three major sources of groundwater. The first, and probably most important, is the surface water in Klondike Canyon which originates from a spring northwest of Livingston Quarry. Rainfall and natural surface run-off, especially in areas of fissuring, also contributes, but paving and drainage devices in the Seaview Tract have probably had a positive effect in minimizing surface penetration. Landscape watering and sewage disposal are also sources which are significant. Homes and cottages south of Palos Verdes Drive South are served by seepage pits which discharge water directly into the subsurface.

RSA has made specific recommendations concerning control of infiltration of water into the subsurface. Thus far, the only work completed has been the repair of pavement in the Seaview Tract by the City and removal of a small road fill in Klondike Canyon by the Klondike Canyon Residents Protective Association.

In July, 1981, concerned homeowners formed a non-profit corporation ("Klondike Canyon Residents Protective Association" - KCRPA) to deal with these problems. In addition to planning and implementing recommended remedial work, this organization also gives the homeowners an active voice in work proposed by other agencies. However, probably its most important function is to serve as protection against unnecessary exposure to liability. One of the major stumbling blocks in carrying out the recommended moisture control measures is the threat of potential lawsuits. As might be expected, landslide movements in a developed area often create a very negative atmosphere. One disgruntled homeowner can stymie even the most well meaning and well planned efforts. KCRPA acts as a buffer to protect involved individuals and organizations. The net worth of the corporation at any given time amounts to about one dollar; funds and time are loaned and donated as they are needed for each project. The directors of the corporation have an insurance policy with coverage up to a million dollars each for protection against personal liability.

Tentative plans have been made for installation of a paved drain in Klondike Canyon and additional dewatering wells in the beach area. A landslide abatement district similar to that currently in force in the Abalone Cove area is planned, but in the meantime, KCRPA will act as an interim organization.

ACKNOWLEDGEMENTS

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Investigations by Moore and Taber and other consultants on Parcels 11, 12 and 15 have been performed for Palos Verdes Properties. Their support and cooperation over the years is much appreciated, and especial thanks is due to Monte Brower for his permission and encouragement in the preparation of this article.

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Jahns, R. H., October 1973, Space-Time Relationships of Landsliding on the Southerly Side of the Palos Verdes Hills, California: AEG Special Publication.

