September 2007

Survey Report

for the

Monitoring and Control Surveys

of the

Rancho Palos Verdes Portuguese Landslide

By

McGee Surveying Consulting and Charles Abbott Associates, Inc.

Surveyed by: McGee Surveying Consulting of Santa Barbara, CA, and Charles Abbott Associates, Inc.
Client: City of Rancho Palos Verdes; **Project Name**: Portuguese Bend Landslide Monitoring
Location: Rancho Palos Verdes, California; **County:** Los Angeles; **State:** California

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INDEX

ATTACHMENTS

FULL DATA-THROUGH 2007-NAD27.xls (coordinates, overall movements and Sept. 2006 to Sept. 2007 movements)
FULL DATA POSTING-NAD83.xls (future reporting of coordinates and movements)
COORDINATE LIST-NAD83 2007 Survey.xls (current NAD83 Geodetic & Grid Coordinates, NAVD88 Heights)
COORDINATE LIST-NAD83 All Historical Pts.xls (coordinates of all points since 1994 in NAD83, NAVD88)
PHOTOS-SEP2007.doc (September 2007 photos of points)

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PROJECT OVERVIEW:

McGee Surveying Consulting performed a ground slide monitoring control survey at Portuguese Bend on behalf of the City of Rancho Palos Verdes in September 2007. The purpose of the survey was to establish high accuracy positions on monitoring points, determine the overall and periodical movements and convert from the old North American Datum of 1927 to the new North American Datum of 1983 coordinate system. This survey is a continuation of a monitoring survey program conducted by the City since 1994 and assumed by McGee Surveying Consulting in September 2007. The results of this Survey are reported on spreadsheets described in this Report and attached hereto.

The field survey was planned, coordinated and executed by Michael McGee, PLS3945 of McGee Surveying Consulting of Santa Barbara, California in coordination with Frederick (Rick) Jones; P.E., P.L.S., City Engineer, City of Rancho Palos Verdes. Michael McGee, PLS was responsible for the final processing of the observations, network adjustments and reports. The monitoring points cover approximately a 1½ square mile area and are measured annually or more often as necessary to determine the rate and extent of ground movement. Global Positioning System (GPS) technology was used for the purpose of determining positions based on the North American Datum of 1983 (NAD83) and the North American Vertical Datum of 1988 (NAVD 88) and are referenced to the CORS (Continuously Operated Reference Stations) which are permanently mounted GPS receivers.

To ensure the accuracy of the process and results, this survey was required to meet a relative accuracy standard of two centimeters (0.066 feet) in the active slide area and one centimeter (0.033 feet) in other areas at the 95% Level of Confidence. Field procedures were designed for this purpose and Quality Control-Quality Assurance (QAQC) processes were incorporated to verify this accuracy was attained. The 2007 adjustment results discussed hereafter returned horizontal and vertical accuracies averaging 0.01 feet and relative accuracies of 0.02 feet at the 95% Level of Confidence.

HISTORY

This survey is a continuation of a monitoring program initiated by the County of Los Angeles and taken over by the City of Rancho Palos Verdes circa 1994. Between 1994 and September 2006, a GPS Base Station receiver was set at AB01 on the westerly side of the project while GPS receivers occupied other points during monitoring surveys. AB01 was fixed at a WGS84 position apparently based on a navigation position

discussed hereafter. The observations were processed in Leica software to develop geodetic coordinates of latitudes, longitudes and ellipsoid heights. These geodetic coordinates were imported into a Corps of Engineers software program called Corpscon as NAD83 geodetic coordinates and exported as NAD27 State Plane Coordinates System in Zone 7. Corpscon calls the program NADCON which uses a database of the nearest points with coordinates common to both the old NAD27 and new NAD83 system to compute a transformation. The NGS NADCON program has been used for this purpose up through 2007. Although the absolute accuracy of the NADCON conversions is a ½ foot or less, the local relative accuracies are about 0.05 feet. The NAD27 State Plane Coordinates were then compared year over year to report ground movements. See the "STATUS OF MONITORING POINTS" in the Appendix for a historical list of all monitoring points and their status as of September 2007.

PROJECT DATUMS, REFERENCE SYSTEM

This September 2007 Survey reports coordinates, elevations and movements in NAD27 (horizontal) and NGVD29 (vertical) for the last time, and in NAD83 and NAVD88 for the first time and going forward in time.

Datum for Reporting the 2007 and Future Surveys

Horizontal Datum: North American Datum of 1983 (NAD83) per the National Geodetic Survey (NGS) **Epoch:** 2007.00 referred to as NAD83(2007) or NAD83(NSRS2007); **Units:** Feet

Reference Network: The survey is referenced to the CORS Stations which are continuously operating reference GPS receivers mounted on a stabile platform (for more information see NGS Data Sheets for the PID's listed below). No data sheet exists for PVE3. PVE3's position was downloaded from the California Spatial Reference Center (CSRC). CSRC provides NGS sanctioned positions on all California CORS.

	NAD83(2007)				
CORS	Latitude(Dms)	Longitude(Dms)	EH(feet)	NGS PID	NAME
PVE3	33 44 35.853290	-118 24 15.269036	235.42	no data sheet	PALOS VERDES CORS
PVHS	33 46 46.020150	-118 22 19.741258	853.99	AJ1915	PENINSULA HIGH SCH
PVRS	33 46 25.891904	-118 19 14.067218	198.63	AJ1916	PALOS VERDES RES
VTIS	33 42 45.489584	-118 17 37.712290	197.52	AJ1936	MARINE EXCHANGE

Regional CORS in the Vicinity of Rancho Palos Verdes

Vertical Datum: NAVD88 per NGS
Geoid Model: Geoid 03

Reference Network: CORS Station VTIS (see NGS Data Sheets)

CORS	Elevation(feet)	
PVE3		Not Available
PVHS	972.1	Based on a Refined Geoid Model
PVRS	316.3	Based on a Refined Geoid Model
VTIS	315.26	Based on Second Order Leveling by CSRC

Projection: NAD83 California State Plane Coordinates Zone 5
State Plane Coordinates Parameters for Zone Five: The average Scale Factor is 1.00007543, the Ellipsoid Height Reduction Factor, based on the average ellipsoid heights is 0.99999092, therefore the average Combined Grid Factor is 1.00006635. Multiply the Combined Factor times ground distances to obtain grid distances relative to this survey. Grid bearings resulting from this survey must be rotated by a Convergence Angle to obtain geodetic (true) bearings. The average convergence angle is -0-12-30.2±.

Datum for Reporting the 2007 and Prior Surveys

Horizontal Datum: World Geodetic System of 1984 (WGS84)
Reference Network: AB01

Point	Latitude	Longitude	EH(feet)	
AB01	33-44-38.28119	-118-22-53.02044	34.065	Historical Record

Vertical Datum: National Geodetic Vertical Datum of 1929 (NGVD 29)
Reference Network: AB01

CORS	Elevation(feet)	
AB01	176.06	Historical Record

Projection: NAD27 Calif. State Plane Coordinates Zone 7
NAD27 State Plane Coordinates Parameters for Zone Seven: the average Scale Factor is 1.00001261, the Elevation Reduction Factor based on the average elevation above sea level is 0.99998585, the average Combined Grid Factor is 0.99999846. Multiply the Combined Factor times ground distances to obtain grid distances. Grid bearings are rotated by a Convergence Angle to obtain geodetic bearings. The average convergence angle is -0-01-05.3±.

Datum Notes/Comments:
Horizontal positions and ellipsoid heights are referenced to the North American Datum of 1983 (NAD83), 2007.00 Epoch adjustment of the National Spatial Reference System (NSRS) based on the four CORS listed above. NAD83 superseded the North American Datum of 1927 (NAD27) in 1986. The original NAD83 adjustment is based on earlier conventional survey measurements and triangulation networks referenced to a global network. With the advent of GPS technology, a High Precision Geodetic Network (HPGN) was established in California in 1991. The most recent realization of NAD83, used by this survey, is based on an extremely precise adjustment of the national CORS network. The shift from NAD27 to NAD83 in this vicinity is -6 feet in latitude and -275 feet in longitude.

Orthometric heights (elevations) are based on the North American Vertical Datum of 1988 (NAVD 88) as determined by the NGS on the CORS station "VTIS". The NAVD 88 vertical datum superseded the National Geodetic Vertical Datum of 1929 (NGVD 29) in 1991. The NGVD 29 datum was originally intended to approximate local sea level and differs from NAVD88 by about 3 feet in California. An NGS program called Vertcon computes the shift between datums with an estimated accuracy of about 2 centimeters (0.06 feet). The Vertcon computed shift from the NAVD 88 to NGVD 29 at AB01 is -2.43 feet (–0.741 meters), and the difference between the NGVD29 value used historically for AB01 and the NAVD88 determined by this survey is -2.56 feet.

RELATIONSHIPS: GPS positions are reported as coordinates in a three dimensional X, Y, Z Cartesian Coordinate System with the origin 0,0,0 being earth-centered and earth-fixed. These coordinates are converted for mapping purposes to geodetic coordinates of latitude, longitude and ellipsoid heights which are further converted to plane or grid coordinates for local applications. The GPS satellite positions are in the military World Geodetic System of 1984 (WGS84). The parameters and orientation of the ellipsoid for NAD83 and WGS84 are for practical purposes the same; however NAD83 unlike WGS84 is not geocentric and the same position in both systems will differ about 4 feet on the ground. NAD83 positions are realized by attaching WGS84 measured vectors to NAD83 reference points (CORS). As a matter of information, the WGS84 reference frame has migrated over the years to its present definition which is consistent with the International Terrestrial Reference Frame of 2000 (ITRF2000).

Multiple coordinates may exist for points by virtue of the changes in datums and re-adjustments over time of points on the Pacific Plate relative to the fixed North American Plate. The Pacific Plate is moving west-northwesterly relative to the North American Plate about 4 centimeters (0.13 feet) per year resulting in different positions being published for the same point on different epochs. The NAD83, 2007.00 Epoch adjustment is the latest in a series of adjustments of NAD83 since its adoption in 1986 and will be held fixed on future monitoring surveys. Although the Pacific Plate is moving relative to the North American Plate, this is not a problem for the purpose of this survey since the region of this survey is moving relatively the same as exhibited by the N, E, Up velocities on the CORS listed below as published by the CSRC.

Annual Velocities in Feet

CORS	North	East	Up
PVE3	0.06	-0.13	-0.01
PVHS	0.06	-0.13	-0.01
PVRS	0.06	-0.13	-0.00
VTIS	0.06	-0.13	-0.01

In summary, the City as a whole is moving at a constant rate and the four CORS listed above serve as a rigid reference frame for monitoring the Portuguese Landslide.

FIELD SURVEYS:

Prior to initiating the field surveys a reconnaissance of the area was performed to identify access, recover previous monitoring points and assess suitability. Sixty points were recovered from previous surveys dating back to 1994. Nineteen new points were set at locations determined by Glen Tofani, City Geologist. Fifty-two of the recovered points and nineteen new points (71 points total) were monitored and reported in 2007 (shown below). The monitoring points were documented with photographs and recovery sheets that detail the location, character of the monument and obstructions of GPS observations.

AB01 has been used since 1994 as the primary Base Station. Over the years a pine tree northeast of the point has become an obstruction; therefore, a new GPS Base Station was established on Portuguese Point known as AB61. The location is secured behind a locked gate, has a clear horizon above 15 degrees (ideal for collecting GPS observations from satellites), and sits on a stable geological formation (location approved by Glen Tofani, City Geologist).

The field survey commenced each day by setting up a GPS receiver on a tripod at AB61 while two GPS receivers roamed freely collecting observations on fixed height poles at 70 on-site monitoring points. Many of the points are surrounded by mature trees and plants which attenuate satellite signals passing through foliage degrading accuracies. To obtain the highest possible accuracies, available satellite were compared in real time with the obstruction diagrams to estimate the best time and sequence for observing points. Upon arriving at a point to be observed the receiver was set up, the location in the sky of each satellite was estimated with a compass and abney, and satellites obstructed by foliage and trees were turned off. If 5 or

more un-obstructed satellites with a GDOP (measure of the geometry of the constellation) of 5 or less were available then the measurement commenced for 15-30 minutes of data collection. If sufficient satellites and geometry were not available then the receiver was moved to the next point and the point was returned to later. This process was followed until all points were occupied twice and sometimes three times under a different constellation of satellites with the exception of BB52 which was occupied once for an extended time due to high tides. BB53 was set as a backup for BB52.

