University of California Riverside
Glen Mor 2 Student Apartments Project
Final Environmental Impact Report
Volume 4 of 4 Draft Environmental Impact Report
Appendices L-S

SCH#2010081020

Prepared for:

UCR
Office of Design & Construction

Prepared by:

ICF INTERNATIONAL

UC RIVERSIDE
UNIVERSITY OF CALIFORNIA

Appendices

Appendix L

Geotechnical Investigation

GEOTECHNICAL INVESTIGATION
PROPOSED GLEN MOR 2 STUDENT APARTMENTS
UNIVERSITY OF CALIFORNIA, RIVERSIDE
PROJECT NO. 956334
PREPARED FOR
UNIVERSITY OF CALIFORNIA, RIVERSIDE
FACILITIES DESIGN AND CONSTRUCTION
JOB NO. 10325-3

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June 25, 2010

University of California, Riverside
Design & Construction
3615A Canyon Crest Drive
Riverside, California 92507
Attention: Mr. Tim Brown

Job No. 10325-3

Dear Mr. Brown:

Attached herewith is the Geotechnical Investigation report prepared for the proposed Glen Mor 2 Student Apartments, to be located on the northwest corner of Valencia Hill Drive and Big Springs Road, northeast corner of the University of California campus, in the City of Riverside, California.

This report was based upon a scope of services generally outlined in our proposal letter, dated April 27, 2010, and other written and verbal communications.

We appreciate this opportunity to provide geotechnical services for this project. If you have questions or comments concerning this report, please contact this firm at your convenience.

Respectfully submitted,
C.H.J., INCORPORATED

Fred Yi, Ph.D., P.E.
Project Engineer

FY:ndt

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INTRODUCTION

During June 2010, a geotechnical investigation was performed by this firm for the proposed Glen Mor 2 Student Apartments, to be located on the northwest corner of Valencia Hill Drive and Big Springs Road, the northeast corner of the university campus, in the City of Riverside, California. The proposed Glen Mor 2 Student Apartments include nine multi-story apartment buildings, a parking structure, two bridges, and appurtenant structures. The purpose of this investigation was to explore and evaluate the geotechnical conditions at the subject site and to provide appropriate geotechnical recommendations for design of the proposed development.

To orient our investigation at the site, a set of 50 percent Schematic Design Submittal plans, dated May 20, 2010, prepared by Sasaki Associates, Inc., were furnished for our use. New topographic mapping by TMAD Taylor & Gaines became available during our investigation and was utilized as the base map for our geologic mapping. The approximate location of the proposed Glen Mor 2 Student Apartments is shown on the attached Index Map (Enclosure "A-1").

The results of our investigation, together with our conclusions and recommendations, are presented in this report.

SCOPE OF SERVICES

The scope of services provided during this geotechnical investigation included the following:

- Review of published and unpublished literature and maps
- Review and analysis of stereoscopic aerial photographs flown between 1931 and 2006
- A geologic field reconnaissance of the site and surrounding area
- Logging and sampling of 27 exploratory borings for testing and evaluation
- Laboratory testing on selected samples including density, moisture content, optimum moisture - maximum density relationships, direct shear strength, hydroconsolidation, sand equivalent, R-value, and chemical/corrosivity analyses
- Evaluation of geologic and geotechnical data including:
  - geologic concerns and hazards, including faulting and seismicity
  - liquefaction potential
  - seismic settlement and seismic differential settlement
  - expansion potential
- Development of site-specific recommendations regarding:
  - site grading
  - shallow foundation design
  - deep foundation design
  - lateral earth pressures
  - preliminary shoring design
  - preliminary asphalt concrete (AC) and Portland cement concrete (PCC) pavement structural section designs
  - mitigation of potential geotechnical concerns and hazards such as liquefaction and seismic settlement

The scope of services had the following exceptions:

- Boring elevations were estimated using topographic mapping provided by the client. A topographic survey to determine boring location elevations was not included in our scope.
- A Phase 1 environmental assessment and Limited Subsurface Investigation for residual pesticides was performed and issued under separate cover by this firm as Job No. 10326-9.

PROJECT CONSIDERATIONS

Based on the 50 percent Schematic Design Submittal plans provided to us, we understand that the proposed Glen Mor 2 Student Apartments project involves construction of approximately 800 beds in apartment style units, along with support and community spaces totaling approximately 334,000 gross square feet (approximately 251,000 assignable square feet), with residential, community and food service space, office and support space, and a conference facility arranged in multiple buildings. The proposed project also involves an approximately 600-space parking structure, enhancements to the adjacent arroyo, two bridges between the proposed project and the existing Glen Mor 1 student housing complex, a swimming pool, and associated landscape and utility extensions. The project site is located north of Big Springs Road, west of Valencia Hill Drive, south of Glen Mor 1 and an arroyo, and east of Lothian Residence Hall.

The subject site includes a relatively flat southern portion and a northern portion consisting of a broad hillside. Four of the proposed apartment buildings and the proposed parking structure will be located in the southern portion of the site with other buildings and a pool located in the northern portion.

The grading plan included in the 50 percent Schematic Design Submittal indicates that development of this site will entail cuts and fills on the order of 10 feet or less. The final grading plan should be reviewed by the geotechnical engineer.

SITE DESCRIPTION

The proposed project area is bounded to the north by an arroyo, to the east by Valencia Hill Drive, to the south by Big Springs Road, and to the west by the existing Lothian Residence Hall. The project area extends westward to the area of Parking Lot 15 as a narrow 'panhandle' along the arroyo between Lothian Hall and Pentland Hills. Existing improvements within the project area include asphalt-paved parking and landscaping in the southern portion of the site and an abandoned residential structure in the northern hillside portion. The slopes in the northern portion of the site have been modified with terraces for prior citrus cultivation.

The site elevations range from approximately 1,145 feet in the hillside portion to approximately 1,070 feet near the southwest corner of Parking Lot 14 and the western panhandle portion. Typical slope gradients in the hillside portion vary from approximately 3 horizontal to 1 vertical [3(h):1(v)] to 5(h):1(v) with locally steep erosional slopes (up to approximately 4 feet high) adjacent to the active channel of the arroyo in the hillside and panhandle portions. Significant slopes are not located within the southern portion of the project area.

As part of this investigation, stereoscopic aerial photographs dating back to 1931 were reviewed for past land usage and evidence of geotechnical hazards. From 1931 to 1953, the site appears as relatively native topography cultivated with citrus groves with terraced hillsides. The hilltop residence and Valencia Hill Drive are present. In the 1962 photographs, the site is cleared of citrus groves and appears as open uncultivated land. In the 1974 photographs, Big Springs Road is present and the adjoining area to the north is landscaped. The site is visible in a similar condition until the time of the 1990 photographs in which Lothian Hall and the adjacent parking lot are visible. The Pentland Hills complex is visible after 2000, and Glen Mor 1 is visible after 2006.

Based on the 1931 aerial photographs, it appears that the northwestern margin of the former University arroyo traverses the southeast corner of the proposed parking structure. The approximate limit of the arroyo, based on the 1931 photographs, is shown on Enclosure "A-2".

No evidence of faulting or recent flooding was observed on the site in the aerial photographs.

FIELD INVESTIGATION

The soil conditions underlying the subject site were explored by means of 27 exploratory borings. Eleven borings were drilled to depths of approximately 60 feet, with the remaining borings drilled to depths of approximately 30 feet. The exploratory borings were drilled with a CME 75 track or truck rig equipped for soil sampling. The approximate locations of our exploratory borings are indicated on the attached Site Plan (Enclosure "A-2").

Continuous logs of the subsurface conditions, as encountered within the exploratory borings, were recorded at the time of drilling by a staff geologist from this firm. Both a standard penetration test (SPT) sampler (2-inch outer diameter and 1-3/8-inch inner diameter) and a modified California sampler (3-1/4-inch outer diameter and 2-3/8-inch inner diameter) were utilized in our investigation. Relatively undisturbed samples were obtained by driving the modified California sampler (a split-spoon ring sampler) ahead of the borings at selected levels. The penetration resistance was recorded on the boring logs as the number of hammer blows used to advance the sampler in 6-inch increments (or less if noted). Samplers are driven with an automatic hammer that drops a 140-pound weight 30 inches for each blow. After the required seating, samplers are advanced up to 18 inches, providing up to 3 sets of blowcounts at each sampling interval. The recorded blows are raw numbers without any corrections for hammer type (automatic vs. manual cat head) or sampler size (California sampler vs. SPT sampler). Relatively undisturbed, as well as bulk, samples of typical soil types obtained were returned to the laboratory in sealed containers for testing and evaluation.

Our exploratory boring logs, together with our in-place blowcounts per 6-inch increment, are presented in Appendix "B". The stratification lines presented on the boring logs represent approximate boundaries between soil types, which may include gradual transitions.

LABORATORY INVESTIGATION

Included in our laboratory testing program were field moisture content tests on all samples returned to the laboratory and field dry density tests on all relatively undisturbed samples. The results are included on the exploratory boring logs. Optimum moisture content - maximum dry density relationships were established for typical soil types in order that the relative compaction of the subsoils might be evaluated. Direct shear tests on selected relatively undisturbed samples of soils were performed in order to provide shear strength parameters for bearing capacity, lateral resistance, and earth pressure evaluations. Hydroconsolidation tests were performed on selected relatively undisturbed samples in order to evaluate hydroconsolidation settlement. Sieve analyses and fines content testing were performed on selected samples of soil for classification purposes and to provide parameters necessary for liquefaction and seismic settlement analyses.

Sand equivalent and R-value tests were performed on probable pavement subgrade soils to develop criteria for preliminary pavement design recommendations. Selected samples of materials were delivered to Schiff Associates for soil corrosivity analyses.

Summaries of the laboratory test results are presented in Appendix "C".

SITE GEOLOGY AND SUBSURFACE SOIL CONDITIONS

The site is located on the Perris Block, a portion of the Peninsular Ranges Geomorphic Province. The Perris Block is a fault-bounded region of relative tectonic stability composed of crystalline bedrock of the Southern California Batholith that is thinly and discontinuously mantled by sedimentary material.

Several geomorphic surfaces are well developed on the Perris Block that represent former, local, erosional/depositional base levels. The site lies in the northern portion of the Perris Block in an area of relatively low-lying Pleistocene-age and Holocene-age alluvium surrounded by elevated erosion surfaces. A Geologic Index Map is presented as Enclosure "A-3".

The project area is situated in an area of 'very old alluvial-fan deposits' dissected and bounded by the historic 'University arroyo' on the south and a smaller tributary arroyo on the north. As mapped by Morton and Cox (2001), the native geologic materials underlying the majority of the site consist of very old alluvial-fan deposits (Qvoa). Localized areas of young axial-channel deposits (Qya) mantle Qvoa along existing and historic arroyo bottoms within the site. Fill was encountered within Exploratory Boring Nos. 6, 17, 23, 24, 25, and 27 to typical depths ranging from 2 to 7 below the ground surface (bgs). The fill consists primarily of silty sand, locally includes gravel, and is interpreted to be derived from local native materials. Deeper fill was encountered in Boring No. 18 to a depth of approximately 15 feet bgs. Based on review of aerial photographs dated 1931, it appears that the southeast corner of the proposed parking structure is located within the former margin of the University arroyo and is underlain by fill mantling native sediments.

The materials within unit Qoa are generally dense to very dense.

Bedrock was not encountered in our exploratory borings to the maximum depth attained (63-1/2 feet).

Refusal to further advancement of the drilling augers was not experienced.

The on-site soils encountered during this investigation are generally granular and considered non-critically expansive.

Consolidation testing and field dry density tests on relatively undisturbed samples indicated negligible to moderate potential for hydroconsolidation (water-induced collapse) and a potential for moderate settlement for the upper younger alluvial soils when loaded.

Groundwater was not encountered within the maximum 63-1/2 foot depth of the current borings.

The results of corrosivity testing are discussed in the "Chemical/Corrosivity Testing" section of this report.

Slight caving of the borings was experienced upon removal of the augers.

A more detailed description of the subsurface soil conditions encountered is presented on the attached boring logs (Appendix "B").

FAULTING

The site does not lie within or immediately adjacent to an Alquist-Priolo Earthquake Fault Zone designated by the State of California to include traces of suspected active faulting. No active faults are shown on or in the immediate vicinity of the site on published geologic maps, nor was evidence for active faulting on or immediately adjacent to the site observed during the geologic field reconnaissance or on the aerial photographs reviewed.

The tectonics of the Southern California area are dominated by the interaction of the North American and Pacific tectonic plates, which are sliding past each other in a translational manner. Although some of the motion may be accommodated by rotation of crustal blocks such as the western Transverse Ranges (Dickinson, 1996), the San Andreas fault zone is thought to represent the major surface expression of the tectonic boundary and to be accommodating most of the translational motion between the Pacific Plate and the North American Plate. However, some of the plate motion is accommodated by other northwest-trending, strike-slip faults that are related to the San Andreas system, such as the San Jacinto fault and the Elsinore fault. Local compressional or extensional strain resulting from the translational motion along this boundary is accommodated by left-lateral, reverse, and normal faults such as the Cucamonga fault, the Crafton Hills fault zone, and the blind thrust faults of the Los Angeles Basin (Matti and others, 1992; Morton and Matti, 1993).

The San Jacinto fault zone is a system of northwest-trending right-lateral strike-slip faults. The San Bernardino segment of the San Jacinto fault zone is located approximately 8.7 kilometers (5.4 miles) east-northeast of the site and is assigned a characteristic maximum magnitude of Mw 7.06. The San Jacinto Valley segment of the San Jacinto fault zone traverses portions of the San Jacinto Valley and San Timoteo Badlands and is located approximately 8.9 kilometers east-southeast of the site. The San Jacinto fault zone is considered to contribute the majority of seismic-shaking hazard to the site. More large historic earthquakes have occurred on the San Jacinto fault than any other fault in Southern California (Working Group on California Earthquake Probabilities, 1988). The Working Group on California Earthquake Probabilities (1995) tentatively assigned a 43 percent (±17 percent) probability of a major earthquake on the San Jacinto Valley segment of the San Jacinto fault for the 30-year interval from 1994 to 2024.

The San Andreas fault zone is located along the southwest margin of the San Bernardino Mountains, approximately 21 kilometers (13 miles) northeast of the site. The toe of the mountain front in the San Bernardino area roughly demarcates the presently active trace of the San Andreas fault, which is characterized by youthful fault scarps, vegetational lineaments, springs, and offset drainages. The Working Group on California Earthquake Probabilities (1995) tentatively assigned a 28 percent (±13 percent) probability to a major earthquake occurring on the San Bernardino Mountains segment of the San Andreas fault between 1994 and 2024.

The southern margin of the San Gabriel Mountains is coincident with a series of east-west trending, predominantly reverse and thrust faults known as the Transverse Ranges frontal fault system. The San

Fernando fault of this system ruptured during the 1971 magnitude (**M**) 6.7 San Fernando earthquake. The Cucamonga fault of this system is located approximately 25 kilometers (15-1/2 miles) north-northwest of the site. Evidence of recent activity on this fault includes fresh scarps, sag ponds, and disrupted Holocene alluvium (Dutcher and Garrett, 1963; Yerkes, 1985; Morton and Yerkes, 1987).

The Glen Ivy segment of the Elsinore fault zone is located approximately 28 kilometers (17 miles) southwest of the site. The Elsinore fault zone is composed of multiple *en echelon* and diverging fault traces and splays into the Whittier and Chino faults to the north. In addition to being a zone of overall right-lateral deformation consistent with the regional plate tectonics, traces of the Elsinore fault zone form the graben of the Elsinore and Temecula Valleys. Holocene surface rupture events have been documented for several principal strands of the Elsinore fault zone (Saul, 1978; Rockwell and others, 1986; Wills, 1988).

HISTORICAL EARTHQUAKES

A map of recorded earthquake epicenters is included as Enclosure "A-4" (Epi Software, 2000). This map includes the California Institute of Technolgy database for earthquakes of magnitude 4.0 or greater from 1932 through 2009.

The Working Group on California Earthquake Probabilities (1988) lists seven **M** 6.0 or greater earthquakes that have occurred on the San Jacinto fault since 1899, although they acknowledge that several of these earlier episodes may have occurred on other nearby faults. Two of these earthquakes took place in the San Bernardino Valley. A **M** 6.5 event in 1899 near Lytle Creek and a **M** 6.2 event in 1923 near Loma Linda may have occurred on the San Jacinto fault. However, Fife and others (1976) and Matti and Carson (1991) sugges that the 1923 event took place on an unnamed fault parallel to and east of the San Jacinto fault.

A large historical earthquake that is definitely attributed to the Elsinore fault was a **M** 6.0 event in 1910 in the Temescal Valley area. This event caused damage to structures from Corona to Wildomar (Weber, 1977). Since 1932, four **M** 4.0 or greater earthquakes have occurred along the Elsinore fault zone in the Santiago Peak area (Weber, 1977).

No large earthquakes have occurred on the San Bernardino Mountains segment of the San Andreas fault within the regional historical time frame. Using dendrochronological evidence, Jacoby and others (1987) inferred that a great earthquake on December 8, 1812 ruptured the northern reaches of this segment. Recent trenching studies have revealed evidence of rupture on the San Andreas fault at Wrightwood within this time frame (Fumal and others, 1993). Comparison of rupture events at the Wrightwood site and Pallett Creek, and analysis of reported intensities at the coastal missions, led Fumal and others (1993) to conclude that the December 8, 1812 event ruptured the San Bernardino Mountains segment of the San Andreas fault largely to the southeast of Wrightwood, possibly extending into the San Bernardino Valley. The average recurrence interval for large earthquakes along the southern San Andreas fault at six paleoseismic sites is 182 years (Stone and others, 2005).

Surface rupture occurred on the Mojave segment of the San Andreas fault in the great 1857 Fort Tejon earthquake. The Coachella Valley segment of the San Andreas fault was responsible for the 1948 **M** 6.5 earthquake in the Desert Hot Springs area and for the 1986 **M** 5.6 earthquake in the North Palm Springs area.

No significant historical earthquakes have been specifically attributed to the Cucamonga fault.

DESIGN ACCELERATION PARAMETERS

Based on the geologic setting and anticipated earthwork for construction of the proposed project, the soils underlying the site are classified as Site Class D, "stiff soil", according to the 2007 California Building Code (CBC). The seismic parameters according to the 2007 CBC are summarized in the following table.

2007 CBC - Seismic Parameters	
Mapped Spectral Acceleration Parameters	$S_s = 1.50$ and $S_1 = 0.60$
Site Coefficients	$F_a = 1.0$ and $F_v = 1.5$
Adjusted Maximum Considered Earthquake (MCE) Spectral Response Parameters	$S_{MS} = 1.50$ and $S_{M1} = 0.90$
Design Spectral Acceleration Parameters	$S_{DS} = 1.00$ and $S_{D1} = 0.60$

The corresponding value of PGA from the design acceleration spectrum according to the 2007 CBC is 0.40g.

GROUNDWATER AND LIQUEFACTION

The site is located in Sections 20 and 29 of Township 2 South, Range 4 West, in the Riverside-Arlington Subbasin of the Upper Santa Ana Valley groundwater basin. Depth-to-groundwater data in the vicinity of the site is available from the Western Municipal Water District, Cooperative Well Program (2009). These data are summarized in the following table.

State Well No.	Date Measured	Depth to Water (feet)	Approximate Water Surface Elevation (feet)	Location of Well
02S/04W-29M001S	11-19-08	65.93	986	1/2 mile SW
	05-23-95	63.50	989	

Based on published groundwater contour mapping by Carson and Matti (1985), the minimum depth to groundwater in the area of the site was approximately 150 feet bgs for the time period from 1973 to 1979. Based on the available data, a historic high groundwater of 60 feet bgs was utilized in our analyses.

LIQUEFACTION POTENTIAL AND SEISMIC SETTLEMENT

The portions of the site located within areas of younger sediments (mapped as 'Qya' on the geologic index map, Enclosure "A-3") are located within areas designated by the City of Riverside (2004) as being underlain by soils with a "moderate" liquefaction potential.

Liquefaction is a process in which strong ground shaking causes saturated soils to lose their strength and behave as a fluid (Matti and Carson, 1991). Ground failure associated with liquefaction can result in severe damage to structures. Soil types susceptible to liquefaction include sand, silty sand, sandy silt, and silt, as well as soils having a plasticity index (P.I.) less than 7 (Boulanger and Idriss, 2006) and loose soils with a P.I. less than 12 and a moisture content greater than 85 percent of the liquid limit (Bray and Sancio, 2006). The geologic conditions for increased susceptibility to liquefaction are: 1) shallow groundwater (generally less than 50 feet in depth); 2) the presence of unconsolidated sandy alluvium, typically Holocene in age; and 3) strong ground shaking. All three of these conditions must be present for liquefaction to occur, and all three of these conditions could occur on the site during the lifetime of the project.

Due to the low potential for the presence of shallow groundwater beneath the site (greater than 60 feet bgs), liquefaction is not considered a hazard in most of the site. To confirm the potential of liquefaction for the area designated by the City of Riverside (2004) as being underlain by soils with a "moderate" liquefaction potential, the liquefaction potential of the site has been evaluated based on the SPT data obtained and using the simplified procedure described by Seed and Idriss (1982), Seed and others (1985), modified in the 1996 National Center for Earthquake Engineering Research (NCEER) and 1998 NCEER/National Science Foundation (NSF) workshops (Youd and Idriss, 2001), and as recently summarized by Idriss and Boulanger (2008). The method of evaluating liquefaction potential consists of comparing the cyclic stress ratio (CSR) developed in the soil by the earthquake motion to the CSR, or cyclic resistance ratio (CRR), that will cause liquefaction of the soil for a given number of cycles. In the simplified procedure, the CSR developed in the soil is calculated from a formula that incorporates ground surface acceleration, total and effective stresses in the soil at different depths (which in turn are related to the location of the ground-water table), non-rigidity of the soil column, and a number of simplifying assumptions.

The CSR that will cause liquefaction is related to the relative density of the soil, expressed in terms of SPT blowcounts $(N_1)_{60}$ (Seed and Idriss 1982, Seed and others 1985, Youd and Idriss 2001, Idriss and Boulanger 2008), cone penetration resistance (q_{c1N}) (Robertson and Wride 1998, Youd and Idriss 2001, Idriss and Boulanger 2008), or shear wave velocity (V_{s1}) (Andrus and Stokoe 2000, Youd and Idriss 2001, Andrus and others 2004), all normalized for an effective overburden pressure of 1 ton per square foot and corrected to equivalent clean sand resistance. In this investigation, SPT blowcounts were obtained and utilized in the analysis. A projected future depth to groundwater of 60 feet bgs at the site was utilized to calculate the liquefaction potential in the area. The peak horizontal ground acceleration of 0.40g from the design acceleration spectrum and the deaggregated magnitude 7.0 earthquake were utilized as input into the liquefaction analysis program GeoSuite 2008 (Yi, 2010). The seismic hazard analysis computer program EZ-FRISK, version 7.40 (Risk Engineering, 2010), was utilized for the deaggregation.

Prediction of seismic-induced settlement is very important for the design of structures. The seismic-induced settlement includes settlement which occurs both in dry sands and saturated sands (California Geological Survey, 2008). Severe seismic shaking may cause dry sands to densify, resulting in settlement expressed at the ground surface. Seismic settlement in dry soils generally occurs in loose sands and silty sands, with cohesive and fine-grained soils being less prone to significant settlement. For saturated soils, significant settlement is anticipated if the soils exhibit liquefaction during seismic shaking.

Strata of silts, sandy silts, and silty sands were encountered within all exploratory borings utilized for this investigation. Equivalent SPT blowcounts and density testing performed on relatively undisturbed samples indicate that the soils encountered range from very loose to dense. The loose sandy soils may tend to densify and settle during seismic vibration.

The methods for evaluating seismic settlement in saturated sands can generally be classified into two groups. The method for the first group was developed during the 1970's and 1980's, generally based on the relationship between cyclic stress ratio, $(N_1)_{60}$, and volumetric strain (Silver and Seed, 1971, Lee and Albaisa, 1974, and Tokimatsu and Seed, 1987). The method for the second group was developed in the early 1990's, with the paper by Ishihara and Yoshimine (1992) as the first publication in the category, modified and improved by various researchers (Robertson and Wride, 1998, Yoshimine et al., 2006, and Idriss and Boulanger, 2008) and is generally based on the relationship between volumetric strain and the factor of safety for liquefaction. Idriss and Boulanger (2008) modified the methods to incorporate both SPT and CPT data.

Research related to the estimation of dry sand settlement during earthquake excitation was initiated in the early 1970's by Silver and Seed (1971), followed by the works of several researchers (Seed and Silver, 1972, Pyke et al., 1975, Tokimatsu and Seed, 1987, and Pradel, 1998). A simplified method of evaluating earthquake-induced settlements in dry sandy soils based on the Tokimatsu and Seed procedure has been developed by Pradel (1998) and is recommended by Martin and Lew (1999) as one of the standard methods for the estimation of earthquake-induced settlements of dry sands in California. All of these methods generally utilize SPT data.

The procedures and corrections recently summarized by Idriss and Boulanger (2008) were utilized to evaluate the liquefaction potential and seismic settlement of saturated sandy soils for SPT data. The seismic settlement of dry sands was evaluated based on Pradel's procedures (Pradel 1998). All of these methods were incorporated into a liquefaction and seismic settlement program, GeoSuite 2008 version 2.0.8.10 (Yi, 2010).

Exploratory Boring Nos. 1 and 6 (near the drainage area) were utilized for liquefaction potential analyses (Enclosures "D-1" and "D-2"). Our calculation indicates that liquefaction is generally not anticipated.

Exploratory Boring Nos. 1, 6, 18, 19, 20, 23, and 26 were utilized for seismic settlement analyses. Results of our seismic settlement evaluation are shown in Enclosures "D-3" thru "D-9". The results indicate that the seismic settlement varies from approximately 0.1 inch to 2-1/2 inches for the site with current conditions, resulting in a maximum differential settlement of 2-1/2 inches between analyzed exploratory borings.

SUBSIDENCE

Subsidence of the ground surface has been reported in several areas of California. Principal causes have been fluid withdrawal (oil, gas, water), soil collapse, and oxidation of organic-rich soil. According to the County of Riverside Land Information System (2010), the site is located in a subsidence-susceptible area. The subsidence hazard in this area is primarily related to historic declines in groundwater levels. No organic-rich soils were encountered during this investigation in the area of the site. During the geologic field reconnaissance of the site and surrounding area, no evidence of past ground cracks or areas of water ponding were observed. Evidence of steeply-inclined geologic contacts that could trigger subsidence cracking at the ground surface was not observed. Based on these observations and the dense nature of older geologic materials underlying the project area, it is our opinion that the hazard of subsidence-induced ground cracking is very low to non-existent at the site.

HYDROCONSOLIDATION

Density testing and equivalent SPT data from our exploratory borings indicates that the soils encountered were in loose to medium dense states and are thus considered to be of moderate hydroconsolidation potential.

To evaluate the potential deformation which may be caused by the addition of water, hydroconsolidation tests were performed on selected representative relatively undisturbed samples. The results are shown in Enclosure "C-4".

The results of these tests show that a maximum hydroconsolidation strain of approximately 3.9 percent could be developed in the upper loose silty sands. This could result in hydroconsolidation settlement of approximately 7 inches if the loose soils at the site become fully saturated. Considering the possibility of full saturation, a maximum hydroconsolidation settlement of approximately 3 inches and a hydroconsolidation differential settlement of approximately 2 inches are anticipated for site soils in their existing condition.

SLOPE STABILITY

The site topography includes slopes with typical gradients ranging from approximately 3 horizontal to1 vertical [3(h):1(v)] to 5(h):1(v) with locally steep erosional slopes (up to approximately 4 feet tall) adjacent to the active channel of the arroyo in the hillside and panhandle portions. Significant slopes are not located within the southern portion of the project area. Grading for the proposed project is anticipated to form cut slopes with maximum heights up to approximately 10 feet.

