RANCHO PALOS VERDES
California

City of Rancho Palos Verdes

Engineer's Report

KLONDIKE CANYON GEOLOGIC HAZARD ABATEMENT DISTRICT

FISCAL YEAR 2025-2026

LOS ANGELES COUNTY, CALIFORNIA

JUNE 10, 2025

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: 2024-25 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 2025-26

TABLE OF CONTENTS

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 2025-26

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 2025-26

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 25/26.

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 A – 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: 6/10/2025

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

Part I – Overview and Benefits Provided to the District

History:

- In 1979-1982 geologic studies were done in and around what was then referred to as the Klondike Canyon Landslide. This land movement had just begun to show signs of pavement failure, 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, pages 24-27).

- 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 (attachment B 28-39).

- 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, a pumping well (well no. 3) at the beach area was drilled to a depth of approximately 150 feet, and is founded in the same fractured rock, artesian aquifer as the nearby 1981 artesian well. The 1987 pumping well remained in operation until

  September 2024, but only as a shallow well after the casing broke in February of 2024. The original artesian well 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, if needed. That original artesian well was destroyed by the landslide in January 2024 and was abandoned. A new dewatering well (well 4), drilled to a depth of 150-feet, was put into operation in December 2023 with an initial production of 115 gpm and was successful in lowering the water table from 5 ft. below ground surface (bgs) to a maximum of 35 ft. bgs by March of 2024. However, the pump then failed due to the land movement and a smaller pump was installed (shallow well). This well (no. 4) stopped producing in September 2024 when a new well (no. 5) was put in service in August 2024 that lowered the water table to below where the shallow wells could work. Then well no. 6 was initiated in early October and within a month produced a combined 550 gpm with #5 and #6 pumping together. This brought the water table down to where it remains to this date at approximately 90ft. bgs (60 to 70 feet below sea level).

- At the same time of KCLAD's adding dewatering wells at location, the City, using Malcolm their Contractor, started drilling geologic borings along the beach frontage at the toe of the Portuguese Bend Landslide (PBL), which is just West of the Klondike Slide (KCL). The purpose of the deep borings (250' to 300') was to obtain geologic information to determine a possible launch site location for the proposed hydroger (horizontal underground dewatering pipes) to be constructed in that area. However, what was found was a much deeper slip plane, for the land movement, that had never been known of by the past geologist. This discovery prompted the City to start drilling more vertical wells and installing pumps for dewatering; also abandoning the hydroger project in that area. Soon the City wells were producing sufficient quantities of water to reduce the hydrostatic pressure and thereby slow the land movement of the PBL, which is of tremendous help to the KCL.

- The 1987 pumping well (no. 3), with several pump exchanges over the years, 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 (due to land movement), recharged groundwater levels and accelerated movement of the landslide to the point that Federal, State, County, City and KCGHAD authorities declared emergency disasters.

- Fixed position GPS Survey monuments, positioned throughout the KCLAD Boundary areas, began indicating near zero land movement in the Klondike landslide in October of 2024. The two wells no. 5 and no. 6 (although having to go to generator power with SCE shutdown) continued to keep the water table below 90 ft bgs and GPS monument readings have indicated that the Klondike Canyon Landslide (KCL) has been at pre-2023 movement since October 2024 and to this date. The City has a California License Land Surveyor regularly monitoring the GPS monuments to determine vertical and horizontal movement for the entire slide complex. Vector analysis maps are drawn from the information for a visual look at the amount of land movement. KCLAD regularly review these vector and GPS reports with our Geologists.

- In the early of 90's, a 48" storm drain pipe, with debris basin, was constructed in Klondike Canyon by the City from the upstream side of PV drive South to outlet to the ocean. This 48" pipe was crushed by the 2023-2024 landslide and is now being redesigned and constructed on an improved alignment. Around that same time (early 1990's) other piping systems, suggested by Sikand Engineering report, were temporarily installed which extended further upstream from-PVDS. This system proved not to be effective, continually fell apart and were not liked by the Land Conservancy. In 2023 and 2024, KCLAD worked on an agreement, with the City, that KCLAD would take responsibility for repair/realignment of the damaged 48" storm drain pipe south of PV Drive and that the City would clear the brush filled Canyon, fill fissures and line the flow line of the Canyon with PVC sheeting to improve drainage and control erosion.

What KCGHAD is Doing to Mitigate

With KCLAD's success in 2024-2025 with the controlling of the Klondike Canyon Landslide movement to pre-2023 conditions, it became apparent that the actions being taken using dewatering wells and surface storm water control measures created the desired positive results the KCLAD team had hoped for. However, the KCGHAD Board realized that this could not have happened as quickly as it did without the continuous help from the City (with both professional advice and financial help) and our good fortune of a dry "rainy season".

The following mitigation measures are being pursued:

Ongoing Mitigation Measures:

- Continue with seeking Government funding sources for grants and loans for the continuation of construction projects that will sustain the current stability of the landslide.

- Provide close cooperation and coordination with City forces regarding improvements to the upper Canyon for the monitoring of drainage and fissures.

- Addition of two (2) more dewatering wells at the base of the slide on the beach with the goal of the completion of the first before the end of 2025.

- Finish the design and construction of the replacement/realignment of the storm drain system that will replace the 48" pipe that was destroyed with the land movement.

- Provide for improved power supply to the dewatering pump systems, including the purchase of a reliable backup generator that is compliant with air quality regulations and is quiet.

- Provide help to the City for supplying 3-phase power to their new deep wells on the beach front along the Portuguese Bend Landslide to the West of Klondike Canyon Landslide.

- Continue with the removal of dirt as needed where soil pressure from the Portuguese Bend slide along its East face where it is trying to join with KCLAD.

- Design a storm drain system along the head of the Ancient Beach Club Slide (North of PV Drive South) to avoid storm water runoff from entering that slide plane. Construction will be dependent on availability of funding.

- Continue to closely monitor dewatering wells pumping records for production and water table depths. This information is important for understanding below ground activities with the potential for land movement and a buildup of hydrostatic pressure.

- Continue to monitor City reports on surveyed GPS monuments and any signs of movement vectors vertically or horizontally. This would also include keeping records of weather reports and having rain gauges installed in the District.

- Send occasional reminders to KCLAD District residence regarding restraint of overwatering and reporting of any fissuring or unusual land movement observed.

- Provide for maintenance budgets to repair/replace improvements that were put in place to mitigate any renewed signs of landslide movement.

- Continue to pursue, with the City, reaching out to County Flood Control District, Corp of Engineers, LA County Sanitation District, and other Government Agencies that we believe should be involved in the design and construction of proper drainage systems which reach all the way to Crest Road in the City of Rolling Hills. These improvements will ultimately be needed to intercept storm water and sewage that currently enters the ground at the very large, naturally vegetated upper regions of the Klondike drainage basin. KCLAD believes that these improvements are the only permanent solution to stabilize the Klondike Landslide. We also believe that this is a regional issue that impacts the entire South Bay, due to the dangerous conditions created on Palos Verdes Drive South for general travel, emergency services and essential utilities. These improvements are tremendously expensive and (it's our opinion) should not be the burden of Rancho Palos Verdes, the GHAD's or residence of the community alone.

Cost of mitigation Measures:

The total estimated cost of the construction mitigation measures, as outlined above, is estimated to be $4,860,000.00 for construction projects that are paid for with the City Loan and $808,356.00 for administration and maintenance, paid with assessment funds.

Funding requests are actively being pursued by KCLAD with City of RPV, County, State and Federal agencies. We hope to be receiving some positive information in the future.

City Funding: (for critical needs)

In the interim, KCLAD has been working with, and now secured, the City of Rancho Palos Verdes Loan of $1,917,500.00 as a "jump start" to fund a portion of the mitigation construction project costs to move forward with the most critical items in order to avoid, as much as possible, the chance of extreme rains in 2026. 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 2025-2026 increased assessments, of the members of the District, is to fund that operational part of the project needs and to start the replacement of KCLADs reserve funds.

The estimated total cost for KCLAD Operations and Mitigation Measures, as outlined above, for Administrative Maintenance items and essential Construction items is as follows:

Total estimated costs for KCLAD Operations items, as outlined in the mitigation measures, that can only be paid with assessment fees:

- Administration, Consultants, Expenses..... $55,000.00
- Maintenance and Operations $441,600.00
- Replacement Reserves.....$16,000.00
- Litigation Defense.....$250,000.00
- Contingency.....$45,756.00

GRAND TOTAL.....**$808,356.00**

Total estimated cost for KCLAD Construction projects, as outlined by the above mitigation measures, that can only be paid for with City Loan or Government Grant funds:

- Two new Dewatering Wells & appurtenances.....$1.100,000.00
- 48" Storm Drain Realignment & Relocation Completion $900,000.00
- Power Supply Upgrades & Backup Generator.....$200,000.00
- Dirt Removal at East Face of PBL.....$250,000.00
- Storm Drain System at Ancient Beach Club Landslide.....$1,600,000.00
- Contingency (20%).....$810,000.00

GRAND TOTAL.....$4,860,000.00

In summary: The above Mitigation Plan is to keep as much water as possible out of the ground water and, for that water that does get underground, pump it out with dewatering wells to the Ocean. KCGHAD Plan of control for the prevention, mitigation, abatement and control of the geologic hazard is our continued focus on the public health, safety and welfare of the District's community.

What KCLAD Has Already Accomplished in 2024-25.

- Establish a financial Committee team that worked tirelessly in the very difficult pursuit of governmental Grants and Loans. Many meetings were attended, both in person and via zoom, with FEMA, CalOES, LA County the City and others, with a large amount of paper work preparation being involved. Some headway was made but some rejections were also issued by the agencies. Appeals are now being processed, with an attitude by the Committee of not giving up. The City loan of $1,917,500.00 was secured with the first payment moved to Decembe2026.
- Video of the 48" existing storm drain, and its laterals, only to find that the entire drainage system had been crushed by the lateral forces of the KLS land movement. This triggered the necessity of a redesign and realignment of the storm drain.

- The City Council decided to have RPV do the clearing and lining of the Canyon floor with PVC sheeting and the filling of the fissures, at the head of the KCL, to the north of PV Drive South; as this area is all on City property. KCLAD agreed that they would then take responsibility for the realignment and redesign of the storm drain system south of PV Drive to the ocean.

- Coordinated with the City for the clearance of all brush and trees from around the 48" pipe inlet, the canyon floor, the fissures at the head of the slide and the area around the head of the Ancient Beach Club Slide.

- Coordinated with the City for the installation of tarps and placement of sandbags over and around fissures at the head of the slide as temporary protection from storm water runoff and then removal of same when the Canyon was eventually cleared.

- Provide for the design and realignment of a new storm drain system from south of PV Drive South to the ocean. The new system provides an above ground 30" HDPE pipe connected at the existing manhole located on the south side of the roadway that was part of the original drainage system. From there, the above ground 30" pipe, supported by concrete and steel pipe anchors, is aligned westerly and southerly as it descends the roadway embankment for PV Drive. At Yacht Harbor Drive, the 30" pipe continues westerly along the northerly side of Yacht Harbor Drive to an energy dissipater and rip-rap rock erosion protection that then flows into a graded drainage channel. The channel

is then aligned along the westerly slope of the road and goes southerly into the ocean. We expect completion of the drain by July.

- Preparation for providing the drilling and pump installations for two (2) new deep dewatering wells, 150 ft. in depth, which will be located in an area on the beach that is westerly of the two pumps that are currently in operation. The locations are at the toe of the KCL, where the artesian pressures are greatest, for purposes of the relieving hydrostatic pressures that are found there.

- Continued coordination with Cal Water to get water lines moved above surface in areas of concern to avoid breakage issues.

- Provided coordination with LA County Sanitation District for their project of replacing the existing force main sewer steel pipes with HDPE pipes project along the south side of PV Drive South. The purpose of the project was to provide a more flexible and continuously joined pipe system over the landslide complex.

- Continued request notices for reduction of landscape watering in the Portuguese Bend Beach Club and Seaview Tract with Owners.