DATA COLLECTION: EQUIPMENT & PROCESSING

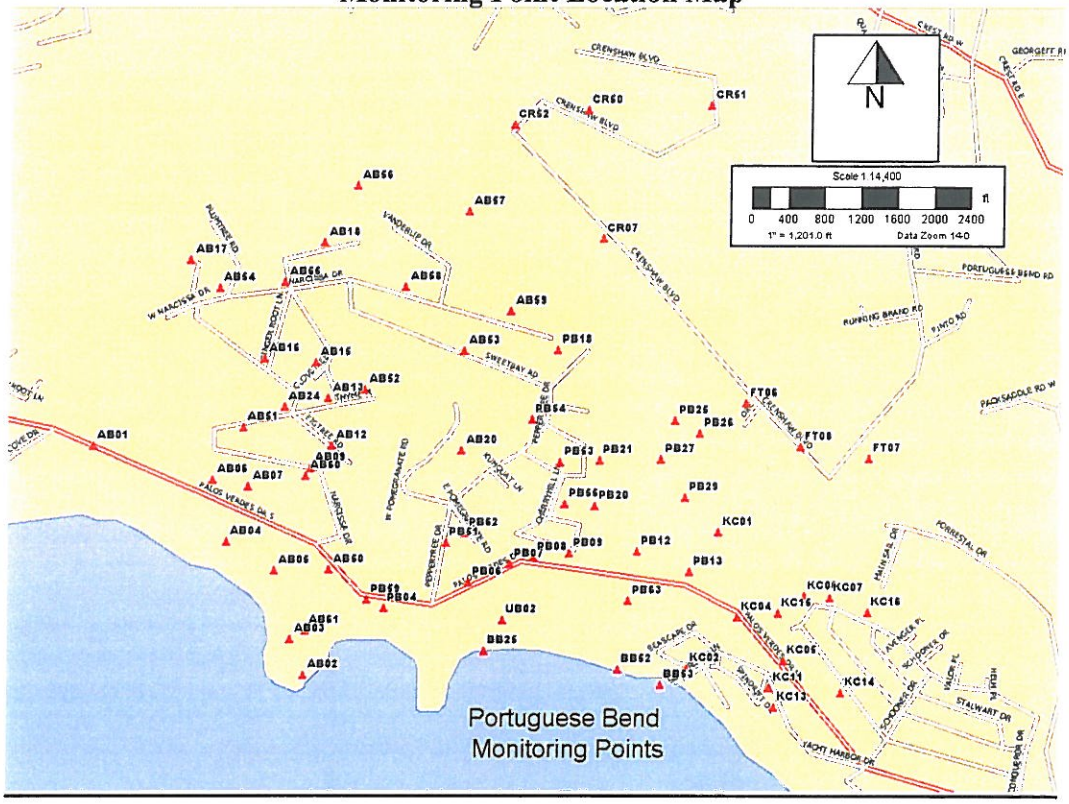
Description: Network Control and Data Collection were performed by establishing a base receiver at point AB61 while two roving receivers occupied all points in a radial fashion. There were no equipment failures. See below for the GPS Survey Parameters.

Date of Field Surveys: 09/22/2007 to 09/26/2007 between 0600-1800 PDST (+7 hrs for UTC).
GPS constellation: Consisted of 29 Block II satellites
GPS Observables: L1 & L2 Carrier wave, C/A Code and P-Code; P-code was encrypted and SA was off
Epoch Rate & Occupation Times: 10" for 15-30 minutes and 10-11 hours for CORS connections
Minimum Satellites: 5 ; GDOP=< 5 ; Elevation Mask for Data Collection: 15 degrees; Processing: 15 deg
Ephemeris: Rapid for Static Post-Processing
Space Weather: Boulder K Index was 1-2 on a scale of 0-9 and gauges ionospheric activity.

GPS Base Receiver Unit No. M2, Operator: M. McGee,PLS; Station Identification: AB61
Make & Model: Leica 399 ; Antenna: Leica 399 Internal, Mount: Tribrach on Tripod; Height: varies
GPS Rover Receiver Unit No. M3, Operator: R. Reese,PLS,
Make & Model: Leica 530; Antenna Leica AT502; Mount: Fixed Height Pole #1; Antenna Height: 2.083m
GPS Rover Receiver Unit No. M4, Operator: M. McGee,PLS;
Make & Model: Leica 530; Antenna Leica AT502; Mount: Fixed Height Pole #3; Antenna Height: 2.085m
Three Leica geodetic GPS receivers were utilized to collect, process and store satellite signal data. Units M3 and M4 components consisted of an Leica 530 receiver and AT502 antenna; and Unit M2 consists of a SR399 Sensor (antenna). Two, two meter fixed height poles were used for the field observations of the monitoring points with a base station receiver utilizing a tribrach on tripod setup. Prior to initiating the field observations a calibration of the tribrach and fixed height poles was conducted to verify the accuracy of the equipment. Weather conditions were generally clear skies and mild temperatures. Heavy showers occurred the evening before the field survey commenced, otherwise there was no precipitation for the many months since the rainy season. There were no equipment failures.

A total of 77 points (71 monitoring+2 miscellaneous+4 CORS) were connected with 181 measured vectors. Data was processed using the Leica "SKI-Pro" post processing software running in a Windows XP operating system. The baseline connections to the CORS were processed with a precise ephemeris at a cutoff vertical angle of 15° above the horizon. The network baselines were processed with a broadcast ephemeris at a cutoff vertical angle of 15°. Analysis of processing statistics and residuals led to the rejection of 5 vectors. Network adjustments and analysis were performed with "Starnet-PRO" version 6.0 software. The CORS stations were included by downloading Rinex files from the NGS and using the NGS antenna models in the processing.

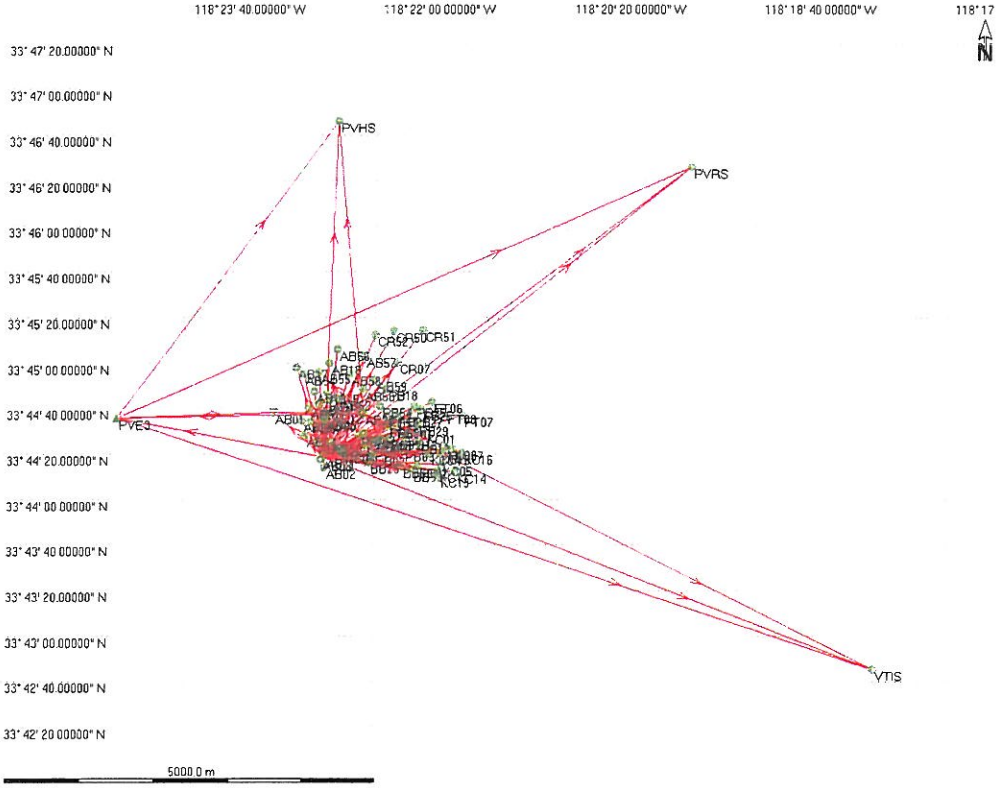
Monitoring Point Location Map



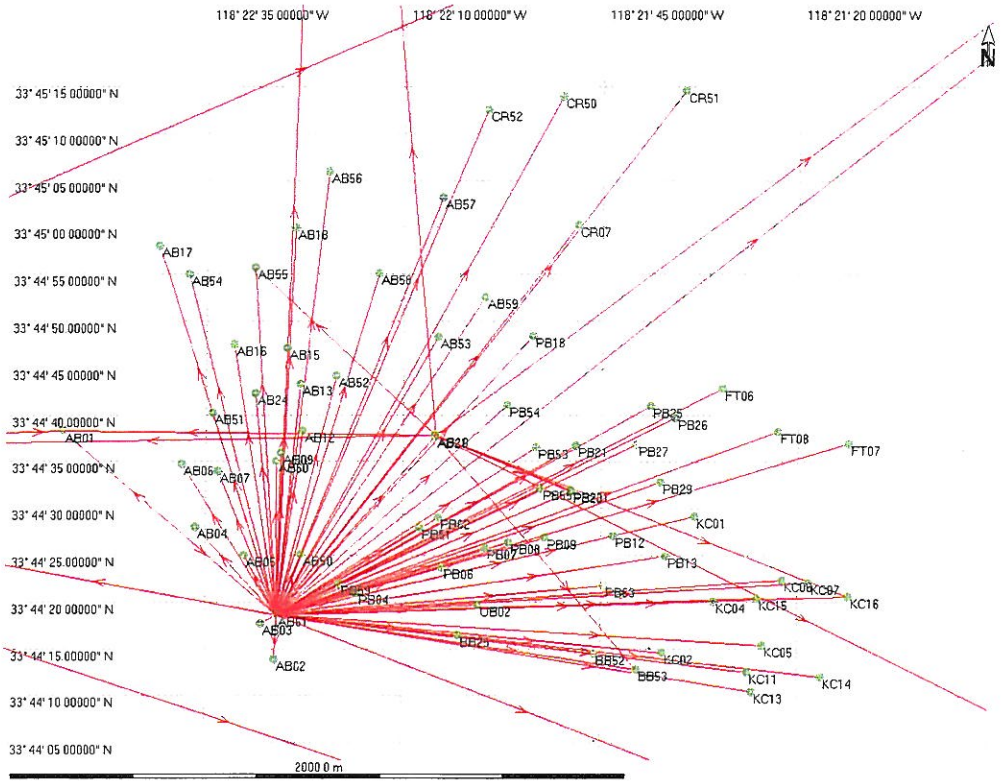
Monitoring Point Location on Aerial Photo

NETWORK

GPS Network



GPS Network Enlargement Showing Monitoring Points



Network: A new Base Station was established at point AB61 on Portuguese Point from which a static network was created including four CORS stations. The survey of was conducted as a radial static network from AB61.
Number of Points in Network: Four CORS, 71 monitoring points and two miscellaneous points (AB21 and PB201). These two points were located because they were in near proximity to monitoring points, but not used for monitoring.
Control Stations: Control stations are the four CORS taking their assigned four letter ID for use in this survey.
Point Status/Comments: Monitoring Points used in this survey take their ID from previous surveys. The ID of new points were assigned by the Glen Tofani, City Geologist consistent with prior naming conventions.

Since 1994, 149 monitoring points have been established in the Portuguese Bend area many of which are now lost or destroyed. Sixty of the original points were recovered in 2007. Eight of the 60 points were deleted because they were in close proximity of other better suited for GPS leaving 52 points monitored for movement between September 2006 and September 2007. Three of the 60 points (AB09, KC11, PB51) were monitored in 2007 for the last time and are replaced on future surveys by new points set nearby better suited for GPS measurements. Nineteen new points set in 2007 will have their movements reported beginning in 2008. In 2008, and moving forward, 49 original and 19 new points will be surveyed for a total of 68 monitoring points. See the "STATUS OF MONITORING POINTS" in the Appendix for information and status.

ADJUSTMENTS & ANALYSIS

Adjustment 1: Minimally Constrained to develop Geodetic and Ellipsoid Coordinates in NAD83(2007)
Fixed Control: The CORS PVE3 was fixed at its published three dimensional position in a Minimally Constrained Adjustment to determine latitude, longitude, ellipsoid heights, and State Plane Coordinates, and compare with other known points shown below. See the attached file "COORDINATE LIST-NAD83 2007 Survey.xls" for a list of points and coordinates resulting from this survey which will be the basis for computing future movements.