No evidence of landsliding was observed on the site or in the review of historic aerial photographs, and landsliding is not anticipated. The site is not located in an area identified as having a potential for slope instability. The relatively flat-lying older alluvial fan deposits underlying the site are not anticipated to contain well-developed planes of weakness such as bedding or joints that may be prone to landsliding. Based on the results of our liquefaction calculations and observations at the site, landslides and lateral spreading are not considered to be a hazard to the site.

Most of the site is situated within older alluvium that is anticipated to be relatively cohesive. Temporary cut slopes, shoring, or both may be required during construction. The near surface soils (Qoa) at the site are generally classified as Type 'B' soils as per CAL/OSHA (California, State of, 2001) with the exception of the fill and younger alluvium (Qya) in the southeast portion of the proposed parking structure which is classified as Type 'C' soils as per CAL/OSHA. Accordingly, the steepest inclination allowed by CAL/OSHA for simple temporary slopes up to 20 feet in height in Type 'B' soils is 1(h):1(v) and for Type 'C' soils is 1.5(h):1(v). Slopes for excavations greater than 20 feet should be designed by a registered professional engineer.

FLOODING AND EROSION

No evidence of recent flooding of the site or surrounding area was observed during the geologic mapping or on the aerial photographs reviewed. The northern boundary of a 100-year flood zone is located along the trend of Big Springs Road near the southern portion of the project area. Proposed project structures are not within the 100-year flood zone. An evaluation of the hazard of flooding to the site and the adequacy of existing flood control measures near the site fall outside the purview of this firm.

According to the City of Riverside General Plan (2004), the site is not located within a potential inundation zone for seismically-induced dam/reservoir failure. No large water storage facilities are known to exist within the area of the site; therefore, the potential for seismically-induced dam failure or seiche to affect the site appears low. The site is not located within a coastal area; therefore, tsunami is not a potential hazard to the site.

CONCLUSIONS

On the basis of our research and field and laboratory investigations, it is the opinion of this firm that construction of the proposed structures is feasible from a geotechnical standpoint, provided the recommendations contained in this report are implemented during planning, grading, and construction.

No evidence of active faulting was observed on or adjacent to the site.

Moderate to severe seismic shaking of the site can be expected during the lifetime of the proposed project.

Fill was encountered within the exploratory borings to a maximum depth of 15 feet bgs.

Bedrock was not encountered in any of the exploratory borings.

Refusal was experienced in most of our exploratory borings at depths ranging from 31-1/2 feet to 63-1/2 feet bgs.

No groundwater was encountered within any of our exploratory borings.

All of our current exploratory borings experienced slight caving upon removal of the drilling augers.

The on-site soils encountered during this investigation are generally granular and considered non-critically expansive.

Due to the depth to groundwater, liquefaction potential is not anticipated at the site.

The maximum seismic settlement could be on the order of 2-1/2 inches. Due to the significant variation of soil deposits on the site, the maximum differential seismic settlement could be on the order of 2-1/2 inches.

Consolidation testing performed on selected samples indicate that the on-site surficial soils have a moderate potential for hydroconsolidation (collapse) upon application of a surcharge load and inundation with water. It is the opinion of this firm that positive drainage should be provided, and water should not be allowed to pond on the site. Water should not be allowed to flow over graded or natural areas in such a way as to cause saturation of soils. Measures should also be taken to prevent leakage from pipelines that might result in unexpected saturation of soils.

No evidence of recent significant flooding of the site was observed during the geologic field reconnaissance or on the aerial photographs reviewed. The site is located adjacent to a 100-year flood zone; however, proposed structures are not located within the flood zone. A more detailed evaluation of the flood potential of the site falls under the purview of others.

No evidence of landsliding was observed on the site or in the review of historic aerial photographs, and landsliding is not anticipated. The site is not located in an area identified as having a potential for slope instability.

Based upon our field investigation and test data, it is our opinion that the upper undocumented fill and loose native soils will not, in their present condition, provide uniform or adequate support for the proposed structures. Our equivalent SPT data and density testing results indicated variable in-situ conditions of the upper soils to 15 feet in depth, ranging from very loose to medium dense and from soft to medium stiff. Evaluation of the maximum dry density of soils encountered indicates that the existing native soils generally have a relative compaction of approximately 80 to 90 percent.

Based on the site conditions, it is our recommendation that the proposed building and parking structures be supported on one of the following foundation systems: 1) pile foundations, or 2) conventional shallow foundations on compacted fill with removal and recompaction of loose soils.

Because of the site conditions, it will be necessary to remove, at a minimum, the upper 36 inches of existing soils in all areas to be graded, regardless of the foundation type selected. This removal is to be performed in order to locate and facilitate the removal of undocumented fill, debris, or loose and disturbed soils. The extent and depth of removal should be confirmed by an engineering geologist from this firm during grading.

The proposed grading is expected to be feasible utilizing conventional heavy grading equipment.

RECOMMENDATIONS

DESIGN ACCELERATION PARAMETERS:

Based on the geological setting and subsurface data from the site, the soils underlying the site are classified as Site Class D, "stiff soil profile", according to the 2007 CBC. The Design Acceleration Parameters were determined according to the 2007 CBC and are summarized in the following table.

2007 CBC - Seismic Parameters	
Mapped Spectral Acceleration Parameters	$S_s = 1.50$ and $S_1 = 0.60$
Site Coefficients	$F_a = 1.0$ and $F_v = 1.5$
Adjusted Maximum Considered Earthquake (MCE) Spectral Response Parameters	$S_{MS} = 1.50$ and $S_{M1} = 0.90$
Design Spectral Acceleration Parameters	$S_{DS} = 1.00$ and $S_{D1} = 0.60$

The corresponding value of PGA from the design acceleration spectrum according to the 2007 CBC is 0.40g.

Moderate to severe seismic shaking of the site can be expected during the lifetime of the proposed improvements. Therefore, the proposed structures should be designed accordingly.

GENERAL SITE GRADING:

It is imperative that no clearing and/or grading operations be performed without the presence of a representative of the geotechnical engineer. An on-site, pre-job meeting with the project owner, the contractor, and the geotechnical engineer should occur prior to all grading-related operations. Operations undertaken at the site without the geotechnical engineer present may result in exclusions of affected areas from the final compaction report for the project.

Grading of the subject site should be performed, at a minimum, in accordance with these recommendations and with applicable portions of the 2007 CBC. The following recommendations are presented for your assistance in establishing proper grading criteria.

INITIAL SITE PREPARATION:

All areas to be graded should be stripped of significant vegetation and other deleterious materials. These materials should be removed from the site for disposal.

Any existing pockets of undocumented fill or loose disturbed soils encountered during construction should be completely removed, cleaned of significant deleterious materials, and may be reused as compacted fill. Any roots or other deleterious materials encountered at this time should be removed prior to replacing the soil.

To assist in undocumented fill and/or loose native soil identification and removal, it is our opinion that all the areas to be graded should be subexcavated to a minimum depth of 36 inches bgs. Depending on the foundation type selected, further removal may be necessary. If conventional shallow foundations are utilized, all loose material in the structure pad areas should be completely removed. Removal depths on the order of 15 feet may be necessary in the southern portion and 10 feet in the northern hillside area. The removal should extend beyond the footing at the bottom of the excavation to a distance equal to the depth of removal plus 10 feet, *where possible*. An engineering geologist from this firm should be present during the subexcavation operation prior to scarification and refilling in order to identify existing fills or loose soils extending below this zone. A relative compaction of at least 85 percent may be utilized as preliminary quantitative criteria to supplement the engineering geologist's qualitative determination of the suitable base of excavation. The bottoms of all excavations should be observed and approved by the engineering geologist.

In addition, it is our recommendation that all existing undocumented fills and loose soils under any proposed paved and flatwork areas be removed and replaced with properly compacted and controlled fills.

If this is not done and any undocumented fills are left, premature structural distress of the paved and flatwork areas can be expected. However, the additional cost of mandatory subexcavation, complete undocumented fill, and loose soil removal should be compared to the higher ongoing maintenance costs and other problems caused by distressed paved and flatwork areas. It is our opinion that decreased settlement will result from increasing the amount of undocumented fill and loose soils removed, with complete removal of all undocumented fill and loose soil being the upper limit of reasonable efforts to minimize settlement. An economic analysis of the relationship between current construction costs and ongoing maintenance costs could be undertaken to determine the most cost-effective amount of undocumented fill and loose soil to be removed.

Cavities created by removal of subsurface obstructions should be thoroughly cleaned of loose soil, organic matter, and other deleterious materials, shaped to provide access for construction equipment, and backfilled as recommended for site fill.

COMPACTED FILLS:

The on-site soils should provide adequate quality fill material, provided they are free from roots, other organic matter, and deleterious materials. Unless approved by the geotechnical engineer, rock or similar irreducible material with a maximum dimension greater than 8 inches should not be buried or placed in fills.

Import fill should be inorganic, non-expansive granular soil free from rocks or lumps greater than 6 inches in maximum dimension. Sources for import fill should be observed and approved by the geotechnical engineer prior to their use.

Fill should be spread in near-horizontal layers, approximately 8 inches in thickness. Thicker lifts may be approved by the geotechnical engineer if testing indicates that the grading procedures are adequate to achieve the required compaction. Each lift should be spread evenly, thoroughly mixed during spreading to attain uniformity of the material and moisture in each layer, brought to between optimum moisture content and 2 percent above, and compacted to a minimum relative compaction of 95 percent in accordance with the current version of ASTM D 1557.

SHRINKAGE AND SUBSIDENCE:

Based upon the relative compaction of the soils tested during this investigation, and the relative compaction anticipated for compacted fill soils, we estimate a compaction shrinkage of approximately 10 to 15 percent. Therefore, 1.10 cubic yards to 1.15 cubic yards of in-place soil material would be necessary to yield 1 cubic yard of properly compacted fill material. In addition, we would anticipate subsidence of approximately 0.1 to 0.15 foot. These values are exclusive of losses due to stripping or the removal of other subsurface obstructions, if encountered, and may vary due to differing conditions within the project boundaries and the limitations of this investigation.

Values presented for shrinkage and subsidence are estimates only. Final grades should be adjusted, and/or contingency plans to import or export material should be made to accommodate possible variations in actual quantities during site grading.

DEWATERING:

Groundwater was not encountered within any of our exploratory borings. Generally, groundwater should not be an issue during construction.

LATERAL LOADING:

Resistance to lateral loads will be provided by passive earth pressure and base friction. For footings bearing against compacted fill, passive earth pressure may be considered to be developed at a rate of 440 pounds per square foot (psf) per foot of depth. Base friction may be computed at 0.43 times the normal load. Base friction and passive earth pressure may be combined without reduction, but should not be increased by one-third during seismic loadings. If the design is to be based on allowable lateral resistance values, we recommend that minimum factors of safety of 1.5 and 2.0 be applied to the friction coefficient and passive lateral earth pressure, respectively. The resulting allowable lateral resistance values are: passive lateral earth pressure, 220 psf per foot of depth; and base friction coefficient, 0.29.

For preliminary retaining wall design purposes utilizing the existing on-site native and fill materials, a lateral active earth pressure developed at a rate of 40 psf per foot of depth should be utilized for unrestrained conditions. For restrained conditions, an at-rest earth pressure of 65 psf per foot of depth should be utilized. The "at-rest" condition applies to braced walls which are not free to tilt. The "active" condition applies to unrestrained cantilevered walls where wall movement is anticipated. The structural designer should use judgement in determining the wall fixity and may utilize values interpolated between the "at-rest" and "active" conditions where appropriate. These values should be verified prior to construction when the backfill materials and conditions have been determined. These values are applicable only to level properly drained backfill with no additional surcharge loadings and do not include a factor of safety other than conservative modeling of the soil strength parameters. If import material is to be utilized for backfill, an engineer from this firm should verify the backfill has equivalent or superior strength values. Toe bearing pressure for walls on soils not bearing against compacted fill as described earlier under PREPARATION OF FOOTING AREAS should not exceed the 2007 CBC values.

For walls with a surcharge loading, the increase in active pressure can be calculated as the product of 0.29 and the surcharge load, q, (i.e., 0.29×q) for level backfill. The increase in at-rest pressure can be calculated as the product of 0.46 and the surcharge load, q, (i.e., 0.46×q). The resulting additional surcharge pressure should be applied to the wall as a rectangular distribution, from top to bottom.

For a shoring system design, a rectangularly distributed apparent earth pressure of 30 psf/ft could be used for calculating the total load for sandy soil. The typical earth pressure distributions are included in Enclosure "D-11". The design engineer should reference FHWA-IF-99-015 for the recommended apparent earth pressure diagram.

Backfill behi .d retaining walls should consist of a soil of sufficient granularity that the backfill will properly drain. The granular soil should be classified per the Unified Soil Classified System as either a GW, GP, SW, SP, SW-SM, or SP-SM. Surface drainage should be provided to prevent ponding of water behind walls. A drainage system should be installed behind all retaining walls consisting of any of the following:

1. A 4-inch diameter perforated PVC (Schedule 40) pipe or equivalent at the base of the stem encased in 2 cubic feet of granular drain material per linear foot of pipe; or

2. Synthetic drains such as Enkadrain, Miradrain, Hydraway 300, or equivalent

Perforations in the PVC pipe should be 3/8-inch in diameter. Granular drain material should be wrapped with filter cloth to prevent clogging of the drains with fines. Below grade walls should be waterproofed to prevent nuisance seepage. Water should outlet to an approved drain.

Foundation concrete should be placed in neat excavations with vertical sides, or the concrete should be formed and the excavations properly backfilled as recommended for site fill.

SEISMIC LATERAL EARTH PRESSURE:

Seismic earth pressure was evaluated for both cantilever-type and nonyielding-type walls. The latter generally refers to massive gravity walls founded on rock or basement walls braced at both the top and bottom. For cantilever-type walls, the active seismic earth pressure was calculated using the Mononobe-Okabe ("M-O") (Okabe, 1926; Mononobe and Okabe, 1929) method. For nonyielding-type walls, the seismic earth pressure was estimated using the Wood (1973) method assuming a wall-to-wall space and height ratio (L/H) larger than 4.0 (Kramer, 1996). It is recommended by FEMA (NEHRP 2004, Part 2, Commentary, 7.5.1) that the pseudostatic horizontal acceleration coefficient (K_h) be taken equal to K_h=S_{DS}/2.5=1.0/2.5=0.4g. The pseudostatic vertical acceleration coefficient (K_v) was taken as one-half of K_h. For retaining walls with on-site soils as backfill, a unit weight of 135 pounds per cubic foot (pcf) and friction angle of 33 degrees were used in the calculation.

For level backfill, lateral seismic earth pressure components were evaluated as shown in the following table. Because Wood's solution amounts to a total lateral thrust that acts about 0.63 times the height of the wall above the base of the wall, we modified the active seismic earth pressure (for a cantilever-type wall) to a total lateral thrust with the acting point as shown in the following table. In general, the active seismic earth pressure calculated by the M-O method is in an inverted triangular distribution, while the seismic earth pressure calculated by the Wood method approximates a parabolic distribution.

Seismic Earth Pressure

Seismic Earth Pressure	Cantilever Type Wall	Nonyielding Type Wall
ΔP_{eq} (lbf)	$22.5H^2$	$54H^2$
Thrust Point (ft.)*	$\frac{2}{3}H$	$0.63H$

where H is the height of the wall in feet

* above base of wall

EARTH PRESSURES WITH INCLINED BACKFILLS:

For inclined backfills with slope heights of up to 3 feet and wall heights of 10 feet or more, the following active earth pressures may be utilized in the design.

Earth Pressures with Inclined Backfills

Slope	Slope Height (ft)	Active Earth Pressures (psf/ft)	
		Static	Seismic
5(h):1(v)	3.0	45	60
3(h):1(v)	3.0	50	55
2.5(h):1(v)	5.0	55	55

EXPANSIVE SOILS:

All soil materials encountered during this investigation were sufficiently granular to be non-critically expansive. Specialized construction procedures to specifically resist expansive soil forces are not anticipated at this time. Requirements for reinforcing steel to satisfy structural criteria are not affected by this recommendation. Additional evaluation of soils for expansion potential should be conducted by the soils engineer during the grading operation.

CHEMICAL/CORROSIVITY TESTING:

Selected samples of materials were delivered to Schiff Associates for soil corrosivity testing. Laboratory testing consisted of pH, resistivity, and major soluble salts commonly found in soils. The results of the laboratory tests performed by Schiff Associates appear in Enclosure"C-16".

These tests have been performed to screen the site for potentially corrosive soils. Although C.H.J., Incorporated does not practice corrosion engineering, values from the soil tested are considered potentially "mildly" to "moderately" corrosive to ferrous metals at as-received and saturated conditions, respectively. Specific corrosion control measures, such as coating of the pipe with non-corrosive material or alternative non-metallic pipe material, are considered to be needed if there is a potential for saturated soils.

Results of the soluble sulfate testing indicate a "negligible" anticipated exposure to sulfate attack. Based upon the criteria from Table 4.3.1. of the American Concrete Institute Manual of Concrete Practice (2000), no special measures, such as specific cement types, water-cement ratios, etc., will be needed for this "negligible" exposure to sulfate attack.

The soluble chloride content of the soils tested was at levels high enough to be of concern with respect to corrosion of reinforcing steel. The results should be considered in combination with the soluble chloride content of the hardened concrete in determining the effect of chloride on the corrosion of reinforcing steel.

C.H.J., Incorporated does not practice corrosion engineering. If further information concerning the corrosion characteristics, or interpretation of the results submitted herein are required, then a competent corrosion engineer could be consulted.

PRELIMINARY FLEXIBLE PAVEMENT DESIGN:

The following recommended structural sections were calculated based on traffic indices (T.I.s) provided in the Caltrans Highway Design Manual for Safety Roadside Rest Areas (Caltrans, 2008). Based upon our preliminary sampling and testing, the structural sections tabulated below should provide satisfactory AC pavement.

Usage	T.I.	R-value	Recommended Structural Section
Auto Parking Areas	5.0	50	0.25' AC/0.35' Class 2 AB
Auto Roads	5.5	50	0.25' AC/0.35' Class 2 AB
Truck Parking Areas	6.0	50	0.25' AC/0.35' Class 2 AB
Truck Roads	8.0	50	0.40' AC/0.45' Class 2 AB

AB=Aggregate Base

Recommended AC pavement sections for other T.I.s are tabulated in Enclosure "C-15".

The above structural sections are predicated upon proper compaction of utility trench backfill, if any, and subgrade soils, with the upper 12 inches of subgrade soils and all AB material brought to a relative compaction of at least 95 percent in accordance with ASTM D 1557 prior to paving. The AB should meet Caltrans requirements for Class 2 base.

It should be noted that the above pavement designs were based upon the results of preliminary sampling and testing performed on this project. Therefore, the values provided here should be verified by additional sampling and testing during construction when the actual subgrade soils are exposed.

PRELIMINARY RIGID PAVEMENT DESIGN:

Rigid pavement design for the subject project should be performed, at a minimum, in accordance with these recommendations and with applicable portions of ACI 330R, "Guide for Design and Construction of Concrete Parking Lots". The following recommendations are based on an R-value of 12.

Traffic Category	Average Daily Truck Traffic (ADTT)	Recommended Section
B	25	6.0" PCC/Compacted Soils
B	300	6.5" PCC/Compacted Soils
C	100	6.5" PCC/Compacted Soils
C	300	7.0" PCC/Compacted Soils
C	700	7.0" PCC/Compacted Soils
D	700	7.0" PCC/Compacted Soils

The above recommended concrete sections are based on a design life of 20 years, a concrete 28-day compressive strength of approximately 3,500 psi, and a flexural strength of approximately 500 psi. In addition, the above structural sections are predicated upon proper compaction of the utility trench backfills and the subgrade soils, with the upper 12 inches of subgrade soils brought to a uniform relative compaction of 95 percent (ASTM D 1557).

The concrete sections may be placed directly over a compacted subgrade and prepared as described above. The concrete to be utilized for the concrete pavement should have a minimum modulus of rupture of 500 pounds per square inch (psi). This equates to a 28-day compressive strength of approximately 3,500 psi. However, the design strength should be based upon the modulus of rupture and not the compressive strength. Transverse joints should be sawcut in the pavement at approximately 12-foot intervals within 12 hours of concrete placement, or preferably sooner. Sawcut depths should be equal to approximately one-quarter of the slab thickness. The use of plastic strips for formation of jointing is not recommended. The use of expansion joints is not recommended, except where the pavement will adjoin structures. Construction joints should be constructed such that adjacent sections butt directly against each other and are keyed or doweled into each other. Parallel pavement sections should also be keyed or doweled into each other. It should be noted that distributed steel reinforcement (welded wire fabric) is not necessary, nor will any decrease in section thickness result from its inclusion.

It has been assumed that concrete shoulders will be utilized. Concrete shoulders reduce the necessary thickness of concrete pavement. If concrete shoulders are not utilized and vehicles are permitted to drive over the edge of pavements, the thickness of the pavement will need to be increased approximately 1-1/2 inches.

C.H.J., Incorporated does not practice traffic engineering. The T.I. and ADTT values used to develop the recommended pavement sections are typical for projects of this type. We recommend that the T.I. and ADTTs used be reviewed by the project civil engineer or traffic engineer to verify that they are appropriate for this project.

It should be noted that the above pavement designs were based upon the results of preliminary sampling and testing performed on this project. Therefore, the values provided here should be verified by additional sampling and testing during construction when the actual subgrade soils are exposed.

SHALLOW FOUNDATION RECOMMENDATIONS

The proposed building and parking structures may be supported by shallow foundations, including conventional spread footings and grade beams, provided the recommendations contained in this report are implemented during planning, grading, and construction.

PREPARATION OF FOOTING AREAS:

If shallow foundations are utilized, all footings should rest upon at least 3 feet of properly compacted fill material. Shallow foundations constructed within the building pad area should be underlain by additional compacted fill, as necessary, such that the fill thickness is at least equal to the footing width. In areas where the required thickness of compacted fill is not accomplished by the mandatory subexcavation operation and by site rough grading, the footing areas should be subexcavated to a depth of at least 3 feet below the proposed footing base grade or a depth equal to the footing width, as appropriate. The subexcavation should extend horizontally beyond the footing lines a distance equal to the depth of removal below the bottom of the footing plus 10 feet. This distance should be measured at the bottom of the excavation. This subexcavation operation should include the minimum removal even though planned filling will be sufficient to satisfy compacted fill thickness requirements. The bottom of this excavation should then be scarified to a depth of at least 12 inches, brought to between optimum moisture and 2 percent above, and recompacted to at least 95 percent relative compaction in accordance with the current version of ASTM D 1557 prior to refilling the excavation to grade as properly compacted fill.

Should grading result in fill thicknesses that vary by a significant amount, a potential for static differential settlement will exist. As such, it is our recommendation that the thickness of fill not be allowed to vary by more than 50 percent, a 10 feet maximum, across a single structure. If fill thickness is to vary by more than 50 percent or 10 feet as a result of grading, it will be necessary to increase the removals in the cut portion of the building pad in order to construct a fill mat with a relatively uniform fill thickness.

FOUNDATION DESIGN:

If removal and replacement is chosen as the method of remediation, and the site is prepared as recommended, the proposed structure may be safely founded on conventional spread foundations, either individual spread footings and/or continuous wall footings. Footings should be a minimum of 12 inches wide and should be established at a minimum depth of 24 inches below the lowest adjacent final subgrade level. For the minimum width and depth, footings may be designed for a maximum safe soil bearing pressure of 2,600 psf for dead plus live loads. This allowable bearing pressure may be increased to a maximum safe soil bearing pressure of 4,500 psf for dead plus live loads for a width of up to 5 feet. Further increase of footing width will significantly increase the amount of settlement and thus result in a decrease of allowable bearing pressure. The variation of bearing pressures are shown in Enclosure "D-10".

These bearing values may be increased by one-third for wind or seismic loading.

For footings thus designed and constructed, we would anticipate a maximum static settlement of 1 inch or less. Differential settlement between similarly loaded adjacent footings is expected to be approximately one-half the total settlement. These settlement estimates do not include seismically-induced settlement.

Foundation concrete should be placed in neat excavations with vertical sides, or the concrete should be formed and the excavations properly backfilled as recommended for site fill.

SLABS-ON-GRADE:

To provide adequate support, concrete slabs-on-grade should bear on a minimum of 12 inches of compacted soil. Concrete slabs-on-grade should be a minimum of 4 inches in thickness. The soil should be compacted to 95 percent relative compaction. The final pad surfaces should be rolled to provide smooth dense surfaces.

Slabs to receive moisture-sensitive coverings should be provided with a moisture vapor retarder. We recommend that a vapor retarder be designed and constructed according to the American Concrete Institute (ACI) 302.1R, Concrete Floor and Slab Construction guidelines, which addresses moisture vapor retarder construction. At a minimum, the vapor retarder should comply with ASTM E 1745 and have a nominal thickness of at least 10 mils. The vapor retarder should be properly sealed per the manufacturer's recommendations and protected from punctures and other damages. Two inches of sand under the vapor retarder may assist in reducing punctures.

Concrete slabs subjected to heavy loads, such as materials storage and/or forklift traffic, should be designed by a registered civil engineer competent in concrete design.

The modulus of vertical subgrade reaction as a function of footing width is included in Enclosure "D-10" and may be utilized in the design of slabs-on-grade for the proposed project.

DEEP FOUNDATION RECOMMENDATIONS

As an alternative to using shallow foundations (with the necessary removal and recompaction), the buildings and parking structures could be supported by pile foundations. For purposes of our analyses, a concrete cast-in-drilled-hole (CIDH) pile foundation was assumed in order to develop preliminary conclusions regarding pile capacity and depth. Alternative pile foundations could include driven pre-cast concrete or steel "H" piles. Pile-type selection should be based on environmental considerations, constructability, and cost. Pile driving will induce localized ground vibration and is generally much noisier than CIDH construction. Groundwater may be a concern during CIDH pile installation. See the section entitled CIDH PILE INSTALLATION.

The pile calculations were based on assumed 24-inch-diameter CIDH piles, with a targeted allowable vertical capacity of 200 kilo-pounds (kips), for the proposed building and parking structures.

ALLOWABLE AXIAL PILE CAPACITIES:

Both upward and downward allowable axial capacities were calculated (Allpile Version 7.8e) for concrete CIDH piles as a function of embedment depth. The summaries of axial capacities are included in Enclosures "E-1", "E-5", and "E-9" for selected Exploratory Boring Nos. "B-6", "B-18", and "B-23", respectively. The embedment depths shown on the capacity vs. depth charts (Enclosures "E-3", "E-4", "E-7", "E-8", "E-11", and "E-12") are measured from the bottom of the pile cap, which has been assumed to be approximately 4 feet bgs. Greater or lesser pile cap elevations should result in a corresponding decrease or increase in pile depth.

The recommended capacities apply to the total of dead plus live loads and are gross values at the pile head. Both ultimate and allowable capacities are presented in Table 1. The design engineer should select capacities according to the design method selected. If the "strength design" method is selected, ultimate capacities should be utilized. Alternatively, if the "working stress design" method is used, allowable capacities should be selected. The nominal resistance is provided for use in LRFD design. The design engineer should apply performance factors in accordance with corresponding design specifications.

The maximum allowable downward capacity utilized a factor of safety of 2.0 for skin friction and 3.0 for tip bearing. The maximum allowable uplift capacity utilized a factor of safety of 3.0 for skin friction and 2.0 for pile weight. Utilizing these values, the combined dead plus live loads should be limited to the values presented in Table 1. We have also included ultimate downward capacities for piles should calculations utilizing other factors of safety be desired. These capacities may be increased by one-third for wind or seismic loading. The capacities provided are based on soil strengths. Structural capacities of piles must be verified by the design engineer.

The pile lengths shown in Table 1 are minimum values and are based on the assumption that the top of the pile will be approximately 4 feet bgs. It should be noted that practical refusal may be achieved prior to reaching the minimum depth of embedment. Stopping the pile short of the minimum depth of embedment will reduce pile capacity during a seismic event.

For properly-installed piles, it is anticipated that a total settlement of less than 1/2 inch will be required to mobilize allowable capacity.