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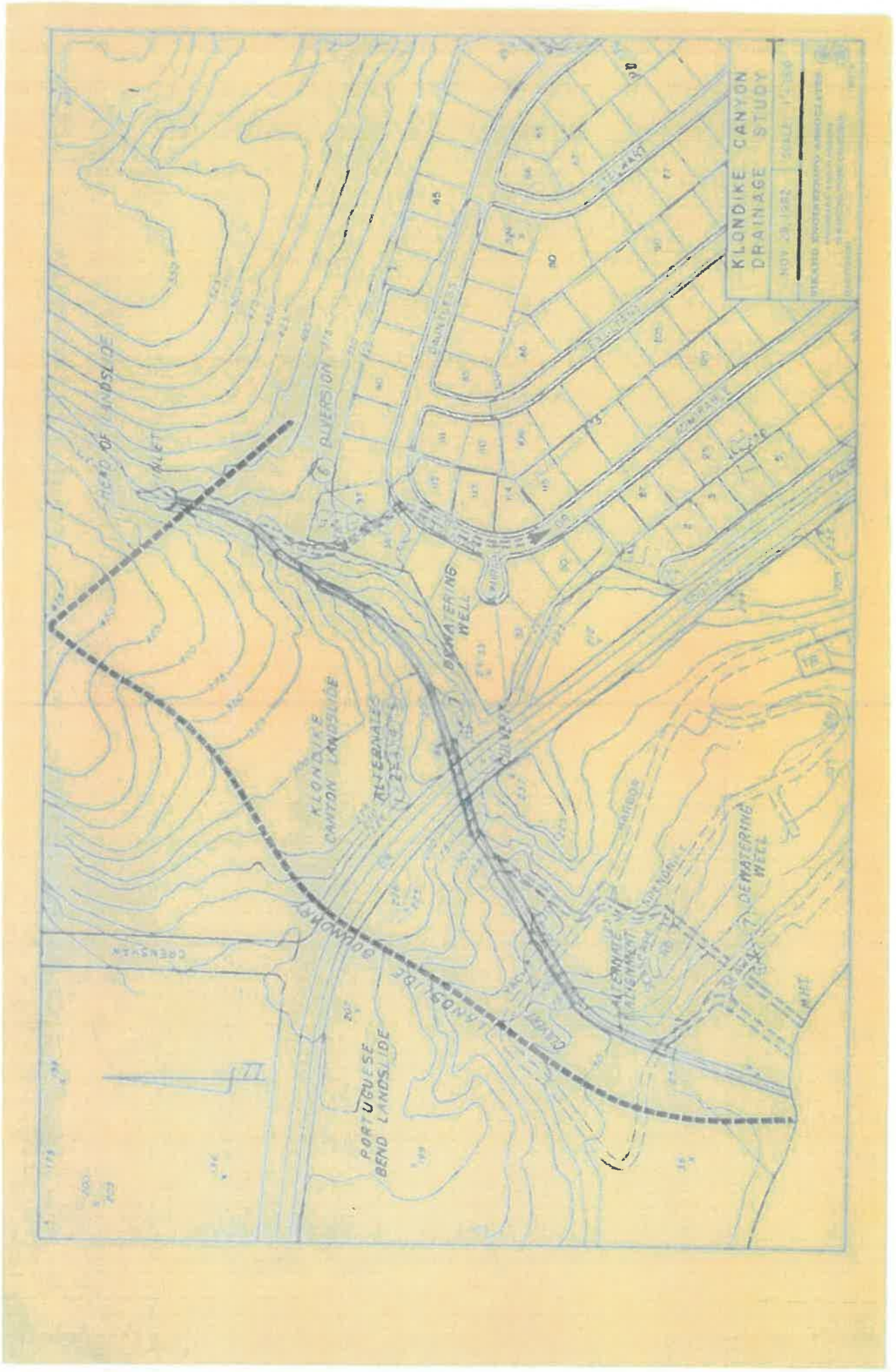
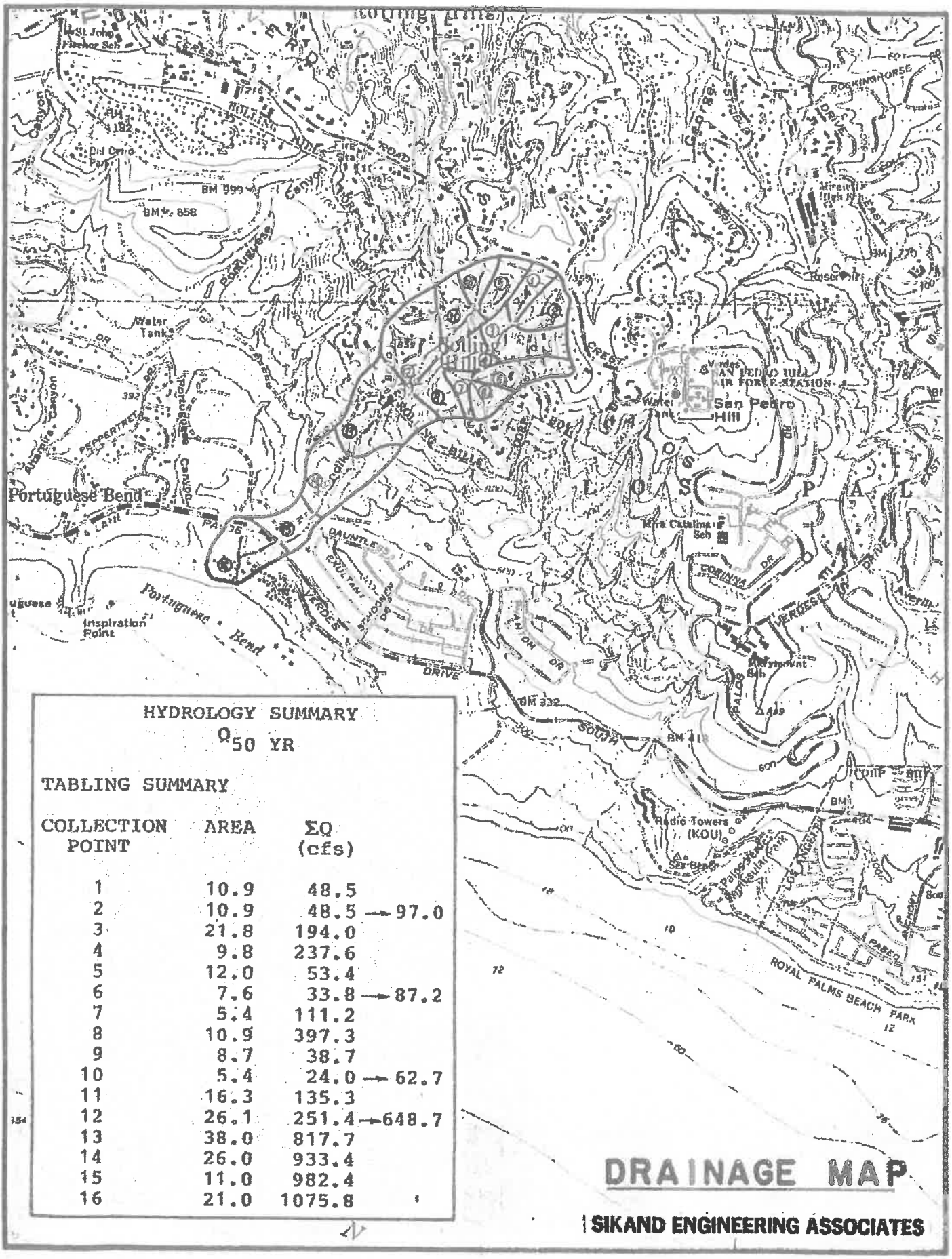