- Provided weekly monitoring of pumping rates and water table elevations at the beach wells. Dewatering wells No. 5 and No. 6 are adjusted to currently, producing together, an average of 210 GPM, which is holding the water table to approximately 90 feet below the ground surface and at pre-2023 land movement.

- Requested from City Surveyor to provide additional GPS monuments at the beach area close to the dewatering wells. These were provided in the locations requested. KCLAD also provided weekly GPS survey reviews and monitoring of the GPS monument survey reports issued by the City.

- Provided for pumping systems repairs and monitoring of the electrical and piping appurtenances that kept are dewatering systems operational 24/7.

- Removal of PBL dirt on its east face that is exerting lateral forces on KCL on its west face. This reduces the chance of the PBL in connecting with the KCL.

- Added HDPE pipes as force mains from the dewatering wells No. 5 and No. 6 pumps directly to the ocean. This makes the water extraction more efficient with less strain on the pumps.

- Repair, cleaning and regrading / shaping of surface graded channels for drainage purposes at the toe of the KCL which is being uplifted by the continuing vertical rising of the land at the beach.

- Continued discussions with utility Companies regarding various service issues within the District. Meetings with SCE and the City, during the 6 months of the power being turned off, in an effort to get it restored ASAP.

- Establishment of a Committee for purposes of keeping more accurate water production records from the dewatering wells and the water table height from ground surface. Accurate flow meters have been purchased for wells No. 5 and No. 6 that are now being installed.

- Establishment of a Communications Committee that has upgraded the KCLAD WEBB page to more completely get information to the District and others who need the information

Part II: Current Financial Status and Proposed FY 25/26 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 two new deep wells (No. 5 and No. 6) and installed dewatering pumps in these wells. KCLAD provided constant maintenance to the previously existing pumping well (No. 4) and made attempts at refurbishing it; but without success. New piping systems needed to be installed for the force mains coming from the two active wells using HDPE fused pipe to the ocean. 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 (and more) have reduced KCLAD's cash reserves on hand to approximately $193,000.00 with two months remaining in its fiscal year. (see 2024-2025 budget on page 15 and the "KCLAD Reserve" sheet on page 16). The City "Jump Start" funding of $1,917'000.00, for immediate project work (see pages 9-10), was intended to help stabilize the landslide and by October of 2024, with the aid of two new dewatering wells, some dry weather and the use of the City Loan funds, the KCL was successfully brought to pre-2023 land movement. Unfortunately, there has not been success with FEMA type loans; but it was not for lack of the team trying. Any 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 still needed for the stabilization.

As mentioned above the KCLAD Board Finance Committee 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 2025-2026 budget, shown on page 17, 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.

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 2025-2026 Assessment Table" is presented on pages 18 and 19 and in Appendix 1 (pages 21-23) 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 comprised 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 20 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, assisted City forces with 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.

To overcome the financial burden placed on KCGHAD by those winter rains, the board has set a much higher 2025-2026 budget, raised assessments in preparation for the building of sustainable projects and paying dept services and continuing a team to make applications to secure funds from Federal, State, County agencies and from the City of Rancho Palos Verdes.

The KCLAD Board of Directions 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 two new deep wells and installed dewatering pumps in these wells. KCLAD provided constant maintenance to these now existing pumping wells and made attempts at refurbishing the original artesian wells. New pump piping systems needed to be installed and repaired, due to the rising beach and surf zone. With SCE power turned off for months, generators and fuel were required for the dewatering pumps to keep doing their job.

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. This grading will need to continue into the future, along with the grading at the storm water channel in that same general location. All of these construction projects are very expensive and depend on the assessment funding as discussed earlier in the Report

In addition to the above assessment funds, The City has loaned KCLAD a sum of $1,917,500.00. Also, there are continuing efforts by KCLAD to obtain grant funding from Government Agencies, with marginal hope of receipts but some positive responses. However, it must be noted that government grants and the City Loan **cannot** be used for litigation defense or payments. The funds can only be used for the landslide stabilization projects. Therefore, with the number of tort claims filed against KCGHAD, it was necessary to include a line item for litigation defense in the budget for $250,000.00.

Some of those stabilization projects mentioned above include:

- Changing the alignment of the canyon storm drain system to the ocean.
- Additional well/pump construction at the artesian pressure zone at the beach.
- Purchase of a new, compliant back-up generator for the pumps.
- Drainage piping at the Ancient Beach Club Slide.
- Maintenance dollars for monitoring and keeping systems running.

These two funding measures (assessment and City loan) should be viewed as complimentary and not overlapping. The two new deep wells and the new channel grading to the surf zone need to be completed and other maintenance and repair issues are continuous and require constant spending. Therefore, our limited resources could soon be exhausted.

The Board hopes that you see that two funding sources as separate and that both are needed to keep the land movement at pre-2023 levels. If you agree, please vote in favor of the assessment.

Thank you,
KCGHAD Board of Directors

Engineer's Report

KCLAD

Fiscal Year 2025-26

Los Angeles, County, California

Maintenance & Operations Budget, 2024-2025 Fiscal Year
Klondike Canyon Geologic Hazard Abatement District

Expenses																	
Account No.	Description	Adopted Budget	2024					2025							Annual	Current
	Administration		July	August	Sept	Oct	Nov	Dec	Jan	Feb	Mar	April	May	June	Totals	Budget Balance
010	Exec. Director	$12,000.00	$1,000.00	$1,000.00	$2,000.00	$2,000.00	$2,000.00	$1,000.00	$1,000.00	$1,000.00	$1,000.00	$1,000.00			$13,000.00	($1,000.00)
011	Consulting Geologist/Legal Service	$10,000.00		$27,100.00		$13,020.00	$13,530.77	$19,122.24	$4,205.00	$23,896.08	$595.00	$2,590.00			$104,059.09	($94,059.09)
013	Board Expense	$500.00		$1,528.00											$1,528.00	($1,028.00)
014	Election Services	$1,200.00		$394.94											$394.94	$805.06
016	Admin. Consulting	$500.00						$32,101.58	$127.00						$32,228.58	($31,728.58)
Total Administration		$24,200.00	$1,000.00	$30,022.94	$2,000.00	$15,020.00	$15,530.77	$52,223.82	$5,332.00	$24,896.08	$1,595.00	$3,590.00	$0.00	$0.00	$151,210.61	($127,010.61)
	Maint. & Operations															
202	Insurance	$7,500.00	$2,060.10	$3,702.55		$5,329.31									$11,091.96	-$3,591.96
203	Office Expense	$1,000.00	$541.71	$436.50	$319.57	$989.63		$91.90				$64.50			$2,443.81	-$1,443.81
207	Replacement Reserves	$80,000.00														
208	Well Drilling Costs	$200,000.00		$106,182.65	$58,278.97											
209	Well-Pipeline Maintenance	$65,000.00	$117,175.76	$31,642.46	$16,480.84	$67,348.48	$23,900.48	$25,854.16	$165,008.12	$58,789.52	$95,694.42	$131,621.00			$733,515.24	-$668,515.24
210	Extraordinary Repairs	$25,000.00			$11,101.47	$13,430.00	$39,854.76				$18,400.00				$82,786.23	-$57,786.23
211	Electricity	$6,000.00	$1,000.00	$1,000.00							$2,699.64	$4,359.76				-$3,059.40
212	Channel Maintenance Project	$100,000.00														$100,000.00
213	Sub-slide Consulting/Beach Club Slide	$10,000.00														$10,000.00
Total Maintenance & Operations		$494,500.00	$120,777.57	$142,964.16	$86,180.85	$87,097.42	$63,755.24	$25,946.06	$165,008.12	$58,789.52	$116,794.06	$136,045.26	$0.00	$0.00	$1,003,358.26	-$508,858.26
	Reserves & Contingency															
410	Contingency Fund	$51,870.00														
Total Warrants		$570,570.00	$121,777.57	$172,987.10	$88,180.85	$102,117.42	$79,286.01	$78,169.88	$170,340.12	$83,685.60	$118,389.06	$139,635.26	$0.00	$0.00	$981,047.85	-$583,998.87
Income																
	24/25Assessment	$570,570.00														
	24/25 Direct Payments received	$487,922.03														
	24/25 Tax Collector Pymts-req.	$82,647.97														
	24/25 Payments - (rec. later)		$194.15													
Balance Owed																
Bank Activity																
	Transfers - savings to checking		$100,000.00	$175,000.00	$75,000.00	$175,000.00	$50,000.00	$80,000.00	$232,055.08	$0.00	$0.00	$0.00			$887,055.08	
	Interest Savings/Savings		$13.43	$14.51	$9.51	$4.37		$5.73			$2.83				$50.38	
	Interest CD - 11/7/00 $30,000														$0.00	
	Interest CD - 8/26/05 $60,000														$0.00	
	Bank charges/checking															
	Bank charges/savings															
	B of A (City Loan 6786) 2	$343,756.00					$343,756.00	$343,756.00	$178,747.88	$119,958.36	$379,986.30	$1,346,647.01				
Reserves																
	B of A (Checking) 1		$29,574.40	$31,587.30	$18,406.45	$91,289.03	$108,203.30	$143,838.29	$138,506.29	$113,610.21	$112,015.21	$108,425.21	$108,425.21	$108,425.21		
	B of A (Savings)		$478,602.38	$322,618.98	$247,628.49	$72,632.86	$22,632.86	$84,447.62	$84,447.62	$84,447.62	$84,450.45	$84,450.45	$84,450.45	$84,450.45		
	CD/US Bank $30,000		$39,553.92	$39,553.92	$39,553.92	$39,553.92	$39,553.92	$39,553.92	$0.00	$0.00	$0.00	$0.00				
	CD/US Bank $60,000		$71,344.79	$71,344.79	$71,344.79	$71,344.79	$71,344.79	$71,344.79	$0.00	$0.00	$0.00	$0.00				
Total Reserves	2024/2025		$547,730.70	$393,760.20	$305,588.86	$203,475.81	$170,390.08	$267,839.83	$222,953.91	$198,057.83	$196,465.66	$192,875.66	$192,875.66	$192,875.66		
	* Estimated totals		*	*	*	*	*	$611,595.83	$401,701.79	$318,016.19	$576,451.96	$1,539,522.67				

KCLAD RESERVE

	Beginning	Ending	Gain/Loss
24-25	$547,730.70	$192,875.66	($354,855.04)
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)