<u>LATERAL PILE ANALYSES</u>:

As part of our lateral pile capacity evaluation, we analyzed the behavior of CIDH piles embedded into the representative soil profiles in the proposed structure area for both free and fixed head conditions. In each case, base shear forces were applied at the top of the pile which was assumed to be at the bottom of the footing. The graphed results, showing pile deflection and force distribution and lateral load vs.

head deflection or maximum moment, are included in Enclosures "E-13" thru "E-24" for 24-inch CIDH piles. Based on these results, we have estimated the allowable lateral loads, considering Section 1808.2.9.3 of the 2007 CBC.

The structural engineer should use judgment when modeling the degree of fixity. If a "semi-fixed" condition is considered, the lateral deflections should be re-estimated.

Section rigidity (E.I.) of 4.88×10^7 kip·in^2 was utilized for 24-inch CIDH piles.

TABLE 1

AXIAL AND LATERAL PILE CAPACITIES

ITEM				
	Exploratory Boring No.	**B-6**	**B-18**	**B-23**
	Pile Diameter (in.)	24	24	24
	Minimum Length of Pile (ft.)	37	36	39
Vertical Capacities	Ultimate Downward Capacity (kips)	588	548	570
	Ultimate Uplift Capacity (kips)	132	119	134
	Nominal Downward Resistance (kips)	338	310	325
	Nominal Uplift Resistance (kips)	67	60	67
	Allowable Downward Capacity (kips)	234	217	228
	Allowable Uplift Capacity (kips)	47	42	47
Lateral Capacities	Ultimate*, Free Head	92	90	93
	Nominal, Free Head	65	64	65
	Allowable, Free Head	46	45	46
	Ultimate*, Fixed Head	210	213	220
	Nominal, Fixed Head	150	151	157
	Allowable, Fixed Head	105	106	110

*Assumed a maximum lateral deflection of 1 inch at pile head

PILE SPACING AND GROUP EFFICIENCY:

Both axial and lateral capacities recommended in the above sections are for single piles. In the case of grouped piles, the total capacity will be subjected to pile spacing. For axial downward capacities, the group efficiency (η) should be > 0.7 for spacing = 3B, increasing linearly to 1.0 for spacing = 6B, where B is the pile diameter or width. η = 0.7 for spacing $\leq$3B. For pile groups subjected to uplift, the allowable working uplift load for the group should be the lesser of:

a. The proposed individual pile uplift working load times the number of piles in the group.

b. Two-thirds of the effective weight of the pile group and the soil contained within a block defined by the perimeter of the group and the length of the pile. An average unit weight of 125 pcf may be utilized in the calculation of soil weight.

For lateral capacities, McClelland (1972) suggested that η should be = 1.0 for spacing $\geq$ 8B and that η should decrease linearly to 0.7 at a spacing = 3B. The following publications can be referenced for the group efficiency necessitated to be considered in the design of group piles.

AASHTO, 2007, *LRFD Bridge Design Specifications*, 4th Edition

Caltrans, 2000, *Bridge Design Specifications*, Section 4, Foundations

Coduto, Donald P., 1994, *Foundation Design, Principles and Practices*, Prentice-Hall

FHWA, 1999, Drilled Shafts: *Construction Procedures and Design Methods*, Publication No. FHWA-IF-99-025

U.S. Army Corps. of Engineers, 1998, *Design of Deep Foundations*, Chapter 5, TI 818-02

CIDH PILE INSTALLATION:

The installation of the CIDH piles should be observed by the geotechnical engineer to verify the soil condition and that the desired diameter and depth of pile are achieved. CIDH piles should be true and plumb.

Because of the granular nature of the soils encountered and the anticipated diameter of the drilled holes, it is anticipated that caving could occur during the drilling and the construction of piles within the on-site soils. Appropriate precautions should therefore be taken during the construction of piles to reduce caving and raveling.

The drilling speed should be reduced as necessary to minimize vibration and caving of the sandy materials. Based on the data developed during our investigation, drilling for the piles may proceed without the need for casing. However, should caving soils be encountered, the contractor should be prepared to use casing or other approved means to prevent caving.

Closely spaced piles should be drilled and filled alternately, allowing the concrete to set at least eight hours before drilling the adjacent pile. All excavations should be filled with concrete as soon after drilling as possible. In no event should pile holes be left open overnight. The concrete should be placed with appropriate equipment, so that the concrete is not allowed to fall freely more than 5 feet, and to prevent concrete from striking the walls of the shaft, thus causing caving. All loose materials should be cleared from the bottom of the pile excavation. This is especially important because end bearing has been considered in determining the provided pile capacities. If casing is necessary and is utilized, then the casing should be withdrawn concurrently with the concrete placement.

Prior to concrete placement, any disturbed soils under and within the area of the grade beams or at the sides of pile caps should be compacted to at least 95 percent relative compaction (ASTM D 1557).

PAVEMENT AND HARDSCAPE:

Concrete slabs should be structurally supported by the pile and grade-beam foundation. Pavement and hardscape, such as driveways and sidewalks which are not structurally supported, should be designed to resist the effects of settlement.

PRELIMINARY SHORING RECOMMENDATIONS

GENERAL:

We anticipate that temporary shoring may be required during excavation for the proposed building and parking structures. The following recommendations are preliminary and may require revision for final design. The contractor should be responsible for final shoring design and for providing adequate excavation support.

LATERAL PRESSURES:

For design of cantilevered shoring, a triangular distribution of lateral earth pressure may be used. It may be assumed that the retained soils with a level surface behind the cantilevered shoring will exert a lateral pressure equal to that developed by a fluid with a density of 40 pounds pcf.

For the design of tied-back or braced shoring, we recommend the use of a rectangularly distributed apparent earth pressure for calculating the total load. The recommended pressure distribution, for the case where the grade is level behind the shoring, is illustrated in Enclosure "D-11"(e), with the maximum pressure equal to 30H in pounds per square foot (psf), where H is the height of the shoring in feet. The design engineer should refer to FHWA-IF-99-015 for the recommended apparent earth pressure diagram.

In addition to the recommended earth pressures, the upper 10 feet of shoring adjacent to streets or other vehicular traffic areas should be designed to resist a uniform lateral pressure of 100 psf, behind the shoring due to the normal street traffic. If the traffic is kept back at least 10 feet from the shoring, the traffic surcharge may be neglected.

Shoring adjacent to existing buildings should be designed to support the lateral surcharge pressure from existing building foundations, or the foundations should be underpinned.

DESIGN OF SOLDIER PILES:

For the design of soldier piles spaced a minimum of two diameters on center, the allowable lateral bearing value (passive value) of the soils below the level of excavation may be assumed to be 440 psf per foot of depth below the excavated surface, up to a maximum of 4,000 psf. To develop the full lateral value, provisions should be taken to assure firm contact between the soldier piles and the relatively undisturbed soils. The concrete placed in the soldier pile excavations may be a lean-mix concrete. However, the concrete used in that portion of the soldier pile which is below the planned excavated level should be of sufficient strength to adequately transfer the imposed loads to the surrounding soils. Provided that the portion of the soldier piles below the excavated level is backfilled with structural concrete, the soldier piles below the excavated level may be used to resist downward loads. The frictional resistance between the concrete soldier piles and the soils below the excavated level can be calculated as the product of 0.30 and the effective overburden pressure, σ_{v0}', (i.e., $0.30\sigma_{v0}'$) for level backfill or the product of 0.25 and the dead load as recommended in the 2007 CBC, and should not exceed 500 psf.

LAGGING:

Continuous lagging will be required between the soldier piles. The soldier piles and anchors should be designed for the full anticipated lateral pressure. However, the pressure on the lagging will be less due to arching in the soils. We recommended that the lagging be designed for the recommended earth pressure but limited to a maximum value of 400 psf.

ANCHOR DESIGN:

Tie-back friction anchors may be used to resist lateral loads. For design purposes, it may be assumed that the active wedge adjacent to the shoring is defined by a plane drawn at 35 degrees with the vertical through the bottom of the excavation. Friction anchors should extend at least 15 feet beyond the potential active wedge and to a greater length if necessary to develop the desired capacities.

The capacities of the anchors should be confirmed by testing of the initial anchors as outlined in the following section. For preliminary design purposes, it may be estimated that drilled friction anchors will develop an average friction value of 1,200 psf with a minimum overburden of 15 feet over the center of the anchor bond zone. Only the frictional resistance developed beyond the active wedge would be effective in resisting lateral loads. If the anchors are spaced at least 6 feet on center, no reduction in the capacity of the anchors need be considered due to group action.

ANCHOR INSTALLATION:

The anchors may be installed at angles of 15 to 40 degrees below the horizontal. Caving and difficult drilling of the anchor holes should be anticipated and provisions made to minimize the effects of caving.

The anchors should be filled with concrete placed by pumping from the tip out, and the concrete should extend from the tip of the anchor to the active wedge. To reduce the hazard of caving, we suggest that the portion of the anchor shaft within the active wedge be backfilled with sand before testing the anchor. This portion of the shaft should be filled tightly and flush with the face of the excavation. The sand backfill may contain a small amount of cement to allow the sand to be placed by pumping.

ANCHOR TESTING:

The geotechnical engineer should select at least two percent of the initial anchors for a 24-hour 200 percent test and at least an additional five percent of the anchors for quick 200 percent tests. The purpose of the 200 percent tests is to verify the friction value assumed in design. The anchors should be tested to develop twice the assumed friction value. Anchor rods of sufficient strength should be installed in these anchors to support the 200 percent test loading. Where satisfactory tests are not achieved on the initial anchors, the anchor diameter and/or length should be increased until satisfactory test results are obtained.

The total deflection during the 24-hour 200 percent test should not exceed 12 inches. During the 24-hour test, the anchor deflection should not exceed 0.75 inch, measured after the 200 percent test load is applied. If the anchor movement after the 200 percent load has been applied for 12 hours is less than 0.5 inch, and the movement over the previous 4 hours has been less than 0.1 inch, the 24-hour test may be terminated.

For the quick 200 percent tests, the 200 percent test load should be maintained for 30 minutes. The total deflection of the anchor during the 200 percent quick tests should not exceed 12 inches; the deflection after the 200 percent test load has been applied should not exceed 0.25 inch during the 30-minute period.

Where satisfactory tests are not achieved on the initial anchors, the anchor diameter and/or length should be increased until satisfactory test results are obtained.

All production anchors should be pretested to at least 150 percent of the design load; the total deflection during the test should not exceed 12 inches. The rate of creep under the 150 percent test should not exceed 0.1 inch over a 15-minute period in order for the anchor to be approved for the design loading.

After a satisfactory test, each anchor should be locked-off at the design load. The locked-off load should be verified by rechecking the load in the anchor. If the locked-off load varies by more than 10 percent from the design loads, the load should be reset until the anchor is locked-off within 10 percent of the design load.

The installation of the anchors and the testing of the completed anchors should be observed by our firm.

DEFLECTION:

It is difficult to accurately predict the amount of deflection of a shored embankment. It should be realized, however, that some deflection will occur. We estimate that this deflection could be on the order of 1 inch at the top of the shored embankment. If greater deflection occurs during construction, additional bracing may be necessary to reduce movement or settlement of the adjacent structures and utilities. If it is desired to reduce the deflection of the shoring, a greater active pressure could be used in the shoring design.

MONITORING:

Some means of monitoring the performance of the shoring system is recommended. The monitoring should consist of periodic surveying of the lateral and vertical locations of the tops of all soldier piles. In addition, we recommend that monuments be established on the surrounding ground prior to excavation and that they be monitored for horizontal and vertical movement during and following excavation and shoring installation. Also, a survey of existing cracks and offsets in nearby buildings should be performed and recorded and photographic records made.

PRE-JOB CONFERENCE:

It is imperative that no clearing and/or grading operations be performed without the presence of a representative of the geotechnical engineer. An on-site pre-job meeting with the owner, the contractor, and the geotechnical engineer should occur prior to all grading-related operations. It should be stressed that operations undertaken at the site without the presence of the geotechnical engineer may result in exclusions of affected areas from the final compaction report for the project.

CONSTRUCTION OBSERVATION:

All grading operations, including site clearing and stripping, should be observed by a representative of this firm. The presence of our field representative will be for the purpose of providing observation and field testing and will not include any supervising or directing of the actual work of the contractor, his employees, or agents. Neither the presence of our field representative, nor the observations and testing by our firm shall excuse the contractor in any way for defects discovered in his work. It is understood that our firm will not be responsible for job or site safety on this project, which will be the sole responsibility of the contractor.

LIMITATIONS

C.H.J., Incorporated has striven to perform our services within the limits prescribed by our client, and in a manner consistent with the usual thoroughness and competence of reputable geotechnical engineers and engineering geologists practicing under similar circumstances. No other representation, express or implied, and no warranty or guarantee is included or intended by virtue of the services performed or reports, opinion, documents, or otherwise supplied.

This report reflects the testing conducted on the site as the site existed during the investigation, which is the subject of this report. However, changes in the conditions of a property can occur with the passage of time, due to natural processes or the works of man on this or adjacent properties. Changes in applicable or appropriate standards may also occur whether as a result of legislation, application, or the broadening of knowledge. Therefore, this report is indicative of only those conditions tested at the time of the subject investigation, and the findings of this report may be invalidated fully or partially by changes outside of the control of C.H.J., Incorporated. This report is therefore subject to review and should not be relied upon after a period of one year.

The conclusions and recommendations in this report are based upon observations performed and data collected at separate locations, and interpolation between these locations, carried out for the project and the scope of services described. It is assumed and expected that the conditions between locations observed and/or sampled are similar to those encountered at the individual locations where observation and sampling was performed. However, conditions between these locations may vary significantly. Should conditions be encountered in the field, by the client or any firm performing services for the client or the client's assign, that appear different from those described herein, this firm should be contacted immediately in order that we might evaluate their effect.

If this report or portions thereof are provided to contractors or included in specifications, it should be understood by all parties that they are provided for information only and should be used as such.

The report and its contents resulting from this investigation are not intended or represented to be suitable for reuse on extensions or modifications of the project, or for use on any other project.

CLOSURE

We appreciate this opportunity to be of service and trust this report provides the information desired at this time. Should questions arise, please do not hesitate to contact this firm.

Respectfully submitted,

C.H.J., INCORPORATED

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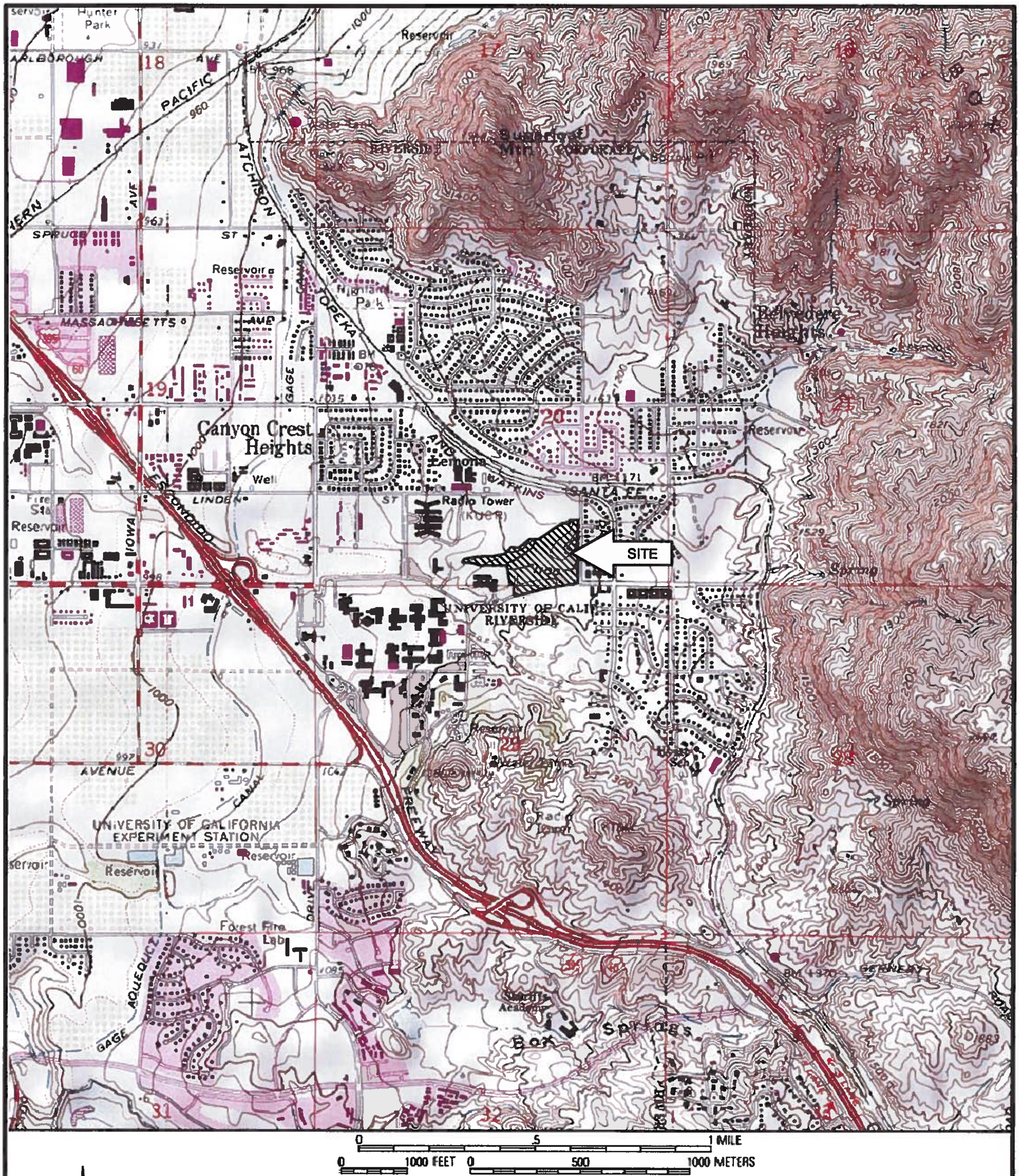
APPENDIX "A"

GEOTECHNICAL MAPS



-N-

SCALE: 1" = 2,000'

INDEX MAP

FOR: UNIVERSITY OF CALIFORNIA, RIVERSIDE
FACILITIES DESIGN AND CONSTRUCTION

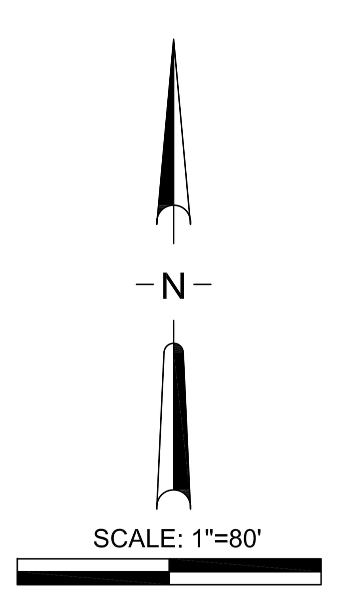
DATE: JUNE 2010

GEOTECHNICAL INVESTIGATION
PROPOSED GLEN MOR 2 STUDENT APARTMENTS
UNIVERSITY OF CALIFORNIA
RIVERSIDE, CALIFORNIA

ENCLOSURE "A-1"

JOB NUMBER 10325-3

C.H.J. Incorporated



Base Map:

Preliminary topography by: TMAD Taylor & Gaines
Dated: June 6, 2010

Structure footprints from 50% Schematic Design
Produced by: Sasaki Associates
Dated: May 20, 2010

GEOLOGIC UNITS:

f - Undifferentiated fill including turf soils, asphalt and concrete (latest Holocene)
f on Qya - Undifferentiated fill underlain by younger axial channel deposits (Holocene)
f on Qoa - Undifferentiated fill underlain by older alluvium (Pleistocene)
Qya - younger axial channel deposits including some active wash deposits (Holocene)
Qoa - older alluvium (Pleistocene)

LEGEND:

B-27 EXPLORATORY BORING LOCATIONS
(R15') — RECOMMENDED DEPTH OF REMOVAL (IN FEET)
APPROXIMATE GEOLOGIC CONTACT. DASHED WHERE INFERRED
FOOTPRINT OF EXISTING STRUCTURE
FOOTPRINT OF PROPOSED STRUCTURE

GEOLOGIC MAP

FOR: UNIVERSITY OF CALIFORNIA, RIVERSIDE
FACILITIES DESIGN AND CONSTRUCTION

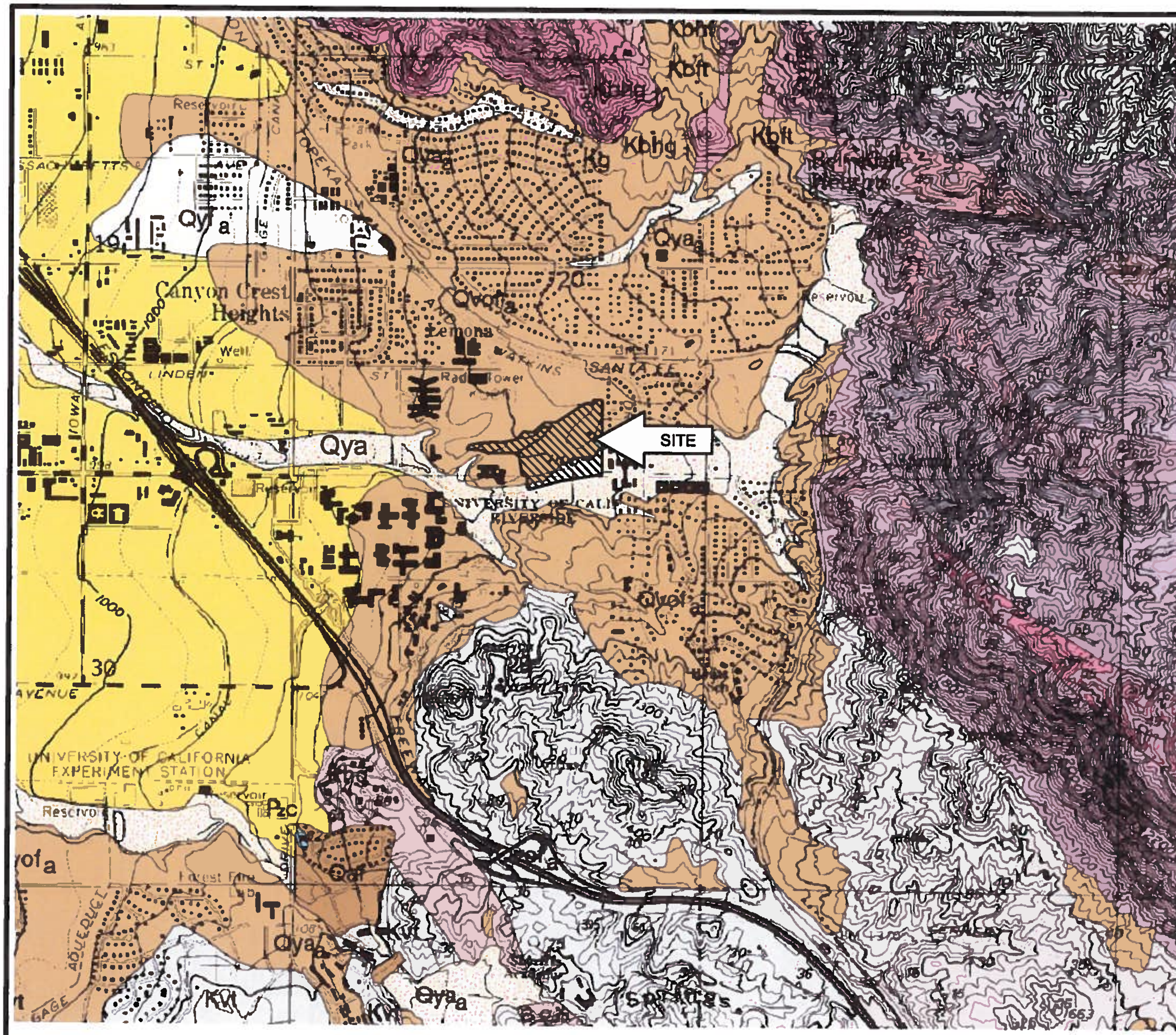
DATE: JUNE 2010

GEOTECHNICAL INVESTIGATION
PROPOSED GLEN MOR 2 STUDENT APARTMENTS
UNIVERSITY OF CALIFORNIA
RIVERSIDE, CALIFORNIA

ENCLOSURE "A-2"

JOB NUMBER 10325-3

C.H.J. Incorporated



(Base Map: Morton and Cox, 2001)

GEOLOGIC UNITS:

Qaf - Artificial fill (late Holocene)
Qyf - Young alluvial fan deposits (Holocene and late Pleistocene)
Qya - Young axial channel deposits (Holocene and late Pleistocene)
Qof - Old alluvial fan deposits (late to middle Pleistocene)
Qvof - Very old alluvial fan deposits (early Pleistocene)
Kbfg - Box Springs plutonic complex biotite, granodiorite and tonalite (Cretaceous)
Kbg - Box Springs plutonic complex porphyritic granodiorite (Cretaceous)
Kbft - Box Springs plutonic complex biotite-hornblende tonalite (Cretaceous)
Kvt - Val Verde tonalite (Cretaceous)
Kt - Tonalite, undifferentiated (Cretaceous)
Pzc - Calc-silicate rocks (Paleozoic?)

geologic contact

N

SCALE: 1" = 2,000'

GEOLOGIC INDEX MAP

FOR: UNIVERSITY OF CALIFORNIA, RIVERSIDE
FACILITIES DESIGN AND CONSTRUCTION

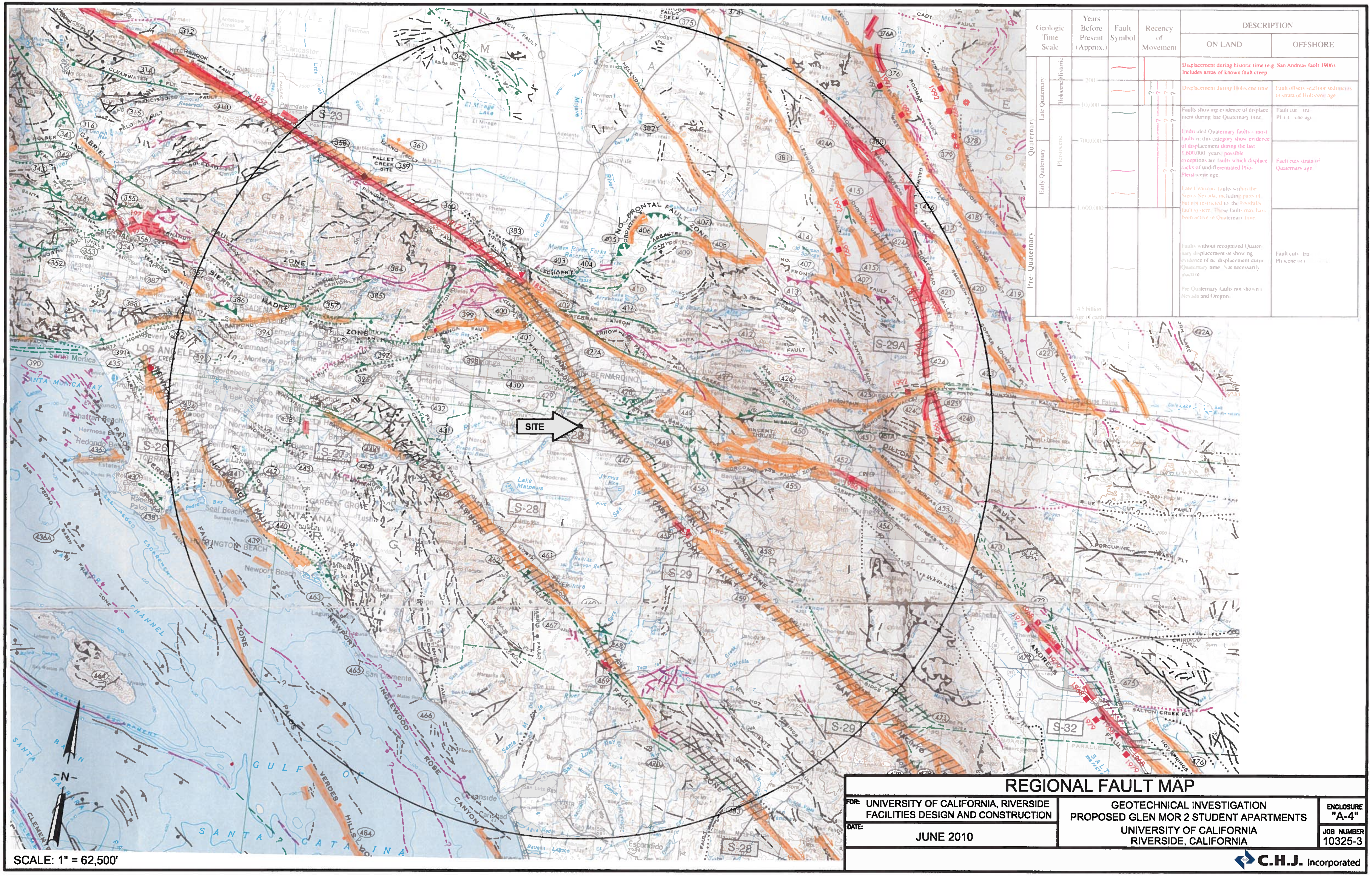
DATE: JUNE 2010

GEOTECHNICAL INVESTIGATION
PROPOSED GLEN MOR 2 STUDENT APARTMENTS
UNIVERSITY OF CALIFORNIA
RIVERSIDE, CALIFORNIA

ENCLOSURE "A-3"