The 3D and Ellipsoid Height adjustment results follow with coordinate differences (closures) from record to computed in feet.

Station	dN	dE	dZ	
AB01	2.163	-2.560	26.077	Record WGS84 Position of historically Base Station
PVE3	0.000	0.000	0.000	Fixed
PVHS	0.004	-0.017	0.033	
PVRS	0.013	-0.011	-0.032	
VTIS	0.007	-0.003	-0.012	

Notes/Comments: Relative to the primary Base Station point AB61, the CORS station PVE3 is located 1.8 miles west-northwest, PVHS is 2.8 miles north, PVRS 3.9 miles northeast and VTIS is 4.9 miles east-southeast. The 2D closures on the CORS is 0.017 feet or less and for the purposes of this survey a constrained adjustment was not necessary as it would not change the values determined by this survey. Furthermore, the ongoing plan for the monitoring surveys is to fix AB61 and use the CORS to verify the stability of the reference system. The difference at AB01 indicates the position used historically is 2.16 feet S, 2.56 feet E and 26.08 feet lower than the NAD83 position determined by this survey.

The following lists the position of AB01 in datums of interest for this survey. Note, although AB01 is described in the historical records as a WGS84 position, it is 3.50 feet S, 6.69 feet E and 23.75 feet lower than its WGS84 position by the present definition. The historical WGS84 position of AB01 was apparently a navigation solution.

Point	Latitude	Longitude	EH (ft)	
AB01	33-44-38.30249	-118-22-53.05085	60.142	NAD83, 2007.00
AB01	33-44-38.31554	-118-22-53.09980	57.820	WGS84=ITRF2000
AB01	33-44-38.28119	-118-22-53.02044	34.065	Historical Record WGS84

Adjustment 2: Minimally Constrained to develop Orthometric Heights (Elevations) in NAVD88
Fixed Control: The CORS PVE3 was fixed horizontally and the CORS VTIS was fixed vertically in a Minimally Constrained Adjustment that combined the measured ellipsoid height differences with the NGS Geoid 03 (models the undulations between the ellipsoid and geoid surfaces) to determine NAVD88 orthometric heights on all points and compare with other known points shown below. See the attached file "COORDINATE LIST-NAD83 2007 Survey.xls" for a list of points and heights which will be the basis for computing future movements.

Orthometric Heights: The adjustment results follow with the height differences (closures) from record to computed listed.

Station	dZ (ft)	
AB01	2.56	NGVD29 Historical Record
PVE3		Not Available
PVHS	-0.1	
PVRS	0.0	
VTIS	0.00	Fixed NAVD88

Notes/Comments: The orthometric closure between VTIS (based on Second Order Leveling) and PVHS and PVRS is better than the stated accuracies of their published values. The difference at AB01 represents the shift from the historical record elevation on NGVD29 to the NAVD88 as determined by this survey. For the purposes of this survey a constrained adjustment is not necessary.

Adjustment 3: Minimally Constrained to develop Geodetic and Ellipsoid Coordinates in Psuedo-WGS84 (Duplicates 1994-2006 procedures)
Fixed Control: The historical record position of AB01 (33-44-38.28119, -118-22-53.02044, 34.065 feet) was fixed at its three dimensional position in a Minimally Constrained Adjustment to determine latitude, longitude and ellipsoid heights on the 52 points monitored in 2006 for processing in Corpscon. Consistent with prior processing methods, the results were imported to Corpscon v6 software as NAD83 positions and exported as NAD27 State Plane Coordinates Zone 7. See the attached file "FULL DATA-THROUGH 2007-NAD27.xls" for a list of grid coordinates and movements.

Adjustment 4: Minimally Constrained to develop Orthometric Heights (Elevations) in NGVD29 (Duplicates 1994-2006 procedures)
Fixed Control: The historical record elevation of AB01 (176.06 feet) was fixed vertically in a Minimally Constrained Adjustment that combined the measured ellipsoid height differences with Geoid 03 (models the undulations between the ellipsoid and geoid surfaces) to determine NGVD29 elevations on the 52 points monitored in 2006. See the attached file "FULL DATA-THROUGH 2007-NAD27.xls" for a list of elevations and movements.

Comment on Heights: Analysis of past records indicates as far back as 2000 ellipsoid heights were used to calculate elevations on monitoring points. In 2006 the Geoid 99 model was apparently used. This adjustment derives elevations consistent with past practices but used the newer Geoid03 model. The difference between Geoid99 and Geoid03 heights varies 0.02 to 0.04 feet; however the relative point to point differences affecting this survey are less than 0.011 feet in height and are ignored.

Comment on Recovery of Reference Frame: Points AB02, AB03, AB17 and CR52 are considered historically to be stable and the horizontal closures of 0.01 to 0.03 feet on the 2006 record positions (Adjustments #3 and #4), are listed below and indicate the previous survey reference frame relative to AB01 is stable at the level indicated and was recovered successfully.

Point	N	E	Up	
AB01	0.00	0.00	0.00	Fixed
AB02	0.00	-0.01	-0.08	
AB03	-0.03	0.00	0.00	
AB17	0.02	-0.02	0.00	
CR52	0.01	0.00	0.01	

ACCURACY

Relative Accuracy: On site the points are expected to be at 0.02 feet (<1 cm) horizontal at the 95% Level of Confidence.

Absolute Accuracy: The network is expected to be less than 0.02 feet (<1 cm) horizontal at the 95% Level of Confidence relative to the NAD83 Datum based on the PVE3 CORS as fixed in Adjustment #1.

Vector Residuals: Adjustment #1 referred to above was processed with the following results: the two dimensional horizontal residuals average 0.01 feet with a standard deviation of 0.01 feet and a maximum of 0.03 feet. The absolute value of the vertical residuals average 0.01 feet with a standard deviation of 0.01 feet and a maximum of 0.06 feet.

The North American Vertical Datum 1988 orthometric heights (elevations) resulting from Adjustment #2 are derived from the GPS ellipsoid heights combined with the Geoid 03 model and constrained to known elevations. The ellipsoid heights are expected to be within 0.03 feet. The Geoid 03 model is expected to have a probable error of 1 part per million. Relative elevation accuracies are expected to be 0.03 feet. The absolute accuracy of these heights is dependent on the published values on the VTIS CORS.

In the Minimally Constrained Adjustment #2 the average Standard Deviations (68% Level of Confidence) of the monitoring point coordinates follow in feet.

	North	East	Up
Average	0.008	0.006	0.017
Maximum	0.014	0.012	0.038
Minimum	0.002	0.002	0.003

Baseline (vector) precisions for the monitoring points, at the 95% Level of Confidence (2 sigma), vary 2 ppm to 77 ppm and average 7.5 ppm for 76 measured vectors varying in length between 192 feet and 7,182 feet and averaging 3500 feet. The relative distance error at the 95% Level of Confidence averages 0.017 feet with a maximum of 0.032 feet. The precision ratio based on the averages is 1:206,000 exceeding the criteria for a First Order (C-1) survey per the FGCS requirements by a factor of two under the former classification system.

Baseline (vector) precisions between AB61 and the CORS, at the 95% Level of Confidence (2 sigma), vary 0.1 ppm to 0.5 ppm and average 0.3 ppm for 7 measured connections varying in length between 9,395 and 35,385 feet and averaging 20,700 feet. The relative distance error at the 95% level of Confidence averages 0.005 feet with a maximum of 0.006 feet. The precision ratio is 1:7,000,000 exceeding the criteria for a B Order survey per the FGCS requirements for the former classification system..

CORS connections in feet

From - To	Grid Distance	95%	PPM
AB61 PVE3	9395.7221	0.004	0.5
AB61 PVHS	14914.8779	0.006	0.4
AB61 PVRS	20693.1014	0.006	0.3
AB61 VTIS	26103.4525	0.005	0.2
PVE3 PVHS	16379.9943	0.005	0.3
PVE3 PVRS	27759.1021	0.005	0.2
PVE3 VTIS	35385.8424	0.005	0.1

The residuals and the closures between known control points discussed in the above Adjustments are good indications of the accuracies obtained by this survey. This survey conforms to the intent of the Federal Geodetic Control Subcommittee (FGCS) Specifications for GPS Relative Positioning (1988) and the California Geodetic Control Committee (CGCC) Specifications for High-Production GPS Surveying Techniques (1993).

QAQC ANALYSIS

To ensure the accuracy of GPS, an independent validation of the measurement system was performed by measuring the distance between a sampling of five inter-visible points with a conventional calibrated total station. The results are listed below in feet. Distances are horizontal ground distances and the "95%" column indicates the relative confidence of the computed GPS distances at 95%.

Comparison of Computed GPS Distances v. Direct Conventional Measurements (Total Station)

From - To	GPS Dist	95%	Total Station Distance	Difference
AB02 - AB61	477.964	0.016	477.973	-0.009
AB03 - AB61	191.838	0.015	191.854	-0.016
KC06 - KC07	288.562	0.020	288.577	-0.015
KC07 - KC16	443.143	0.019	443.149	-0.006
KC11 - KC13	219.804	0.027	219.814	-0.010
Averages		0.019		-0.011

The differences of the computed distances between positions obtained with GPS and distances obtained with direct conventional instruments average 0.011 feet. The maximum is 0.016 feet which is better than the average of 0.019 feet at the 95% Level of Confidence. This test indicates that GPS techniques are equivalent to conventional measurement systems that would require a much greater amount of time and costs to perform.

A second validation was made by computing the inverse distance between the GPS positions of AB20 and five other points spread across the site and then comparing with the directly measured GPS vectors introduced into the adjustment and comparing the change in the distance.

Comparison of Computed GPS Distances v. Direct GPS Measurements

From - To	Calc'd Dist	Direct Dist	Difference
AB20 - AB55	2651.000	2650.995	+0.005
AB20 - AB61	2573.293	2573.296	-0.003
AB20 - BB53	3322.413	3322.423	-0.010
AB20 - KC16	4749.444	4749.448	-0.004
AB20 - PB20	1562.957	1562.966	-0.009
		Average:	-0.004

The difference in the distances average -0.004 feet with a maximum of 0.010 feet. This test indicates relative accuracies are better than 0.010 feet. This test, consistent with the above test results, indicates the radial method of positioning monitoring points is reliable at 0.01 feet, more than sufficient for monitoring purposes.

SUMMARY

For the historical status of all monitoring points as of September 2007, see the "STATUS OF MONITORING POINTS" in the Appendix. The historical positions of all points between 1994-2006 are listed in the file "ALL POINTS MOST RECENT OBSERVED POSITION AS OF SEPTEMBER 15, 2006.xls" available on CD due it large size.

Generally, between 2006 and 2007 the points in the "Portuguese Bend Landslide" moved about ½ to 3½ feet. Points east and west of the "Portuguese Bend Landslide" moved about 0.1 feet or less. The movement for the present period between September 2006 to September 2007 for each monitored point is listed in "FULL DATA-THROUGH 2007-NAD27.xls". The overall movement since the beginning position (varies between 1994 and 2005) is also listed in the same document. The movements are given in north, east and up or down as well as a vector of distance and direction. The direction is given as an azimuth in degrees where 0° is north, 90° is east, 180° is south and 270° is west.

The overall movement of point BB25 is referenced to the 11/04/1998 position because the position changed 6 feet west of its first reported position on 12/13/1997 indicating a different point may have been used. At KC01 it was observed that the recent annual 2006-2007 movement was S19°E 0.05'; however, the 9/14/2006 position is N29°E 1.24' and down 1.8' from the 12/9/2005 position. The 12/9/2005 position is 1.5' higher than its previous position in 02/09/2005, otherwise the point has been stable between 1994 and 2005. This may indicate two points have been used for KC01 and will be resolved with the next survey.

Analysis of the historical data for AB02, AB03 and AB17 (considered stable points) indicates the probability that movement has occurred in the past reports when the distance is greater than 0.05 feet and the direction is consistent with the direction of the overall movement for a particular point.

The September 2007 survey used refined field procedures and processing techniques, the benefits of which will be realized at the completion of the 2008 monitoring survey. At that time, a rigorous simultaneous adjustment that combines the results of both surveys is expected to determine the movement reliability to better than 0.03 feet (1cm) at the 95% Level of Confidence. Beginning in 2008, the spreadsheet "FULL DATA POSTING 2007-NAD83.xls" will be used to report overall and period movements in the NAD83(2007) coordinate system.

Attachments: Find the following documents attached to this Report.