Maintenance & Operations Budget, 2025-2026 Fiscal Year Klondike Canyon Geologic Hazard Abatement District		
Expenses		
Account No.	Description	Adopted Budget
	Administration	
010	Exec. Director	$16,800.00
011	Consulting Geologist/Legal Service	$30,000.00
013	Board Expense	$2,000.00
014	Election Services	$1,200.00
016	Admin. Consulting	$5,000.00
Total Administration		$55,000.00
	Maint. & Operations	
202	Insurance	$12,600.00
203	Office Expense	$3,000.00
207	Replacement Reserves	$16,000.00
208	Well Drilling Costs	0 City Loan
209	Well-Pipeline Maintenance	$265,000.00
210	Extraordinary Repairs	$150,000.00
211	Electricity	$6,000.00
212	Channel Maintenance Project	0 City Project
213	Sub-slide Consulting/Beach Club	$5,000.00
214	Litigation Defense	$250,000.00
Total Maintenance & Operations		$707,600.00
	Reserves & Contingency	
410	Contingency Fund (6%)	$45,756.00
Total Warrants		$808,356.00

anum	Lrel	map book	page	parcel	Fname	Lname	Address	CSZ	amount	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
1		7564	001	915	Rancho Palos Verdes	City of	30940 Hawthorne Blvd.	Rancho P.V. CA 90275	$ 8,447.62	$903.10				24,800.00		0.000	0.000	4.960	0.000	4.960		7,544.52	835%
2		7564	002	001	Thomas	Berg	4353 Palos Verdes Dr. S.	Rancho P.V. CA 90275	$ 3,558.74	$380.45		13,090.00	1,789.00			0.301	1.789	0.000	0.000	2.090		3,178.29	835%
3	x	7564	002	002	Poul	Gamsgaard	4343 P.V. Dr. South	Rancho P.V. CA 90275	$ 3,549.44	$379.46		10,500.00	1,843.00			0.241	1.843	0.000	0.000	2.084		3,169.98	835%
4		7564	002	003	Steven	yutronich	4329 P.V. Dr. South	Rancho P.V. CA 90275	$ 4,010.72	$428.77		10,580.00	2,112.00			0.243	2.112	0.000	0.000	2.355		3,581.95	835%
5		7564	002	004	Charles F.	Stirling	4319 P.V. Dr. South	Rancho P.V. CA 90275	$ 4,196.22	$448.60		10,925.00	2,213.00			0.251	2.213	0.000	0.000	2.464		3,747.62	835%
6		7564	002	005	Michael & Terri	Carman	4315 P.V. Dr. South	Rancho P.V. CA 90275	$ 3,469.73	$370.93		10,465.00	1,797.00			0.240	1.797	0.000	0.000	2.037		3,098.80	835%
7		7564	002	025	Vincent J. and Theresa	Iacono	4304 Admirable Dr.	Rancho P.V. CA 90275	$ 3,259.63	$348.47		10,580.00	1,671.00			0.243	1.671	0.000	0.000	1.914		2,911.16	835%
8		7564	002	026	Ricardo & Sonia	Rivas	4312 Admirable Dr.	Rancho P.V. CA 90275	$ 3,548.07	$379.31		10,465.00	1,843.00			0.240	1.843	0.000	0.000	2.083		3,168.76	835%
9		7564	002	027	Vulin Roko	Milicic Marica	405 W. 20th St	San Pedro, CA 90731-5505	$ 3,474.22	$371.42		10,580.00	1,797.00			0.243	1.797	0.000	0.000	2.040		3,102.80	835%
10		7564	002	028	Robert	Locke	4332 Admirable Dr.	Rancho P.V. CA 90275	$ 4,056.70	$433.69		10,580.00	2,139.00			0.243	2.139	0.000	0.000	2.382		3,623.01	835%
									$ -		$ 41,571.09												
11	x	7564	003	011	Junichi	Kasuga	4334 Exultant Dr.	Rancho P.V. CA 90275	$ 3,988.03	$426.34		11,960.00	2,067.00			0.275	2.067	0.000	0.000	2.342		3,561.69	835%
12	x	7564	003	012	Andrew C.	Derr	4338 Exultant Dr.	Rancho P.V. CA 90275	$ 4,301.93	$459.52		12,010.00	2,303.00			0.276	2.303	0.000	0.000	2.579		3,922.41	835%
13	x	7564	003	013	James Buesing	Eva Albuja	955 Deep Valley Dr. #2992	P. V. Peninsula CA 90274	$ 3,314.48	$354.34		12,810.00	1,652.00			0.294	1.652	0.000	0.000	1.946		2,960.12	835%
14		7564	003	014	Negar & Donna B	Noushkam	4354 Exultant Dr.	Rancho P.V. CA 90275	$ 4,571.01	$488.67		12,060.00	2,407.00			0.277	2.407	0.000	0.000	2.684		4,082.34	835%
15	x	7564	003	015	Lawrence & Christine	Williams	4362 Exultant Dr	Rancho P.V. CA 90275	$ 4,180.35	$446.90		12,000.00	2,179.00			0.275	2.179	0.000	0.000	2.454		3,733.45	835%
16	x	7564	003	016	Matthew & Sara	Stelwagen	4380 Dauntless Dr.	Rancho P.V. CA 90275	$ 4,122.69	$440.74		12,050.00	2,144.00			0.277	2.144	0.000	0.000	2.421		3,681.95	835%
17		7564	003	017	Frank S. & Lisa M.	Matura	4394 Dauntless Dr.	Rancho P.V. CA 90275	$ 3,665.56	$391.87		13,470.00	1,843.00			0.309	1.843	0.000	0.000	2.152		3,273.69	835%
18	x	7564	003	018	Frank & Karen	Kostrencich	4353 Admirable Dr.	Rancho P.V. CA 90275	$ 5,028.07	$537.53		12,250.00	2,671.00			0.281	2.671	0.000	0.000	2.952		4,490.54	835%
19		7564	003	019	Michael	Bible	4335 Admirable Dr.	Rancho P.V. CA 90275	$ 3,532.66	$377.66		12,075.00	1,797.00			0.277	1.797	0.000	0.000	2.074		3,155.02	835%
20		7564	003	020	Alfredo	Gomez	4327 Admirable Dr.	Rancho P.V. CA 90275	$ 3,285.72	$351.26		12,075.00	1,652.00			0.277	1.652	0.000	0.000	1.929		2,934.46	835%
									$ -		$ 40,080.50												
21		7564	003	021	Carlos Cuervo	Vanessa Serrano	4319 Admirable Dr.	Rancho P.V. CA 90275	$ 3,648.49	$390.05		12,075.00	1,865.00			0.277	1.865	0.000	0.000	2.142		3,258.44	835%
22		7564	003	022	David G.	French	4305 Admirable Dr.	Rancho P.V. CA 90275	$ 3,524.84	$376.83		10,350.00	1,832.00			0.238	1.832	0.000	0.000	2.070		3,148.01	835%
23	x	7564	004	025	Derek & Connie	Anderson	4332 Dauntless Dr.	Rancho P.V. CA 90275	$ 4,518.19	$483.02		12,103.00	2,375.00			0.278	2.375	0.000	0.000	2.653		4,035.17	835%
24	x	7564	004	026	Jonathan Orozco	Hugo Rolando Gutierrz	434 McDonald Ave	Wilmington, CA 90744	$ 3,658.45	$391.11		13,680.00	1,834.00			0.314	1.834	0.000	0.000	2.148		3,267.34	835%
25		7564	004	027	David	Roth	4335 Exultant Dr.	Rancho P.V. CA 90275	$ 5,172.58	$552.98		17,340.00	2,639.00			0.398	2.639	0.000	0.000	3.037		4,619.60	835%
26		7564	005	900	Rancho Palos Verdes	City of	30940 Hawthorne Blvd.	Rancho P.V. CA 90275	$ 5,858.82	$626.34			0.00		74,923.00	0.000	0.000	0.000	3.440	3.440		5,232.48	835%
27	x	7564	005	002	Peter J & Kathy	Mirich	4342 Admirable Dr.	Rancho P.V. CA 90275	$ 3,474.26	$371.42		10,930.00	1,789.00			0.251	1.789	0.000	0.000	2.040		3,102.86	835%
28		7564	005	003	Richard	Horton	4906 Via El Sereno	Torrance, CA 90505	$ 3,996.53	$427.25		10,740.00	2,100.00			0.247	2.100	0.000	0.000	2.347		3,569.28	835%
29		7564	005	004	Mark Lloyd	Young	4364 Admirable Dr	Rancho P.V. CA 90275	$ 3,575.88	$382.28		13,180.00	1,797.00			0.303	1.797	0.000	0.000	2.100		3,193.60	835%
30		7564	005	005	Karen P.	Miller	4370 Admirable Dr.	Rancho P.V. CA 90275	$ 3,277.31	$350.36		11,860.00	1,652.00			0.272	1.652	0.000	0.000	1.924		2,926.95	835%
									$ -		$ 40,705.37												
31	x	7564	005	006	Glenn S.	Streeter	4372 Admirable Dr.	Rancho P.V. CA 90275	$ 80.07	$8.56		2,048.00	0.00			0.047	0.000	0.000	0.000	0.047		71.51	835%
32	x	7564	005	007	Glenn S.	Streeter	4372 Admirable Dr.	Rancho P.V. CA 90275	$ 9,521.15	$1,017.87		23,580.00	5,049.00			0.541	5.049	0.000	0.000	5.590		8,503.26	835%
33	x	7564	005	008	Gregory & Sandra	Montgomery	4378 Admirable Dr.	Rancho P.V. CA 90275	$ 4,766.33	$509.55		16,620.00	2,417.00			0.382	2.417	0.000	0.000	2.799		4,256.78	835%
34		7564	005	009	Patty	Perkinson, Trust	4393 Dauntless Dr.	Rancho P.V. CA 90275	$ 4,517.66	$482.96		12,220.00	2,372.00			0.281	2.372	0.000	0.000	2.653		4,034.70	835%
35	x	7564	005	010	Nicolas & Alison	Grillo	4387 Dauntless Dr.	Rancho P.V. CA 90275	$ 3,653.69	$390.60		15,170.00	1,797.00			0.348	1.797	0.000	0.000	2.145		3,263.09	835%
36	x	7564	005	011	Jack I.	Esensten	4000 P.V. Drive N. St.200	Rolling Hills Est. CA 90274	$ 4,520.84	$483.31		23,540.00	2,114.00			0.540	2.114	0.000	0.000	2.654		4,037.53	835%
37	x	7564	005	012	Mohammadriza & Delbar	Tahmasebi	4369 Dauntless Dr.	Rancho P.V. CA 90275	$ 6,064.13	$650.43		16,478.00	3,194.00			0.378	3.194	0.000	0.000	3.572		5,433.70	835%
38		7564	005	013	Don & Vielka	Schmid	4361 Dauntless Dr.	Rancho P.V. CA 90275	$ 4,399.75	$470.36		12,210.00	2,303.00			0.280	2.303	0.000	0.000	2.583		3,929.39	835%
39		7564	005	014	C. & D.	Heimer	4351 Dauntless Dr.	Rancho P.V. CA 90275	$ 3,632.05	$388.29		12,090.00	1,855.00			0.278	1.855	0.000	0.000	2.133		3,243.76	835%
40		7572	001	007	Rancho Palos Verdes	City of	30940 Hawthorne Blvd.	Rancho P.V. CA 90275	$ 366,926.31	$39,226.60			0.00		4,692,283.20	0.000	0.000	0.000	215.440	215.440		327,699.71	835%
									$ -		$ 406,101.98												
41		7572	003	018	Portuguese Bend Club	H.O.A.	4100 P. V. Dr. South	Rancho P.V. CA 90275	$ 37,026.45	$3,958.35		946,994.40				21.740	0.000	0.000	0.000	21.740		33,068.10	835%
42		7572	005	020	Eric C.	Johnson	461 W. 6th St #300	San Pedro, CA 90731	$ 8,447.62	$903.10		216,057.60	0.00			4.960	0.000	0.000	0.000	4.960		7,544.52	835%
43		7572	020	008	John	Hazard	44 Seawall Rd.	Rancho P.V. CA 90275	$ 2,454.27	$262.38		3,050.00	1,371.00			0.070	1.371	0.000	0.000	1.441		2,191.89	835%
44		7572	020	009	Brando	Valencia	518 De Sales St. N	San Gabriel, CA 91775	$ 1,911.37	$204.34		4,280.00	1,024.00			0.098	1.024	0.000	0.000	1.122		1,707.03	835%
45		7572	020	014	Robin	Pierson	1370 Dunning Dr.	Laguna Beach, CA 92651	$ 3,488.36	$372.93		19,305.00	1,605.00			0.443	1.605	0.000	0.000	2.048		3,115.43	835%
46		7572	020	015	Joel	Dime	132 Sea Urchin Lane	Rancho P.V. CA 90275	$ 2,974.54	$318.00		8,296.00	1,556.00			0.190	1.556	0.000	0.000	1.746		2,656.54	835%
47		7572	020	016	Dennis P.	Jacony	133 Sea Urchin Lane	Rancho P.V. CA 90275	$ 2,433.56	$260.16		6,310.00	1,284.00			0.145	1.284	0.000	0.000	1.429		2,173.40	835%
48		7572	020	017	Ben	Cheng	134 Seawall Road	Rancho P.V. CA 90275	$ 1,967.20	$210.31		6,100.00	1,015.00			0.140	1.015	0.000	0.000	1.155		1,756.89	835%
49	x	7572	020	018	Paul	Galletti	135 Seawall Road	Rancho P.V. CA 90275	$ 2,956.65	$316.08		3,920.00	1,646.00			0.090	1.646	0.000	0.000	1.736		2,640.57	835%
50		7572	020	019	John C. & Anna D.	Hazard	44 Seawall Road	Rancho P.V. CA 90275	$ 112.58	$12.04		2,879.32	0.00			0.066	0.000	0.000	0.000	0.066		100.54	835%
											$ 63,772.60												
51		7572	020	020	John Mu	Seawall Investments	458 N. California St.	San Gabriel, CA 91775	$ 3,320.29	$354.96		4,421.34	1,648.00			0.102	1.648	0.000	0.000	1.950		2,965.33	835%
52		7572	020	021	John	Moeller	47 Seawall Rd.	Rancho P.V. CA 90275	$ 2,488.96	$266.08		4,068.00	1,368.00			0.093	1.368	0.000	0.000	1.461		2,222.88	835%
53		7572	020	022	Michael & Honeya	Barth	48 Seawall Rd.	Rancho P.V. CA 90275	$ 2,256.67	$241.25		4,051.08	1,232.00			0.093	1.232	0.000	0.000	1.325		2,015.42	835%
54		7572	020	023	Lucianna M.	Molinari	49 Seawall Rd.	Rancho P.V. CA 90275	$ 1,501.16	$160.48		3,720.02	796.00			0.085	0.796	0.000	0.000	0.881		1,340.68	835%
55		7572	021	027	Robert H.	Scott	1109 P.V. Dr. W	P.V. Est. CA 90274	$ 2,774.87	$296.65		4,890.00	1,517.00			0.112	1.517	0.000	0.000	1.629		2,478.22	835%
56		7572	021	028	Judith	Hotchkiss	84 Yacht Harbor Dr.	Rancho P.V. CA 90275	$ 2,207.33	$235.96		4,880.00	1,184.00			0.112	1.184	0.000	0.000	1.296		1,971.35	835%
57		7572	021	029	Freeman Family	Trust	85 Yacht Harbor Dr.	Rancho P.V. CA 90275	$ 2,021.91	$216.15		5,060.00	1,071.00			0.116	1.071	0.000	0.000	1.187		1,805.76	835%