JOB NUMBER 10325-3

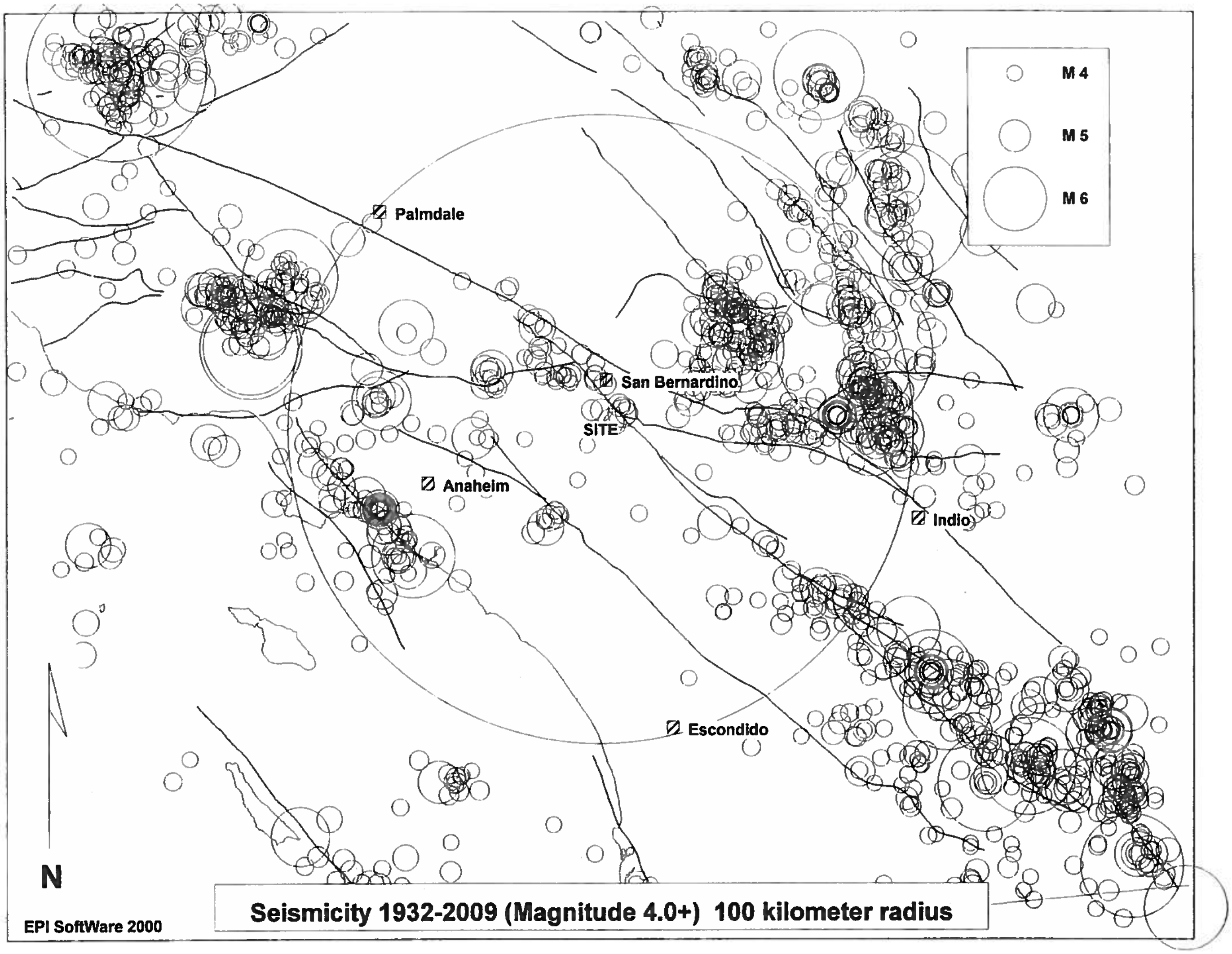
C.H.J. Incorporated



REGIONAL FAULT MAP

FOR: UNIVERSITY OF CALIFORNIA, RIVERSIDE FACILITIES DESIGN AND CONSTRUCTION	GEOTECHNICAL INVESTIGATION PROPOSED GLEN MOR 2 STUDENT APARTMENTS UNIVERSITY OF CALIFORNIA RIVERSIDE, CALIFORNIA		ENCLOSURE "A-4"
DATE: JUNE 2010			JOB NUMBER 10325-3

C.H.J. Incorporated



SITE LOCATION: 33.9766 LAT. -117.3199 LONG.

0 50 100
KILOMETERS

MINIMUM LOCATION QUALITY: C

TOTAL # OF EVENTS ON PLOT: 1538

TOTAL # OF EVENTS WITHIN SEARCH RADIUS: 643

MAGNITUDE DISTRIBUTION OF SEARCH RADIUS EVENTS:

4.0- 4.9 : 581
5.0- 5.9 : 57
6.0- 6.9 : 4
7.0- 7.9 : 1
8.0- 8.9 : 0

CLOSEST EVENT: 4.7 ON TUESDAY, NOVEMBER 07, 1939 LOCATED APPROX. 4 KILOMETERS NORTHEAST OF THE SITE

LARGEST 5 EVENTS:

7.3 ON SUNDAY, JUNE 28, 1992 LOCATED APPROX. 84 KILOMETERS EAST OF THE SITE
6.4 ON SUNDAY, JUNE 28, 1992 LOCATED APPROX. 51 KILOMETERS NORTHEAST OF THE SITE
6.4 ON SATURDAY, MARCH 11, 1933 LOCATED APPROX. 72 KILOMETERS SOUTHWEST OF THE SITE
6.1 ON THURSDAY, APRIL 23, 1992 LOCATED APPROX. 92 KILOMETERS EAST OF THE SITE
6.0 ON SATURDAY, DECEMBER 04, 1948 LOCATED APPROX. 86 KILOMETERS EAST OF THE SITE

EARTHQUAKE EPICENTER MAP

FOR: UNIVERSITY OF CALIFORNIA, RIVERSIDE FACILITIES DESIGN AND CONSTRUCTION	GEOTECHNICAL INVESTIGATION PROPOSED GLEN MOR 2 STUDENT APARTMENTS UNIVERSITY OF CALIFORNIA RIVERSIDE, CALIFORNIA	ENCLOSURE "A-5"
DATE: JUNE 2010		JOB NUMBER 10325-3

C.H.J. Incorporated

FAULT TABLE - UCR GLEN MOR 2 STUDENT HOUSING				
Fault Name	Distance (km[(2)])	Fault Area (km^2)[1]	Maximum Magnitude[1]	Slip Rate (mm/year)[1]
San Jacinto-San Bernardino	8.7	725.7	7.06	12.0
San Jacinto-San Jacinto Valley	8.9	686.7	7.04	12.0
San Andreas- South San Bernardino	21	555.5	6.94	24.0
San Andreas- North San Bernardino	21	451.9	6.86	24.0
San Jacinto - Anza	22	1193.9	7.28	12.0
Cucamonga	25	308.8	6.7	5.0
Elsinore - Glen Ivy	28	488.6	6.8	5.0
Whittier	29	562.4	6.8	2.5
Chino - Central Avenue (Elsinore)	29	424	6.7	1.0
Cleghorn	33	391.9	6.8	3.0
North Frontal Fault Zone (West)	34	1043	7.2	1.0
Elsinore-Temecula	35	734.9	7.07	5.0
San Jose	37	322.8	6.7	0.5
San Andreas - South Mojave	38	1279	7.31	30.0
Sierra Madre	42	1012	7.2	2.0
San Andreas - Banning/Garnet Hill	48	843	7.13	3.0
Puente Hills Blind Thrust	51	835.7	7.1	0.7
San Joaquin Hills Thrust	53	730.1	7.1	0.5
North Frontal Fault Zone (East)	54	678	7.0	0.5
Pinto Mountain	56	1147.8	7.3	2.5
Clamshell - Sawpit	57	293.3	6.7	0.5
Helendale-S. Lockhart	60	1459.2	7.4	0.6
Raymond	65	357.2	6.8	1.5
Newport-Inglewood (L.A. Basin)	68	980.1	7.2	1.0
Newport-Inglewood (Offshore)	68	677.5	7.0	1.5
Upper Elysian Park Thrust	73	315.7	6.7	1.3
Lenwood-Lockhart-Old Woman	75	1915.8	7.5	0.9
Elsinore-Julian	76	1426.1	7.35	5.0
Verdugo	77	513.5	6.9	0.5
Burnt Mountain	79	364	6.8	0.6
San Andreas - Coachella	79	693.4	7.04	25.0
Johnson Valley (northern)	84	559.8	6.9	0.6
Landers	85	1427.2	7.4	0.6
Hollywood	85	309.9	6.7	1.0
Eureka Peak	87	282.8	6.7	0.6
Palos Verdes	88	1347.9	7.3	3.0
Santa Monica	90	423.6	6.8	1.0
San Jacinto - Coyote Creek	91	681.5	7.03	4.0
San Jacinto - Clark segment	92	786.1	7.1	4.0
South Emerson-Copper Mountain	94	761.8	7.1	0.6
San Gabriel	95	1198.7	7.3	1.0
Coronado Bank	95	1602.2	7.4	3.0
Rose Canyon	95	538.1	7.5	1.0
Sierra Madre - San Fernando	96	332.6	6.7	2.0

1 Petersen et al., 2008.

(2) EZFRISK version 7.40 (2010).

APPENDIX "B"

EXPLORATIONS

KEY TO LOGS

LEGEND OF LAB/FIELD TESTS:

Blows	A measure of the penetration resistance of soil expressed as the number of hammer blows required to advance the indicated sampler 6 inches (or less if noted). Samplers are driven with an automatic hammer that drops a 140-pound weight 30 inches for each blow. After the required seating, samplers are advanced up to 18 inches ahead of the boring, providing up to 3 sets of blows per drive.
Bulk	Indicates Disturbed or Bulk Sample
Consol.	Consolidation Test (ASTM D 2435)
Cor.	Chemical/Corrosivity Tests
Dist.	Indicates Disturbed Sample
DS	Direct Shear Test (ASTM D 3080)
Exp.	Expansion Test (California Building Code Standard Test Method 18-2)
MDC	Maximum Density Optimum Moisture Determination (ASTM D 1557)
N.R.	Indicates No Recovery of Sample
Pass #200	Wash through #200 Screen
Ring	Indicates Relatively Undisturbed Ring Sample. Relatively Undisturbed Ring Samples are obtained with a "Modified California Sampler" (3.25" O.D. and 2.42" I.D.) lined with rings driven with a 140-pound weight falling 30 inches.
RV	R-value (Caltrans 301)
SA	Sieve Analysis (ASTM D 422)
SE	Sand Equivalent Test (ASTM D 2419)
SPT	Indicates a sample obtained with an unlined Standard Penetration Test sampler (2" O.D. and 1-3/8" I.D.).
*	Elevations based on topography by TMAD, dated June 6, 2010

SOIL CLASSIFICATION CHART

MAJOR DIVISIONS			GRAPH SYMBOL	LETTER SYMBOL	TYPICAL DESCRIPTIONS
COARSE GRAINED SOILS	GRAVEL AND GRAVELLY SOILS	CLEAN GRAVELS (LITTLE OR NO FINES)		GW	WELL-GRADED GRAVELS, GRAVEL-SAND MIXTURES, LITTLE OR NO FINES
				GP	POORLY-GRADED GRAVELS, GRAVEL-SAND MIXTURES, LITTLE OR NO FINES
	MORE THAN 50% OF COARSE FRACTION RETAINED ON NO. 4 SIEVE	GRAVELS WITH FINES (APPRECIABLE AMOUNT OF FINES)		GM	SILTY GRAVELS, GRAVEL-SAND-SILT MIXTURES
				GC	CLAYEY GRAVELS, GRAVEL-SAND-CLAY MIXTURES
	SAND AND SANDY SOILS	CLEAN SAND (LITTLE OR NO FINES)		SW	WELL-GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
				SP	POORLY-GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
MORE THAN 50% OF MATERIAL IS LARGER THAN NO. 200 SIEVE SIZE	MORE THAN 50% OF COARSE FRACTION PASSING NO. 4 SEIVE	SANDS WITH FINES (APPRECIABLE AMOUNT OF FINES)		SM	SITLY SANDS, SAND-SILT MIXTURES
				SC	CLAYEY SANDS, SAND-CLAY MIXTURES
FINE GRANED SOILS	SILTS AND CLAYS	LIQUID LIMIT LESS THAN 50		ML	INORGANIC SILTS AND VERY FINE SANDS, ROCK FLOUR, SILTY OR CLAYEY FINE SANDS OR CLAYEY SILTS WITH SLIGHT PLASTICITY
				CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS
				OL	ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY
MORE THAN 50% OF MATERIAL IS SMALLER THAN NO. 200 SIEVE SIZE	SILTS AND CLAYS	LIQUID LIMIT GREATER THAN 50		MH	INORGANIC SILTY, MICACEOUS OR DIATOMACEOUS FINE SAND OR SILTY SOILS
				CH	INORGANIC CLAYS OF HIGH PLASICITY, FAT CLAYS
				OH	ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTS
HIGHLY ORGANIC SOILS				PT	PEAT, HUMUS, SWAMP SOILS WITH HIGH ORGANIC CONTENTS

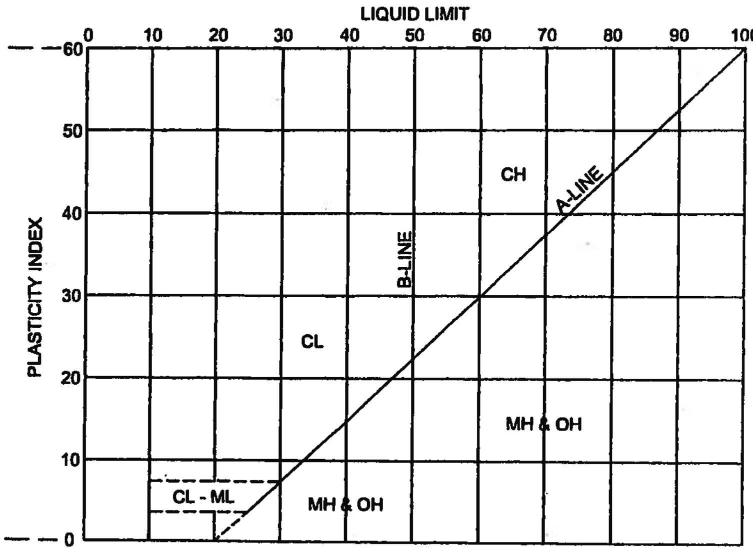
FOR LABORATORY CLASSIFICATION OF FIN-GRAINED SOILS

GRADATION CHART

MATERIAL SIZE		PARTICLE SIZE			
		LOWER LIMIT		UPPER LIMIT	
		MILLIMETERS	SIEVE SIZE	MILLIMETERS	SIEVE SIZE
SAND	FINE	.074	#200x	0.42	#40 x
	MEDIUM	042	#40 x	2.00	#10 x
	COARSE	200	#10 x	4.76	# 4 x
GRAVEL	FINE	4.76	# 4 X	191	3/4"•
	COARSE	191	3/4"•	76 2	3" •
COBBLES		76.2	3"	304.8	12"
BOULDERS		304.8	12	914.4	36"

x US STANDARD • CLEAR SQUARE OPENINGS

PLASTICITY CHART



UNIFIED SOIL CLASSIFICATION SYSTEM

C.H.J. Incorporated

Enclosure "B" (2of2)
Job No. 10325-3

EXPLORATORY BORING NO. 1

Date Drilled: 6/10/10
Client: University of California, Riverside
Equipment: CME 75 Track Rig
Driving Weight / Drop: 140 lbs./30 in.
Surface Elevation(ft): 1,090*
Logged by: VJR
Measured Depth to Water(ft): N/A

DEPTH (ft)	GRAPHIC LOG	VISUAL CLASSIFICATION	REMARKS	SAMPLES DRIVE	SAMPLES BULK	BLOWS/6 IN.	FIELD MOISTURE (%)	DRY UNIT WT. (pcf)	LAB/FIELD TESTS
		(SP-SM) Sand, fine with medium, brown	Qya		X		4.8		
				X		6 5 6	6.7	113	Ring
5				X		6 5 7	5.3	114	Ring
		(SP-SM) Sand, fine to medium with coarse, brown			X		5.6		
10			Qoa	X		6 11 14	7.3	116	Ring, DS
15				X		18 30 50	8.0	119	Ring
20				X		10 30 35	7.7	123	Ring
		(SM) Silty Sand, fine with medium to coarse, brown			X		11.0		
25				X		13 20 28	9.7	130	Ring
30				X		17 40 50/5"	10.1	126	Ring
		(SM) Silty Sand, fine with medium, brown			X		8.1		

BORING LOG - NO EQUIV & BLOW PER 6 IN 10325-3.GPJ CHJ.GDT 6/25/10

C.H.J.

GLEN MOR 2 STUDENT APARTMENTS
UNIVERSITY OF CALIFORNIA, RIVERSIDE CAMPUS

Job No. 10325-3
Enclosure B-1a

EXPLORATORY BORING NO. 1

Date Drilled: 6/10/10
Client: University of California, Riverside
Equipment: CME 75 Track Rig
Driving Weight / Drop: 140 lbs./30 in.
Surface Elevation(ft): 1,090*
Logged by: VJR
Measured Depth to Water(ft): N/A

DEPTH (ft)	GRAPHIC LOG	VISUAL CLASSIFICATION	REMARKS	SAMPLES DRIVE	SAMPLES BULK	BLOWS/6 IN.	FIELD MOISTURE (%)	DRY UNIT WT. (pcf)	LAB/FIELD TESTS
		(SM) Silty Sand, fine with medium, brown		X		26 50	7.4	126	Ring
40				X		20 40 50/5"	5.3	132	Ring
		(SP-SM) Sand, fine to medium with coarse and silt, brown			X		5.8		
45				X		26 50/5"	5.4	123	Ring
50				X		30 50/4"	6.5	132	Ring
55				X		30 50/5"	8.3	128	Ring
60				X		27 50	10.9	129	Ring
		END OF BORING NO REFUSAL, NO BEDROCK NO FILL, SLIGHT CAVING NO FREE GROUNDWATER							
65									

BORING LOG - NO EQUIV & BLOW PER 6 IN 10325-3.GPJ CHJ.GDT 6/25/10

EXPLORATORY BORING NO. 2

Date Drilled: 6/8/10 | Client: University of California, Riverside

Equipment: CME 75 Track Rig | Driving Weight / Drop: 140 lbs./30 in.

Surface Elevation(ft): 1,093* | Logged by: VJR

Measured Depth to Water(ft): N/A

DEPTH (ft)	GRAPHIC LOG	VISUAL CLASSIFICATION	REMARKS	SAMPLES DRIVE	SAMPLES BULK	BLOWS/6 IN.	FIELD MOISTURE (%)	DRY UNIT WT. (pcf)	LAB/FIELD TESTS
		(SP-SM) Sand, fine to medium with coarse and silt, brown	Qoa		X		2.5		
				X		7 10 11	3.1	120	Ring
5									
		(SP-SM) Sand, fine to coarse with silt, brown			X		4.4		
				X		15 25 35	3.4	118	Ring
10									
				X		13 14 22	13.3	124	Ring
15		(SP-SM) Sand, fine to medium with coarse, brown			X		7.0		
				X		15 25 43	5.8	125	Ring
20									
				X		16 36 44	7.4	123	Ring
25									
				X		16 34 50	8.2	125	Ring
30									
				X		22 33 50	8.4	130	Ring

BORING LOG - NO EQUIV & BLOW PER 6 IN 10325-3.GPJ CHJ.GDT 6/25/10

EXPLORATORY BORING NO. 2

Date Drilled: 6/8/10
Client: University of California, Riverside
Equipment: CME 75 Track Rig
Driving Weight / Drop: 140 lbs./30 in.
Surface Elevation(ft): 1,093*
Logged by: VJR
Measured Depth to Water(ft): N/A

DEPTH (ft)	GRAPHIC LOG	VISUAL CLASSIFICATION	REMARKS	SAMPLES DRIVE	SAMPLES BULK	BLOWS/6 IN.	FIELD MOISTURE (%)	DRY UNIT WT. (pcf)	LAB/FIELD TESTS
		(SM) Silty Sand, fine to medium with coarse, brown			X		7.5		
				X		26 35 40	8.5	132	Ring
40									
				X		26 50	8.6	130	Ring
45									
				X		20 50	12.2	122	Ring
50									
				X		24 50	11.9	119	Ring
55									
				X		18 50	11.6	122	Ring
60									
				X		18 50	16.0	111	Ring
		END OF BORING							
65		NO REFUSAL, NO BEDROCK NO FILL, SLIGHT CAVING NO FREE GROUNDWATER							

BORING LOG - NO EQUIV & BLOW PER 6 IN 10325-3.GPJ CHJ.GDT 6/25/10

EXPLORATORY BORING NO. 3

Date Drilled: 6/8/10 | Client: University of California, Riverside

Equipment: CME 75 Track Rig | Driving Weight / Drop: 140 lbs./30 in.

Surface Elevation(ft): 1,092* | Logged by: VJR | Measured Depth to Water(ft): N/A

DEPTH (ft)	GRAPHIC LOG	VISUAL CLASSIFICATION	REMARKS	SAMPLES DRIVE	SAMPLES BULK	BLOWS/6 IN.	FIELD MOISTURE (%)	DRY UNIT WT. (pcf)	LAB/FIELD TESTS
		(SM) Silty Sand, fine to medium, brown	Native		X		2.5		
				X		8 16 23	4.6	120	Ring
		(SP-SM) Sand, fine to coarse with silt, brown			X		3.4		
5				X		12 16 21	6.0	115	Ring
10				X		11 15 17	7.6	117	Ring
		(SM) Silty Sand, fine to medium with coarse, brown			X		9.9		
15				X		17 20 36	10.1	129	Ring
		(SP) Sand, fine to coarse with silt, red brown			X		3.6		
20				X		21 46 50/5"	3.0	122	Ring
25				X		30 38 50/5"	5.6	122	Ring
30				X		30 46 50/5"	3.2	119	Ring
		END OF BORING NO REFUSAL, NO BEDROCK NO FILL, SLIGHT CAVING NO FREE GROUNDWATER							

BORING LOG - NO EQUIV & BLOW PER 6 IN 10325-3.GPJ CHJ.GDT 6/25/10

C.H.J.

GLEN MOR 2 STUDENT APARTMENTS
UNIVERSITY OF CALIFORNIA, RIVERSIDE CAMPUS

Job No. 10325-3 | Enclosure B-3

EXPLORATORY BORING NO. 4

Date Drilled: 6/10/10 | Client: University of California, Riverside

Equipment: CME 75 Track Rig | Driving Weight / Drop: 140 lbs./30 in.

Surface Elevation(ft): 1,114* | Logged by: VJR

Measured Depth to Water(ft): N/A

DEPTH (ft)	GRAPHIC LOG	VISUAL CLASSIFICATION	REMARKS	SAMPLES DRIVE	SAMPLES BULK	BLOWS/6 IN.	FIELD MOISTURE (%)	DRY UNIT WT. (pcf)	LAB/FIELD TESTS
		(SM) Silty Sand, fine to medium with coarse, red brown	Qoa		X		6.8		
				X		9 11 17	6.9	126	Ring
5									
				X		22 44 50/5"	7.2	132	Ring
		(SP-SM) Sand, fine to medium with coarse and silt, brown			X		6.1		
10									
				X		25 50	10.0	121	Ring
15									
				X		25 40 50	4.3	126	Ring
20		BORING TERMINATED AT 32.5' NO REFUSAL, NO BEDROCK NO FILL, SLIGHT CAVING NO FREE GROUNDWATER							
				X		28 50	7.7	129	Ring
25									
		(SM) Sand, fine with medium, brown			X		10.5		
				X		30 50/5"	7.1	123	Ring
30									
				X		25 35 50/5"	7.5	128	Ring
		END OF BORING							

BORING LOG - NO EQUIV & BLOW PER 6 IN 10325-3.GPJ CHJ.GDT 6/25/10

EXPLORATORY BORING NO. 5

Date Drilled: 6/11/10
Client: University of California, Riverside
Equipment: CME 75 Track Rig
Driving Weight / Drop: 140 lbs./30 in.
Surface Elevation(ft): 1,113*
Logged by: VJR
Measured Depth to Water(ft): N/A

DEPTH (ft)	GRAPHIC LOG	VISUAL CLASSIFICATION	REMARKS	SAMPLES DRIVE	SAMPLES BULK	BLOWS/6 IN.	FIELD MOISTURE (%)	DRY UNIT WT. (pcf)	LAB/FIELD TESTS
0		(SM) Silty Sand, fine to medium, brown	Qoa		X		5.1		
				X		9 13 50/5"	3.4	124	Ring
4		(SP-SM) Sand, fine to coarse with silt, brown			X		2.3		
5				X		4 7 11	3.4	114	Ring, DS
10				X		9 11 18	2.6	117	Ring
15				X		20 25 25	1.9	121	Ring
20				X		20 27 32	7.9	127	Ring
25				X		18 30 50	4.9	128	Ring
30				X		21 38 50	1.7	115	Ring

BORING LOG - NO EQUIV & BLOW PER 6 IN 10325-3.GPJ CHJ.GDT 6/25/10

EXPLORATORY BORING NO. 5

Date Drilled: 6/11/10

Client: University of California, Riverside

Equipment: CME 75 Track Rig

Driving Weight / Drop: 140 lbs./30 in.

Surface Elevation(ft): 1,113*

Logged by: VJR

Measured Depth to Water(ft): N/A

DEPTH (ft)	GRAPHIC LOG	VISUAL CLASSIFICATION	REMARKS	SAMPLES DRIVE	SAMPLES BULK	BLOWS/6 IN.	FIELD MOISTURE (%)	DRY UNIT WT. (pcf)	LAB/FIELD TESTS
		(SP-SM) Sand, fine to coarse with silt, brown		X		32 50	8.3	118	Ring
40				X		50	4.3	112	Ring
45				X		33 50	2.9	111	Ring
		(SP-SM) Sand, fine to coarse with silt, brown			X		2.6		
50				X		33 50/5"	6.8	117	Ring
55				X		23 50	9.0	123	Ring
60				X		35 50/5"	8.7	116	Ring
		END OF BORING NO REFUSAL, NO BEDROCK NO FILL, SLIGHT CAVING NO FREE GROUNDWATER							
65									

BORING LOG - NO EQUIV & BLOW PER 6 IN 10325-3.GPJ CHJ.GDT 6/25/10

EXPLORATORY BORING NO. 6

Date Drilled: 6/10/10 | Client: University of California, Riverside

Equipment: CME 75 Track Rig | Driving Weight / Drop: 140 lbs./30 in.