ATTACHMENT B



HYDROLOGY SUMMARY

$Q_{50\ YR}$

TABLING SUMMARY

COLLECTION POINT	AREA	ΣQ (cfs)	
1	10.9	48.5	
2	10.9	48.5	→ 97.0
3	21.8	194.0	
4	9.8	237.6	
5	12.0	53.4	
6	7.6	33.8	→ 87.2
7	5.4	111.2	
8	10.9	397.3	
9	8.7	38.7	
10	5.4	24.0	→ 62.7
11	16.3	135.3	
12	26.1	251.4	→ 648.7
13	38.0	817.7	
14	26.0	933.4	
15	11.0	982.4	
16	21.0	1075.8	

ATTACHMENT C

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wsp.com

March 18, 2024
5-212-102200

Mr. Steve Cummins
Chairman
Klondike Canyon Geologic Hazard Abatement District
PMB 142
P.O. Box 7000
Rolling Hills Estate, CA 90274

Subject: **Emergency Measures - Klondike Canyon Geologic Hazard Abatement District (KCGHAD)**
Klondike Canyon Landslide Area
Including Portions of the Seaview and Portuguese Bend Club Residential Tracts
Rancho Palos Verdes, California 90275

As requested, WSP USA Environment & Infrastructure Inc. (WSP), is providing the following comments regarding the value/effectiveness of the emergency measures proposed by the KCGHAD, as outlined in the attached summaries prepared by KCGHAD representatives. These summaries identify the proposed landslide mitigation measures as 5 steps:

Step 1 - Install water removal channel/pipe - Klondike Canyon from PV South to head of Klondike Canyon slide.
Step 2 - Add 3 new water extraction wells at beach in Klondike & 1 observation well near head of slide.
Step 3 - Fill fissures at head of Klondike slide & remove dirt at interface of Portuguese PB & KC Slide in PBC
Step 4 - Create storm drain at the head of the Beach Club Slide that channels the water to Klondike Canyon.
Step 5 - 4 additional tactical drain items to help mitigate slide (added by Steve C Feb 2024).

The large areal extent and great depth of the Klondike Canyon landslide (KC slide), and of the overlying Beach Club landslide (BC slide), along with the presence of the existing residential tracts, essentially limit the feasibility of any proposed mitigation measures to those that can control and reduce the groundwater levels/pressure within the landslides. Controlling and lowering the local groundwater levels/pressure increases the resistance to landslide movement and associated ground deformation/damage. Each of the items outlined above is intended to limit/control the volume surface water/rainfall infiltration into the landslides, or to lower/extract the groundwater that is present within the slides.