anum	Lrel	map book	page	parcel	Fname	Lname	Address	CSZ	amount	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
58		7572	021	032	Portuguese Bend Club	H.O.A.	4100 P. V. Dr. South	Rancho P.V. CA 90275	$ 147.40	$15.76		3,770.00	0.00			0.087	0.000	0.000	0.000	0.087		131.64	835%
59		7572	021	033	Portuguese Bend Club	H.O.A.	4100 P. V. Dr. South	Rancho P.V. CA 90275	$ 172.82	$18.48		4,420.00	0.00			0.101	0.000	0.000	0.000	0.101		154.34	835%
60		7572	021	034	Randee	Wood	2 Las Estrellas Loop 2050	Rancho Mission Viejo.CA 92694	$ 1,631.83	$174.45		4,100.00	864.00			0.094	0.864	0.000	0.000	0.958		1,457.38	835%
									$ -		$ 18,523.24												
61		7572	021	035	Andrew	Ely	112 Spindrift Dr.	Rancho P.V. CA 90275	$ 2,850.86	$304.77		3,218.00	1,600.00			0.074	1.600	0.000	0.000	1.674		2,546.09	835%
62		7572	021	036	David A. Link	Lisa H. Link	880 Winthrop Rd.	San Marino, CA 91108	$ 3,954.18	$422.73		2,992.00	2,253.00			0.069	2.253	0.000	0.000	2.322		3,531.45	835%
63		7572	021	038	Tashia	Hinchliffe	116 Spindrift Dr.	Rancho P.V. CA 90275	$ 2,518.26	$269.22		8,607.00	1,281.00			0.198	1.281	0.000	0.000	1.479		2,249.04	835%
64		7572	021	040	David John	Afinowicz	4406 Red Maple Court	Concord, CA 94521	$ 3,099.32	$330.27		7,836.00	1,634.00			0.180	1.634	0.000	0.000	1.814		2,759.05	835%
65		7572	021	041	William & Judith	Hassoldt	10 Pinetree Lane	Rolling Hills, CA 90274	$ 2,275.21	$243.23		5,440.00	1,211.00			0.125	1.211	0.000	0.000	1.336		2,031.98	835%
66	x	7572	021	042	Steven H.	Yu	204 Seascape Rd.	Rancho P.V. CA 90275	$ 2,032.81	$217.32		3,640.00	1,110.00			0.084	1.110	0.000	0.000	1.194		1,815.49	835%
67	x	7572	021	045	Jeffery	Hobbs	201 Seascape Rd	Rancho P.V. CA 90275	$ 2,253.45	$241.98		7,535.00	1,156.00			0.173	1.156	0.000	0.000	1.329		2,021.47	835%
68		7572	021	050	Lora B.	Hester	205 Seascape Rd.	Rancho P.V. CA 90275	$ 1,920.27	$205.29		8,428.00	934.00			0.193	0.934	0.000	0.000	1.127		1,714.98	835%
69		7572	021	051	Charles S.	Cummins	81 Yacht Harbor Dr.	Rancho P.V. CA 90275	$ 3,702.99	$395.87		5,540.83	2,047.00			0.127	2.047	0.000	0.000	2.174		3,307.12	835%
70		7572	021	052	Stanley A.	Moore	2416 Via Anita	Palos Verdes, CA 90274	$ 2,169.81	$231.97		5,009.40	1,159.00			0.115	1.159	0.000	0.000	1.274		1,937.84	835%
									$ -		$ 26,777.16												
71	x	7572	021	054	Jon	Roth	114 Spindrift Dr.	Rancho P.V. CA 90275	$ 4,808.35	$514.04		8,460.00	2,629.00			0.194	2.629	0.000	0.000	2.823		4,294.31	835%
72		7572	021	055	Thomas & Andrea	MacMillan	201 Spindrift Dr.	Rancho P.V. CA 90275	$ 2,832.51	$302.81		7,627.36	1,488.00			0.175	1.488	0.000	0.000	1.663		2,529.70	835%
73	x	7572	021	060	Charlotte	Pesusich	86 Yacht Harbor Dr.	Rancho P.V. CA 90275	$ 3,501.50	$374.33		5,179.28	1,937.00			0.119	1.937	0.000	0.000	2.056		3,127.17	835%
74	x	7572	021	061	Steven P. Tomicic	Tomicic	87 Yacht Harbor Drive	Rancho P.V. CA 90275	$ 2,315.77	$247.57		6,126.59	1,219.00			0.141	1.219	0.000	0.000	1.360		2,068.20	835%
75					City of	Rancho Palos Verdes	30940 Hawthorne Blvd.	Rancho P.V. CA 90275	$ 94,669.54	$10,120.74				277,925.09		0.000	0.000	55.585	0.000	55.585		84,548.80	835%
76	x	7572	022	026	James E.	Welsh	22 Empty Saddle	Rolling Hills Est CA 90274	$ 2,876.74	$307.54		3,880.00	1,600.00			0.089	1.600	0.000	0.000	1.689		2,569.20	835%
77	x	7572	022	027	Kevin & Allison	Wolcott	100 Spindrift Dr.	Rancho P.V. CA 90275	$ 1,559.41	$166.71		4,600.00	810.00			0.106	0.810	0.000	0.000	0.916		1,392.70	835%
78		7572	022	028	Hoffman	Trust	101 Spindrift Dr.	Rancho P.V. CA 90275	$ 4,164.64	$445.23		2,625.00	2,385.00			0.060	2.385	0.000	0.000	2.445		3,719.41	835%
79	x	7572	022	029	Joseph Lay	Lynda Lima	102 Spindrift Dr.	Rancho P.V. CA 90275	$ 3,263.34	$348.87		2,660.00	1,855.00			0.061	1.855	0.000	0.000	1.916		2,914.47	835%
80		7572	022	030	Portuguese Bend Club	H.O.A.	4100 Palos Verdes Dr. S.	Rancho P.V. CA 90275	$ 109.20	$11.67		2,793.30	0.00			0.064	0.000	0.000	0.000	0.064		97.53	836%
									$ -		$ 120,101.00												
81	x	7572	022	031	Ann	Lineberger	104 Spindrift Dr.	Rancho P.V. CA 90275	$ 2,325.33	$248.59		3,150.00	1,293.00			0.072	1.293	0.000	0.000	1.365		2,076.74	835%
82		7572	022	032	Jerry	Schwartz	105 Spindrift Dr.	Rancho P.V. CA 90275	$ 1,982.45	$211.94		6,098.00	1,024.00			0.140	1.024	0.000	0.000	1.164		1,770.51	835%
83		7572	022	033	Portuguese Bend Club	H.O.A.	4100 Palos Verdes Dr. S.	Rancho P.V. CA 90275	$ 123.55	$13.21		3,160.00	0.00			0.073	0.000	0.000	0.000	0.073		110.34	835%
84		7572	022	036	Portuguese Bend Club	H.O.A.	4100 Palos Verdes Dr. S.	Rancho P.V. CA 90275	$ 293.95	$31.42		7,518.00	0.00			0.173	0.000	0.000	0.000	0.173		262.53	836%
85		7572	022	037	Richard	Weirick	1406 El Vago St.	La Canada, CA 91011	$ 2,983.74	$318.98		4,700.00	1,644.00			0.108	1.644	0.000	0.000	1.752		2,664.76	835%
86		7572	022	040	Kirk	Ayers	122 Spindrift Dr.	Rancho P.V. CA 90275	$ 1,529.89	$163.55		4,760.00	789.00			0.109	0.789	0.000	0.000	0.898		1,366.34	835%
87		7572	022	044	Betty	Helford	127 Spindrift Dr.	Rancho P.V. CA 90275	$ 3,946.53	$422.12		5,679.00	2,188.00			0.130	2.188	0.000	0.000	2.318		3,526.41	835%
88		7572	022	045	Betty	Helford	127 Spindrift Dr.	Rancho P.V. CA 90275	$ 1,530.74	$163.64		5,130.00	781.00			0.118	0.781	0.000	0.000	0.899		1,367.10	835%
89		7572	022	046	Rita	Willens	130 Spindrift Dr.	Rancho P.V. CA 90275	$ 2,518.94	$269.29		7,187.00	1,314.00			0.165	1.314	0.000	0.000	1.479		2,249.65	835%
90		7572	022	047	Curtice	Booth	98 Yacht Harbor Dr.	Rancho P.V. CA 90275	$ -	$21.94			0.00			0.000	0.000	0.000	0.000	0.000		(21.94)	-100%
									$ -		$ 17,237.12												
91		7572	022	048	Eric C.	Johnson	461 W. 6th St. St.300	San Pedro, CA 90731	$ 181.81	$19.44		4,650.00	0.00			0.107	0.000	0.000	0.000	0.107		162.37	835%
92		7572	022	049	Eric C.	Johnson	461 W. 6th St. St.300	San Pedro, CA 90731	$ 217.00	$23.20		5,550.00	0.00			0.127	0.000	0.000	0.000	0.127		193.80	835%
93		7572	022	050	Eric C.	Johnson	461 W 6th St. St.300	San Pedro, CA 90731	$ 234.59	$25.08		6,000.00	0.00			0.138	0.000	0.000	0.000	0.138		209.51	835%
94		7572	022	051	Eric	Johnson	461 W. 6th St. St.300	San Pedro, CA 90731	$ 295.98	$31.64		7,570.00	0.00			0.174	0.000	0.000	0.000	0.174		264.34	835%
95		7572	022	052	Stephen	Hinchliffe	120 Spindrift Lane	Rancho P.V. CA 90275	$ 3,584.79	$383.24		3,737.45	2,019.00			0.086	2.019	0.000	0.000	2.105		3,201.55	835%
96	x	7572	022	053	Ann or Alan	Johnson	121 Spindrift Lane	Rancho P.V. CA 90275	$ 2,597.45	$277.68		2,651.00	1,464.00			0.061	1.464	0.000	0.000	1.525		2,319.77	835%
97		7572	022	058	Portuguese Bend Club	H.O.A.	4100 Palos Verdes Dr. South	Rancho P.V. CA 90275	$ 144.67	$15.47		3,700.00				0.085	0.000	0.000	0.000	0.085		129.20	835%
98	x	7572	022	059	Mois	Mayhar	92 Yacht Harbor Dr.	Rancho P.V. CA 90275	$ 3,169.56	$338.84		5,357.88	1,738.00			0.123	1.738	0.000	0.000	1.861		2,830.72	835%
99	x	7572	022	060	William D.	Silverthorn	4614 Fargo Ave.	San Diego, CA 92117	$ 1,520.07	$162.50		2,592.00	833.00			0.060	0.833	0.000	0.000	0.893		1,357.57	835%
100		7572	022	065	Portuguese Bend Club	H.O.A.	4100 Palos Verdes Dr. South	Rancho P.V. CA 90275	$ 187.67	$20.06		4,800.00				0.110	0.000	0.000	0.000	0.110		167.61	836%
									$ -		$ 12,133.59												
101		7572	022	066	Grace	Petterson	96 Yacht Harbor Dr.	Rancho P.V. CA 90275	$ 4,782.76	$511.31		9,025.00	2,601.00			0.207	2.601	0.000	0.000	2.808		4,271.45	835%
102		7572	022	067	Curtice	Booth	98 Yacht Harbor Dr.	Rancho P.V. CA 90275	$ 2,017.72	$215.71		7,871.29	1,004.00			0.181	1.004	0.000	0.000	1.185		1,802.01	835%
103	x	7572	022	072	Robert	Bogdonovich	108 Spindrift Dr.	Rancho P.V. CA 90275	$ 2,968.76	$317.38		3,227.80	1,669.00			0.074	1.669	0.000	0.000	1.743		2,651.38	835%
104		7572	022	073	Ralph	Black	36 Saddleback Rd	Rolling Hills, CA 90274	$ 2,814.61	$300.90		3,380.00	1,575.00			0.078	1.575	0.000	0.000	1.653		2,513.71	835%
105		7572	022	074	Edison M.	Fabian	124 Spindrift Dr.	Rancho P.V. CA 90275	$ 2,970.71	$317.59		2,450.00	1,686.00			0.056	1.686	0.000	0.000	1.744		2,653.12	835%
		7572	022	080	Michael	La Barbera	125 Spindrift Dr.	Rancho P.V. CA 90275	$ 1,140.73	$121.95		4,085.00	576.00			0.094	0.576	0.000	0.000	0.670		1,018.78	835%
107	x	7572	022	081	Martin	Vincent	126 Spindrift Dr.	Rancho P.V. CA 90275	$ 2,657.07	$284.06		4,360.00	1,460.00			0.100	1.460	0.000	0.000	1.560		2,373.01	835%
											$ 19,352.36												
									$ 808,356.01	$ 86,440.02		1,957,912.94	150,252.00	302,725.09	4,767,206.20	44.947	150 252	60.545	218.880			808,356.01	