Surface Elevation(ft): 1,109* | Logged by: VJR | Measured Depth to Water(ft): N/A

DEPTH (ft)	GRAPHIC LOG	VISUAL CLASSIFICATION	REMARKS	SAMPLES DRIVE	SAMPLES BULK	BLOWS/6 IN.	FIELD MOISTURE (%)	DRY UNIT WT. (pcf)	LAB/FIELD TESTS
		3" Asphalt Concrete, No Aggregate Base	Asphalt		X		9.4		
		(SM) Silty Sand, fine with medium, dark brown	Fill						
				X		7 10 11	17.4	117	Ring
		(SP-SM) Sand, fine to medium with silt, brown	Qoa		X		6.8		
5									
				X		4 6 7	3.0	119	Ring, DS
10									
				X		5 8 14	8.0	120	Ring
15									
		(SP) Sand, fine to coarse with silt, brown			X		4.4		
				X		8 13 15	5.0	110	Ring
20									
				X		10 18 30	8.6	128	Ring
25									
				X		25 36 42	2.3	125	Ring
30									
		(SM) Silty Sand, fine to medium with coarse, brown			X		15.8		
				X		8 14 17	15.0	118	Ring

BORING LOG - NO EQUIV & BLOW PER 6 IN 10325-3.GPJ CHJ.GDT 6/25/10

EXPLORATORY BORING NO. 6

Date Drilled: 6/10/10 | Client: University of California, Riverside

Equipment: CME 75 Track Rig | Driving Weight / Drop: 140 lbs./30 in.

Surface Elevation(ft): 1,109* | Logged by: VJR | Measured Depth to Water(ft): N/A

DEPTH (ft)	VISUAL CLASSIFICATION	REMARKS	SAMPLES DRIVE	SAMPLES BULK	BLOWS/6 IN.	FIELD MOISTURE (%)	DRY UNIT WT. (pcf)	LAB/FIELD TESTS
	(SM) Silty Sand, fine to medium with coarse, brown							
			X		17 31 44	4.4	125	Ring
40								
	(SP-SM) Sand, fine to medium with coarse and silt, brown			X		10.5		
			X		17 34 50/5"	8.2	130	Ring
45								
			X		20 30 42	5.7	124	Ring
50								
			X		22 31 45	5.7	115	Ring
55								
	(SM) Silty Sand, fine to medium, brown			X		18.2		
			X		19 23 34	15.2	117	Ring
60								
	END OF BORING		X		17 41 50/5"	10.4	129	Ring
65	NO REFUSAL, NO BEDROCK FILL TO 4.0', SLIGHT CAVING NO FREE GROUNDWATER							

EXPLORATORY BORING NO. 7

Date Drilled: 6/11/10 | Client: University of California, Riverside

Equipment: CME 75 Track Rig | Driving Weight / Drop: 140 lbs./30 in.

Surface Elevation(ft): 1,125* | Logged by: VJR

Measured Depth to Water(ft): N/A

DEPTH (ft)	GRAPHIC LOG	VISUAL CLASSIFICATION	REMARKS	SAMPLES: DRIVE	SAMPLES: BULK	BLOWS/6 IN.	FIELD MOISTURE (%)	DRY UNIT WT. (pcf)	LAB/FIELD TESTS
0		(SM) Silty Sand, fine with medium, brown	Qoa		X		5.3		
				X		18 28 16	3.2	115	Ring
4		(SM) Silty Sand, fine to medium, red brown			X		5.8		
5				X		50/3"	5.1	103	Ring
9		(SM) Silty Sand, fine with medium, brown			X		4.6		
10				X		22 50	4.1	129	Ring
14		(SP-SM) Sand, fine to medium, brown			X		5.8		
15				X		17 22 34	6.9	122	Ring
20				X		18 40 50/5"	6.9	125	Ring
25				X		30 50	5.4	119	Ring
30				X		26 50/5	5.3	115	Ring
31		END OF BORING NO REFUSAL, NO BEDROCK NO FILL, SLIGHT CAVING NO FREE GROUNDWATER							

BORING LOG - NO EQUIV & BLOW PER 6 IN 10325-3.GPJ CHJ.GDT 6/25/10

EXPLORATORY BORING NO. 8

Date Drilled: 6/11/10 | Client: University of California, Riverside

Equipment: CME 75 Track Rig | Driving Weight / Drop: 140 lbs./30 in.

Surface Elevation(ft): 1,132* | Logged by: VJR | Measured Depth to Water(ft): N/A

DEPTH (ft)	GRAPHIC LOG	VISUAL CLASSIFICATION	REMARKS	SAMPLES DRIVE	SAMPLES BULK	BLOWS/6 IN.	FIELD MOISTURE (%)	DRY UNIT WT. (pcf)	LAB/FIELD TESTS
		(SM) Silty Sand, fine with medium, red brown	Qoa		X		5.8		
				X		50/2"	6.0	98	Ring
5		(SM) Silty Sand, fine to medium with coarse, brown			X		7.3		
				X		32 50	6.4	125	Ring
		(SP-SM) Sand, fine to coarse with silt, brown			X		6.6		
10									
				X		23 42 50/5"	3.5	124	Ring
15									
				X		20 31 42	6.3	123	Ring
20									
		(SM) Silty Sand, fine to medium with coarse, brown			X		8.1		
				X		25 50	6.9	135	Ring
25		BORING TERMINATED AT 33.5' NO REFUSAL, NO BEDROCK NO FILL, SLIGHT CAVING NO FREE GROUNDWATER							
				X		18 20 30	7.9	126	Ring
30		(SP-SM) Sand, fine to medium, brown			X		4.2		
				X		16 35 50/5"	4.0	122	Ring
		END OF BORING							

BORING LOG - NO EQUIV & BLOW PER 6 IN 10325-3.GPJ CHJ.GDT 6/25/10

C.H.J.

GLEN MOR 2 STUDENT APARTMENTS
UNIVERSITY OF CALIFORNIA, RIVERSIDE CAMPUS

Job No. 10325-3 | Enclosure B-8

EXPLORATORY BORING NO. 9

Date Drilled: 6/11/10 | Client: University of California, Riverside

Equipment: CME 75 Track Rig | Driving Weight / Drop: 140 lbs./30 in.

Surface Elevation(ft): 1,132* | Logged by: VJR | Measured Depth to Water(ft): N/A

DEPTH (ft)	GRAPHIC LOG	VISUAL CLASSIFICATION	REMARKS	SAMPLES DRIVE	SAMPLES BULK	BLOWS/6 IN.	FIELD MOISTURE (%)	DRY UNIT WT. (pcf)	LAB/FIELD TESTS
0		(SM) Silty Sand, fine to medium, brown	Qoa		X		6.6		
1				X		36 50/4"	7.5	116	Ring
5				X		50	4.8	118	Ring
8		(SP-SM) Sand, fine to medium with coarse and silt, brown			X		5.8		
10				X		25 40 50/5"	4.5	125	Ring
15				X		41 39 50/5"	2.8	117	Ring
16		(SM) Silty Sand, fine to medium with coarse, brown			X		6.4		
20				X		35 50/4"	7.1	126	Ring
25				X		42 50/5"	6.3	136	Ring
30				X		26 40 50	8.4	123	Ring

END OF BORING
NO REFUSAL, NO BEDROCK
NO FILL, SLIGHT CAVING
NO FREE GROUNDWATER

BORING LOG - NO EQUIV & BLOW PER 6 IN 10325-3.GPJ CHJ.GDT 6/25/10

EXPLORATORY BORING NO. 10

Date Drilled: 6/11/10 | Client: University of California, Riverside

Equipment: CME 75 Track Rig | Driving Weight / Drop: 140 lbs./30 in.

Surface Elevation(ft): 1,136* | Logged by: VJR

Measured Depth to Water(ft): N/A

DEPTH (ft)	GRAPHIC LOG	VISUAL CLASSIFICATION	REMARKS	SAMPLES DRIVE	SAMPLES BULK	BLOWS/6 IN.	FIELD MOISTURE (%)	DRY UNIT WT. (pcf)	LAB/FIELD TESTS
0		(SM) Silty Sand, fine with medium, brown	Fill		X		8.9		
				X		8 9 12	10.5	119	Ring
5		(SP-SM) Sand, fine with medium and silt, brown			X		5.6		
				X		9 12 11	5.3	116	Ring
10		(SP-SM) Sand, fine to coarse with silt, red brown	Qoa		X		5.3		
				X		21 40 50/5"	7.3	133	Ring
15									
				X		22 35 50	9.3	127	Ring
20									
				X		22 32 41	6.7	130	Ring
25									
				X		24 42 50/5"	3.7	123	Ring
30									
				X		35 50/4"	4.7	123	Ring

BORING LOG - NO EQUIV & BLOW PER 6 IN 10325-3.GPJ CHJ.GDT 6/29/10

EXPLORATORY BORING NO. 10

Date Drilled: 6/11/10 | Client: University of California, Riverside
Equipment: CME 75 Track Rig | Driving Weight / Drop: 140 lbs./30 in.
Surface Elevation(ft): 1,136* | Logged by: VJR | Measured Depth to Water(ft): N/A

DEPTH (ft)	GRAPHIC LOG	VISUAL CLASSIFICATION	REMARKS	SAMPLES DRIVE	SAMPLES BULK	BLOWS/6 IN.	FIELD MOISTURE (%)	DRY UNIT WT. (pcf)	LAB/FIELD TESTS
		(SM) Silty Sand, fine with medium, brown			X		9.9		
				X		18 50/5"	9.6	125	Ring
40									
				X		40 50	1.5	112	Ring
		(SP-SM) Sand, fine to medium with coarse, brown			X		1.5		
45									
				X		36 50	3.2	113	Ring
50									
				X		40 50/5"	2.7	115	Ring
55									
				X		28 35 50/5"	10.2	120	Ring
60									
				X		43 50	5.6	113	Ring
		END OF BORING							
65		NO REFUSAL, NO BEDROCK NO FILL, SLIGHT CAVING NO FREE GROUNDWATER							

BORING LOG - NO EQUIV & BLOW PER 6 IN 10325-3.GPJ CHJ.GDT 6/29/10

EXPLORATORY BORING NO. 11

Date Drilled: 6/11/10
Client: University of California, Riverside
Equipment: CME 75 Track Rig
Driving Weight / Drop: 140 lbs./30 in.
Surface Elevation(ft): 1,118*
Logged by: VJR
Measured Depth to Water(ft): N/A

DEPTH (ft)	GRAPHIC LOG	VISUAL CLASSIFICATION	REMARKS	SAMPLES DRIVE	SAMPLES BULK	BLOWS/6 IN.	FIELD MOISTURE (%)	DRY UNIT WT. (pcf)	LAB/FIELD TESTS
0		(SM) Silty Sand, fine to medium, brown	Qoa		X		3.4		
1				X		5 6 8	3.6	113	Ring
5				X		36 50/5"	4.7	113	Ring
10				X		50/5"	6.0	115	Ring
15				X		50	3.9	121	Ring
19		(SP-SM) Sand, fine to medium, brown			X		3.6		
20				X		30 50	3.5	120	Ring
25				X		34 50/5"	3.4	117	Ring
30				X		28 41 50/5"	5.3	126	Ring
31.5		END OF BORING NO REFUSAL, NO BEDROCK NO FILL, SLIGHT CAVING NO FREE GROUNDWATER							

BORING LOG - NO EQUIV & BLOW PER 6 IN 10325-3.GPJ CHJ.GDT 6/25/10

EXPLORATORY BORING NO. 12

Date Drilled: 6/10/10 | Client: University of California, Riverside

Equipment: CME 75 Track Rig | Driving Weight / Drop: 140 lbs./30 in.

Surface Elevation(ft): 1,123* | Logged by: VJR | Measured Depth to Water(ft): N/A

DEPTH (ft)	VISUAL CLASSIFICATION	REMARKS	SAMPLES DRIVE	SAMPLES BULK	BLOWS/6 IN.	FIELD MOISTURE (%)	DRY UNIT WT. (pcf)	LAB/FIELD TESTS
	(SM) Silty Sand, fine to medium with coarse, brown	Qoa		X		5.6		
			X		17 26 19	7.8	122	Ring
5								
			X		50	9.7	---	Ring
10								
			X		30 50	7.9	129	Ring
15								
	(SM) Silty Sand, fine to medium, brown			X		1.0		
			X		27 50/5"	13.3	117	Ring
20								
			X		40 50/4"	6.7	125	Ring
25	BORING TERMINATED AT 33.5' NO REFUSAL, NO BEDROCK NO FILL, SLIGHT CAVING NO FREE GROUNDWATER							
			X		30 50	2.9	123	Ring
30								
			X		25 46 50/5"	4.3	122	Ring
	END OF BORING							

C.H.J.

GLEN MOR 2 STUDENT APARTMENTS
UNIVERSITY OF CALIFORNIA, RIVERSIDE CAMPUS

EXPLORATORY BORING NO. 13

Date Drilled: 6/10/10 | Client: University of California, Riverside

Equipment: CME 75 Track Rig | Driving Weight / Drop: 140 lbs./30 in.

Surface Elevation(ft): 1,124* | Logged by: VJR | Measured Depth to Water(ft): N/A

DEPTH (ft)	GRAPHIC LOG	VISUAL CLASSIFICATION	REMARKS	SAMPLES DRIVE	SAMPLES BULK	BLOWS/6 IN.	FIELD MOISTURE (%)	DRY UNIT WT. (pcf)	LAB/FIELD TESTS
0		(SM) Silty Sand, fine to medium, brown	Qoa		X		11.5		
				X		45 50/3"	4.9	116	Ring
		(SM) Silty Sand, fine to medium with coarse, yellow brown			X		6.3		
5				X		50	5.2	114	Ring
10				X		20 47 50/5"	5.1	123	Ring
		(SM) Silty Sand, fine to medium, brown			X		7.3		
15				X		20 30 46	5.8	129	Ring
20				X		22 45 50/5"	6.4	124	Ring
25		BORING TERMINATED AT 31.25' NO REFUSAL, NO BEDROCK NO FILL, SLIGHT CAVING NO FREE GROUNDWATER		X		14 22 35	7.6	129	Ring
30				X		17 41 50/4"	7.4	117	Ring
		END OF BORING							

BORING LOG - NO EQUIV & BLOW PER 6 IN 10325-3.GPJ CHJ.GDT 6/25/10

EXPLORATORY BORING NO. 14

Date Drilled: 6/11/10
Client: University of California, Riverside
Equipment: CME 75 Truck Rig
Driving Weight / Drop: 140 lbs./30 in.
Surface Elevation(ft): 1,104*
Logged by: VJR
Measured Depth to Water(ft): N/A

DEPTH (ft)	GRAPHIC LOG	VISUAL CLASSIFICATION	REMARKS	SAMPLES DRIVE	SAMPLES BULK	BLOWS/6 IN.	FIELD MOISTURE (%)	DRY UNIT WT. (pcf)	LAB/FIELD TESTS
		(SM) Silty Sand, fine to medium, brown	Qoa		X		3.4		
				X		3 2 3	5.7	112	Ring
5		(SM) Silty Sand, fine with medium to coarse, brown			X		4.8		
				X		9 14 15	5.9	122	Ring
10									
				X		38 50/5"	3.8	112	Ring
15									
		(SM) Silty Sand, fine to coarse, brown			X		3.4		
				X		25 29 41	2.9	120	Ring
20									
				X		25 37 44	4.7	119	Ring
25									
				X		15 32 50/4"	--	117	Ring
		(SP-SM) Sand, fine to medium with coarse and silt, brown			X		2.9		
30		BORING TERMINATED AT 33.5' NO REFUSAL, NO BEDROCK NO FILL, SLIGHT CAVING NO FREE GROUNDWATER							
				X		24 39 50/5"	2.2	112	Ring
		END OF BORING							

C.H.J.

GLEN MOR 2 STUDENT APARTMENTS
UNIVERSITY OF CALIFORNIA, RIVERSIDE CAMPUS

Job No. 10325-3
Enclosure B-14

EXPLORATORY BORING NO. 15

Date Drilled: 6/11/10
Client: University of California, Riverside
Equipment: CME 75 Truck Rig
Driving Weight / Drop: 140 lbs./30 in.
Surface Elevation(ft): 1,105*
Logged by: VJR
Measured Depth to Water(ft): N/A

DEPTH (ft)	GRAPHIC LOG	VISUAL CLASSIFICATION	REMARKS	SAMPLES DRIVE	SAMPLES BULK	BLOWS/6 IN.	FIELD MOISTURE (%)	DRY UNIT WT. (pcf)	LAB/FIELD TESTS
		(SM) Silty Sand, fine with medium, brown	Qoa		X		4.1		
				X		3 2 4	4.0	111	Ring
		(SM) Silty Sand, fine with medium to coarse, dark brown			X		6.8		
5				X		4 10 15	8.4	127	Ring
10				X		12 26 45	5.8	120	Ring
		(SM) Silty Sand, fine to medium with coarse, brown			X		4.6		
15				X		15 29 50/4"	5.4	117	Ring
20				X		20 36 50	4.5	123	Ring
		(SP-SM) Sand, fine to coarse with silt, brown			X		4.2		
25				X		16 37 37	3.1	123	Ring
30				X		21 34 50/5"	3.1	111	Ring

BORING LOG - NO EQUIV & BLOW PER 6 IN 10325-3.GPJ CHJ.GDT 6/25/10

EXPLORATORY BORING NO. 15

Date Drilled: 6/11/10
Client: University of California, Riverside
Equipment: CME 75 Truck Rig
Driving Weight / Drop: 140 lbs./30 in.
Surface Elevation(ft): 1,105*
Logged by: VJR
Measured Depth to Water(ft): N/A

DEPTH (ft)	GRAPHIC LOG	VISUAL CLASSIFICATION	REMARKS	SAMPLES DRIVE	SAMPLES BULK	BLOWS/6 IN.	FIELD MOISTURE (%)	DRY UNIT WT. (pcf)	LAB/FIELD TESTS
		(SP-SM) Sand, fine to coarse with silt, brown		X		29 45 50	2.6	110	Ring
		(SP-SM) Sand, fine to medium with silt, brown			X		6.3		
40				X		31 46 50/4"	5.2	123	Ring
45				X		29 47 50/4"	6.2	117	Ring
50				X		30 37 50	6.6	115	Ring
		END OF BORING NO REFUSAL, NO BEDROCK NO FILL, SLIGHT CAVING NO FREE GROUNDWATER							
55									
60									
65									

BORING LOG - NO EQUIV & BLOW PER 6 IN 10325-3.GPJ CHJ.GDT 6/25/10

EXPLORATORY BORING NO. 16

Date Drilled: 6/11/10
Client: University of California, Riverside
Equipment: CME 75 Truck Rig
Driving Weight / Drop: 140 lbs./30 in.
Surface Elevation(ft): 1,106*
Logged by: VJR
Measured Depth to Water(ft): N/A

DEPTH (ft)	GRAPHIC LOG	VISUAL CLASSIFICATION	REMARKS	SAMPLES DRIVE	SAMPLES BULK	BLOWS/6 IN.	FIELD MOISTURE (%)	DRY UNIT WT. (pcf)	LAB/FIELD TESTS
		(SM) Silty Sand, fine with medium, brown	Qoa				2.9		
						3 5 5	4.2	111	Ring
5		(SM) Silty Sand, fine to medium, dark brown					5.6		
						16 41 50	3.0	124	Ring
10		(SM) Silty Sand, fine to medium with coarse, brown					3.6		
						21 34 50/5"	3.3	117	Ring
15		(SP-SM) Sand, fine to medium with silt, brown					2.5		
						16 19 34	1.8	118	Ring
20						25 37 50	3.2	119	Ring
25		BORING TERMINATED AT 33.0' NO REFUSAL, NO BEDROCK NO FILL, SLIGHT CAVING NO FREE GROUNDWATER				18 29 50/5"	7.7	118	Ring
30						38 50/5"	2.3	---	Ring
		END OF BORING							

EXPLORATORY BORING NO. 17

Date Drilled: 6/8/10
Client: University of California, Riverside
Equipment: CME 75 Track Rig
Driving Weight / Drop: 140 lbs./30 in.
Surface Elevation(ft): 1,103*
Logged by: VJR
Measured Depth to Water(ft): N/A

DEPTH (ft)	GRAPHIC LOG	VISUAL CLASSIFICATION	REMARKS	SAMPLES DRIVE	SAMPLES BULK	BLOWS/6 IN.	FIELD MOISTURE (%)	DRY UNIT WT. (pcf)	LAB/FIELD TESTS
0		3" Asphalt Concrete, 2" Aggregate Base	Asphalt		X		4.8		
		(SM) Silty Sand, fine to medium, brown	Fill	X		20 14 14	1.7	128	Ring
3		(SP-SM) Sand, fine to medium with coarse, brown	Qoa		X		3.7		
5				X		7 8 10	2.2	120	Ring
10				X		6 12 15	5.5	116	Ring
14		(SM) Silty Sand, fine to medium, brown			X		10.5		
15				X		7 12 17	6.8	106	Ring
20				X		14 26 28	11.1	118	Ring
25				X		18 28 38	8.8	115	Ring
30									
31.5		END OF BORING NO REFUSAL, NO BEDROCK FILL TO 3.0', SLIGHT CAVING NO FREE GROUNDWATER							

EXPLORATORY BORING NO. 18

Date Drilled: 6/8/10
Client: University of California, Riverside
Equipment: CME 75 Track Rig
Driving Weight / Drop: 140 lbs./30 in.
Surface Elevation(ft): 1,098*
Logged by: VJR
Measured Depth to Water(ft): N/A

DEPTH (ft)	GRAPHIC LOG	VISUAL CLASSIFICATION	REMARKS	SAMPLES DRIVE	SAMPLES BULK	BLOWS/6 IN.	FIELD MOISTURE (%)	DRY UNIT WT. (pcf)	LAB/FIELD TESTS
0		(SM) Silty Sand, fine to medium with coarse, brown	Fill		X		4.1		
				X		8 9 11			SPT
4		(SP-SM) Sand, fine to medium with coarse and silt, dark brown			X		9.2		
5									
				X		3 2 3			SPT
10									
				X		3 3 4			SPT
15		(SP-SM) Sand, fine to coarse with silt, brown	Qoa		X		9.9		
				X		6 8 10			SPT
20									
				X		10 13 13			SPT
25									
				X		8 14 18			SPT
30									
				X		14 14 16			SPT

BORING LOG - NO EQUIV & BLOW PER 6 IN 10325-3.GPJ CHJ.GDT 6/28/10

EXPLORATORY BORING NO. 18

Date Drilled: 6/8/10 | Client: University of California, Riverside

Equipment: CME 75 Track Rig | Driving Weight / Drop: 140 lbs./30 in.

Surface Elevation(ft): 1,098* | Logged by: VJR | Measured Depth to Water(ft): N/A

DEPTH (ft)	GRAPHIC LOG	VISUAL CLASSIFICATION	REMARKS	SAMPLES DRIVE	SAMPLES BULK	BLOWS/6 IN.	FIELD MOISTURE (%)	DRY UNIT WT. (pcf)	LAB/FIELD TESTS
		(SP-SM) Sand, fine to medium with coarse and silt, brown							
				X		14 16 16			SPT
40									
				X		18 18 28			SPT
45									
		(SM) Silty Sand, fine to medium with coarse, red brown		X		17 23 25			SPT
50									
				X		16 27 31			SPT
55									
				X		17 25 31			SPT
60									
				X		17 31 37			SPT
		END OF BORING							
65		NO REFUSAL, NO BEDROCK FILL TO 17.0', SLIGHT CAVING NO FREE GROUNDWATER							

BORING LOG - NO EQUIV & BLOW PER 6 IN 10325-3.GPJ CHJ.GDT 6/25/10

EXPLORATORY BORING NO. 19

Date Drilled: 6/8/10

Client: University of California, Riverside

Equipment: CME 75 Track Rig

Driving Weight / Drop: 140 lbs./30 in.

Surface Elevation(ft): 1,097*

Logged by: VJR

Measured Depth to Water(ft): N/A

DEPTH (ft)	GRAPHIC LOG	VISUAL CLASSIFICATION	REMARKS	SAMPLES: DRIVE	SAMPLES: BULK	BLOWS/6 IN.	FIELD MOISTURE (%)	DRY UNIT WT. (pcf)	LAB/FIELD TESTS
		3" Asphalt Concrete, 2" Aggregate Base	Asphalt		X		8.9		
		(SM) Silty Sand, fine with medium, dark gray	Fill	X		11 10 11	8.3	129	Ring
		(SM) Silty Sand, fine to medium, brown	Qoa		X		6.6		
5				X		6 7 11	7.4	113	Ring, DS, Consol.
10				X		7 14 24	3.8	116	Ring
15				X		7 16 23	8.4	101	Ring
		(SP-SM) Sand, fine to coarse with silt, gravel to 1", brown			X		3.7		
20				X		17 17 26	4.5	119	Ring
25				X		26 23 28	4.8	108	Ring
30				X		28 32 44	9.3	124	Ring
		(SM) Silty Sand, fine to medium with coarse, red brown			X		8.9		

BORING LOG - NO EQUIV & BLOW PER 6 IN 10325-3.GPJ CHJ.GDT 6/25/10

EXPLORATORY BORING NO. 19

Date Drilled: 6/8/10
Client: University of California, Riverside
Equipment: CME 75 Track Rig
Driving Weight / Drop: 140 lbs./30 in.
Surface Elevation(ft): 1,097*
Logged by: VJR
Measured Depth to Water(ft): N/A

DEPTH (ft)	GRAPHIC LOG	VISUAL CLASSIFICATION	REMARKS	SAMPLES DRIVE	SAMPLES BULK	BLOWS/6 IN.	FIELD MOISTURE (%)	DRY UNIT WT. (pcf)	LAB/FIELD TESTS
		(SM) Silty Sand, fine to medium with coarse, red brown		X		35 50	8.3	131	Ring
40				X		19 40 50/5"	1.8	129	Ring
45				X		22 35 50	10.9	127	Ring
50				X		15 50	9.5	131	Ring
55				X		45 50/5"	9.3	128	Ring
60				X		42 50/3"	6.4	128	Ring
		END OF BORING							
		NO REFUSAL, NO BEDROCK FILL TO 2.0', SLIGHT CAVING NO FREE GROUNDWATER							
65									

EXPLORATORY BORING NO. 20

Date Drilled: 6/8/10
Client: University of California, Riverside
Equipment: CME 75 Track Rig
Driving Weight / Drop: 140 lbs./30 in.
Surface Elevation(ft): 1,093*
Logged by: VJR
Measured Depth to Water(ft): N/A

DEPTH (ft)	VISUAL CLASSIFICATION	REMARKS	SAMPLES: DRIVE	SAMPLES: BULK	BLOWS/6 IN.	FIELD MOISTURE (%)	DRY UNIT WT. (pcf)	LAB/FIELD TESTS
0	2-1/2" Asphalt Concrete, No Aggregate Base	Asphalt		X		2.0		
	(SM) Silty Sand, fine to medium with coarse, light brown	Qoa						
			X		8 9 10	1.9	121	Ring
5	(SP-SM) Sand, fine to medium with coarse and silt, brown			X		2.5		
			X		7 7 12	1.6	114	Ring
10								
			X		17 28 24	1.4	110	Ring
15								
			X		7 13 24	5.9	115	Ring
20	(SM) Silty Sand, fine with medium, brown			X		8.9		
			X		12 26 34	7.6	98	Ring
25								
			X		27 50	7.0	125	Ring
30	(SP-SM) Sand, fine to medium with coarse and silt, red brown							
			X		50/6"	5.4	120	Ring

BORING LOG - NO EQUIV & BLOW PER 6 IN 10325-3.GPJ CHJ.GDT 6/25/10

C.H.J.

GLEN MOR 2 STUDENT APARTMENTS
UNIVERSITY OF CALIFORNIA, RIVERSIDE CAMPUS

Job No. 10325-3
Enclosure B-20a

EXPLORATORY BORING NO. 20

Date Drilled: 6/8/10

Client: University of California, Riverside

Equipment: CME 75 Track Rig

Driving Weight / Drop: 140 lbs./30 in.