Report Spreadsheets

FULL DATA-THROUGH 2007-NAD27.xls (Reporting coordinates and elevations of the present monitoring points for the initial, 2006 and 2007 positions in the old NAD27 and NGVD29 Systems. Also listed are the overall movements and Sept. 2006 to Sept. 2007 movements. Note, going forward, positions and movements will be posted in the NAD83 and NAVD88 Systems in the file "FULL DATA POSTING-NAD83.xls")

FULL DATA POSTING-NAD83.xls (For future reporting of coordinates and movements of the monitoring points for the initial, 2007 and post 2007 positions in the NAD83 and NAVD88 Systems)

Coordinate Files

COORDINATE LIST-NAD83 2007 Survey.xls (Current NAD83 Geodetic & Grid Coordinates, NAVD88 Heights)

COORDINATE LIST-NAD83 All Historical Pts.xls (Beginning coordinates of all published points since 1994 transformed from NAD27 to NAD83, elevations shifted from NGVD29 to NAVD88)

Photos

PHOTOS-SEP2007.doc (September 2007 photos of points)

SURVEYOR'S STATEMENT

This Report on the criteria, procedures and results of the Rancho Palos Verdes Portuguese Landslide Monitoring Survey were prepared by me March 30, 2008 at the request of Frederick (Rick) Jones; P.E., P.L.S. of Charles Abbott Associates Inc. and City Engineer of the City of Rancho Palos Verdes.

Michael R. McGee
P.L.S. 3945

Frederick (Rick) Jones
R.C.E. 36665, P.L.S. 5458

APPENDIX

STATUS OF MONITORING POINTS

Rancho Pales Verdes - Portuguese Landslide Monitoring Point Summary Status 2007

Prepared 09/17/07, Revised 1/31/08

Notes :

UPPER CASE notations indicate site visit comments in Sept. 2007

lower case notation from prior records

Comments column indicates if USED in Sept. 2007 and GPS suitability

149 Monitoring Points Since 1994

60 Old Points Found in 2007

52 Old Points Monitored in 2007

49 Old Points to be Monitored in 2008

19 New Points Set in 2007 to be Monitored in 2008

68 Total Points to Monitor in 2008

Pt ID	Last Obs'd	Status	Comments		Pt ID	Last Obs'd	Status	Comments
AB01	9/11/2006	FOUND	USED (OLD BASE)		**FT01**	year 2001	lost	
AB02	9/6/2006	FOUND	USED		**FT02**	year 2001	lost	
AB03	9/6/2006	FOUND	USED		**FT03**		destroyed	
AB04	9/6/2006	FOUND	USED		**FT04**	year 1995	lost	
AB05	9/6/2006	FOUND	USED		**FT05**	year 2001	lost	
AB06	9/8/2006	FOUND	USED		**FT06**	9/24/2007	NEW	USED
AB07	9/8/2006	FOUND	USED		**FT07**	9/24/2007	NEW	USED
AB08	9/6/2006	PAVED OVER			**FT08**	9/24/2007	NEW	USED
AB09	9/6/2006	FOUND	USED (REPLACE AB60)					
AB10	year 1998	destroyed			**KC01**	9/14/2006	FOUND	USED
AB11	year 1997	destroyed			**KC02**	9/14/2006	FOUND	USED
AB12	9/6/2006	FOUND	USED		**KC03**	2/26/2005	DESTROYED	
AB13	9/6/2006	FOUND	USED-POOR		**KC04**	9/15/2006	FOUND	USED
AB14	8/1/2000	destroyed			**KC05**	4/7/2006	FOUND	USED
AB15	9/11/2006	FOUND	USED-FAIR		**KC06**	9/15/2006	FOUND	USED
AB16	9/11/2006	FOUND	USED-POOR		**KC07**	9/15/2006	FOUND	USED
AB17	9/6/2006	FOUND	USED-FAIR		gap			
AB18	9/11/2006	FOUND	USED-POOR		**KC10**	9/15/2006	FOUND	DELETED
AB19	8/2/2000	destroyed			**KC11**	4/7/2006	FOUND	USED (REPLACE KC13
AB20	9/8/2006	FOUND	USED (NE'LY PIPE)		**KC12**	9/15/2006	FOUND	DELETED-BAD
AB21	9/8/2006	FOUND	DELETED (USED 20)		**KC13**	9/24/2007	NEW	USED
AB22	year 1997	destroyed			**KC14**	9/24/2007	NEW	USED
AB23	9/6/2006	FOUND	DELETED (USED 15)		**KC15**	9/24/2007	NEW	USED
AB24	9/6/2006	FOUND	USED-FAIR		**KC16**	9/24/2007	NEW	USED
gap								
AB28	year 1995	observed 1x			gap			
gap					**PB04**	9/8/2006	FOUND	USED
AB50	9/6/2006	FOUND	USED		**PB05**	10/1/1995	destroyed	
AB51	9/6/2006	FOUND	USED		**PB06**	9/8/2006	FOUND	USED
AB52	9/6/2006	FOUND	USED-POOR		**PB07**	9/8/2006	FOUND	USED
AB53	9/8/2006	FOUND	USED-FAIR		**PB08**	9/8/2006	FOUND	USED
gap					**PB09**	9/8/2006	FOUND	USED
AB54	9/24/2007	NEW	USED-POOR		**PB10**	year 2000	destroyed	
AB55	9/24/2007	NEW	USED		**PB11**	9/11/2006	DESTROYED	
AB56	9/24/2007	NEW	USED-FAIR		**PB12**	9/11/2006	FOUND	USED
AB57	9/24/2007	NEW	USED		**PB13**	9/11/2006	FOUND	USED

AB58	9/24/2007	NEW	USED-POOR		**PB14**	year 1994	observed 1x	
AB59	9/24/2007	NEW	USED		**PB15**	year 1994	observed 1x	
AB60	9/24/2007	NEW	USED		**PB16**	year 1997	destroyed	
AB61	9/24/2007	NEW	USED (NEW BASE)		gap			
					PB18	9/11/2006	FOUND	USED
B06	1/19/2005	LOST			**PB19**	9/11/2006	FOUND	DELETED-POOR
BB00	year 1997	lost			**PB20**	9/15/2006	FOUND	USED
BB01	year 1997	observed 1x			**PB21**	9/14/2006	FOUND	USED-FAIR
BB02	year 1997	lost			**PB22**	9/14/2006	FOUND	DELETED-BAD
BB03	year 1997	observed 2x			**PB23**	year 1997	destroyed	
BB04	year 1997	observed 1x			**PB24**	9/11/2006	FOUND	DELETED-BAD
BB05	year 1997	observed 1x			**PB25**	9/11/2006	FOUND	USED
BB06	year 2000	lost			**PB26**	9/11/2006	FOUND	USED-FAIR
BB07	year 1997	observed 2x			**PB27**	9/14/2006	FOUND	USED
BB08	year 1997	lost			gap			
BB09	year 1998	lost			**PB29**	9/11/2006	FOUND	USED
BB10	1/19/2005	destroyed			gap			
gap					**PB34**	year 1995	destroyed	
BB20	1/10/2005	LOST			gap			
BB21	1/10/2005	LOST			**PB38**	9/11/2006	LOST	
BB22	year 1999	destroyed			**PB39**	year 1995	observed 1x	
BB23	1/10/2005	LOST			**PB40**	year 1996	destroyed	
gap					**PB41**	year 1997	destroyed	
BB25	1/10/2005	FOUND	USED		**PB42**	year 1995	lost	
gap					**PB43**		destroyed	
BB50	1/19/2000	lost			**PB44**		destroyed	
BB51	1/2/2003	LOST			**PB45**	1/27/2005	destroyed	
BB52	9/24/2007	NEW	USED		**PB46**	9/15/2006	destroyed	
BB53	9/24/2007	NEW	USED		gap			
					PB51	9/8/2006	FOUND	USED (REPLACE PB62
CR01	year 1997	destroyed			**PB52**	year 1997	observed 1x	
CR02	year 1994	destroyed			**PB53**	9/8/2006	FOUND	USED-BAD
CR03	year 1997	destroyed			**PB54**	9/8/2006	FOUND	USED-FAIR
CR04	year 1994	destroyed			**PB55**	9/8/2006	FOUND	USED-FAIR
CR05	year 1997	destroyed			**PB56**	9/8/2006	FOUND	DELETED (USE 59)
CR06	year 1997	destroyed			**PB57**	9/8/2006	DESTROYED	
CR07	9/14/2006	FOUND	USED-FAIR		**PB58**	9/8/2006	DESTROYED	
CR08	year 1995	destroyed			**PB59**	9/8/2006	FOUND	USED
gap					**PB60**	year 2002	DESTROYED	
CR12	year 1995	destroyed			**PB61**	2/9/2005	DESTROYED	
gap					**PB62**	9/24/2007	NEW	USED
CR14	year 1995	destroyed			**PB63**	9/24/2007	NEW	USED
gap								
CR50	9/14/2006	FOUND	USED		**UB01**	9/15/2006	DESTROYED	
CR51	9/14/2006	FOUND	USED		**UB02**	9/15/2006	FOUND	USED
CR52	9/14/2006	FOUND	USED-POOR		**UB03**	11/22/2005	LOST	
					UB04	year 2002	destroyed	
FIG2	year 1997	observed 1x			**UB05**	11/22/2005	LOST	

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Photos

PHOTOS-SEP2007.doc (September 2007 photos of points)

FULL DATA - THROUGH 2007 - NAD27

Date: 03/30/2008

PORTUGUESE POINT LANDSLIDE MONITORING

NAD27 COORDINATES & NGVD29 ELEVATIONS of HISTORICAL and 2007 MONITORING POINTS

(See FULL DATA REPORT NAD83 COORDINATES for POST 2007)