Total Operating Cost of the District	808,356.00
Total Units of Assesment	474.62
Assesment / Unit	1,703.15

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	amount	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
1		7564	001	915	Rancho Palos Verdes	City of	30940 Hawthorne Blvd.	Rancho P.V. CA 90275	$ 8,447.62	$903.10				24,800.00		0.000	0.000	4.960	0.000	4.960		7,544.52	835%
2		7564	002	001	Thomas	Berg	4353 Palos Verdes Dr. S.	Rancho P.V. CA 90275	$ 3,558.74	$380.45		13,090.00	1,789.00			0.301	1.789	0.000	0.000	2.090		3,178.29	835%
3	x	7564	002	002	Poul	Gamsgaard	4343 P.V. Dr. South	Rancho P.V. CA 90275	$ 3,549.44	$379.46		10,500.00	1,843.00			0.241	1.843	0.000	0.000	2.084		3,169.98	835%
4		7564	002	003	Steven	yutronich	4329 P.V. Dr. South	Rancho P.V. CA 90275	$ 4,010.72	$428.77		10,580.00	2,112.00			0.243	2.112	0.000	0.000	2.355		3,581.95	835%
5		7564	002	004	Charles F.	Stirling	4319 P.V. Dr. South	Rancho P.V. CA 90275	$ 4,196.22	$448.60		10,925.00	2,213.00			0.251	2.213	0.000	0.000	2.464		3,747.62	835%
6		7564	002	005	Michael & Terri	Carman	4315 P.V. Dr. South	Rancho P.V. CA 90275	$ 3,460.73	$370.93		10,465.00	1,797.00			0.240	1.797	0.000	0.000	2.037		3,098.80	835%
7		7564	002	025	Vincent J. and Theresa	Iacono	4304 Admirable Dr.	Rancho P.V. CA 90275	$ 3,259.63	$348.47		10,580.00	1,671.00			0.243	1.671	0.000	0.000	1.914		2,911.16	835%
8		7564	002	026	Ricardo & Sonia	Rivas	4312 Admirable Dr.	Rancho P.V. CA 90275	$ 3,548.07	$379.31		10,465.00	1,843.00			0.240	1.843	0.000	0.000	2.083		3,168.76	835%
9		7564	002	027	Vulin Roko	Milicic Marica	405 W. 20th St.	San Pedro, CA 90731-5505	$ 3,474.22	$371.42		10,580.00	1,797.00			0.243	1.797	0.000	0.000	2.040		3,102.80	835%
10		7564	002	028	Robert	Locke	4332 Admirable Dr.	Rancho P.V. CA 90275	$ 4,056.70	$433.69		10,580.00	2,139.00			0.243	2.139	0.000	0.000	2.382		3,623.01	835%
									$ -		$ 41,571.09												
11	x	7564	003	011	Junichi	Kasuga	4334 Exultant Dr.	Rancho P.V. CA 90275	$ 3,988.03	$426.34		11,960.00	2,067.00			0.275	2.067	0.000	0.000	2.342		3,561.69	835%
12	x	7564	003	012	Andrew C.	Derr	4338 Exultant Dr.	Rancho P.V. CA 90275	$ 4,391.93	$469.52		12,010.00	2,303.00			0.276	2.303	0.000	0.000	2.579		3,922.41	835%
13	x	7564	003	013	James Buesing	Eva Albuja	955 Deep Valley Dr. #2992	P. V. Peninsula, CA 90274	$ 3,314.46	$354.34		12,810.00	1,652.00			0.294	1.652	0.000	0.000	1.946		2,960.12	835%
14		7564	003	014	Negar & Donna B	Noushkam	4354 Exultant Dr.	Rancho P.V. CA 90275	$ 4,571.01	$488.67		12,060.00	2,407.00			0.277	2.407	0.000	0.000	2.684		4,082.34	835%
15	x	7564	003	015	Lawrence & Christine	Williams	4362 Exultant Dr	Rancho P.V. CA 90275	$ 4,180.35	$446.90		12,000.00	2,179.00			0.275	2.179	0.000	0.000	2.454		3,733.45	835%
16	x	7564	003	016	Matthew & Sara	Stelwagen	4380 Dauntless Dr.	Rancho P.V. CA 90275	$ 4,122.69	$440.74		12,050.00	2,144.00			0.277	2.144	0.000	0.000	2.421		3,681.95	835%
17		7564	003	017	Frank S. & Lisa M.	Matura	4394 Dauntless Dr.	Rancho P.V. CA 90275	$ 3,665.56	$391.87		13,470.00	1,843.00			0.309	1.843	0.000	0.000	2.152		3,273.69	835%
18	x	7564	003	018	Frank & Karen	Kostrencich	4353 Admirable Dr.	Rancho P.V. CA 90275	$ 5,028.07	$537.53		12,250.00	2,671.00			0.281	2.671	0.000	0.000	2.952		4,490.54	835%
19		7564	003	019	Michael	Bible	4335 Admirable Dr.	Rancho P.V. CA 90275	$ 3,532.68	$377.66		12,075.00	1,797.00			0.277	1.797	0.000	0.000	2.074		3,155.02	835%
20		7564	003	020	Alfredo	Gomez	4327 Admirable Dr.	Rancho P.V. CA 90275	$ 3,285.72	$351.26		12,075.00	1,652.00			0.277	1.652	0.000	0.000	1.929		2,934.46	835%
									$ -		$ 40,080.50												
21		7564	003	021	Carlos Cuervo	Vanessa Serrano	4319 Admirable Dr.	Rancho P.V. CA 90275	$ 3,648.49	$390.05		12,075.00	1,865.00			0.277	1.865	0.000	0.000	2.142		3,258.44	835%
22		7564	003	022	David G.	French	4305 Admirable Dr.	Rancho P.V. CA 90275	$ 3,524.84	$376.83		10,350.00	1,832.00			0.238	1.832	0.000	0.000	2.070		3,148.01	835%
23	x	7564	004	025	Derek & Connie	Anderson	4332 Dauntless Dr.	Rancho P.V. CA 90275	$ 4,518.19	$483.02		12,103.00	2,375.00			0.278	2.375	0.000	0.000	2.653		4,035.17	835%
24	x	7564	004	026	Jonathan Orozco	Hugo Rolando Gutierre	434 McDonald Ave	Wilmington, CA 90744	$ 3,658.45	$391.11		13,680.00	1,834.00			0.314	1.834	0.000	0.000	2.148		3,267.34	835%
25		7564	004	027	David	Roth	4335 Exultant Dr.	Rancho P.V. CA 90275	$ 5,172.58	$552.96		17,340.00	2,639.00			0.398	2.639	0.000	0.000	3.037		4,619.60	835%
26		7564	005	900	Rancho Palos Verdes	City of	30940 Hawthorne Blvd.	Rancho P.V. CA 90275	$ 5,858.82	$626.34			0.00		74,923.00	0.000	0.000	0.000	3.440	3.440		5,232.48	835%
27	x	7564	005	002	Peter J & Kathy	Mirich	4342 Admirable Dr.	Rancho P.V. CA 90275	$ 3,474.28	$371.42		10,930.00	1,789.00			0.251	1.789	0.000	0.000	2.040		3,102.86	835%
28		7564	005	003	Richard	Horton	4906 Via El Sereno	Torrance, CA 90505	$ 3,996.53	$427.25		10,740.00	2,100.00			0.247	2.100	0.000	0.000	2.347		3,569.28	835%
29		7564	005	004	Mark Lloyd	Young	4364 Admirable Dr.	Rancho P.V. CA 90275	$ 3,575.88	$382.28		13,180.00	1,797.00			0.303	1.797	0.000	0.000	2.100		3,193.60	835%
30		7564	005	005	Karen P.	Miller	4370 Admirable Dr.	Rancho P.V. CA 90275	$ 3,277.31	$350.36		11,860.00	1,652.00			0.272	1.652	0.000	0.000	1.924		2,926.95	835%
									$ -		$ 40,705.37												
31	x	7564	005	006	Glenn S.	Streeter	4372 Admirable Dr.	Rancho P.V. CA 90275	$ 80.07	$8.56		2,048.00	0.00			0.047	0.000	0.000	0.000	0.047		71.51	835%
32	x	7564	005	007	Glenn S.	Streeter	4372 Admirable Dr.	Rancho P.V. CA 90275	$ 9,521.15	$1,017.87		23,580.00	5,049.00			0.541	5.049	0.000	0.000	5.590		8,503.28	835%
33	x	7564	005	008	Gregory & Sandra	Montgomery	4378 Admirable Dr.	Rancho P.V. CA 90275	$ 4,766.33	$509.55		16,620.00	2,417.00			0.382	2.417	0.000	0.000	2.799		4,256.78	835%
34		7564	005	009	Patty	Parkinson, Trust	4393 Dauntless Dr.	Rancho P.V. CA 90275	$ 4,517.66	$482.96		12,220.00	2,372.00			0.281	2.372	0.000	0.000	2.653		4,034.70	835%
35	x	7564	005	010	Nicolas & Alison	Grillo	4387 Dauntless Dr.	Rancho P.V. CA 90275	$ 3,653.69	$390.60		15,170.00	1,797.00			0.348	1.797	0.000	0.000	2.145		3,263.09	835%
36	x	7564	005	011	Jack I.	Esensten	4000 P.V Drive N. St.200	Rolling Hills Est. CA 90274	$ 4,520.84	$483.31		23,540.00	2,114.00			0.540	2.114	0.000	0.000	2.654		4,037.53	835%
37	x	7564	005	012	Mohammadriza & Delbar	Tahmasebi	4369 Dauntless Dr.	Rancho P.V. CA 90275	$ 6,084.13	$650.43		16,478.00	3,194.00			0.378	3.194	0.000	0.000	3.572		5,433.70	835%
38		7564	005	013	Don & Vielka	Schmid	4361 Dauntless Dr.	Rancho P.V. CA 90275	$ 4,399.75	$470.36		12,210.00	2,303.00			0.280	2.303	0.000	0.000	2.583		3,929.39	835%
39		7564	005	014	C. & D.	Heimer	4351 Dauntless Dr.	Rancho P.V. CA 90275	$ 3,632.05	$388.29		12,090.00	1,855.00			0.278	1.855	0.000	0.000	2.133		3,243.76	835%
40		7572	001	007	Rancho Palos Verdes	City of	30940 Hawthorne Blvd.	Rancho P.V. CA 90275	$ 366,926.31	$39,226.60			0.00		4,692,283.20	0.000	0.000	0.000	215.440	215.440		327,699.71	835%
									$ -		$ 408,101.98												
41		7572	006	018	Portuguese Bend Club	H.O.A.	4100 P. V. Dr. South	Rancho P.V. CA 90275	$ 37,026.45	$3,958.35		946,994.40				21.740	0.000	0.000	0.000	21.740		33,068.10	835%
42		7572	006	020	Eric C.	Johnson	461 W. 6th St #300	San Pedro, CA 90731	$ 8,447.62	$903.10		216,057.60	0.00			4.960	0.000	0.000	0.000	4.960		7,544.52	835%
43		7572	020	008	John	Hazard	44 Seawall Rd.	Rancho P.V. CA 90275	$ 2,454.27	$262.38		3,050.00	1,371.00			0.070	1.371	0.000	0.000	1.441		2,191.89	835%
44		7572	020	009	Brando	Valencia	518 De Sales St. N	San Gabriel, CA 91775	$ 1,911.37	$204.34		4,280.00	1,024.00			0.098	1.024	0.000	0.000	1.122		1,707.03	835%
45		7572	020	014	Robin	Pierson	1370 Durning Dr.	Laguna Beach, CA 92651	$ 3,488.36	$372.93		19,305.00	1,605.00			0.443	1.605	0.000	0.000	2.048		3,115.43	835%
46		7572	020	015	Joel	Dime	132 Sea Urchin Lane	Rancho P.V. CA 90275	$ 2,974.54	$318.00		8,298.00	1,556.00			0.190	1.556	0.000	0.000	1.746		2,656.54	835%
47		7572	020	016	Dennis P.	Jaconi	133 Sea Urchin Lane	Rancho P.V. CA 90275	$ 2,433.56	$260.16		6,310.00	1,284.00			0.145	1.284	0.000	0.000	1.429		2,173.40	835%
48		7572	020	017	Ben	Cheng	134 Seawall Road	Rancho P.V. CA 90275	$ 1,967.20	$210.31		6,100.00	1,015.00			0.140	1.015	0.000	0.000	1.155		1,756.89	835%
49	x	7572	020	018	Paul	Galletti	135 Seawall Road	Rancho P.V. CA 90275	$ 2,956.65	$316.08		3,920.00	1,646.00			0.090	1.646	0.000	0.000	1.736		2,640.57	835%
50		7572	020	019	John C. & Anna D.	Hazard	44 Seawall Road	Rancho P.V. CA 90275	$ 112.58	$12.04		2,879.32	0.00			0.066	0.000	0.000	0.000	0.066		100.54	835%
											$ 63,772.60												
51		7572	020	020	John Mu	Seawall Investments	458 N. California St.	San Gabriel, CA 91775	$ 3,320.29	$354.96		4,421.34	1,848.00			0.102	1.848	0.000	0.000	1.950		2,965.33	835%
52		7572	020	021	John	Moeller	47 Seawall Rd.	Rancho P.V. CA 90275	$ 2,488.96	$266.08		4,068.00	1,368.00			0.093	1.368	0.000	0.000	1.461		2,222.88	835%
53		7572	020	022	Michael & Honeya	Barth	48 Seawall Rd.	Rancho P.V. CA 90275	$ 2,256.67	$241.25		4,051.08	1,232.00			0.093	1.232	0.000	0.000	1.325		2,015.42	835%
54		7572	020	023	Lucianna M.	Molinari	49 Seawall Rd.	Rancho P.V. CA 90275	$ 1,501.16	$160.48		3,720.02	796.00			0.085	0.796	0.000	0.000	0.881		1,340.68	835%
55		7572	021	027	Robert H.	Scott	1109 P.V. Dr. W	P.V. Est. CA 90274	$ 2,774.87	$296.65		4,890.00	1,517.00			0.112	1.517	0.000	0.000	1.629		2,478.22	835%
56		7572	021	028	Judith	Hotchkiss	84 Yacht Harbor Dr.	Rancho P.V. CA 90275	$ 2,207.33	$235.98		4,880.00	1,184.00			0.112	1.184	0.000	0.000	1.296		1,971.35	835%
57		7572	021	029	Freeman Family	Trust	85 Yacht Harbor Dr.	Rancho P.V. CA 90275	$ 2,021.91	$216.15		5,060.00	1,071.00			0.116	1.071	0.000	0.000	1.187		1,805.76	835%