Surface Elevation(ft): 1,093*

Logged by: VJR

Measured Depth to Water(ft): N/A

DEPTH (ft)	VISUAL CLASSIFICATION	REMARKS	SAMPLES DRIVE	SAMPLES BULK	BLOWS/6 IN.	FIELD MOISTURE (%)	DRY UNIT WT. (pcf)	LAB/FIELD TESTS
	(SP-SM) Sand, fine to medium with coarse and silt, red brown							
			X		45 40 50/5"	5.9	131	Ring
	(SM) Silty Sand, fine to medium, brown			X		1.0		
40								
			X		27 50/5"	6.6	124	Ring
45								
			X		34 50/5"	5.9	127	Ring
50								
			X		43 50/4"	7.4	128	Ring
55								
			X		34 50/4"	13.7	111	Ring
60	(SP-SM) Sand, fine to coarse with silt, red brown			X		4.1		
			X		30 50/5"	4.1	118	Ring
	END OF BORING							
65	NO REFUSAL, NO BEDROCK NO FILL, SLIGHT CAVING NO FREE GROUNDWATER							

BORING LOG - NO EQUIV & BLOW PER 6 IN 10325-3.GPJ CHJ.GDT 6/25/10

EXPLORATORY BORING NO. 21

Date Drilled: 6/8/10 | Client: University of California, Riverside

Equipment: CME 75 Track Rig | Driving Weight / Drop: 140 lbs./30 in.

Surface Elevation(ft): 1,089* | Logged by: VJR | Measured Depth to Water(ft): N/A

DEPTH (ft)	GRAPHIC LOG	VISUAL CLASSIFICATION	REMARKS	SAMPLES DRIVE	SAMPLES BULK	BLOWS/6 IN.	FIELD MOISTURE (%)	DRY UNIT WT. (pcf)	LAB/FIELD TESTS
0		2" Asphalt Concrete, No Aggregate Base	Asphalt		X		6.6		
		(SM) Silty Sand, fine to coarse, brown	Qoa	X		8 11 12	3.5	122	Ring
5				X		8 12 14	1.2	117	Ring
		(SP-SM) Sand, fine to coarse with silt, brown			X		4.7		
10				X		18 23 29	4.5	121	Ring
15				X		17 24 33	1.3	116	Ring
		(SP-SM) Sand, fine to medium with silt, brown			X		7.8		
20				X		13 17 19	3.4	110	Ring
25				X		16 25 31	3.3	114	Ring
30				X		13 30 41	5.5	112	Ring

END OF BORING
NO REFUSAL, NO BEDROCK
NO FILL, SLIGHT CAVING
NO FREE GROUNDWATER

BORING LOG - NO EQUIV & BLOW PER 6 IN 10325-3.GPJ CHJ.GDT 6/25/10

C.H.J.

GLEN MOR 2 STUDENT APARTMENTS
UNIVERSITY OF CALIFORNIA, RIVERSIDE CAMPUS

Job No. 10325-3 | Enclosure B-21

EXPLORATORY BORING NO. 22

Date Drilled: 6/8/10

Client: University of California, Riverside

Equipment: CME 75 Track Rig

Driving Weight / Drop: 140 lbs./30 in.

Surface Elevation(ft): 1,088*

Logged by: VJR

Measured Depth to Water(ft): N/A

DEPTH (ft)	VISUAL CLASSIFICATION	REMARKS	SAMPLES: DRIVE	SAMPLES: BULK	BLOWS/6 IN.	FIELD MOISTURE (%)	DRY UNIT WT. (pcf)	LAB/FIELD TESTS
0	2" Asphalt Concrete, 2" Aggregate Base	Asphalt		X		1.1		
	(SM) Silty Sand, fine with medium, light brown	Qoa						
			X		5 8 9	0.7	---	Ring
				X		0.9		SA, MDC, DS
3	(SP-SM) Sand, fine to coarse with silt, light brown							
5								
			X		6 7 8	0.5	103	Ring
10								
			X		14 19 23	1.6	119	Ring
15								
16	(SM) Silty Sand, fine to medium, brown			X		7.3		
			X		10 20 24	8.2	98	Ring
20								
			X		11 26 33	2.8	114	Ring
24	(SW-SM) Sand, fine to medium with coarse and silt, brown			X		2.6		
25								
	BORING TERMINATED AT 33.5' NO REFUSAL, NO BEDROCK NO FILL, SLIGHT CAVING NO FREE GROUNDWATER		X		14 22 32	2.2	117	Ring
30								
			X		17 19 37	6.0	127	Ring
33.5	END OF BORING							

EXPLORATORY BORING NO. 23

Date Drilled: 6/8/10 | Client: University of California, Riverside

Equipment: CME 75 Track Rig | Driving Weight / Drop: 140 lbs./30 in.

Surface Elevation(ft): 1,085* | Logged by: VJR | Measured Depth to Water(ft): N/A

DEPTH (ft)	GRAPHIC LOG	VISUAL CLASSIFICATION	REMARKS	SAMPLES DRIVE	SAMPLES BULK	BLOWS/6 IN.	FIELD MOISTURE (%)	DRY UNIT WT. (pcf)	LAB/FIELD TESTS
0		(SM) Silty Sand, fine to medium with coarse, brown	Fill		X				
				X		2 2 2			SPT
5				X		1 2 3			SPT
7		(SM) Silty Sand, fine to coarse, brown	Qoa		X				
10				X		5 5 8			SPT
15				X		5 9 13			SPT
18		(SM) Silty Sand, fine to medium, brown							
20				X		4 5 9			SPT
24		(SP-SM) Sand, fine to coarse with silt, brown							
25				X		9 11 15			SPT
30				X		6 6 9			SPT
34		(SM) Silty Sand, fine with medium, brown							

BORING LOG - NO EQUIV & BLOW PER 6 IN 10325-3.GPJ CHJ.GDT 6/25/10

EXPLORATORY BORING NO. 23

Date Drilled: 6/8/10
Client: University of California, Riverside
Equipment: CME 75 Track Rig
Driving Weight / Drop: 140 lbs./30 in.
Surface Elevation(ft): 1,085*
Logged by: VJR
Measured Depth to Water(ft): N/A

DEPTH (ft)	GRAPHIC LOG	VISUAL CLASSIFICATION	REMARKS	SAMPLES DRIVE	SAMPLES BULK	BLOWS/6 IN.	FIELD MOISTURE (%)	DRY UNIT WT. (pcf)	LAB/FIELD TESTS
		(SM) Silty Sand, fine with medium, brown		X		9 9 11			SPT
40				X		4 9 12			SPT
45				X		8 11 19			SPT
50				X		9 10 11			SPT
55		(SM) Silty Sand, fine to medium with coarse and silt, brown		X		12 18 17			SPT
60				X		10 15 15			SPT
		END OF BORING NO REFUSAL, NO BEDROCK FILL TO 7.0', SLIGHT CAVING NO FREE GROUNDWATER							
65									

BORING LOG - NO EQUIV & BLOW PER 6 IN 10325-3.GPJ CHJ.GDT 6/25/10

EXPLORATORY BORING NO. 24

Date Drilled: 6/8/10

Client: University of California, Riverside

Equipment: CME 75 Track Rig

Driving Weight / Drop: 140 lbs./30 in.

Surface Elevation(ft): 1,092*

Logged by: VJR

Measured Depth to Water(ft): N/A

DEPTH (ft)	GRAPHIC LOG	VISUAL CLASSIFICATION	REMARKS	SAMPLES DRIVE	SAMPLES BULK	BLOWS/6 IN.	FIELD MOISTURE (%)	DRY UNIT WT. (pcf)	LAB/FIELD TESTS
		2-1/2" Asphalt Concrete, No Aggregate Base	Asphalt		X		7.8		
		(SM) Silty Sand, fine to medium, brown	Fill						
				X		4 7 11	8.4	127	Ring
		(SM) Silty Sand, fine with medium, light brown	Qoa		X		4.1		
5									
				X		7 8 10	5.3	107	Ring, DS, Consol.
10									
				X		10 16 17	5.7	95	Ring
15		(SP-SM) Sand, fine to medium, brown			X		4.2		
				X		15 27 42	2.4	129	Ring
20									
				X		18 36 50/3"	---	112	Ring
25		BORING TERMINATED AT 32.75' NO REFUSAL, NO BEDROCK FILL TO 3.0', SLIGHT CAVING NO FREE GROUNDWATER							
				X		50/6"	5.9	113	Ring
30									
				X		30 50/4"	4.3	126	Ring
		END OF BORING							

EXPLORATORY BORING NO. 25

Date Drilled: 6/10/10 | Client: University of California, Riverside

Equipment: CME 75 Track Rig | Driving Weight / Drop: 140 lbs./30 in.

Surface Elevation(ft): 1,092* | Logged by: VJR | Measured Depth to Water(ft): N/A

DEPTH (ft)	GRAPHIC LOG	VISUAL CLASSIFICATION	REMARKS	SAMPLES DRIVE	SAMPLES BULK	BLOWS/6 IN.	FIELD MOISTURE (%)	DRY UNIT WT. (pcf)	LAB/FIELD TESTS
0		(SP-SM) Sand, fine to medium with coarse and silt, dark brown	Fill		X		8.6		
				X		15 11 14	9.1	126	Ring
4		(SM) Silty Sand, fine to medium with coarse, brown	Qoa		X		9.9		SA, MDC
5				X		4 4 7	10.4	125	Ring, DS, Consol.
10				X		6 7 12	11.9	107	Ring
15				X		11 14 19	5.7	122	Ring
19		(SP-SM) Sand, fine with medium and silt, brown			X		7.6		
20				X		13 18 25	8.8	115	Ring
25				X		11 23 30	10.3	130	Ring
30				X		20 50	7.7	127	Ring

END OF BORING

NO REFUSAL, NO BEDROCK
FILL TO 4.0', SLIGHT CAVING
NO FREE GROUNDWATER

BORING LOG - NO EQUIV & BLOW PER 6 IN 10325-3.GPJ CHJ.GDT 6/25/10

EXPLORATORY BORING NO. 26

Date Drilled: 6/8/10 | Client: University of California, Riverside

Equipment: CME 75 Track Rig | Driving Weight / Drop: 140 lbs./30 in.

Surface Elevation(ft): 1,093* | Logged by: VJR | Measured Depth to Water(ft): N/A

DEPTH (ft)	GRAPHIC LOG	VISUAL CLASSIFICATION	REMARKS	SAMPLES DRIVE	SAMPLES BULK	BLOWS/6 IN.	FIELD MOISTURE (%)	DRY UNIT WT. (pcf)	LAB/FIELD TESTS
0		(SM) Silty Sand, fine to medium, red brown	f/Qoa		X				
				X		4 3 4			SPT
5									
				X		5 4 4			SPT
10									
		(SP-SM) Sand, fine to medium with coarse and silt, brown			X				
				X		8 11 11			SPT
15									
				X		7 8 13			SPT
20									
		(SM) Silty Sand, fine to medium with coarse, brown							
				X		6 9 12			SPT
25									
		(SM) Silty Sand, fine to medium with coarse and silt, brown							
				X		9 15 17			SPT
30									
				X		7 9 17			SPT
		(SM) Silty Sand, fine to medium with coarse, brown							

BORING LOG - NO EQUIV & BLOW PER 6 IN 10325-3.GPJ CHJ.GDT 6/25/10

C.H.J.

GLEN MOR 2 STUDENT APARTMENTS
UNIVERSITY OF CALIFORNIA, RIVERSIDE CAMPUS

Job No. 10325-3 Enclosure B-26a

EXPLORATORY BORING NO. 26

Date Drilled: 6/8/10 | Client: University of California, Riverside

Equipment: CME 75 Track Rig | Driving Weight / Drop: 140 lbs./30 in.

Surface Elevation(ft): 1,093* | Logged by: VJR | Measured Depth to Water(ft): N/A

DEPTH (ft)	GRAPHIC LOG	VISUAL CLASSIFICATION	REMARKS	SAMPLES DRIVE	SAMPLES BULK	BLOWS/6 IN.	FIELD MOISTURE (%)	DRY UNIT WT. (pcf)	LAB/FIELD TESTS
		(SM) Silty Sand, fine to medium with coarse, brown							
				X		7 9 13			SPT
40									
				X		8 11 14			SPT
45									
				X		13 18 21			SPT
50									
				X		12 17 19			SPT
55									
				X		9 15 20			SPT
60									
				X		9 12 16			SPT
		END OF BORING NO REFUSAL, NO BEDROCK NO FILL, SLIGHT CAVING NO FREE GROUNDWATER							
65									

BORING LOG - NO EQUIV & BLOW PER 6 IN 10325-3.GPJ CHJ.GDT 6/25/10

C.H.J.

GLEN MOR 2 STUDENT APARTMENTS
UNIVERSITY OF CALIFORNIA, RIVERSIDE CAMPUS

Job No. 10325-3 | Enclosure B-26b

EXPLORATORY BORING NO. 27

Date Drilled: 6/8/10 | Client: University of California, Riverside

Equipment: CME 75 Track Rig | Driving Weight / Drop: 140 lbs./30 in.

Surface Elevation(ft): 1,100* | Logged by: VJR | Measured Depth to Water(ft): N/A

DEPTH (ft)	VISUAL CLASSIFICATION	REMARKS	SAMPLES: DRIVE	SAMPLES: BULK	BLOWS/6 IN.	FIELD MOISTURE (%)	DRY UNIT WT. (pcf)	LAB/FIELD TESTS
0	2" Asphalt Concrete, 4" Aggregate Base	Asphalt						
	(SM) Silty Sand, fine to coarse, brown	Fill	X	X	10 12 15	5.3	123	Ring
3	(SP-SM) Sand, fine to medium with coarse and silt, olive brown	Qoa		X				
5			X		7 11 14	5.4	121	Ring
10			X		7 13 14	2.3	108	Ring
15			X	X	6 6 13	9.1	98	Ring
16	(SM) Silty Sand, fine with medium, brown							
20			X		26 30 44	7.5	127	Ring
25			X		17 24 36	6.9	130	Ring
27	(SP) Sand, fine to coarse with silt, red brown			X				
30			X		21 40 50	3.3	119	Ring

END OF BORING
NO REFUSAL, NO BEDROCK
FILL TO 3.0', SLIGHT CAVING
NO FREE GROUNDWATER

BORING LOG - NO EQUIV & BLOW PER 6 IN 10325-3.GPJ CHJ.GDT 6/25/10

APPENDIX "C"

LABORATORY TESTING

TEST DATA SUMMARY

OPTIMUM MOISTURE - MAXIMUM DENSITY RELATION:

(ASTM D 1557)

Sample No.	Depth (ft)	Classification	Optimum Moisture (%)	Max. Dry Density (pcf)
17B+18B+19B	2 to 4	(SM) Silty sand, fine to medium with coarse, brown	6.5	137.5
22B	3	(SW-SM) Sand, fine to coarse with silt, light brown	8.5	130.5
25B	4	(SM) Silty sand, fine to medium with coarse, brown	7.5	135.5

DIRECT SHEAR TEST - Undisturbed: (Saturated)

(ASTM D 3080)

Boring No.	Depth (ft)	Angle of Internal Friction (°)	Apparent Cohesion (psf)
1	10	40	0
5	5	33	486
6	7	30	54
19	5	31	0
22	3	33	0
24	7	29	0

FINES CONTENT:

Boring No.	Depth (ft)	Fine Contents (%)	USCS
18	4 — 15	9.2	SP-SM
18	15 — 47	9.9	SP-SM
18	47 — 63.5	34.0	SM
23	7 — 18	25.0	SM
23	18 — 24	27.0	SM
23	24 — 34	6.5	SP
23	34 — 54	40.0	SM
23	54 — 61.5	17.0	SM

EXPANSION INDEX:

Boring No.	Depth (ft)	Fine Contents (%)	USCS
26	0 — 11	30.0	SM
26	11 — 21	12.0	SP-SM
26	21 — 26	45.0	SM
26	26 — 33	31.0	SM
26	33 — 63.5	34.0	SM

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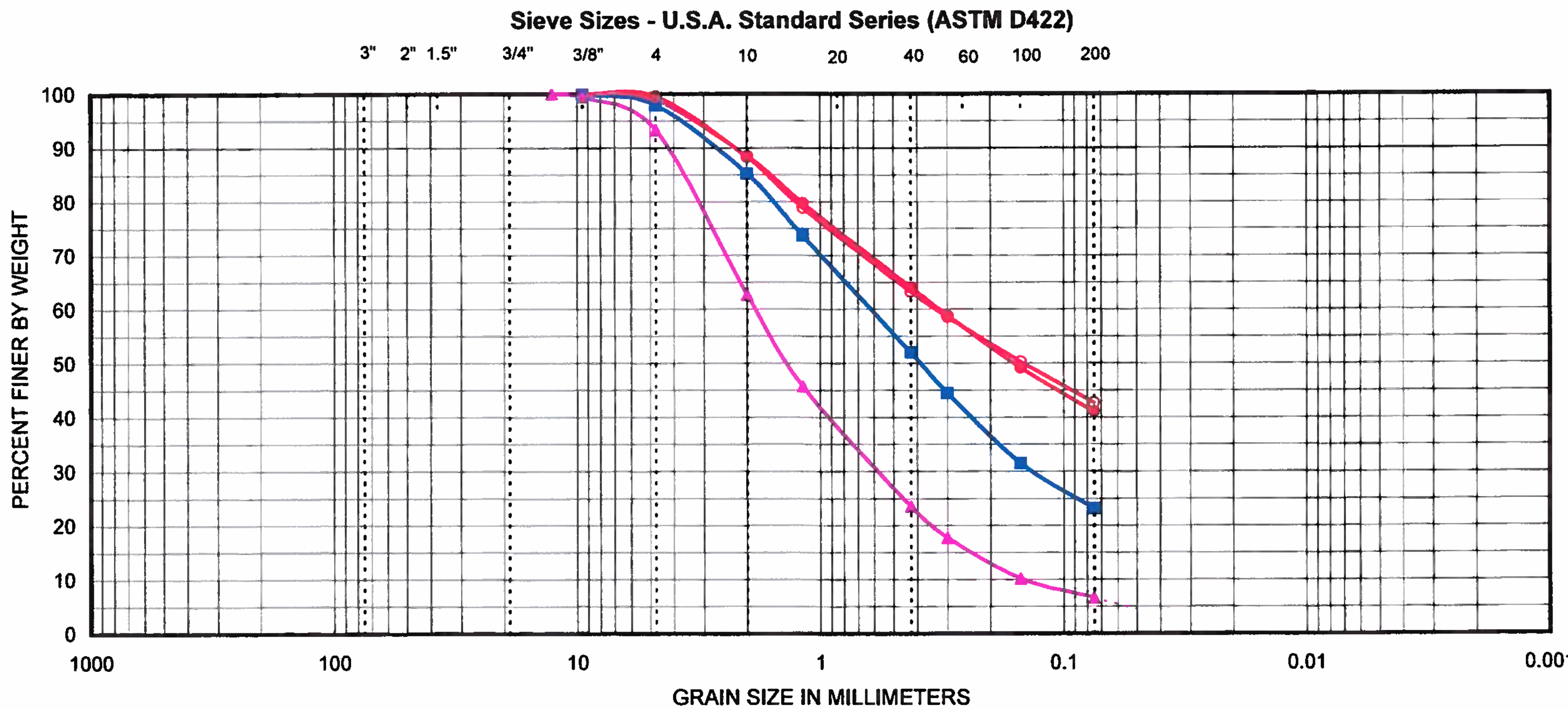
TEST DATA SUMMARY			
Project:	Proposed Glen Mor 2 Student Apartments - Project No. 956334		
Location:	University of California, Riverside, California		
Job No.:	10325-3	Enclosure:	C-1

Prepared at 6/18/2010



Cobbles & Boulders	Gravel		Sand			Silt	Clay
	Coarse	Fine	Coarse	Medium	Fine		

Symbol	Boring No.	Depth (ft)	Classification	D_{10} (mm)	D_{30} (mm)	D_{50} (mm)	D_{60} (mm)	C_u	C_c	SE
●	A+18A+1	0 to 1	(SM) Silty sand, fine to medium with coarse, brown			0.159	0.325			16
■	B+18B+1	2 to 4	(SM) Silty sand, fine to medium with coarse, brown		0.133	0.388	0.620			23
▲	22B	3	(SW-SM) Sand, fine to coarse with silt, light brown	0.1453	0.572	1.347	1.838	12.651	1.223	
○	25B	4	(SM) Silty sand, fine to medium with coarse, brown			0.147	0.335			

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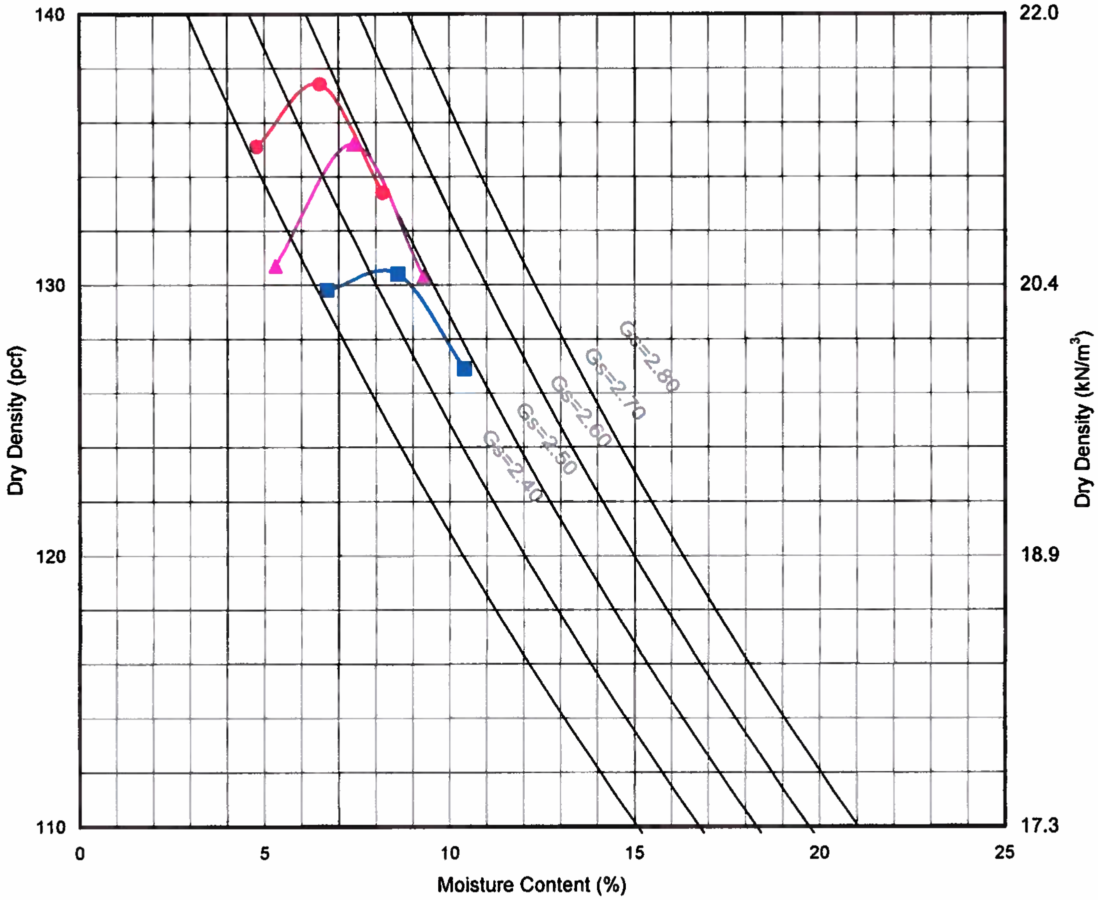
GRAIN SIZE DISTRIBUTION

Project:	Proposed Glen Mor 2 Student Apartments - Project No. 956334		
Location:	University of California, Riverside, California		
Job Number:	10325-3	Enclosure:	C-2

CHJ® LabSuite ver2.97. Programmed by Fred Yi, PhD, PE

Prepared at 6/18/2010

Optimum Moisture - Maximum Density Determination Test (ASTM D 1557)

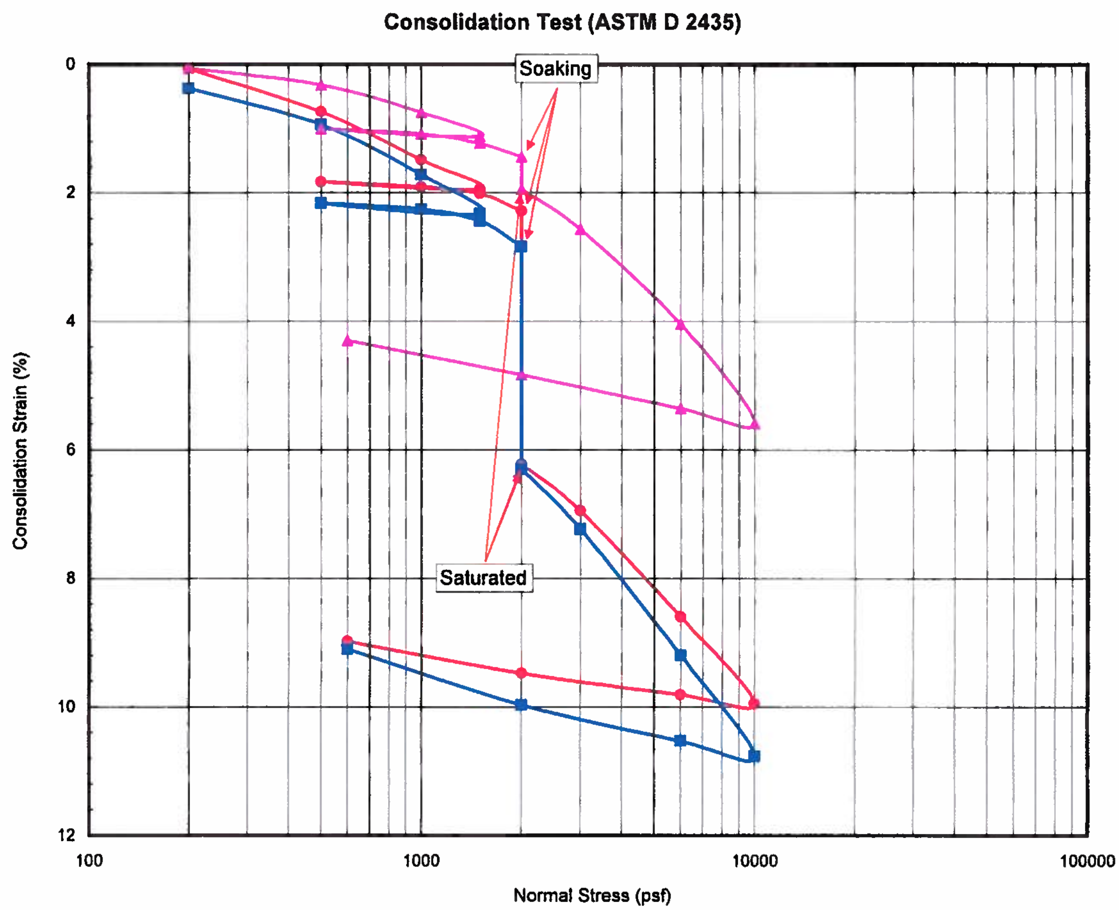


	Sample No.	Depth (ft)	Soil/Sample Type	γ_{max} (pcf)	w_{opt} (%)
●	17B+18B+19B	2 to 4	(SM) Silty sand, fine to medium with coarse, brown	137.5	6.5
■	22B	3	(SW-SM) Sand, fine to coarse with silt, light brown	130.5	8.5
▲	25B	4	(SM) Silty sand, fine to medium with coarse, brown	135.5	7.5

C.H.J. Incorporated

MOISTURE-DENSITY RELATIONSHIP

Project:	Proposed Glen Mor 2 Student Apartments - Project No. 956334		
Location:	University of California, Riverside, California		
Job No.:	10325-3	Enclosure:	C-3



	Boring #	Depth (ft)	Soil/Sample Type	γ_d (pcf)	MC(%)	HCS(%)
●	19-2	7'	(SM) Silty sand, fine to medium with coarse, brown	105.1	5.4	3.9
■	24-2	7'	(SM) Silty sand, fine with medium, light brown	104.2	4.1	3.5
▲	25-2	7'	(SM) Silty sand, fine to medium with coarse, brown	116.1	11.4	0.5

* HCS - Hydroconsolidation strain in percent.