	Original Positions				Sept. 10, 2006 Positions		
		NAD27 SPC Zone 7		NGVD29	NAD27 SPC Zone 7		NGVD29
Point	Date	North (ft)	East (ft)	Elev(ft)	North (ft)	East (ft)	Elev(ft)
AB01	12/1/1994	4019232.49	4172356.65	176.06	4019232.49	4172356.65	176.06
AB02	11/30/1994	4016759.55	4174623.80	113.89	4016759.57	4174623.84	113.99
AB03	12/1/1994	4017150.40	4174472.68	137.04	4017150.48	4174472.67	137.03
AB04	11/30/1994	4018201.67	4173773.74	65.01	4018200.27	4173772.44	64.66
AB05	3/14/1995	4017887.43	4174296.52	78.34	4017886.80	4174295.58	78.11
AB06	4/27/1995	4018868.88	4173624.44	162.72	4018867.80	4173624.09	162.22
AB07	11/30/1994	4018793.21	4174006.83	157.36	4018791.95	4174006.14	156.82
AB09	11/30/1994	4018990.42	4174687.05	168.67	4018989.69	4174686.78	168.36
AB12	11/30/1994	4019229.92	4174918.56	280.87	4019229.09	4174918.14	280.57
AB13	11/30/1994	4019742.18	4174881.25	362.47	4019741.61	4174881.09	361.94
AB15	11/30/1994	4020124.89	4174743.33	394.72	4020124.39	4174743.28	394.34
AB16	11/30/1994	4020169.80	4174175.95	374.06	4020169.63	4174175.95	373.98
AB17	11/30/1994	4021229.31	4173368.11	440.49	4021229.29	4173368.08	440.23
AB18	12/1/1994	4021415.64	4174827.14	454.63	4021415.41	4174827.23	454.26
AB20	3/16/1995	4019178.77	4176333.28	393.87	4019178.10	4176333.03	393.72
AB24	3/12/1997	4019642.06	4174405.53	333.36	4019641.57	4174405.41	333.11
AB50	1/16/1998	4017898.44	4174899.53	179.42	4017898.18	4174898.95	179.29
AB51	3/22/2002	4019427.22	4173952.85	302.86	4019426.93	4173952.84	302.70
AB52	3/22/2002	4019830.67	4175269.34	366.05	4019830.40	4175269.25	365.82
AB53	3/22/2002	4020249.27	4176355.82	350.57	4020249.00	4176355.74	350.30
BB25	11/4/1998	4017019.64	4176586.92	1.25	4017019.50	4176586.93	1.37
CR07	11/30/1994	4021451.83	4177842.56	630.72	4021451.52	4177842.65	629.80
CR50	1/16/1998	4022835.96	4177672.15	870.48	4022835.91	4177672.02	870.20
CR51	1/16/1998	4022888.72	4178996.35	974.19	4022888.85	4178996.36	973.46
CR52	1/16/1998	4022687.31	4176874.65	777.45	4022687.29	4176874.60	777.06
KC01	11/30/1994	4018302.94	4179107.25	310.32	4018303.77	4179107.66	309.86
KC02	3/14/1995	4016829.28	4178773.70	11.28	4016829.20	4178773.63	10.91
KC04	3/14/1995	4017387.74	4179320.06	236.28	4017387.64	4179319.96	235.83
KC05	11/30/1994	4016911.91	4179833.47	225.30	4016911.92	4179833.38	224.97
KC06	11/30/1994	4017615.50	4180048.69	297.79	4017615.48	4180048.48	297.29
KC07	11/30/1994	4017590.74	4180336.01	311.27	4017590.86	4180335.97	310.89
KC11	12/4/2005	4016626.06	4179681.38	176.22	4016626.04	4179681.43	173.88
PB04	11/30/1994	4017491.41	4175504.41	167.96	4017483.14	4175501.98	165.02
PB06	3/15/1995	4017786.93	4176413.48	180.50	4017761.06	4176410.73	175.93
PB07	3/14/1995	4017995.92	4176870.68	197.65	4017963.32	4176864.77	195.55
PB08	12/1/1994	4018058.33	4177120.50	191.12	4018027.15	4177115.03	191.47
PB09	11/30/1994	4018110.67	4177501.53	189.96	4018076.05	4177499.82	187.37
PB12	11/30/1994	4018155.08	4178254.89	190.73	4018095.80	4178239.14	184.92
PB13	3/14/1995	4017912.44	4178815.44	207.98	4017878.45	4178803.03	204.74
PB18	3/15/1995	4020268.37	4177354.33	365.02	4020253.78	4177363.02	360.64
PB20	3/14/1995	4018635.77	4177784.42	240.98	4018578.98	4177775.63	232.53
PB21	3/14/1995	4019121.31	4177819.18	277.46	4019075.21	4177824.98	270.94
PB25	12/1/1994	4019528.09	4178631.38	326.43	4019497.39	4178632.34	323.68
PB26	3/14/1995	4019389.31	4178895.74	282.78	4019366.32	4178898.43	280.31
PB27	3/14/1995	4019164.64	4178483.01	281.86	4019086.51	4178489.03	271.31
PB29	3/15/1995	4018715.22	4178768.92	183.37	4018677.79	4178746.52	171.32
PB51	12/4/1997	4018186.05	4176168.20	234.08	4018183.59	4176167.79	233.48
PB53	12/4/1997	4019074.47	4177401.23	295.19	4019047.81	4177401.91	289.65
PB54	12/4/1997	4019515.56	4177094.54	356.06	4019512.11	4177094.51	355.23
PB55	1/21/1998	4018634.18	4177452.81	243.77	4018606.53	4177450.87	238.60
PB59	6/26/2001	4017581.20	4175314.05	160.83	4017576.80	4175313.01	158.22
UB02	7/23/1997	4017400.86	4176786.69	64.59	4017357.77	4176793.13	60.81

FULL DATA - THROUGH 2007 - NAD27

Date: 03/30/2008

PORTUGUESE POINT LANDSLIDE MONITORING

NAD27 COORDINATES & NGVD29 ELEVATIONS of HISTORICAL and 2007 MONITORING POINTS

(See FULL DATA REPORT NAD83 COORDINATES for POST 2007)

\# Indicates stable points

* Indicates movement unknown to be confirmed in 2008

	Sept.24, 2007 Positions			Overall Movements (US Feet)					
	NAD27 SPC Zone 7		NGVD29	Original Position to September 24, 2007					
Point	North (ft)	East (ft)	Elev(ft)	North	East	Height	Azimuth°	Distance	Moved
AB01	4019232.49	4172356.65	176.06	Fixed	Fixed	Fixed			#
AB02	4016759.57	4174623.83	113.91	0.02	0.03	0.02	61	0.04	#
AB03	4017150.45	4174472.67	137.03	0.05	-0.02	-0.01	344	0.05	#
AB04	4018200.24	4173772.41	64.74	-1.43	-1.33	-0.27	223	1.95	Moved
AB05	4017886.74	4174295.53	78.10	-0.69	-0.99	-0.24	235	1.21	Moved
AB06	4018867.74	4173624.07	162.35	-1.14	-0.37	-0.37	198	1.20	Moved
AB07	4018791.94	4174006.14	156.84	-1.27	-0.69	-0.52	209	1.44	Moved
AB09	4018989.67	4174686.75	168.40	-0.75	-0.30	-0.27	202	0.80	Moved
AB12	4019229.10	4174918.19	280.63	-0.82	-0.37	-0.24	204	0.90	Moved
AB13	4019741.53	4174881.09	361.98	-0.65	-0.16	-0.49	194	0.67	Moved
AB15	4020124.45	4174743.22	394.33	-0.45	-0.11	-0.39	193	0.46	Moved
AB16	4020169.62	4174175.95	373.87	-0.18	0.00	-0.19	179	0.18	Moved
AB17	4021229.31	4173368.07	440.23	0.00	-0.04	-0.26	275	0.05	#
AB18	4021415.39	4174827.18	454.37	-0.25	0.04	-0.26	171	0.26	Moved
AB20	4019178.13	4176333.02	393.66	-0.64	-0.26	-0.21	202	0.70	Moved
AB24	4019641.55	4174405.36	333.18	-0.52	-0.17	-0.18	199	0.54	Moved
AB50	4017898.15	4174898.87	179.47	-0.29	-0.66	0.05	246	0.72	Moved
AB51	4019426.96	4173952.80	302.69	-0.26	-0.05	-0.17	190	0.27	Moved
AB52	4019830.36	4175269.23	365.82	-0.31	-0.11	-0.23	200	0.33	Moved
AB53	4020248.91	4176355.74	350.33	-0.36	-0.08	-0.24	192	0.37	Moved
BB25	4017019.33	4176586.90	1.56	-0.31	-0.02	0.31	183	0.31	Moved
CR07	4021451.38	4177842.62	629.92	-0.45	0.06	-0.80	172	0.46	Moved
CR50	4022835.97	4177672.12	870.10	0.01	-0.03	-0.38	285	0.03	#
CR51	4022888.77	4178996.37	973.69	0.05	0.02	-0.50	20	0.05	#
CR52	4022687.30	4176874.60	777.07	-0.01	-0.05	-0.38	256	0.05	#
KC01	4018303.73	4179107.68	309.85	0.79	0.42	-0.47	28	0.89	*
KC02	4016829.08	4178773.58	11.17	-0.20	-0.12	-0.11	210	0.23	Moved
KC04	4017387.58	4179319.90	235.95	-0.16	-0.16	-0.33	225	0.23	Moved
KC05	4016911.85	4179833.31	224.97	-0.06	-0.16	-0.33	249	0.17	Moved
KC06	4017615.45	4180048.41	297.41	-0.05	-0.28	-0.38	260	0.28	Moved
KC07	4017590.84	4180335.93	310.94	0.10	-0.08	-0.33	321	0.13	*
KC11	4016625.96	4179681.33	174.18	-0.10	-0.05	-2.04	207	0.12	Moved
PB04	4017482.70	4175501.86	164.93	-8.71	-2.55	-3.03	196	9.07	Moved
PB06	4017759.57	4176410.52	175.68	-27.36	-2.96	-4.82	186	27.52	Moved
PB07	4017961.55	4176864.46	195.45	-34.37	-6.22	-2.20	190	34.92	Moved
PB08	4018025.58	4177114.77	191.53	-32.75	-5.73	0.41	190	33.25	Moved
PB09	4018074.25	4177499.72	187.28	-36.42	-1.81	-2.68	183	36.46	Moved
PB12	4018093.01	4178238.34	184.36	-62.07	-16.55	-6.37	195	64.24	Moved
PB13	4017876.81	4178802.38	204.64	-35.63	-13.06	-3.34	200	37.94	Moved
PB18	4020253.28	4177363.11	360.67	-15.09	8.78	-4.35	150	17.46	Moved
PB20	4018576.43	4177775.44	231.92	-59.34	-8.98	-9.06	189	60.02	Moved
PB21	4019072.97	4177825.18	270.72	-48.34	6.00	-6.74	173	48.71	Moved
PB25	4019496.85	4178632.29	323.54	-31.24	0.91	-2.89	178	31.25	Moved
PB26	4019365.84	4178898.46	280.39	-23.47	2.72	-2.39	173	23.63	Moved
PB27	4019083.18	4178489.21	270.95	-81.46	6.20	-10.91	176	81.69	Moved
PB29	4018676.01	4178745.57	170.72	-39.21	-23.35	-12.65	211	45.64	Moved
PB51	4018183.45	4176167.76	233.49	-2.60	-0.45	-0.59	190	2.64	Moved
PB53	4019045.92	4177401.97	289.28	-28.55	0.74	-5.91	179	28.56	Moved
PB54	4019512.01	4177094.46	355.17	-3.55	-0.08	-0.89	181	3.55	Moved
PB55	4018604.37	4177450.71	238.51	-29.81	-2.10	-5.26	184	29.88	Moved
PB59	4017576.13	4175312.81	158.04	-5.07	-1.24	-2.79	194	5.22	Moved
UB02	4017354.20	4176793.62	60.63	-46.66	6.93	-3.96	172	47.17	Moved

FULL DATA - THROUGH 2007 - NAD27

Date: 03/30/2008

PORTUGUESE POINT LANDSLIDE MONITORING

NAD27 COORDINATES & NGVD29 ELEVATIONS of HISTORICAL and 2007 MONITORING POINTS
(See FULL DATA REPORT NAD83 COORDINATES for POST 2007)

\# Indicates stable points

* Indicates movement unknown to be confirmed in 2008

	Periodic (12.5 months) Movements (US Feet) September 10, 2006 to September 24, 2007					
Point	North	East	Height	Azimuth°	Distance	Moved
AB01	Fixed	Fixed	Fixed			#
AB02	0.00	-0.01	-0.08	261	0.01	#
AB03	-0.03	0.00	0.00	190	0.03	#
AB04	-0.03	-0.03	0.08	223	0.04	Moved
AB05	-0.06	-0.05	-0.01	219	0.08	Moved
AB06	-0.06	-0.02	0.13	200	0.06	Moved
AB07	-0.01	0.00	0.02	180	0.01	*
AB09	-0.02	-0.03	0.04	243	0.03	Moved
AB12	0.01	0.05	0.06	76	0.05	*
AB13	-0.08	0.00	0.04	182	0.08	Moved
AB15	0.05	-0.06	-0.01	314	0.08	*
AB16	-0.01	0.00	-0.11	153	0.01	*
AB17	0.02	-0.02	0.00	328	0.03	#
AB18	-0.02	-0.05	0.11	245	0.06	Moved
AB20	0.03	-0.01	-0.06	333	0.03	*
AB24	-0.02	-0.06	0.07	246	0.06	Moved
AB50	-0.03	-0.08	0.18	248	0.09	Moved
AB51	0.03	-0.04	-0.01	306	0.05	*
AB52	-0.04	-0.02	0.00	211	0.05	Moved
AB53	-0.09	0.00	0.03	179	0.09	Moved
BB25	-0.17	-0.03	0.19	189	0.18	Moved
CR07	-0.14	-0.03	0.12	191	0.14	Moved
CR50	0.06	0.10	-0.10	60	0.12	*
CR51	-0.08	0.01	0.23	175	0.08	*
CR52	0.01	0.00	0.01	21	0.01	#
KC01	-0.04	0.01	-0.01	161	0.05	*
KC02	-0.12	-0.05	0.26	201	0.13	Moved
KC04	-0.06	-0.06	0.12	224	0.09	Moved
KC05	-0.07	-0.07	0.00	225	0.10	Moved
KC06	-0.03	-0.07	0.12	249	0.07	Moved
KC07	-0.02	-0.04	0.05	248	0.05	*
KC11	-0.08	-0.10	0.30	231	0.13	Moved
PB04	-0.44	-0.12	-0.09	196	0.45	Moved
PB06	-1.49	-0.21	-0.25	188	1.50	Moved
PB07	-1.77	-0.31	-0.10	190	1.79	Moved
PB08	-1.57	-0.26	0.06	189	1.59	Moved
PB09	-1.80	-0.10	-0.09	183	1.80	Moved
PB12	-2.79	-0.80	-0.56	196	2.90	Moved
PB13	-1.64	-0.65	-0.10	202	1.76	Moved
PB18	-0.50	0.09	0.03	170	0.51	Moved
PB20	-2.55	-0.19	-0.61	184	2.56	Moved
PB21	-2.24	0.20	-0.22	175	2.25	Moved
PB25	-0.54	-0.05	-0.14	185	0.54	Moved
PB26	-0.48	0.03	0.08	177	0.48	Moved
PB27	-3.33	0.18	-0.36	177	3.33	Moved
PB29	-1.78	-0.95	-0.60	208	2.02	Moved
PB51	-0.14	-0.04	0.01	194	0.14	Moved
PB53	-1.89	0.06	-0.37	178	1.89	Moved
PB54	-0.10	-0.05	-0.06	208	0.11	Moved
PB55	-2.16	-0.16	-0.09	184	2.16	Moved
PB59	-0.67	-0.20	-0.18	197	0.70	Moved
UB02	-3.57	0.49	-0.18	172	3.60	Moved