anum	Lrel	map book	page	parcel	Fname	Lname	Address	CSZ	amount	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
58		7572	021	032	Portuguese Bend Club	H.O.A.	4100 P. V. Dr. South	Rancho P.V. CA 90275	$ 147.40	$15.76		3,770.00	0.00			0.087	0.000	0.000	0.000	0.087		131.64	835%
59		7572	021	033	Portuguese Bend Club	H.O.A.	4100 P. V. Dr. South	Rancho P.V. CA 90275	$ 172.82	$18.48		4,420.00	0.00			0.101	0.000	0.000	0.000	0.101		154.34	835%
60		7572	021	034	Randee	Wood	2 Las Estrellas Loop 2050	Rancho Mission Viejo,CA 92694	$ 1,631.83	$174.45		4,100.00	864.00			0.094	0.864	0.000	0.000	0.958		1,457.38	835%
									$ -		$ 18,523.24												
61		7572	021	035	Andrew	Ely	112 Spindrift Dr.	Rancho P.V. CA 90275	$ 2,850.86	$304.77		3,218.00	1,600.00			0.074	1.600	0.000	0.000	1.674		2,546.09	835%
62		7572	021	036	David A. Link	Lisa H. Link	880 Winthrop Rd.	San Marino, CA 91108	$ 3,954.18	$422.73		2,992.00	2,253.00			0.069	2.253	0.000	0.000	2.322		3,531.45	835%
63		7572	021	038	Tashia	Hinchliffe	116 Spindrift Dr.	Rancho P.V. CA 90275	$ 2,518.26	$269.22		8,607.00	1,281.00			0.198	1.281	0.000	0.000	1.479		2,249.04	835%
64		7572	021	040	David John	Afinowicz	4408 Red Maple Court	Concord, CA 94521	$ 3,089.32	$330.27		7,836.00	1,634.00			0.180	1.634	0.000	0.000	1.814		2,759.05	835%
65		7572	021	041	William & Judith	Hassoldt	10 Pinetree Lane	Rolling Hills, CA 90274	$ 2,275.21	$243.23		5,440.00	1,211.00			0.125	1.211	0.000	0.000	1.336		2,031.98	835%
66	x	7572	021	042	Steven H.	Yu	204 Seascape Rd.	Rancho P.V. CA 90275	$ 2,032.81	$217.32		3,640.00	1,110.00			0.084	1.110	0.000	0.000	1.194		1,815.49	835%
67	x	7572	021	045	Jeffery	Hobbs	201 Seascape Rd	Rancho P.V. CA 90275	$ 2,263.45	$241.98		7,535.00	1,156.00			0.173	1.156	0.000	0.000	1.329		2,021.47	835%
68		7572	021	050	Lora B.	Hester	205 Seascape Rd	Rancho P.V. CA 90275	$ 1,920.27	$205.29		8,428.00	934.00			0.193	0.934	0.000	0.000	1.127		1,714.98	835%
69		7572	021	051	Charles S.	Cummins	81 Yacht Harbor Dr.	Rancho P.V. CA 90275	$ 3,702.99	$395.87		5,540.83	2,047.00			0.127	2.047	0.000	0.000	2.174		3,307.12	835%
70		7572	021	052	Stanley A.	Moore	2416 Via Anita	Palos Verdes, CA 90274	$ 2,169.81	$231.97		5,009.40	1,159.00			0.115	1.159	0.000	0.000	1.274		1,937.84	835%
									$ -		$ 26,777.16												
71	x	7572	021	054	Jon	Roth	114 Spindrift Dr.	Rancho P.V. CA 90275	$ 4,808.35	$514.04		8,460.00	2,629.00			0.194	2.629	0.000	0.000	2.823		4,294.31	835%
72		7572	021	055	Thomas & Andrea	MacMillan	201 Spindrift Dr.	Rancho P.V. CA 90275	$ 2,832.51	$302.81		7,627.36	1,488.00			0.175	1.488	0.000	0.000	1.663		2,529.70	835%
73	x	7572	021	060	Charlotte	Pesusich	86 Yacht Harbor Dr.	Rancho P.V. CA 90275	$ 3,501.50	$374.33		5,179.28	1,937.00			0.119	1.937	0.000	0.000	2.056		3,127.17	835%
74	x	7572	021	061	Steven P. Tomicic	Tomicic	87 Yacht Harbor Drive	Rancho P.V. CA 90275	$ 2,315.77	$247.57		6,128.89	1,219.00			0.141	1.219	0.000	0.000	1.360		2,068.20	835%
75					City of	Rancho Palos Verdes	30940 Hawthorne Blvd.	Rancho P.V. CA 90275	$ 94,669.54	$10,120.74				277,925.09		0.000	0.000	55.585	0.000	55.585		84,548.80	835%
76	x	7572	022	026	James E.	Welsh	22 Empty Saddle	Rolling Hills Est. CA 90274	$ 2,876.74	$307.54		3,880.00	1,600.00			0.089	1.600	0.000	0.000	1.689		2,569.20	835%
77	x	7572	022	027	Kevin & Allison	Wolcott	100 Spindrift Dr.	Rancho P.V. CA 90275	$ 1,559.41	$166.71		4,600.00	810.00			0.106	0.810	0.000	0.000	0.916		1,392.70	835%
78		7572	022	028	Hoffman	Trust	101 Spindrift Dr.	Rancho P.V. CA 90275	$ 4,164.64	$445.23		2,625.00	2,385.00			0.060	2.385	0.000	0.000	2.445		3,719.41	835%
79	x	7572	022	029	Joseph Lay	Lynda Lima	102 Spindrift Dr.	Rancho P.V. CA 90275	$ 3,263.34	$348.87		2,660.00	1,855.00			0.061	1.855	0.000	0.000	1.916		2,914.47	835%
80		7572	022	030	Portuguese Bend Club	H.O.A.	4100 Palos Verdes Dr. S.	Rancho P.V. CA 90275	$ 109.20	$11.67		2,793.00	0.00			0.064	0.000	0.000	0.000	0.064		97.53	836%
									$ -		$ 120,101.80												
81	x	7572	022	031	Ann	Lineberger	104 Spindrift Dr.	Rancho P.V. CA 90275	$ 2,325.33	$248.59		3,150.00	1,293.00			0.072	1.293	0.000	0.000	1.365		2,076.74	835%
82		7572	022	032	Jerry	Schwartz	105 Spindrift Dr.	Rancho P.V. CA 90275	$ 1,982.45	$211.94		6,098.00	1,024.00			0.140	1.024	0.000	0.000	1.164		1,770.51	835%
83		7572	022	033	Portuguese Bend Club	H.O.A.	4100 Palos Verdes Dr. S.	Rancho P.V. CA 90275	$ 123.55	$13.21		3,160.00	0.00			0.073	0.000	0.000	0.000	0.073		110.34	835%
84		7572	022	036	Portuguese Bend Club	H.O.A.	4100 Palos Verdes Dr. S.	Rancho P.V. CA 90275	$ 293.95	$31.42		7,518.00	0.00			0.173	0.000	0.000	0.000	0.173		262.53	836%
85		7572	022	037	Richard	Weirick	1406 El Vago St.	La Canada, CA 91011	$ 2,683.74	$318.95		4,700.00	1,644.00			0.108	1.644	0.000	0.000	1.752		2,664.76	835%
86		7572	022	040	Kirk	Ayers	122 Spindrift Dr.	Rancho P.V. CA 90275	$ 1,529.89	$163.55		4,760.00	789.00			0.109	0.789	0.000	0.000	0.898		1,366.34	835%
87		7572	022	044	Betty	Helford	127 Spindrift Dr.	Rancho P.V. CA 90275	$ 3,948.53	$422.12		5,679.00	2,188.00			0.130	2.188	0.000	0.000	2.318		3,526.41	835%
88		7572	022	045	Betty	Helford	127 Spindrift Dr.	Rancho P.V. CA 90275	$ 1,530.74	$163.64		5,130.00	781.00			0.118	0.781	0.000	0.000	0.899		1,367.10	835%
89		7572	022	046	Rita	Willens	130 Spindrift Dr.	Rancho P.V. CA 90275	$ 2,518.94	$269.29		7,187.00	1,314.00			0.165	1.314	0.000	0.000	1.479		2,249.65	835%
90		7572	022	047	Curtice	Booth	98 Yacht Harbor Dr.	Rancho P.V. CA 90275	$ -	$21.94			0.00			0.000	0.000	0.000	0.000	0.000		(21.94)	-100%
									$ -		$ 17,237.12												
91		7572	022	048	Eric C.	Johnson	461 W. 6th St. St.300	San Pedro, CA 90731	$ 181.81	$19.44		4,650.00	0.00			0.107	0.000	0.000	0.000	0.107		162.37	835%
92		7572	022	049	Eric C.	Johnson	461 W. 6th St. St.300	San Pedro, CA 90731	$ 217.00	$23.20		5,550.00	0.00			0.127	0.000	0.000	0.000	0.127		193.80	835%
93		7572	022	050	Eric C.	Johnson	461 W. 6th St. St.300	San Pedro, CA 90731	$ 234.59	$25.08		6,000.00	0.00			0.138	0.000	0.000	0.000	0.138		209.51	835%
94		7572	022	051	Eric	Johnson	461 W. 6th St. St.300	San Pedro, CA 90731	$ 295.98	$31.64		7,570.00	0.00			0.174	0.000	0.000	0.000	0.174		264.34	835%
95		7572	022	052	Stephen	Hinchliffe	120 Spirindrift Lane	Rancho P.V. CA 90275	$ 3,584.79	$383.24		3,737.45	2,019.00			0.086	2.019	0.000	0.000	2.105		3,201.55	835%
96	x	7572	022	053	Ann or Alan	Johnson	121 Spindrift Lane	Rancho P.V. CA 90275	$ 2,597.45	$277.68		2,661.00	1,464.00			0.061	1.464	0.000	0.000	1.525		2,319.77	835%
97		7572	022	058	Portuguese Bend Club	H.O.A.	4100 Palos Verdes Dr. South	Rancho P.V. CA 90275	$ 144.67	$15.47		3,700.00				0.085	0.000	0.000	0.000	0.085		129.20	835%
98	x	7572	022	059	Mois	Mayhar	92 Yacht Harbor Dr.	Rancho P.V. CA 90275	$ 3,169.56	$338.84		5,357.88	1,738.00			0.123	1.738	0.000	0.000	1.861		2,830.72	835%
99	x	7572	022	060	William D.	Silverthorn	4614 Fargo Ave.	San Diego, CA 92117	$ 1,520.07	$162.50		2,592.00	833.00			0.060	0.833	0.000	0.000	0.893		1,357.57	835%
100		7572	022	065	Portuguese Bend Club	H.O.A.	4100 Palos Verdes Dr. South	Rancho P.V. CA 90275	$ 187.67	$20.06		4,800.00				0.110	0.000	0.000	0.000	0.110		167.61	836%
									$ -		$ 12,133.59												
101		7572	022	066	Grace	Petterson	96 Yacht Harbor Dr.	Rancho P.V. CA 90275	$ 4,782.76	$511.31		9,025.00	2,601.00			0.207	2.601	0.000	0.000	2.808		4,271.45	835%
102		7572	022	067	Curtice	Booth	98 Yacht Harbor Dr.	Rancho P.V. CA 90275	$ 2,017.72	$215.71		7,871.29	1,004.00			0.181	1.004	0.000	0.000	1.185		1,802.01	835%
103	x	7572	022	072	Robert	Bogdonovich	108 Spindrift Dr.	Rancho P.V. CA 90275	$ 2,968.76	$317.38		3,227.80	1,669.00			0.074	1.669	0.000	0.000	1.743		2,651.38	835%
104		7572	022	073	Ralph	Black	36 Saddleback Rd.	Rolling Hills, CA 90274	$ 2,814.61	$300.90		3,380.00	1,575.00			0.078	1.575	0.000	0.000	1.653		2,513.71	835%
105		7572	022	074	Edison M.	Fabian	124 Spindrift Dr.	Rancho P.V. CA 90275	$ 2,970.71	$317.59		2,450.00	1,688.00			0.056	1.688	0.000	0.000	1.744		2,653.12	835%
		7572	022	080	Michael	La Barbera	125 Spindrift Dr.	Rancho P.V. CA 90275	$ 1,140.73	$121.95		4,085.00	576.00			0.094	0.576	0.000	0.000	0.670		1,018.78	835%
107	x	7572	022	081	Martin	Vincent	126 Spindrift Dr.	Rancho P.V. CA 90275	$ 2,657.07	$284.06		4,360.00	1,460.00			0.100	1.460	0.000	0.000	1.560		2,373.01	835%
											$ 19,352.36												
									$ 808,356.01	$ 86,440.02		1,957,912.94	150,252.00	302,725.09	4,767,206.20	44.947	150.252	60.545	218.880			808,356.01	