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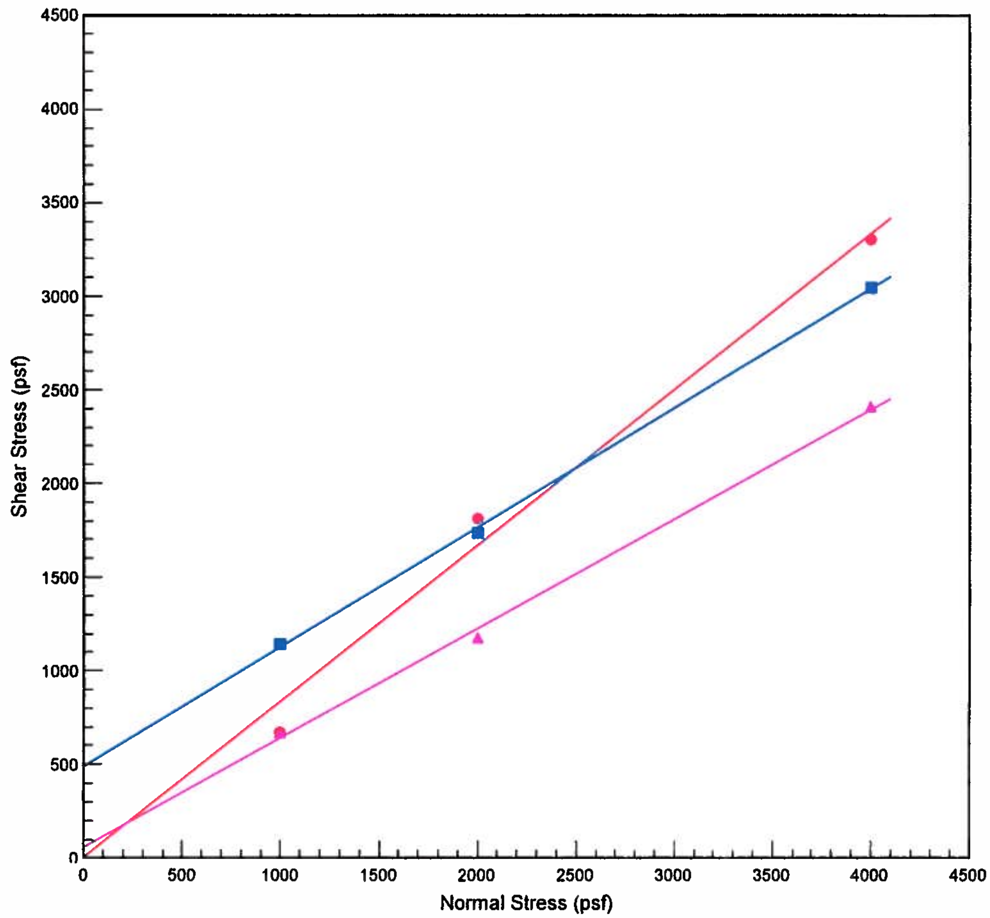
CONSOLIDATION TEST			
Project:	Proposed Glen Mor 2 Student Apartments - Project No. 956334		
Location:	University of California, Riverside, California		
Job No.:	10325-3	Enclosure:	C-4



Boring No.		Depth (ft)	Soil/Sample Type	γ_d (pcf)	MC(%)	C (psf)	φ(°)
●	1	10	(SP-SM) Sand, fine to medium with coarse / undisturbed	116	7.3	0	40
■	5	5	(SP-SM) Sand, fine to coarse with silt / undisturbed	114	3.4	486	33
▲	6	7	(SP-SM) Sand, fine to medium with silt / undisturbed	119	3.0	54	30

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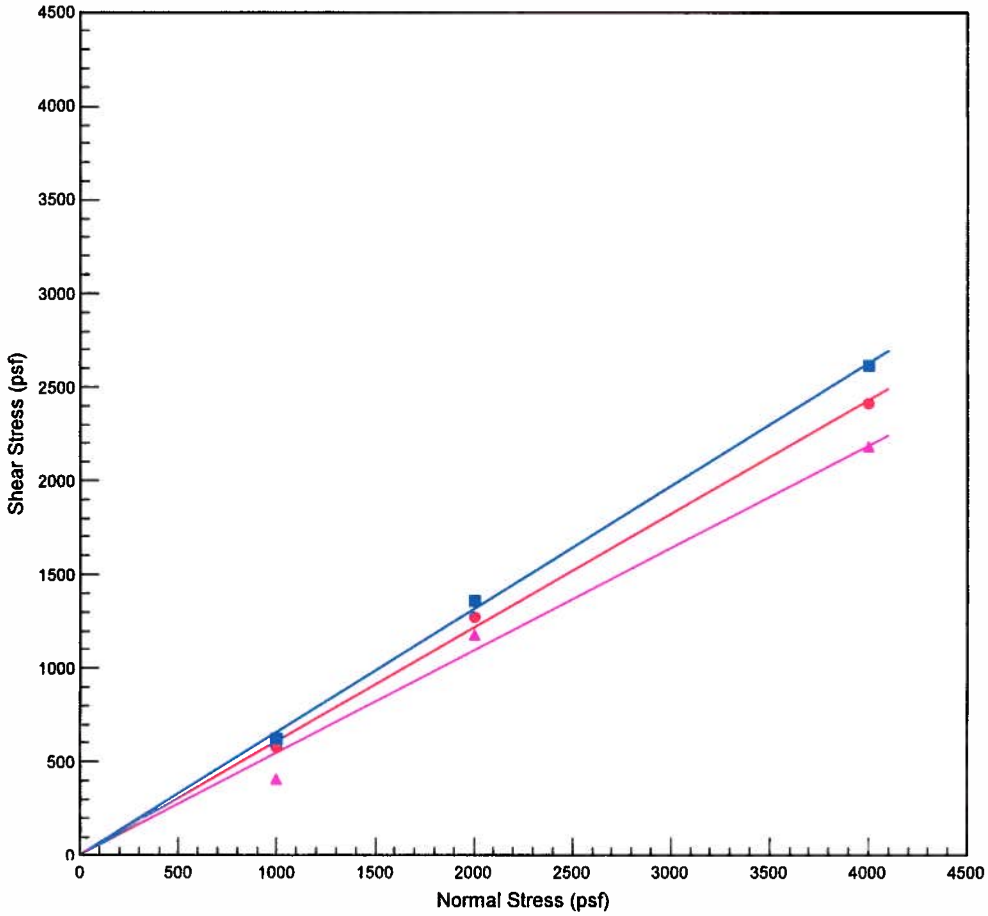
DIRECT SHEAR TEST

Project:	Proposed Glen Mor 2 Student Apartments - Project No. 956334		
Location:	University of California, Riverside, California		
Job No.:	10325-3	Enclosure:	C-5

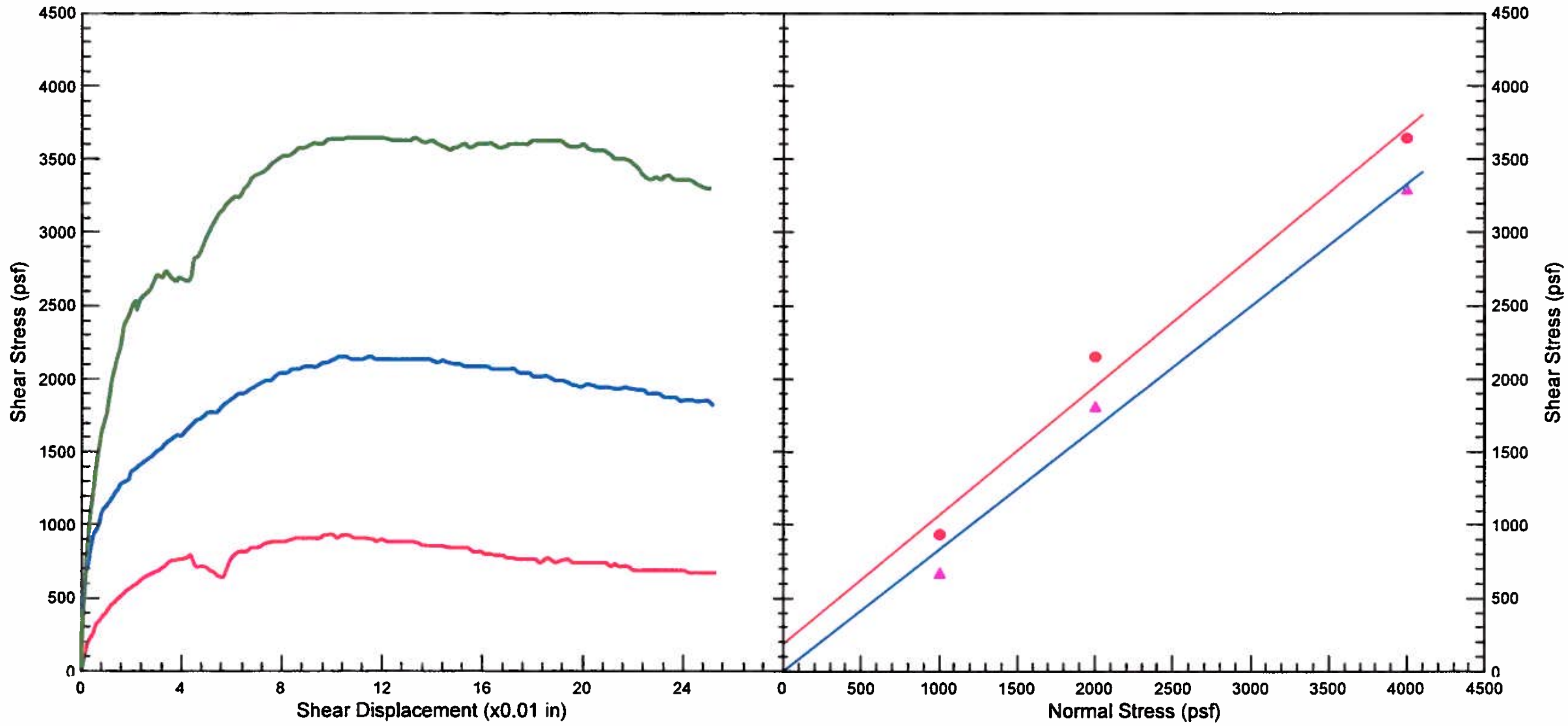
Prepared at 6/18/2010



	Boring No.	Depth (ft)	Soil/Sample Type	γ_d (pcf)	MC(%)	C (psf)	φ(°)
●	19	5	(SM) Silty sand, fine to medium with coarse / undisturbed	113	7.4	0	31
■	22	3	(SW-SM) Sand, fine to coarse with silt / RC=90%	117	9.0	0	33
▲	24	7	(SM) Silty sand, fine with medium / undisturbed	107	5.3	0	29

C.H.J. Incorporated

DIRECT SHEAR TEST			
Project:	Proposed Glen Mor 2 Student Apartments - Project No. 956334		
Location:	University of California, Riverside, California		
Job No.:	10325-3	Enclosure:	C-6



Boring No.		Depth (ft)	Soil/Sample Type	γ_d (pcf)	MC (%)	C_{peak} (psf)	φ_{peak} (°)	C_{res} (psf)	φ_{res} (°)
	1	10	(SP-SM) Sand, fine to medium with coarse / undisturbed	116.0	7.3	186	41	0	40

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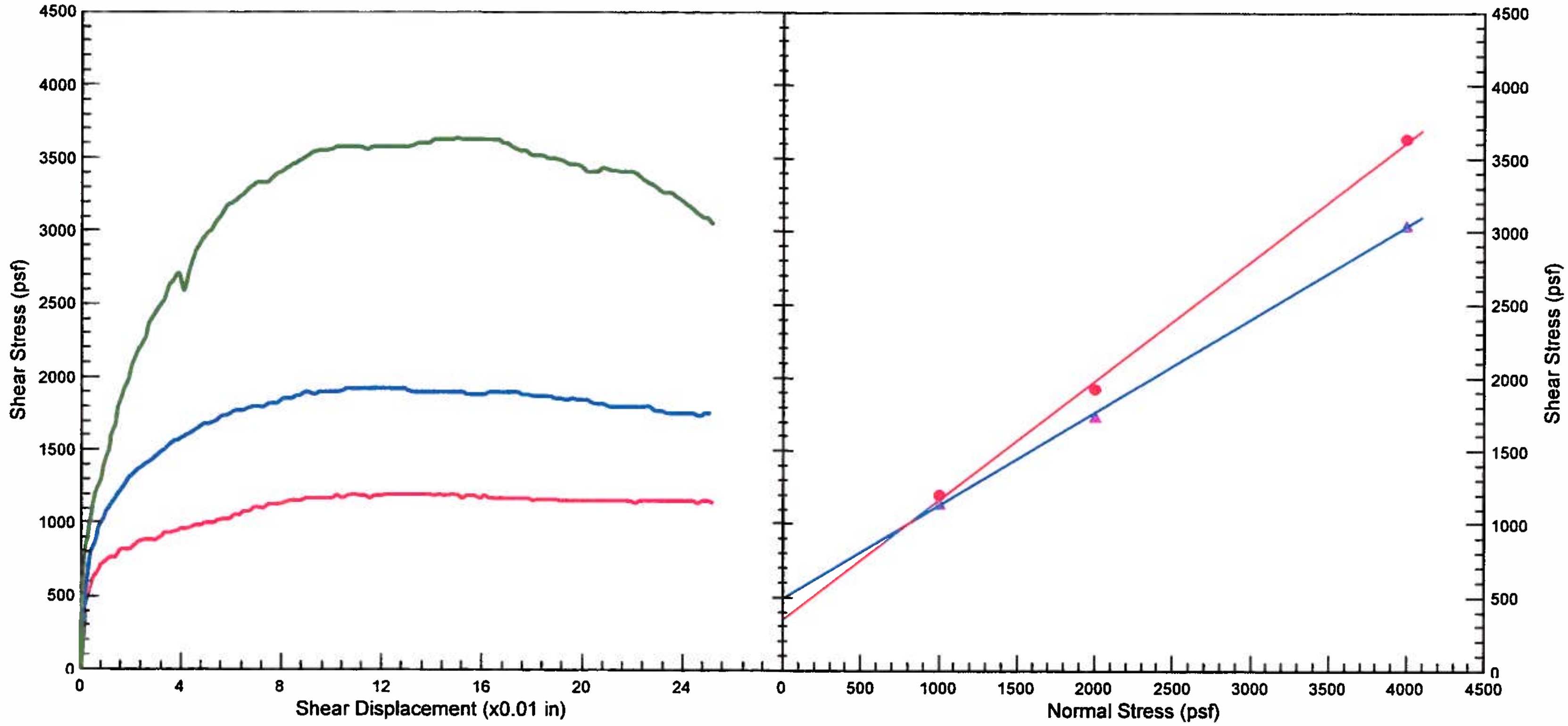
DIRECT SHEAR TEST			
Project:	Proposed Glen Mor 2 Student Apartments - Project No. 956334		
Location	University of California, Riverside, California		
Job Number	10325-3	Enclosure	C-7



Boring No.		Depth (ft)	Soil/Sample Type	γ_d (pcf)	MC (%)	C_{peak} (psf)	φ_{peak} (°)	C_{res} (psf)	φ_{res} (°)
	5	5	(SP-SM) Sand, fine to coarse with silt / undisturbed	114.0	3.4	342	39	486	33

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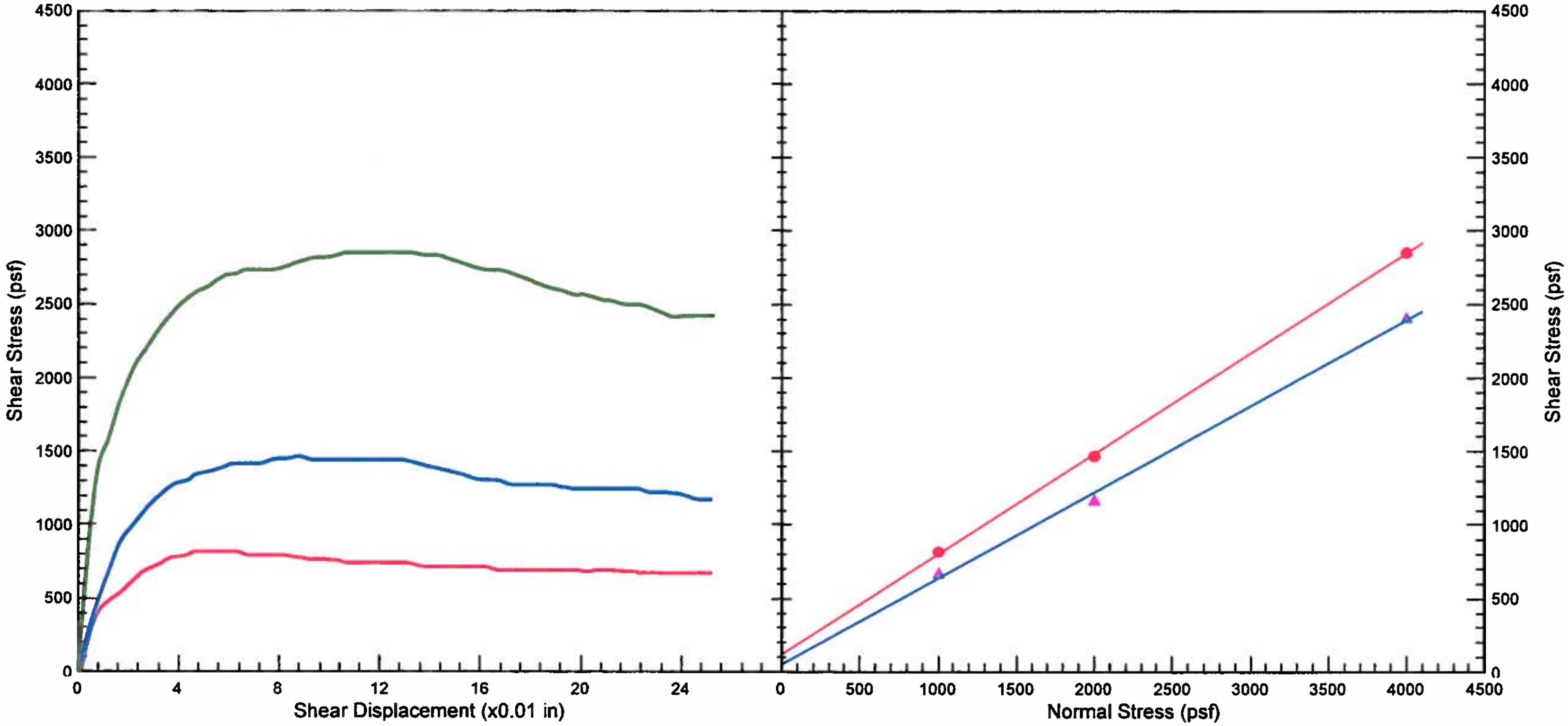
DIRECT SHEAR TEST			
Project:	Proposed Glen Mor 2 Student Apartments - Project No. 956334		
Location	University of California, Riverside, California		
Job Number	10325-3	Enclosure	C-8

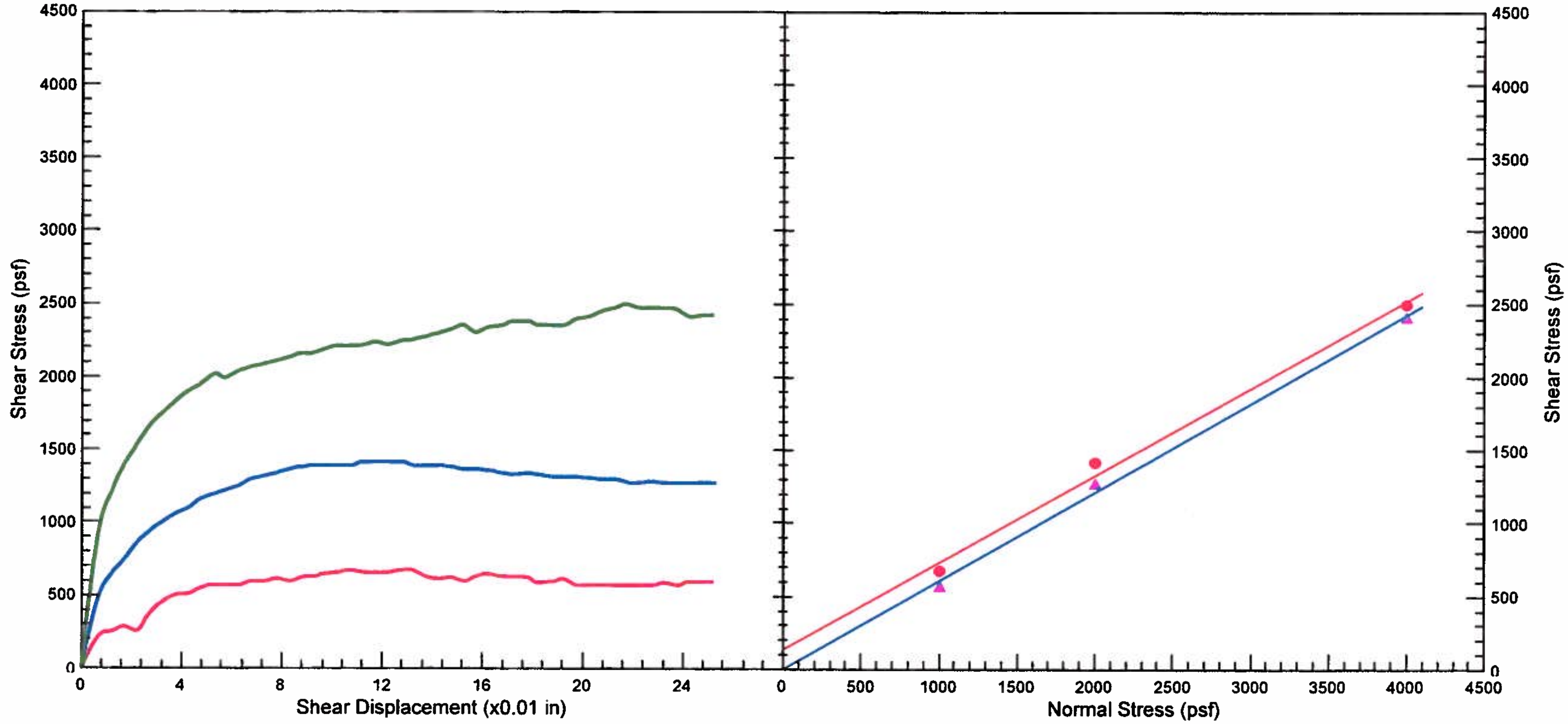
Prepared at 6/18/2010



Boring No.		Depth (ft)	Soil/Sample Type	γ_d (pcf)	MC (%)	C_{peak} (psf)	φ_{peak} (°)	C_{res} (psf)	φ_{res} (°)
	6	7	(SP-SM) Sand, fine to medium with silt / undisturbed	119.0	3.0	120	34	54	30

C.H.J. Incorporated

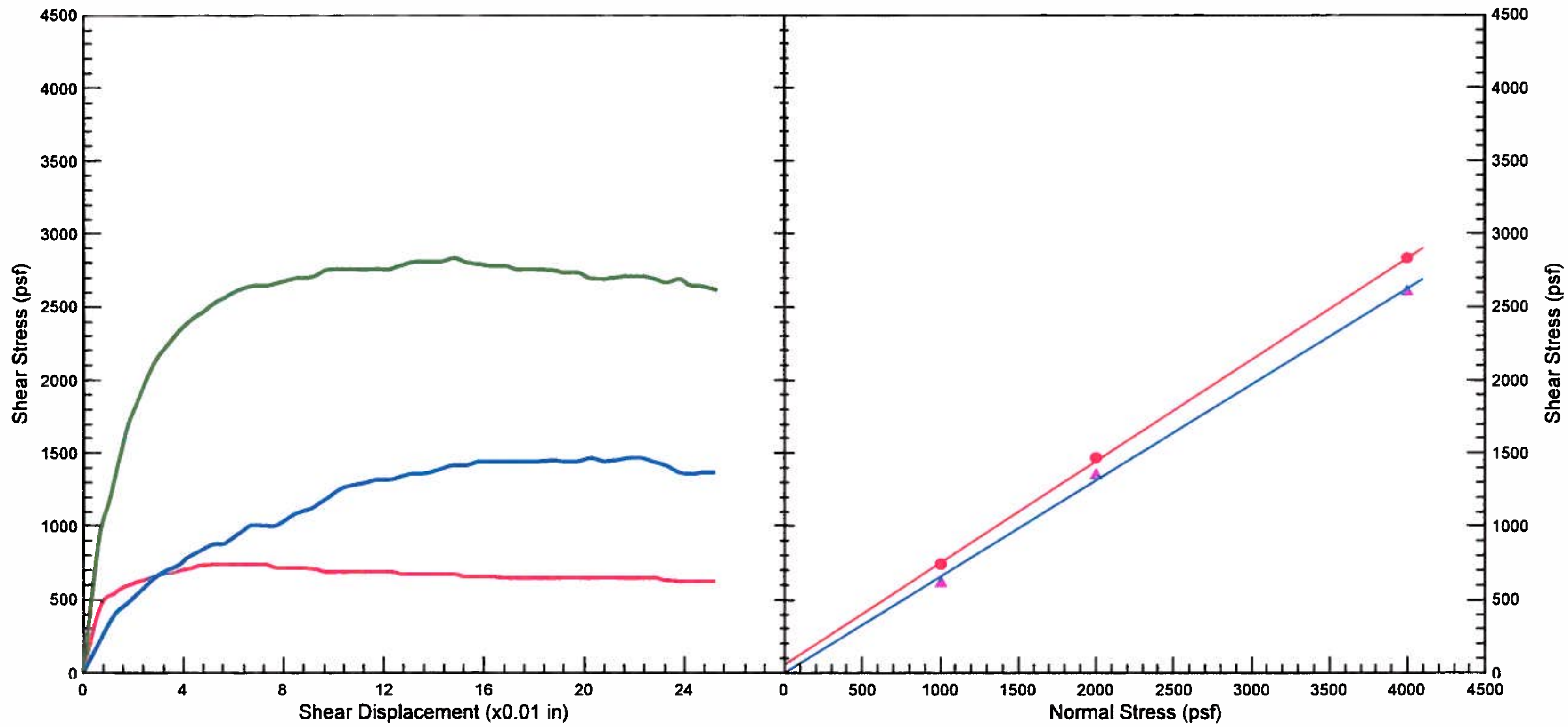
DIRECT SHEAR TEST			
Project:	Proposed Glen Mor 2 Student Apartments - Project No. 956334		
Location	University of California, Riverside, California		
Job Number	10325-3	Enclosure	C-9



Boring No.		Depth (ft)	Soil/Sample Type	γ_d (pcf)	MC (%)	C_{peak} (psf)	φ_{peak} (°)	C_{res} (psf)	φ_{res} (°)
	19	5	(SM) Silty sand, fine to medium with coarse / undisturbed	113.0	7.4	132	31	0	31