FULL DATA POSTING 2007 - NAD83

Date: 03/30/08

PORTUGUESE POINT LANDSLIDE MONITORING

NAD83(2007) COORDINATES and NAVD88 ELEVATIONS of BEGINNING, 2007 & POST 2007 MONITORING POINT POSITIONS

\# Indicates stable points

* Indicates movement unknown to be confirmed in 2008

	Original Positions				Sept. 24, 2007 Positions			Overall Movements (US Feet)					
		NAD83 SPC Zone 5 (Ft)		NAVD88	NAD83 SPC Zone 5 (Ft)		NAVD88	Original Position to September 24, 2007					
Point	Date	North (ft)	East (ft)	Elev(ft)	North (ft)	East (ft)	Elev(ft)	North	East	Height	Azimuth°	Distance	MOVED
AB01	12/1/1994	1729427.58	6445709.61	178.62	1729427.55	6445709.64	178.62	-0.03	0.03	0.00	-	0	#
AB02	11/30/1994	1726946.97	6447968.65	116.45	1726946.98	6447968.69	116.48	0.01	0.04	0.03	72	0.04	#
AB03	12/1/1994	1727338.34	6447818.82	139.60	1727338.39	6447818.81	139.59	0.04	-0.01	-0.01	351	0.04	#
AB04	11/30/1994	1728391.99	6447123.34	67.57	1728390.55	6447122.03	67.31	-1.44	-1.32	-0.26	222	1.95	MOVED
AB05	3/14/1995	1728076.00	6447645.10	80.90	1728075.30	6447644.13	80.67	-0.70	-0.98	-0.23	234	1.20	MOVED
AB06	4/27/1995	1729059.73	6446976.26	165.28	1729058.58	6446975.91	164.91	-1.15	-0.35	-0.37	197	1.21	MOVED
AB07	11/30/1994	1728982.79	6447358.41	159.92	1728981.51	6447357.74	159.40	-1.28	-0.67	-0.52	208	1.44	MOVED
AB12	11/30/1994	1729416.49	6448271.64	283.43	1729415.67	6448271.30	283.19	-0.82	-0.35	-0.24	203	0.89	MOVED
AB13	11/30/1994	1729928.90	6448236.04	365.03	1729928.25	6448235.90	364.54	-0.65	-0.13	-0.49	192	0.66	MOVED
AB15	11/30/1994	1730312.09	6448099.38	397.28	1730311.64	6448099.31	396.90	-0.45	-0.07	-0.38	189	0.45	MOVED
AB16	11/30/1994	1730358.89	6447532.12	376.62	1730358.70	6447532.17	376.44	-0.19	0.04	-0.18	168	0.19	MOVED
AB17	11/30/1994	1731421.14	6446727.77	443.05	1731421.12	6446727.77	442.80	-0.02	0.00	-0.25	167	0.02	#
AB18	12/1/1994	1731602.62	6448187.49	457.19	1731602.37	6448187.58	456.93	-0.26	0.09	-0.26	162	0.27	MOVED
AB20	3/16/1995	1729360.63	6449686.27	396.43	1729360.00	6449686.03	396.23	-0.62	-0.23	-0.20	201	0.67	MOVED
AB24	3/12/1997	1729830.35	6447759.96	335.92	1729829.83	6447759.82	335.74	-0.52	-0.14	-0.18	196	0.54	MOVED
AB50	1/16/1998	1728085.00	6448248.18	181.98	1728084.71	6448247.54	182.03	-0.29	-0.65	0.05	246	0.71	MOVED
AB51	3/22/2002	1729617.01	6447306.54	305.42	1729616.73	6447306.52	305.25	-0.28	-0.02	-0.17	184	0.28	MOVED
AB52	3/22/2002	1730016.10	6448624.44	368.61	1730015.79	6448624.36	368.39	-0.31	-0.08	-0.22	195	0.32	MOVED
AB53	3/22/2002	1730431.11	6449712.37	353.13	1730430.77	6449712.33	352.90	-0.34	-0.04	-0.23	187	0.34	MOVED
AB54	9/24/2007				1731111.94	6447047.87	407.31						
AB55	9/24/2007				1731174.77	6447753.57	405.38						
AB56	9/24/2007				1732214.31	6448545.46	571.65						
AB57	9/24/2007				1731926.91	6449759.36	564.93						
AB58	9/24/2007				1731118.02	6449074.93	405.67						
AB59	9/24/2007				1730850.87	6450212.56	434.37						
AB60	9/24/2007				1729089.70	6447987.57	179.45						
AB61	9/24/2007				1727424.50	6447990.26	140.47						
BB25	11/4/1998	1727200.54	6449932.73	3.81	1727200.25	6449932.73	4.12	-0.29	-0.01	0.31	182	0.29	MOVED
BB52	9/24/2007				1726996.36	6451384.38	3.83						
BB53	9/24/2007				1726831.16	6451840.89	13.81						
CR07	11/30/1994	1731628.78	6451203.19	633.28	1731628.37	6451203.29	632.48	-0.41	0.10	-0.80	166	0.42	MOVED
CR50	1/16/1998	1733013.55	6451037.38	873.04	1733013.62	6451037.38	872.66	0.07	0.00	-0.38	358	0.07	*
CR51	1/16/1998	1733061.90	6452361.82	976.75	1733062.03	6452361.86	976.25	0.13	0.04	-0.50	17	0.14	*
CR52	1/16/1998	1732867.54	6450239.34	780.01	1732867.58	6450239.32	779.63	0.03	-0.02	-0.38	333	0.04	#
FT06	9/24/2007				1729855.61	6452760.21	489.06						
FT07	9/24/2007				1729253.24	6454104.75	589.01						
FT08	9/24/2007				1729388.68	6453350.51	658.44						
KC01	11/30/1994	1728475.52	6452457.46	312.88	1728476.36	6452457.91	312.42	0.84	0.45	-0.46	28	0.96	*
KC02	3/14/1995	1727002.89	6452118.99	13.84	1727002.74	6452118.89	13.74	-0.15	-0.11	-0.10	216	0.18	MOVED
KC04	3/14/1995	1727559.56	6452667.24	238.84	1727559.46	6452667.09	238.51	-0.10	-0.15	-0.33	236	0.18	MOVED
KC05	11/30/1994	1727082.00	6453179.09	227.86	1727082.01	6453178.94	227.53	0.01	-0.15	-0.33	273	0.15	MOVED
KC06	11/30/1994	1727784.91	6453396.67	300.35	1727784.94	6453396.40	299.97	0.03	-0.26	-0.38	276	0.26	MOVED
KC07	11/30/1994	1727759.19	6453683.92	313.83	1727759.37	6453683.85	313.51	0.18	-0.07	-0.32	340	0.19	MOVED
KC13	9/24/2007				1726581.16	6453069.63	191.20						
KC14	9/24/2007				1726742.44	6453806.05	259.94						
KC15	9/24/2007				1727590.45	6453121.10	287.10						
KC16	9/24/2007				1727602.25	6454098.23	326.90						
PB04	11/30/1994	1727675.94	6448851.74	170.52	1727667.25	6448849.17	167.49	-8.69	-2.57	-3.03	196	9.06	MOVED
PB06	3/15/1995	1727968.45	6449761.84	183.06	1727941.12	6449758.81	178.25	-27.33	-3.03	-4.81	186	27.50	MOVED
PB07	3/14/1995	1728175.93	6450219.76	200.21	1728141.60	6450213.44	198.02	-34.32	-6.32	-2.19	190	34.90	MOVED
PB08	12/1/1994	1728237.51	6450469.80	193.68	1728204.81	6450463.98	194.09	-32.70	-5.82	0.41	190	33.21	MOVED
PB09	11/30/1994	1728288.58	6450851.02	192.52	1728252.20	6450849.11	189.84	-36.38	-1.91	-2.68	183	36.43	MOVED
PB12	11/30/1994	1728330.49	6451604.57	193.29	1728268.52	6451587.83	186.93	-61.97	-16.74	-6.36	195	64.19	MOVED
PB13	3/14/1995	1728085.97	6452164.34	210.54	1728050.44	6452151.18	207.21	-35.53	-13.16	-3.33	200	37.89	MOVED
PB18	3/15/1995	1730446.88	6450711.00	367.58	1730431.80	6450719.76	363.24	-15.08	8.77	-4.34	150	17.44	MOVED
PB20	3/14/1995	1728812.77	6451135.67	243.54	1728753.50	6451126.52	234.48	-59.27	-9.16	-9.06	189	59.97	MOVED
PB21	3/14/1995	1729298.22	6451172.05	280.02	1729249.90	6451177.92	273.29	-48.32	5.87	-6.73	173	48.68	MOVED
PB25	12/1/1994	1729702.31	6451985.65	328.99	1729671.12	6451986.48	326.10	-31.19	0.83	-2.89	178	31.20	MOVED
PB26	3/14/1995	1729562.65	6452249.56	285.34	1729539.22	6452252.23	282.95	-23.42	2.67	-2.39	174	23.58	MOVED
PB27	3/14/1995	1729339.34	6451836.06	284.42	1729257.91	6451842.02	273.51	-81.43	5.96	-10.91	176	81.65	MOVED
PB29	3/15/1995	1728888.95	6452120.49	185.93	1728849.86	6452097.03	173.29	-39.08	-23.46	-12.64	211	45.58	MOVED
PB53	12/4/1997	1729252.77	6450753.92	297.75	1729224.25	6450754.60	291.85	-28.52	0.67	-5.90	179	28.53	MOVED
PB54	12/4/1997	1729694.90	6450448.69	358.62	1729691.38	6450448.62	357.73	-3.52	-0.07	-0.89	181	3.52	MOVED
PB55	1/21/1998	1728812.28	6450804.04	246.33	1728782.51	6450801.87	241.07	-29.77	-2.18	-5.26	184	29.85	MOVED
PB59	6/26/2001	1727766.36	6448661.67	163.39	1727761.30	6448660.42	160.61	-5.07	-1.24	-2.78	194	5.22	MOVED
PB62	9/24/2007				1728476.64	6449717.56	287.25						
PB63	9/24/2007				1727734.04	6451488.11	126.06						
UB02	7/23/1997	1727581.11	6450133.78	67.15	1727534.46	6450140.57	63.20	-46.66	6.78	-3.95	172	47.15	MOVED

FULL DATA POSTING 2007 - NAD83

	??, 2008 Positions			Overall Movements (US Feet)						Periodic (? months) Movements (US Feet)						
	NAD83 SPC Zone 5 (Ft)		NAVD88	Original Position to ??, 2008						September 24, 2007 Position to ??, 2008						
Point	North (ft)	East (ft)	Elev(ft)	North	East	Height	Azimuth°	Distance	MOVED	North	East	Height	Azimuth°	Distance	95% Error	MOVED
AB01																
AB02																
AB03																
AB04																
AB05																
AB06																
AB07																
AB12																
AB13																
AB15																
AB16																
AB17																
AB18																
AB20																
AB24																
AB50																
AB51																
AB52																
AB53																
AB54																
AB55																
AB56																
AB57																
AB58																
AB59																
AB60																
AB61																
BB25																
BB52																
BB53																
CR07																
CR50																
CR51																
CR52																
FT06																
FT07																
FT08																
KC01																
KC02																
KC04																
KC05																
KC06																
KC07																
KC13																
KC14																
KC15																
KC16																
PB04																
PB06																
PB07																
PB08																
PB09																
PB12																
PB13																
PB18																
PB20																
PB21																
PB25																
PB26																
PB27																
PB29																
PB53																
PB54																
PB55																
PB59																
PB62																
PB63																
UB02																

COORDINATE LIST-NAD83 2007 Survey

Date: 03/30/08

Portuguese Landslide Monitoring September 2007

Datum: Horizontal NAD83 (2007) Epoch; California State Plane Zone 5; Vertical: NAVD88