Total Operating Cost of the District		808,356.00
Total Units of Assesment		474.62
Assesment / Unit		1,703.15

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.

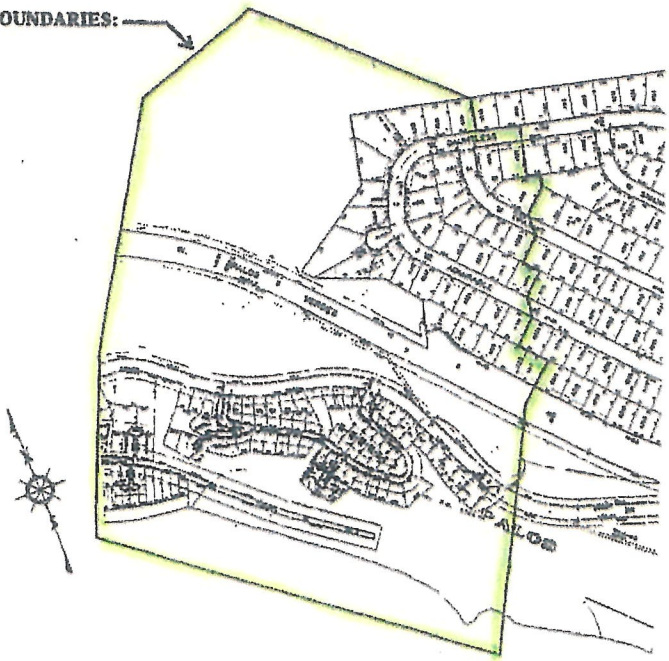
Briefly, the plan consists of the following documents:

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 HERBY 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 Lotthus
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 Lotthus 5/13/2004
CITY CLERK
CITY CLERK

ATTACHMENT B

[illegible] Landslides and Landslide Abatement, Palos Verdes Peninsula, Southern California", Volume and Guidebook for the 78th Annual Meeting of the 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

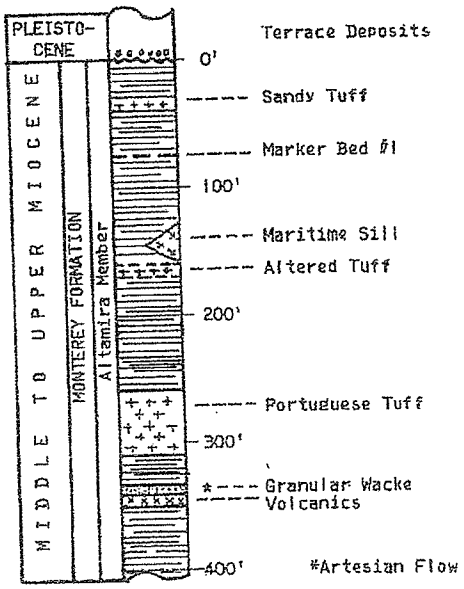
Bedrock underlying the Klondike Canyon area primarily consists of siltstone, shale, tuff and minor sandstone of the Altamira Shale member of the Monterey Formation. Also evident in the area are a few small sill-like bodies of basalt (including the "Maritime Sill") which may be directly associated with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

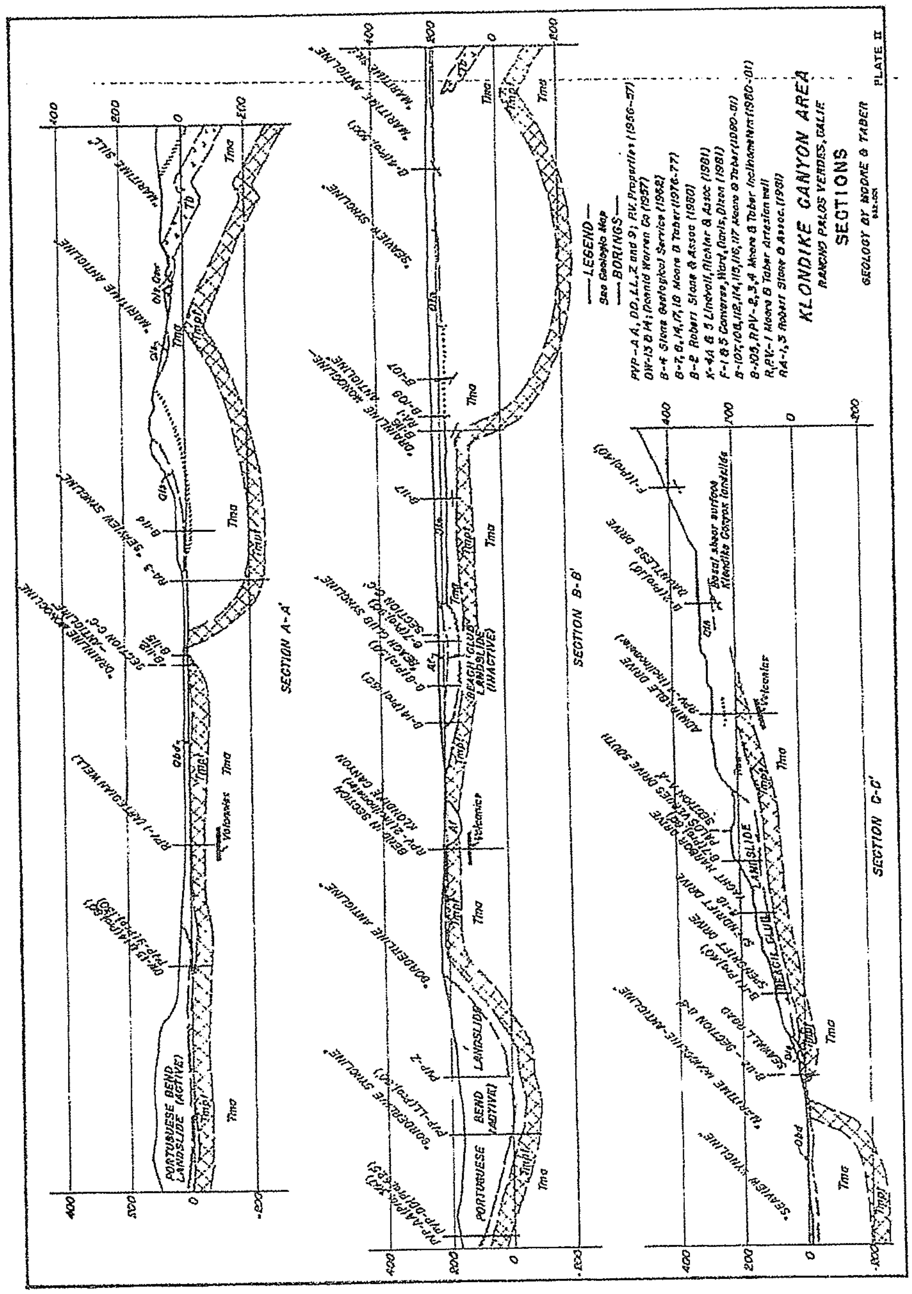
The slide is underlain by a relatively subtle, seaward plunging syncline or trough in the structure ("Beach Club Syncline"). It appears the failure surface is contiguous with the base of the terrace deposits along at least a portion of both sides of the slide. This probably defined the lateral limits 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