Step 3 also includes a local grading/soil removal element to reduce the lateral forces of the adjoining Portuguese Bend landslide (PB slide), which has been continuously moving seaward since 1956, and is now impinging on the westerly edge of the KC slide. GPS survey monitoring of accelerated slide movement after last year's heavy rains suggests these portions of both slides are now moving seaward essentially together. Local grading along the boundary is intended to reduce the lateral pressure being exerted by the PB slide by recreating some of the separation that previously existed between the slide masses. Prior to reactivation of the PB slide in 1956, a deep canyon was present in this area along the easterly edge of the PB slide.

As briefly described above, the steps briefly outlined in the attached KCGHAD summaries are considered essential elements to mitigating movement and associated damage from the KC and the BC slides.

Accelerated movement of the KC slide and associated ground deformation following last year's heavy rainfall resulted in numerous water supply pipeline breaks beneath the streets along and within the boundaries of the KC slide mass. The locations of these pipeline breaks along and near the slide boundaries, allowed large volumes of near surface water to infiltrate directly into the landslide. The local water utility has been actively mitigating the potential for future infiltration with a proactive maintenance program that includes moving particularly problematic portions of the water supply pipelines above grade and installing flexible "swing joints" to accommodate ground movement. Judicious maintenance of the water and sewer pipelines by the local utility companies is also considered an essential element to mitigating movement and associated damage from the KC and the BC slides.

WSP USA Environment & Infrastructure Inc.

S. T. K.

Scott T Kerwin, CEG 1267

Senior Associate Engineering Geologist
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Attachments: **KCGHAD Executive Summary-Emergency Plan to Mitigate Recent Land Movement (031124)**

KCGHAD Additional Detail-Emergency Plan to Mitigate recent Land Movement (030924)

Executive Summary:

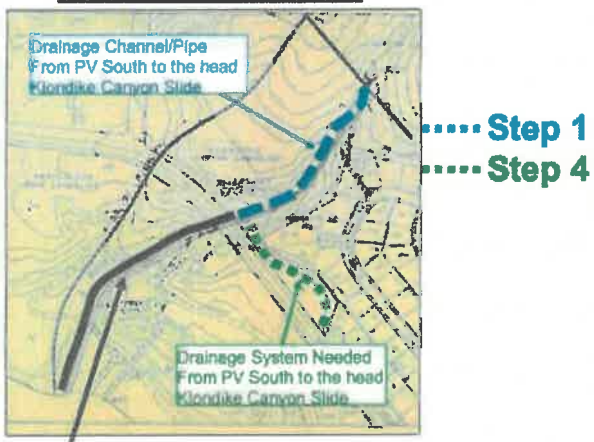
KCGHAD Plan Forward: Klondike Canyon Geologic Hazard Abatement District (emergency measures)

Step 1 $1,275K - Install water removal channel/pipe - Klondike Canyon from PV South to head of Klondike Canyon Slide
Step 2 $1,000K - Add 3 new water extraction wells at beach in Klondike & 1 observation well Head of slide
Step 3 $1,000K - Fill fissures at head of Klondike Slide & Remove dirt at interface of Portuguese PB & KC Slide in PBC
Step 4 $900K - Create Storm Drain at the head of the Beach Club Slide that channels the water to the Klondike
Step 5 $1,185K - 4 additional tactical drain items to help mitigate slide (added by Steve C Feb 2024)

~$5,400K - Total

Step 1 & Step 4

Klondike Canyon - Drainage Map



Current Klondike Canyon – Drain
Extends from PV South to the Beach

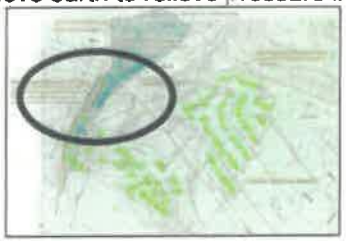
Step 2

5 active Wells ~ 400K Gal/day
210 days to remove 2023 rains (have 2-wells now)

Step 3

Fill Fissures Head of Klondike Slide

Remove earth to relieve pressure in PBC



Step 5

Repair *rain* damage to Klondike
48" storm drain
System damage and
3 other rainwater related items

Note: Calculations are estimates

Klondike Canyon Geologic Hazard Abatement District KCGHAD - Feb 20 2024

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