Note, Fixed PVE3 CORS for Position 3D, Fixed VTIS CORS for NAVD88 Height; See Survey Report

Point	Latitude	Longitude	EH (ft)	North (ft)	East (ft)	OrthoHt(ft)	Description
AB01	33-44-38.30249	118-22-53.05085	60.14	1729427.548	6445709.642	178.62	Stability Check Point/ Old BASE
AB02	33-44-13.84886	118-22-26.19243	-2.01	1726946.982	6447968.685	116.48	Stability Check Point
AB03	33-44-17.71508	118-22-27.98416	21.11	1727338.386	6447818.814	139.59	Stability Check Point
AB04	33-44-28.09727	118-22-36.28088	-51.15	1728390.551	6447122.028	67.31	Monitoring Point
AB05	33-44-24.99811	118-22-30.08505	-37.78	1728075.296	6447644.125	80.67	Monitoring Point
AB06	33-44-34.69996	118-22-38.04072	46.48	1729058.580	6446975.906	164.91	Monitoring Point
AB07	33-44-33.95173	118-22-33.51606	40.99	1728981.510	6447357.744	159.40	Monitoring Point
AB09	33-44-35.91060	118-22-25.45752	52.59	1729176.996	6448039.047	170.96	Monitoring Point/ Deleted after 2007
AB12	33-44-38.28007	118-22-22.71797	164.85	1729415.669	6448271.297	283.19	Monitoring Point
AB13	33-44-43.34918	118-22-23.15958	246.22	1729928.248	6448235.904	364.54	Monitoring Point
AB15	33-44-47.13663	118-22-24.79385	278.59	1730311.638	6448099.313	396.90	Monitoring Point
AB16	33-44-47.58124	118-22-31.51169	258.10	1730358.697	6447532.165	376.44	Monitoring Point
AB17	33-44-58.06084	118-22-41.08404	324.46	1731421.120	6446727.773	442.80	Stability Check Point
AB18	33-44-59.90770	118-22-23.80543	338.68	1731602.367	6448187.579	456.93	Monitoring Point
AB20	33-44-37.78101	118-22-05.96378	277.95	1729360.001	6449686.033	396.23	Monitoring Point
AB21	33-44-37.73183	118-22-06.09391	276.67	1729355.070	6449675.025	394.94	Deleted in 2007, Not for Monitoring
AB24	33-44-42.35815	118-22-28.79267	217.39	1729829.834	6447759.815	335.74	Monitoring Point
AB50	33-44-25.11342	118-22-22.94085	63.61	1728084.708	6448247.535	182.03	Monitoring Point
AB51	33-44-40.23343	118-22-34.15070	186.87	1729616.734	6447306.522	305.25	Monitoring Point
AB52	33-44-44.22942	118-22-18.56369	250.09	1730015.794	6448624.358	368.39	Monitoring Point
AB53	33-44-48.37391	118-22-05.69890	234.68	1730430.766	6449712.326	352.90	Monitoring Point
AB54	33-44-55.01438	118-22-37.27986	288.98	1731111.944	6447047.866	407.31	Monitoring Point/ New 2007
AB55	33-44-55.66191	118-22-28.92603	287.08	1731174.766	6447753.566	405.38	Monitoring Point/ New 2007
AB56	33-45-05.97414	118-22-19.59434	453.44	1732214.311	6448545.457	571.65	Monitoring Point/ New 2007
AB57	33-45-03.17535	118-22-05.20679	446.77	1731926.905	6449759.364	564.93	Monitoring Point/ New 2007
AB58	33-44-55.14904	118-22-13.27649	287.44	1731118.021	6449074.930	405.67	Monitoring Point/ New 2007
AB59	33-44-52.54762	118-21-59.79367	316.20	1730850.867	6450212.555	434.37	Monitoring Point/ New 2007
AB60	33-44-35.04520	118-22-26.06323	61.07	1729089.702	6447987.568	179.45	Monitoring Point/ New 2007
AB61	33-44-18.57319	118-22-25.95806	22.00	1727424.496	6447990.256	140.47	Monitoring Point/ New BASE 2007
BB25	33-44-16.42579	118-22-02.94923	-114.25	1727200.247	6449932.725	4.12	Monitoring Point
BB52	33-44-14.46112	118-21-45.75284	-114.48	1726996.361	6451384.378	3.83	Monitoring Point/ New 2007
BB53	33-44-12.84324	118-21-40.34074	-104.48	1726831.162	6451840.888	13.81	Monitoring Point/ New 2007
CR07	33-45-00.27423	118-21-48.09515	514.39	1731628.371	6451203.293	632.48	Monitoring Point
CR50	33-45-13.97107	118-21-50.11930	754.60	1733013.615	6451037.375	872.66	Monitoring Point
CR51	33-45-14.49718	118-21-34.43636	858.26	1733062.034	6452361.861	976.25	Monitoring Point
CR52	33-45-12.49780	118-21-59.56377	661.53	1732867.578	6450239.324	779.63	Monitoring Point
FT06	33-44-42.79344	118-21-29.58364	370.98	1729855.609	6452760.210	489.06	Monitoring Point/ New 2007
FT07	33-44-36.88198	118-21-13.63766	470.97	1729253.244	6454104.754	589.01	Monitoring Point/ New 2007
FT08	33-44-38.19538	118-21-22.57430	540.36	1729388.682	6453350.505	658.44	Monitoring Point/ New 2007
KC01	33-44-29.13935	118-21-33.10482	194.24	1728476.363	6452457.913	312.42	Monitoring Point
KC02	33-44-14.55038	118-21-37.05654	-104.53	1727002.743	6452118.886	13.74	Monitoring Point
KC04	33-44-20.07680	118-21-30.58930	120.30	1727559.462	6452667.092	238.51	Monitoring Point
KC05	33-44-15.37186	118-21-24.50879	109.33	1727082.007	6453178.944	227.53	Monitoring Point
KC06	33-44-22.33283	118-21-21.96354	181.81	1727784.937	6453396.404	299.97	Monitoring Point
KC07	33-44-22.09001	118-21-18.55901	195.36	1727759.373	6453683.851	313.51	Monitoring Point
KC11	33-44-12.54329	118-21-26.30762	58.53	1726796.603	6453026.002	176.75	Monitoring Point/ Deleted after 2007
KC13	33-44-10.41364	118-21-25.78199	72.96	1726581.157	6453069.631	191.20	Monitoring Point/ New 2007
KC14	33-44-12.03484	118-21-17.06962	141.75	1726742.440	6453806.052	259.94	Monitoring Point/ New 2007
KC15	33-44-20.39934	118-21-25.21509	168.92	1727590.452	6453121.096	287.10	Monitoring Point/ New 2007
KC16	33-44-20.55017	118-21-13.64605	208.78	1727602.246	6454098.234	326.90	Monitoring Point/ New 2007
PB04	33-44-21.00593	118-22-15.79904	49.08	1727667.246	6448849.167	167.49	Monitoring Point
PB06	33-44-23.74812	118-22-05.04057	59.90	1727941.116	6449758.805	178.25	Monitoring Point
PB07	33-44-25.74778	118-21-59.66623	79.71	1728141.604	6450213.437	198.02	Monitoring Point
PB08	33-44-26.38200	118-21-56.70246	75.80	1728204.807	6450463.976	194.09	Monitoring Point
PB09	33-44-26.86466	118-21-52.14433	71.57	1728252.202	6450849.110	189.84	Monitoring Point
PB12	33-44-27.05245	118-21-43.39819	68.69	1728268.516	6451587.833	186.93	Monitoring Point
PB13	33-44-24.91528	118-21-36.71862	89.00	1728050.440	6452151.181	207.21	Monitoring Point
PB18	33-44-48.42050	118-21-53.76957	245.07	1730431.801	6450719.762	363.24	Monitoring Point
PB20	33-44-31.83339	118-21-48.88119	116.26	1728753.497	6451126.515	234.48	Monitoring Point
PB201	33-44-31.88481	118-21-48.86932	116.53	1728758.692	6451127.536	234.75	Found 2" IP 5.3' N'ly of PB20
PB21	33-44-36.74557	118-21-48.29381	155.09	1729249.895	6451177.917	273.29	Monitoring Point
PB25	33-44-40.94115	118-21-38.73760	207.97	1729671.124	6451986.481	326.10	Monitoring Point
PB26	33-44-39.64582	118-21-35.58530	164.82	1729539.223	6452252.228	282.95	Monitoring Point
PB27	33-44-36.84852	118-21-40.43064	155.35	1729257.909	6451842.016	273.51	Monitoring Point
PB29	33-44-32.82121	118-21-37.39371	55.12	1728849.863	6452097.031	173.29	Monitoring Point
PB51	33-44-27.94054	118-22-07.91689	117.72	1728365.822	6449517.439	236.06	Monitoring Point/ Deleted after 2007
PB53	33-44-36.47668	118-21-53.30517	173.63	1729224.246	6450754.597	291.85	Monitoring Point
PB54	33-44-41.08653	118-21-56.94833	239.52	1729691.378	6450448.621	357.73	Monitoring Point
PB55	33-44-32.10879	118-21-52.72650	122.83	1728782.514	6450801.866	241.07	Monitoring Point
PB59	33-44-21.92940	118-22-18.03792	42.19	1727761.298	6448660.423	160.61	Monitoring Point
PB62	33-44-29.04396	118-22-05.55217	168.93	1728476.636	6449717.559	287.25	Monitoring Point
PB63	33-44-21.76186	118-21-44.55620	7.79	1727734.036	6451488.105	126.06	Monitoring Point
UB02	33-44-19.73928	118-22-00.50279	-55.15	1727534.456	6450140.568	63.20	Monitoring Point

NGS Record Positions of CORS (NAVD88 Heights determined by this survey except VTIS published by NGS)

PVE3	33-44-35.85329	118-24-15.26904	235.42	1729207.091	6438765.185	354.36	CORS
PVHS	33-46-46.02015	118-22-19.74126	853.99	1742328.078	6448570.496	972.04	CORS
PVRS	33-46-25.89190	118-19-14.06722	198.63	1740239.290	6464237.888	316.30	CORS
VTIS	33-42-45.48958	118-17-37.71229	197.52	1717933.677	6472307.223	315.26	CORS

COORDINATE LIST-NAD83 All Historical Pts

Date: 03/30/08

PORTUGUESE POINT LANDSLIDE MONITORING

COORDINATE LIST of the INITIAL POSITIONS of ALL HISTORICAL MONITORING POINTS in NAD83(2007)

Datum: Horizontal NAD83, 2007.00 Epoch; California State Plane Zone 5; Based on a 2D conformal transformation from NAD27 at points AB01,AB02,AB03,AB17,CR50,CR52 and KC11. Heights are translated from NGVD29 to NAVD88 at AB01