Appreciation is extended to Jack Eagen and Dan Klemme of Moore and Taber for the time they expended in discussing and reviewing this article. Additional thanks are due to Dr. Perry Ehlig, Dr. Karl Vonder Linden, Eric Lindvall and Mark Bryant for their cooperation, suggestions and exchange of field data.

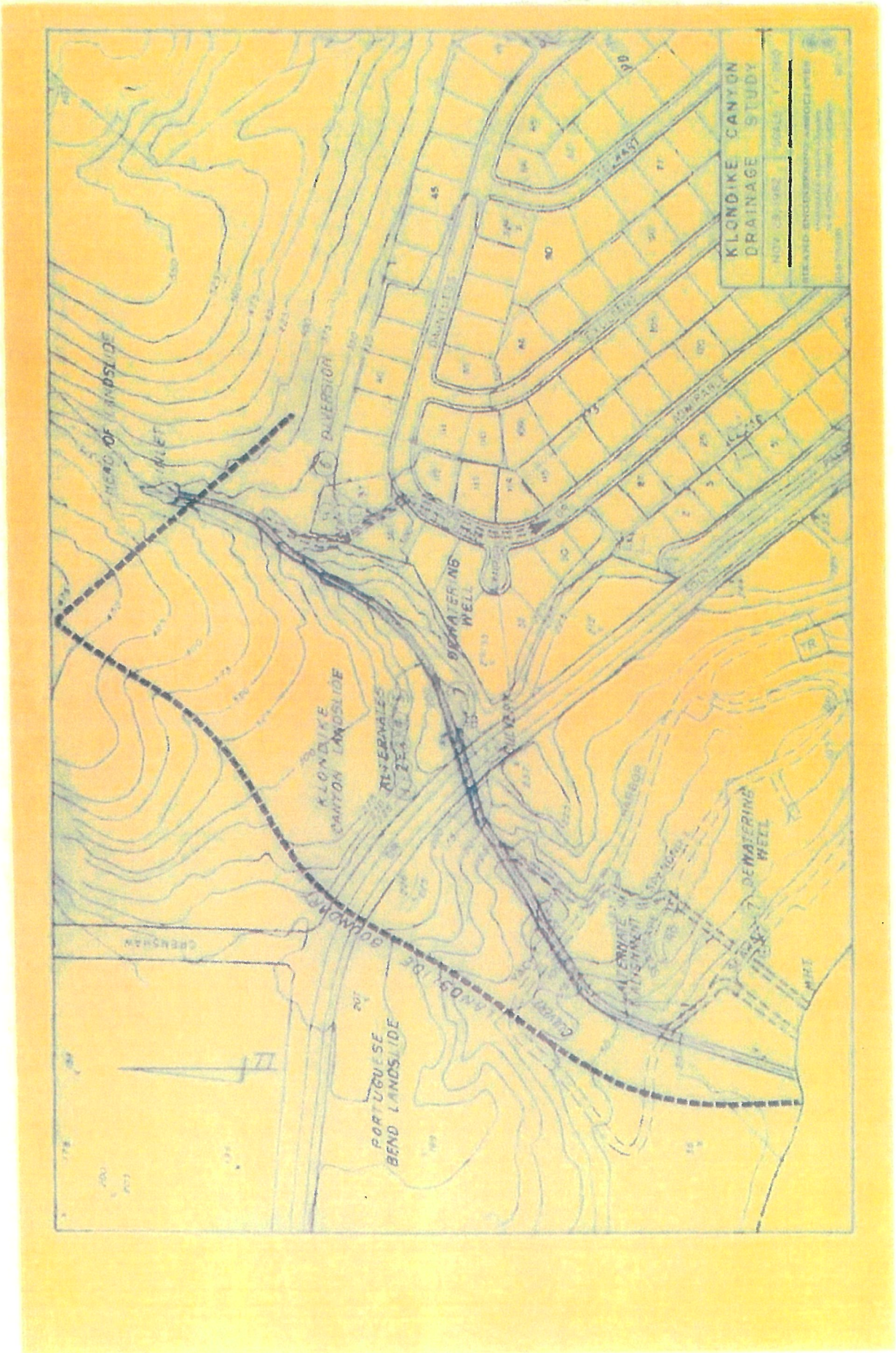
Investigations by Moore and Taber and other consultants on Parcels 11, 12 and 15 have been performed for Palos Verdes Properties. Their support and cooperation over the years is much appreciated, and especial thanks is due to Monte Brower for his permission and encouragement in the preparation of this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

REFERENCES

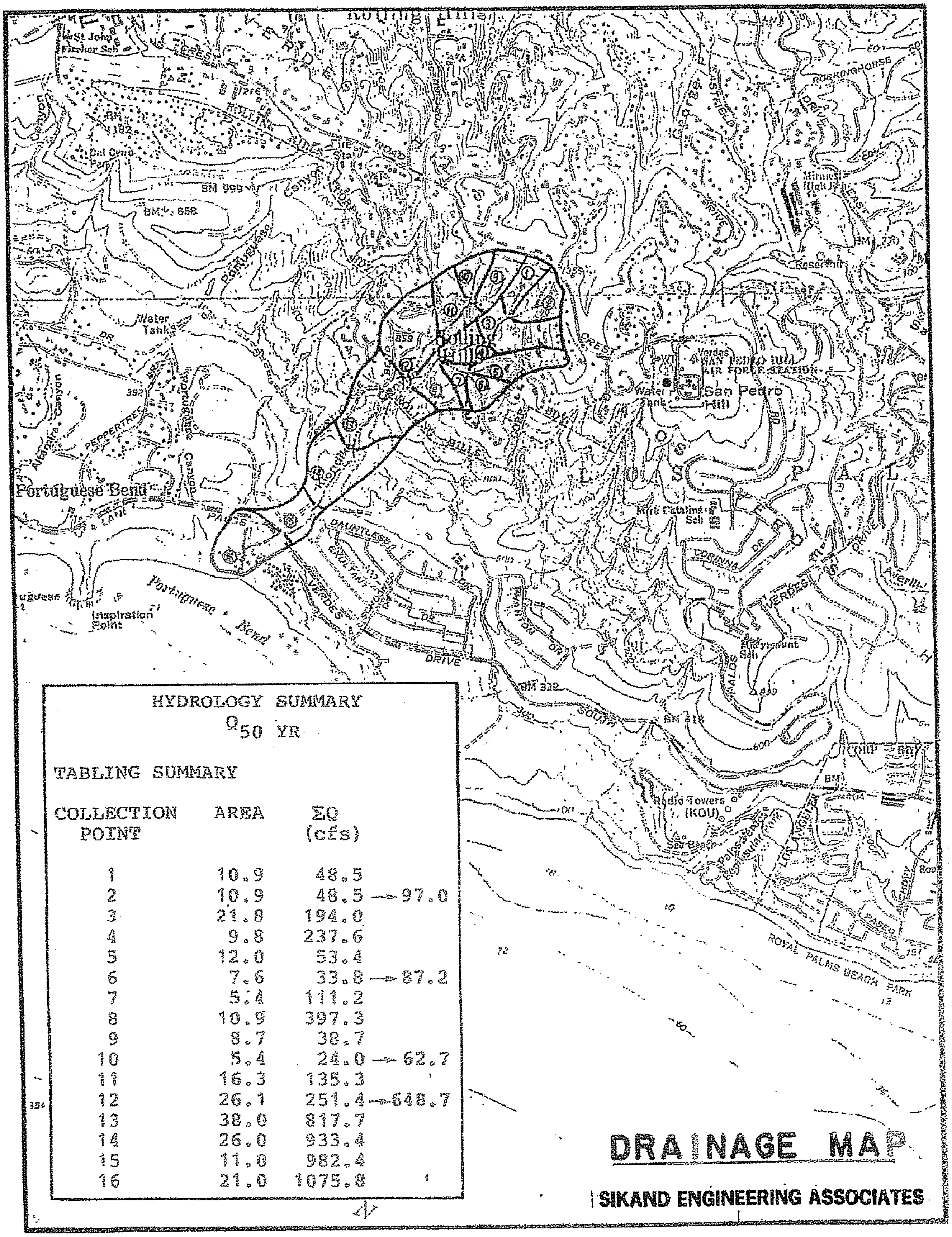
Jahns, R. H., October 1973, Space-Time Relationships of Landsliding on the Southerly Side of the Palos Verdes Hills, California: AEG Special Publication.

Vonder Linden, K., 1972, An Analysis of the Portuguese Bend Landslide, Palos Verdes Hills, California: Unpublished Ph.D. dissertation, Stanford University, 260 p.

Woodring, W. P., M. N. Bramlette, W. S. W. Kew, 1946, Geology and Paleontology of Palos Verdes Hills, California: U.S.G.S. Prof. Paper 207.



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	

DRAINAGE MAP

SIKAND ENGINEERING ASSOCIATES

ATTACHMENT B

ATTACHMENT C

3560 Hyland Avenue
Suite 100
Costa Mesa, CA 92626
+1 (949) 642-0245

wsp.com

April 30, 2025
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: **Critical Landslide Mitigation 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 KCGHAD's ongoing and proposed additional measures to mitigate/control movement of the Klondike Canyon landslide.

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. KCGHAD's emergency measures, therefore, focus on extracting/lowering the groundwater within the slides and limiting/controlling the volume rainfall/near-surface water that infiltrates into the landslides.

An artesian dewatering well established in the beach area in 1981 and a replacement pumping well installed in 1987 were sufficient to control groundwater levels and associated slide movement at acceptable levels until heavy seasonal rains in 2023-24 resulted in a dramatic increase in the local groundwater levels and significant acceleration of the KC slide movement. An additional pumping dewatering well was installed in 2023, but accelerated ground movement displaced/damaged each of these previous wells. Two replacement dewatering wells were, therefore, installed in 2024, and although they are currently pumping, construction of additional wells is planned to maintain sufficient dewatering capacity. Storm drain improvements are also planned/in-progress for Klondike Canyon and for the area at the head of the BC slide to control/mitigate infiltration of rainfall and near-surface water into the slides. KCGHAD's completion and maintenance of these critical mitigation measures are considered essential elements 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
scott.kerwin@wsp.com

ATTACHMENT C