Point	Beginning Date	North (ft)	East (ft)	OrthoHt(ft)	Point	Beginning Date	North (ft)	East (ft)	OrthoHt(ft)
AB01	12/1/1994	1729427.58	6445709.61	178.62	FT04	3/14/1995	1729352.78	6454262.72	646.51
AB02	11/30/1994	1726946.97	6447968.65	116.45	FT05	11/30/1994	1729868.42	6452616.50	473.38
AB03	12/1/1994	1727338.34	6447818.82	139.60	FIG2	7/22/1997	1730170.59	6450513.14	374.93
AB04	11/30/1994	1728391.99	6447123.34	67.57	KC01	11/30/1994	1728475.52	6452457.46	312.88
AB05	3/14/1995	1728076.00	6447645.10	80.90	KC02	3/14/1995	1727002.89	6452118.99	13.84
AB06	4/27/1995	1729059.73	6446976.26	165.28	KC03	12/1/1994	1727582.62	6452181.63	138.15
AB07	11/30/1994	1728982.79	6447358.41	159.92	KC04	3/14/1995	1727559.56	6452667.24	238.84
AB08	10/28/1995	1728714.17	6447750.27	157.44	KC05	11/30/1994	1727082.00	6453179.09	227.86
AB09	11/30/1994	1729177.74	6448039.33	171.23	KC06	11/30/1994	1727784.91	6453396.67	300.35
AB10	3/15/1995	1729595.00	6447300.32	303.98	KC07	11/30/1994	1727759.19	6453683.92	313.83
AB11	3/15/1995	1729797.40	6447729.07	333.05	KC10	12/4/2005	1727775.79	6453569.10	311.68
AB12	11/30/1994	1729416.49	6448271.64	283.43	KC11	12/4/2005	1726796.64	6453026.04	178.78
AB13	11/30/1994	1729928.90	6448236.04	365.03	KC12	12/4/2005	1726866.18	6452986.46	171.19
AB14	11/30/1994	1730015.93	6448624.58	368.83	PB04	11/30/1994	1727675.94	6448851.74	170.52
AB15	11/30/1994	1730312.09	6448099.38	397.28	PB05	3/16/1995	1727498.39	6449836.88	66.42
AB16	11/30/1994	1730358.89	6447532.12	376.62	PB06	3/15/1995	1727968.45	6449761.84	183.06
AB17	11/30/1994	1731421.14	6446727.77	443.05	PB07	3/14/1995	1728175.93	6450219.76	200.21
AB18	12/1/1994	1731602.62	6448187.49	457.19	PB08	12/1/1994	1728237.51	6450469.80	193.68
AB19	11/30/1994	1730441.28	6449711.10	353.42	PB09	11/30/1994	1728288.58	6450851.02	192.52
AB20	3/16/1995	1729360.63	6449686.27	396.43	PB10	11/30/1994	1728262.72	6451142.22	185.51
AB21	13/16/1995	1729355.69	6449675.25	395.13	PB11	11/30/1994	1728143.66	6451215.09	185.96
AB22	212/1/1994	1728057.76	6448294.43	182.06	PB12	11/30/1994	1728330.49	6451604.57	193.29
AB23	9/17/1997	1730230.73	6448048.83	393.28	PB13	3/14/1995	1728085.97	6452164.34	210.54
AB24	3/12/1997	1729830.35	6447759.96	335.92	PB14	11/30/1994	1728433.44	6449713.99	291.51
AB28	10/19/1995	1728769.80	6447662.41	157.35	PB15	11/30/1994	1728993.40	6449817.21	292.43
AB50	1/16/1998	1728085.00	6448248.18	181.98	PB16	11/30/1994	1729229.77	6450615.90	307.01
AB51	3/22/2002	1729617.01	6447306.54	305.42	PB18	3/15/1995	1730446.88	6450711.00	367.58
AB52	3/22/2002	1730016.10	6448624.44	368.61	PB19	3/15/1995	1730469.17	6450996.77	351.56
AB53	3/22/2002	1730431.11	6449712.37	353.13	PB20	3/14/1995	1728812.77	6451135.67	243.54
B06	11/25/1996	1727191.89	6450862.88	4.87	PB21	3/14/1995	1729298.22	6451172.05	280.02
BB00	7/23/1997	1726794.32	6451814.25	1.96	PB22	3/14/1995	1729275.05	6451410.21	278.22
BB01	7/23/1997	1726898.96	6451649.03	3.11	PB23	3/14/1995	1729780.81	6451465.65	313.07
BB02	7/22/1997	1727005.23	6451392.98	0.63	PB24	3/14/1995	1729945.29	6451841.97	307.06
BB03	7/22/1997	1727089.38	6451212.84	1.72	PB25	12/1/1994	1729702.31	6451985.65	328.99
BB04	7/22/1997	1727199.46	6451047.44	0.55	PB26	3/14/1995	1729562.65	6452249.56	285.34
BB05	7/22/1997	1727211.83	6450855.10	2.42	PB27	3/14/1995	1729339.34	6451836.06	284.42
BB06	7/22/1997	1727245.20	6450653.56	1.85	PB29	3/15/1995	1728888.95	6452120.49	185.93
BB07	7/22/1997	1727275.44	6450435.68	2.34	PB34	10/19/1995	1728446.52	6449720.13	288.10
BB08	7/22/1997	1727251.79	6450239.05	0.72	PB38	12/4/1997	1729846.23	6451469.93	310.99
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BB10	7/23/1997	1727052.39	6449676.19	2.32	PB40	3/15/1995	1727653.60	6451009.62	109.96
BB20	11/5/1998	1726890.96	6451591.35	0.53	PB41	3/15/1995	1729055.59	6452179.61	196.79
BB21	1/28/1998	1726995.83	6451383.35	4.44	PB42	3/15/1995	1728696.88	6451790.90	175.56
BB22	12/13/1997	1727090.32	6451142.64	4.10	PB43	9/28/1996	1727627.32	6451980.88	88.13
BB23	12/13/1997	1727241.64	6450197.10	3.94	PB44	9/28/1996	1727527.60	6451739.26	63.37
BB25	11/4/1998	1727200.54	6449932.73	3.81	PB45	1/21/1997	1727329.38	6451761.01	46.71
BB50	11/5/1998	1727233.94	6450408.76	-0.53	PB46	1/21/1997	1727558.90	6451762.73	67.09
BB51	1/29/1999	1726814.40	6451751.66	-0.39	PB51	12/4/1997	1728368.40	6449517.87	236.64
CR01	11/30/1994	1733539.52	6451913.86	1041.15	PB52	12/4/1997	1728818.45	6450806.25	247.46
CR03	11/30/1994	1733072.69	6452392.70	981.46	PB53	12/4/1997	1729252.77	6450753.92	297.75
CR04	11/30/1994	1732398.10	6451433.71	954.88	PB54	12/4/1997	1729694.90	6450448.69	358.62
CR05	11/30/1994	1733283.29	6451513.69	921.11	PB55	1/21/1998	1728812.28	6450804.04	246.33
CR06	11/30/1994	1732700.20	6450107.12	777.12	PB56	6/26/2001	1727863.19	6448618.64	161.39
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CR08	11/30/1994	1731560.90	6452004.02	740.91	PB58	8/29/2001	1727805.71	6448591.96	157.57
CR12	10/19/1995	1732643.03	6453036.33	920.57	PB59	6/26/2001	1727766.36	6448661.67	163.39
CR14	10/19/1995	1732394.89	6451404.62	952.86	PB60	1/3/2002	1727532.49	6451952.56	84.02
CR50	1/16/1998	1733013.55	6451037.38	873.04	UB01	7/23/1997	1727492.14	6449837.89	66.02
CR51	1/16/1998	1733061.90	6452361.82	976.75	UB02	7/23/1997	1727581.11	6450133.78	67.15
CR52	1/16/1998	1732867.54	6450239.34	780.01	UB03	7/23/1997	1727481.43	6450567.95	86.94
FT01	11/30/1994	1729239.59	6453193.02	635.95	UB04	7/23/1997	1727615.24	6451004.68	97.20
FT02	3/14/1995	1728554.04	6453984.44	569.13	UB05	5/16/2002	1727475.93	6450890.20	81.96

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Points AB01 – AB16


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AB01-SE.JPG


AB01-X1.JPG


AB01-X2.JPG


AB02-S.jpg


AB02-SE.JPG


AB02-X.JPG


AB02-X2.JPG


AB03-SW.jpg


AB03-WSW.JPG


AB03-X.JPG


AB04-E.JPG


AB04-X.JPG


AB04-X2.JPG


AB05-NW.JPG


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AB05-X2.JPG


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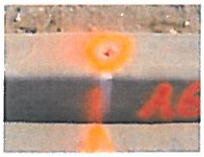
AB06-SE.jpg


AB06-X.JPG


AB07-NW.JPG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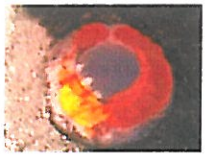
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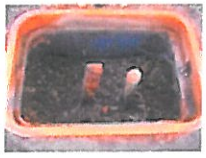
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AB16-NNE.JPG

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Points AB16 – AB56


AB16-NW.JPG


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AB16-WNW.JPG


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AB17-S.JPG


AB17-X.JPG


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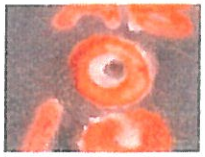
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AB24-E.JPG


AB24-ENE.JPG


AB24-X.JPG


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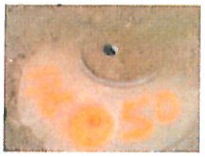
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AB54-NE.JPG


AB54-X.JPG


AB55-NE.JPG

AB55-X.JPG


AB56-E.JPG


AB56-SE.JPG

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September 2007 Photos of Monitoring Points

Points AB56 – BB53


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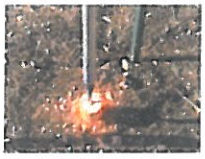
AB57-W.JPG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AB61.JPG


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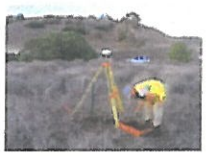
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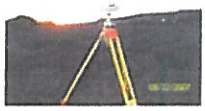
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BB25-NE.jpg


BB25-NE_2.jpg


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BB25-SW.jpg


BB25-X.JPG


BB25-X1.jpg


BB25-X2.jpg


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Rancho Palos Verdes - Portuguese Landslide
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Points BB53 – KC06


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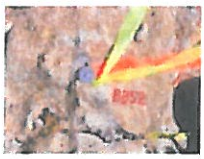
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CR51-X.JPG


CR52-W.JPG


CR52-X.JPG


FT06-SW.JPG


FT06-W.JPG


FT07-closeup.jpg


FT07-closeup_3.jpg


FT07-E to.JPG


FT07-E.jpg


FT07-NW.jpg


FT07-S.jpg


FT08-S.JPG


FT08-W.JPG


FT08-X.JPG


KC01-N.JPG


KC01-X.JPG


KC02-SW.JPG


KC02-SW2.JPG

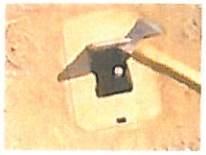

KC02-X.JPG


KC04-NE.JPG


KC04-X1.JPG


KC04-X2.JPG


KC05-SE.JPG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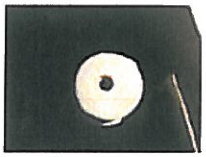
KC05-X2.JPG


KC06-E.JPG

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Points KC06 – PB09


KC06-SE.JPG

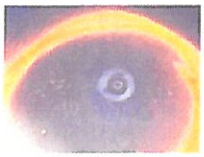

KC06-X.JPG


KC07-N.JPG


KC07-X.JPG


KC07-X1.JPG


KC11-NW.JPG


KC11-X.JPG


KC12-NW.JPG


KC12-X.JPG


KC13.JPG


KC13-N.jpg


KC13-NW.jpg


KC13-SE.jpg


KC13-X.jpg


KC14-NW.JPG


KC14-X.JPG


KC15-NE.jpg


KC15-W.JPG


KC15-W2.jpg


KC15-X.jpg


KC16-S.JPG


KC16-X2.JPG


PB04-E.JPG


PB04-X.JPG


PB06-SW.JPG


PB06-X.JPG


PB07-E.JPG


PB07-N.JPG


PB07-X.JPG


PB08-E.JPG


PB08-X.JPG


PB09-E.JPG


PB09-NE.JPG


PB09-W.JPG


PB09-X.JPG

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Points PB12 – PB54


PB12-E.JPG


PB12-X.JPG


PB13-S.JPG


PB13-X.JPG


PB18-NW.JPG

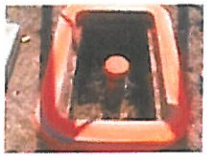

PB18-X.JPG


PB19-E.JPG


PB19-SE.JPG


PB19-X.JPG


PB20-SW.JPG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PB20-X2.JPG


PB21-NW.JPG


PB21-X.JPG


PB22-N.JPG


PB22-X.JPG


PB24-S.JPG


PB24-X.JPG

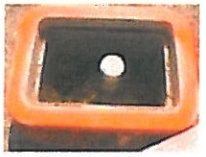

PB25-E.JPG


PB25-X.JPG


PB26-W.JPG


PB26-X.JPG


PB27-W.JPG


PB27-X.JPG


PB29-NE.JPG


PB29-X.JPG


PB51-SE.JPG


PB51-X.JPG


PB51-XA.JPG


PB53-S.JPG


PB53-X.JPG


PB53-XA.JPG


PB54-S.JPG


PB54-X.JPG


PB54-XA.JPG

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Points PB55 – UB02


PB55-NW.JPG


PB55-X.JPG


PB56-NW.JPG


PB56-X.JPG


PB59-S.JPG


PB59-SW.JPG


PB59-X.JPG

PB59-XA.jpg


PB63-NW.jpg


PB63-NW2.jpg


PB63-SE.jpg


PB63-W access.JPG

PB63-X.jpg


PVE3-CORS-S1.JPG


PVE3-CORS-S2.JPG


PVE3-CORS-X.JPG


UB02-E.JPG


UB02-X.JPG

UB02-XA.jpg