C.H.J. Incorporated

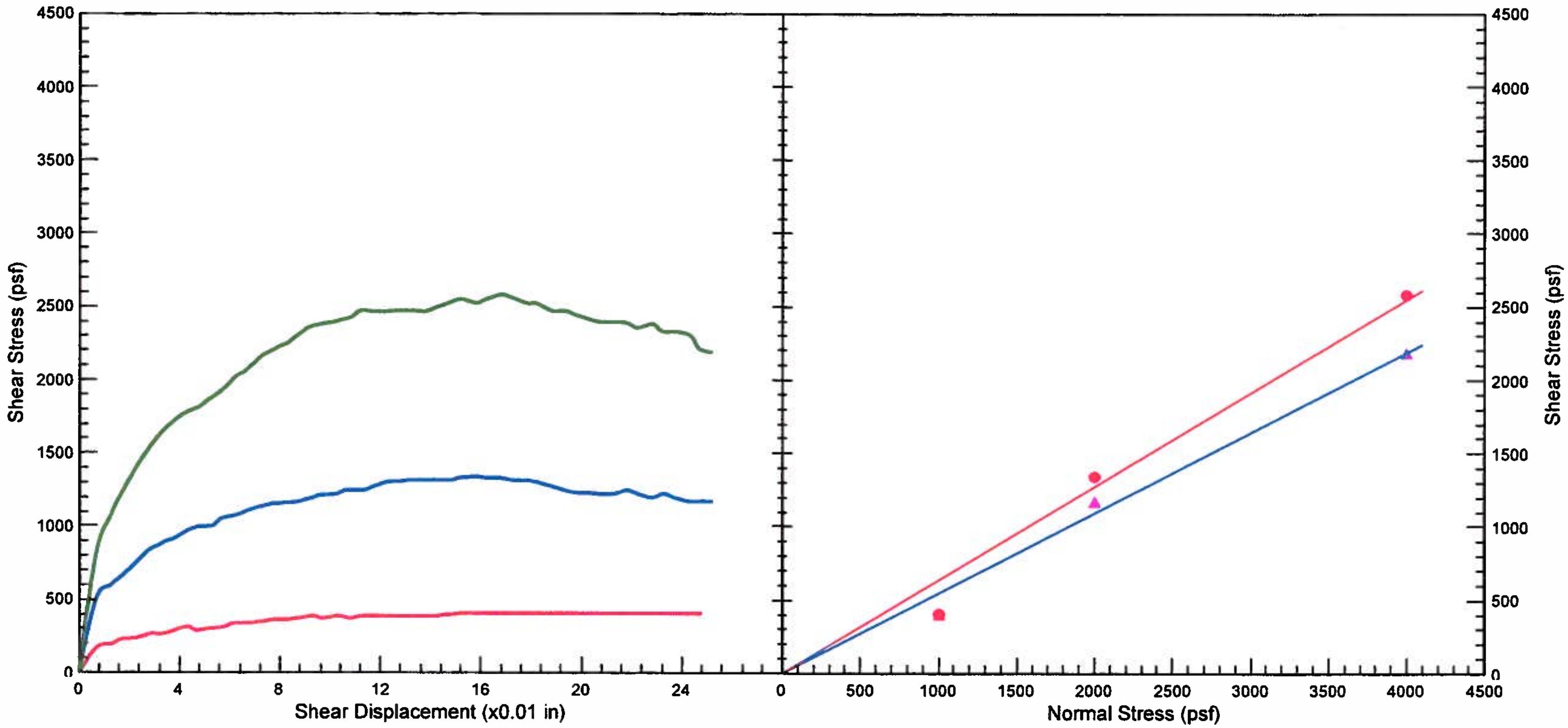
DIRECT SHEAR TEST			
Project:	Proposed Glen Mor 2 Student Apartments - Project No. 956334		
Location	University of California, Riverside, California		
Job Number	10325-3	Enclosure	C-10



Boring No.		Depth (ft)	Soil/Sample Type	γ_d (pcf)	MC (%)	C_{peak} (psf)	φ_{peak} (°)	C_{res} (psf)	φ_{res} (°)
	22	3	(SW-SM) Sand, fine to coarse with silt / RC=90%	117.0	9.0	60	35	0	33

C.H.J. Incorporated

DIRECT SHEAR TEST			
Project:	Proposed Glen Mor 2 Student Apartments - Project No. 956334		
Location	University of California, Riverside, California		
Job Number	10325-3	Enclosure	C-11



Boring No.		Depth (ft)	Soil/Sample Type	γ_d (pcf)	MC (%)	C_{peak} (psf)	φ_{peak} (°)	C_{res} (psf)	φ_{res} (°)
	24	7	(SM) Silty sand, fine with medium / undisturbed	107.0	5.3	0	33	0	29

C.H.J. Incorporated

DIRECT SHEAR TEST			
Project:	Proposed Glen Mor 2 Student Apartments - Project No. 956334		
Location	University of California, Riverside, California		
Job Number	10325-3	Enclosure	C-12

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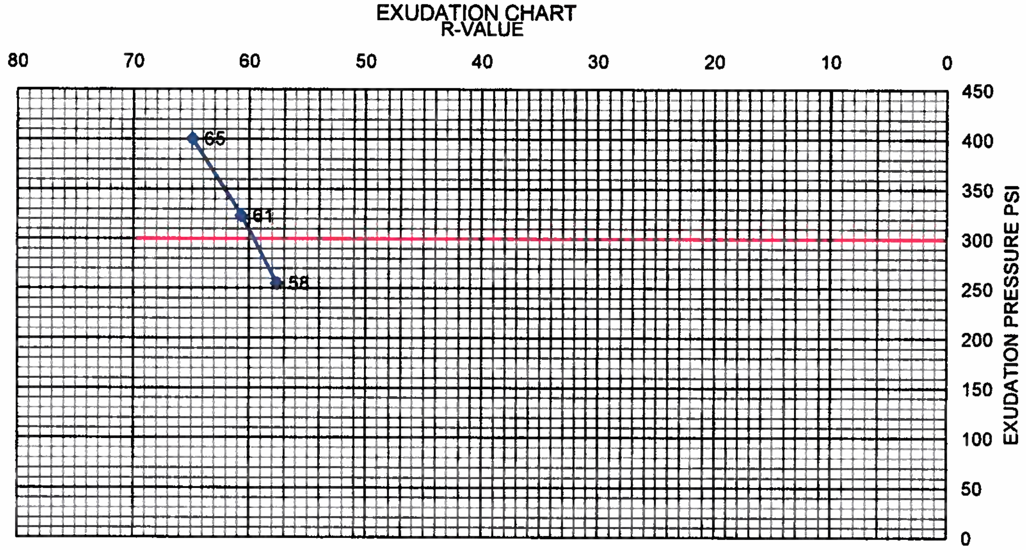
Prepared at 6/21/2010

Traffic Index (T.I.) 5.0	A	B	C	D
COMPACTOR AIR PRESSURE P.S.I.	350	350	350	
INITIAL MOISTURE %	5.4	5.4	5.4	
WATER ADDED, ML	55	50	40	
WATER ADDED %	5.0	4.6	3.6	
MOISTURE AT COMPACTION %	10.4	10.0	9.0	
HEIGHT OF BRIQUETTE	2.49	2.43	2.50	
WET WEIGHT OF BRIQUETTE	1150	1140	1160	
DENSITY LB. PER CU.FT.	126.7	129.2	128.9	
STABILOMETER PH AT 1000 LBS.	14	16	19	
2000 LBS.	38	34	29	
DISPLACEMENT	5.90	6.00	6.10	
R-VALUE	58	61	65	
EXUDATION PRESSURE	255	323	400	
THICK. INDICATED BY STAB.	0.68	0.63	0.56	
EXPANSION PRESSURE	15	20	5	
THICK. INDICATED BY E.P.	0.50	0.67	0.17	

EXUDATION CHART



R-Value: 60

Sample No.	Depth (ft)	Soil/Sample Type	SE	w_0(%)
20A+23A+26A	0	(SM) Silty sand, fine to medium with coarse, brown	16	5.4

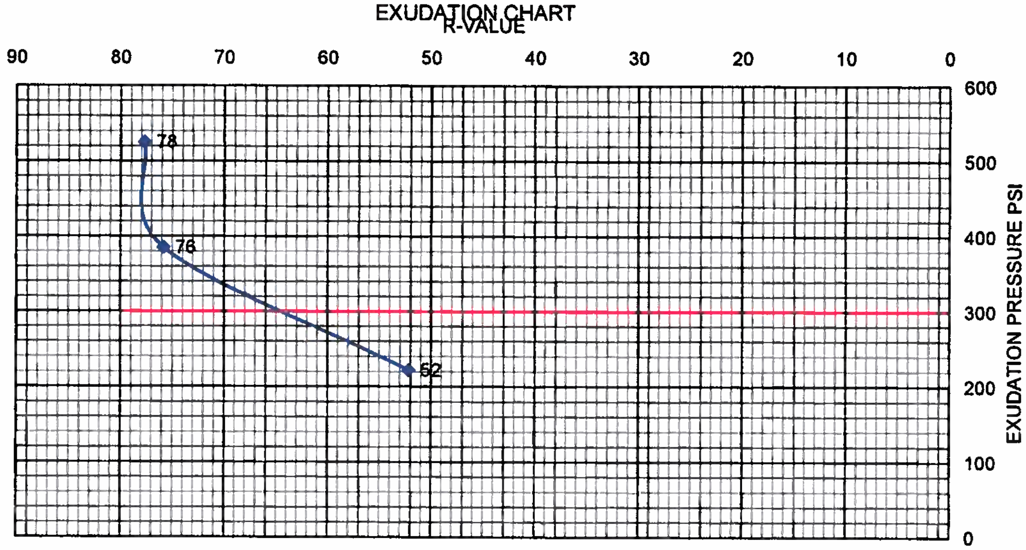
C.H.J. Incorporated

R-VALUE TEST			
Project:	Proposed Glen Mor 2 Student Apartments - Project No. 956334		
Location:	University of California, Riverside, California		
Job No.:	10325-3	Enclosure:	C-13

Prepared at 6/18/2010

Traffic Index (T.I.) 5.0	A	B	C	D
COMPACTOR AIR PRESSURE P.S.I.	350	350	350	
INITIAL MOISTURE %	5.7	5.7	5.7	
WATER ADDED, ML	50	45	40	
WATER ADDED %	4.7	4.1	3.6	
MOISTURE AT COMPACTION %	10.4	9.8	9.3	
HEIGHT OF BRIQUETTE	2.47	2.48	2.48	
WET WEIGHT OF BRIQUETTE	1130	1157	1160	
DENSITY LB. PER CU.FT.	125.6	128.7	129.6	
STABILOMETER PH AT 1000 LBS.	24	13	12	
2000 LBS.	36	25	22	
DISPLACEMENT	7.90	4.30	4.50	
R-VALUE	52	76	78	
EXUDATION PRESSURE	222	385	525	
THICK. INDICATED BY STAB.	0.77	0.39	0.36	
EXPANSION PRESSURE	0	0	0	
THICK. INDICATED BY E.P.	0.00	0.00	0.00	

EXUDATION CHART



R-Value: 67

Sample No.	Depth (ft)	Soil/Sample Type	SE	w_0(%)
17A+18A+19A	0	(SM) Silty sand, fine to medium with coarse, brown	16	5.7

C.H.J. Incorporated

R-VALUE TEST			
Project:	Proposed Glen Mor 2 Student Apartments - Project No. 956334		
Location:	University of California, Riverside, California		
Job No.:	10325-3	Enclosure:	C-14

ASPHALT CONCRETE STRUCTURAL SECTION DESIGN

R-Value used	50

Traffic Index (T.I.)	Recommended Street Sections	
4.00	0.25' AC / 0.35' AB Class 2	0.25' AC / Native
4.50	0.25' AC / 0.35' AB Class 2	0.30' AC / Native
5.00	0.25' AC / 0.35' AB Class 2	0.35' AC / Native
5.50	0.25' AC / 0.35' AB Class 2	0.40' AC / Native
6.00	0.25' AC / 0.35' AB Class 2	0.45' AC / Native
6.50	0.30' AC / 0.35' AB Class 2	0.50' AC / Native
7.00	0.30' AC / 0.40' AB Class 2	0.55' AC / Native
7.50	0.35' AC / 0.45' AB Class 2	0.65' AC / Native
8.00	0.40' AC / 0.45' AB Class 2	0.70' AC / Native
8.50	0.40' AC / 0.50' AB Class 2	0.75' AC / Native
9.00	0.45' AC / 0.55' AB Class 2	0.80' AC / Native
9.50	0.45' AC / 0.60' AB Class 2	0.90' AC / Native
10.00	0.50' AC / 0.65' AB Class 2	0.95' AC / Native
10.50	0.55' AC / 0.65' AB Class 2	1.00' AC / Native
11.00	0.55' AC / 0.70' AB Class 2	1.05' AC / Native
11.50	0.60' AC / 0.75' AB Class 2	1.10' AC / Native
12.00	0.60' AC / 0.80' AB Class 2	1.20' AC / Native
12.50	0.65' AC / 0.85' AB Class 2	1.25' AC / Native
13.00	0.65' AC / 0.90' AB Class 2	1.30' AC / Native

NOTE: MIN. A.C. THICKNESS IS 0.25' MIN. A.B. THICKNESS IS 0.35'
All thicknesses arerounded to the nearest 0.05 foot.
The above values may not reflect applicable county or city minimum standards.
A safety factor of 0.20 for the G.E. of the A.C. is included as per Caltrans.
The values also include a safety factor of 0.10 for A.C./ native soil.
Some agencies do not permit placing A.C. over native soil.

PARKING LOT PCC SECTION DESIGN

R-Value	Concrete Compressive Strength, f_c (psi)	Flexural Strength, M_r (psi)
50	3500	530
Traffic Category	**ADTT**	**PCC Section (in)**
A	0	4
A-1	1	4.5
A-1	10	5.5
B	25	6
B	300	6.5
C	100	6.5
C	300	7
C	700	7
D	700	7

C.H.J. Incorporated

AC & PCC STRUCTURAL SECTION DESIGN			
Project:	Proposed Glen Mor 2 Student Apartments - Project No. 956334		
Location:	University of California, Riverside, California		
Job No.:	10325-3	Enclosure:	C-15

SCHIFF ASSOCIATES
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Table 1 - Laboratory Tests on Soil Samples

C.H.J., Inc.
Glenmore Student Apartment
Your #10325-3, SA #10-0577LAB
15-Jun-10

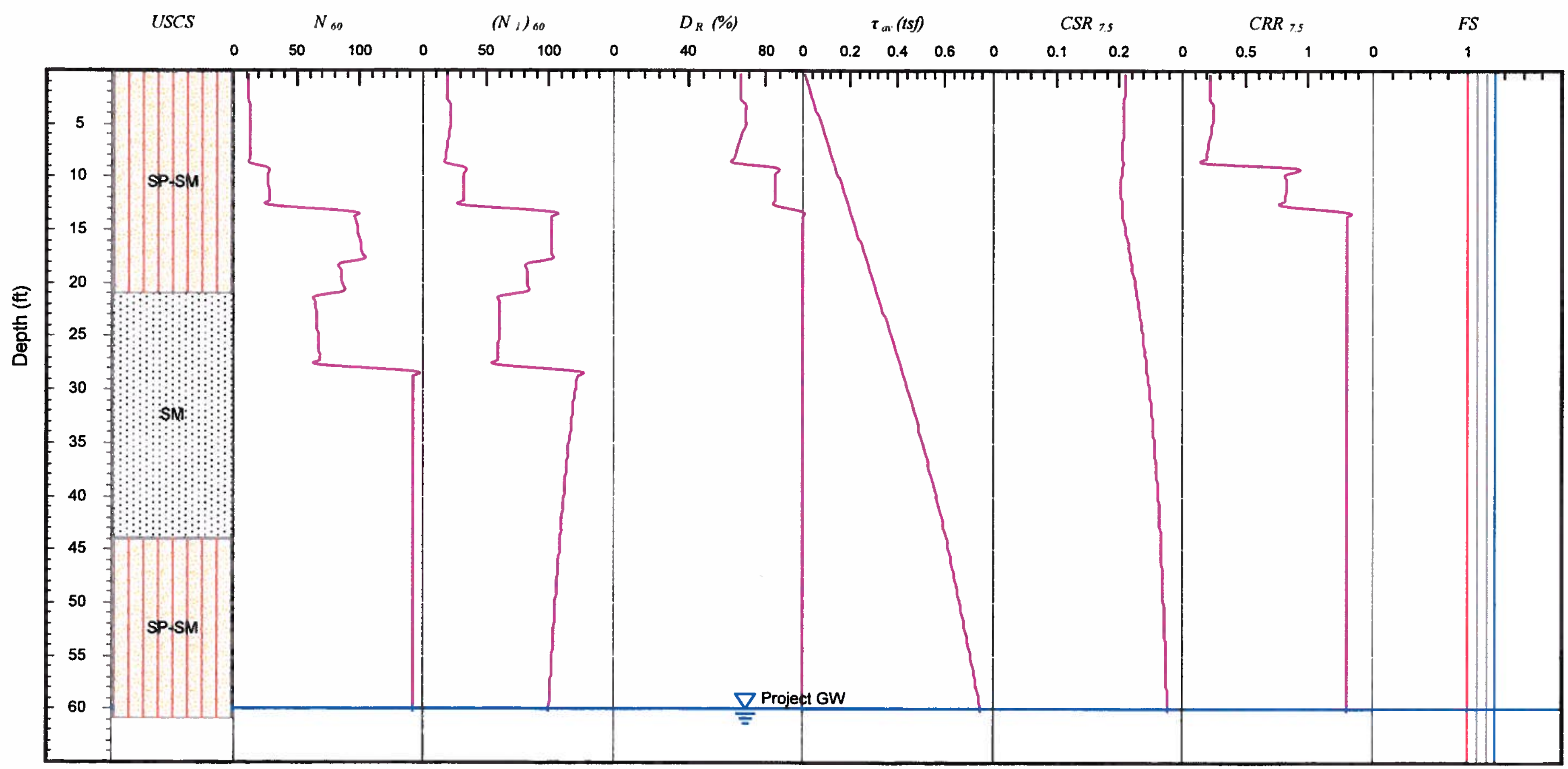
Sample ID			17A, 18A, 19A Combined	20A, 23A, 26A Combined	4A, 9A, 16 Combined
Resistivity		**Units**			
as-received		ohm-cm	27,200	38,000	44,000
saturated		ohm-cm	2,840	3,720	4,800
pH			7.6	7.8	7.5
Electrical Conductivity		mS/cm	0.11	0.11	0.06
Chemical Analyses					
Cations					
calcium	Ca^{2+}	mg/kg	47	44	30
magnesium	Mg^{2+}	mg/kg	7.5	6.0	5.2
sodium	Na^{1+}	mg/kg	62	66	38
potassium	K^{1+}	mg/kg	9.3	7.0	5.9
Anions					
carbonate	CO_3^{2-}	mg/kg	ND	ND	ND
bicarbonate	HCO_3^{1-}	mg/kg	116	165	104
flouride	F^{1-}	mg/kg	3.4	4.0	2.6
chloride	Cl^{1-}	mg/kg	13	18	3.3
sulfate	SO_4^{2-}	mg/kg	68	52	24
phosphate	PO_4^{3-}	mg/kg	6.6	5.6	6.7
Other Tests					
ammonium	NH_4^{1+}	mg/kg	ND	ND	ND
nitrate	NO_3^{1-}	mg/kg	83	22	15
sulfide	S^{2-}	qual	na	na	na
Redox		mV	na	na	na

Electrical conductivity in millisiemens/cm and chemical analysis were made on a 1:5 soil-to-water extract.
mg/kg = milligrams per kilogram (parts per million) of dry soil.
Redox = oxidation-reduction potential in millivolts
ND = not detected
na = not analyzed

431 West Baseline Road · Claremont, CA 91711
Phone: 909.626.0967 · Fax: 909.626.3316

APPENDIX "D"

GEOTECHNICAL CALCULATIONS



SP-SM

SM

Earthquake & Groundwater Information:
Magnitude = 7.04
Max. Acceleration = 0.4 g
Project GW = 60 ft
Maximum Settlement = 0.12 in
Settlement at Target Depth = 0.12 in

C.H.J. Incorporated

Liquefaction Potential - SPT Data

Project:	Proposed Glen Mor 2 Student Apartments - Project No. 956334		
Location:	University of California, Riverside, California		
Job Number:	10325-3	Boring No.:	B-1
Enclosure:	D-1		

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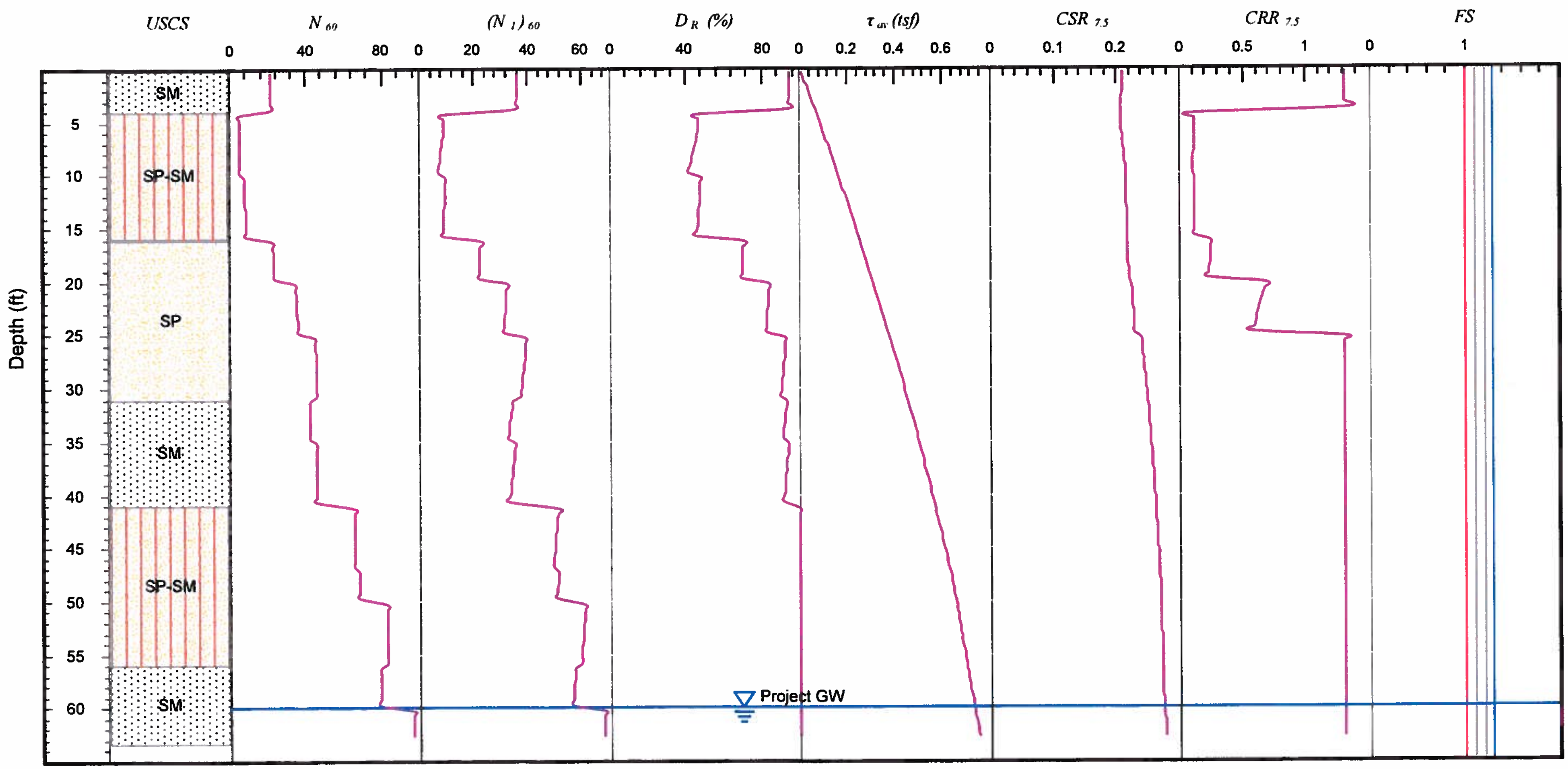

SM

SP

SP-SM

Earthquake & Groundwater Information:
Magnitude = 7.04
Max. Acceleration = 0.4 g
Project GW = 60 ft
Maximum Settlement = 2.39 in
Settlement at Target Depth = 2.39 in

C.H.J. Incorporated

Liquefaction Potential - SPT Data					
Project:	Proposed Glen Mor 2 Student Apartments - Project No. 956334				
Location:	University of California, Riverside, California				
Job Number:	10325-3	Boring No.:	B-6	Enclosure:	D-2

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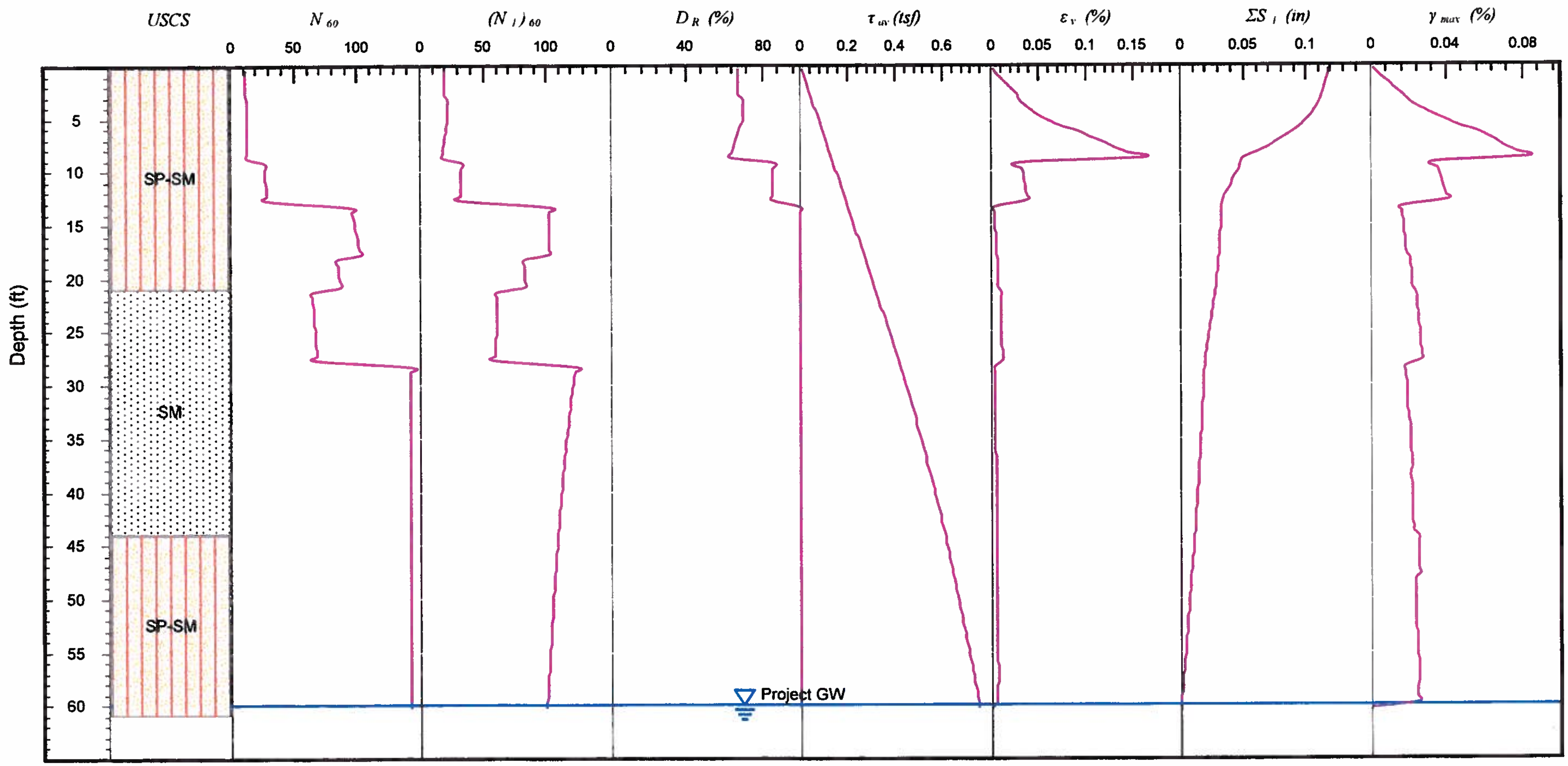

SP-SM

SM

Earthquake & Groundwater Information:
Magnitude = 7.04
Max. Acceleration = 0.4 g
Project GW = 60 ft
Maximum Settlement = 0.12 in
Settlement at Target Depth = 0.12 in

C.H.J. Incorporated

Seismic Settlement - SPT Data

Project:	Proposed Glen Mor 2 Student Apartments - Project No. 956334				
Location:	University of California, Riverside, California				
Job Number:	10325-3	Boring No.:	B-1	Enclosure:	D-3

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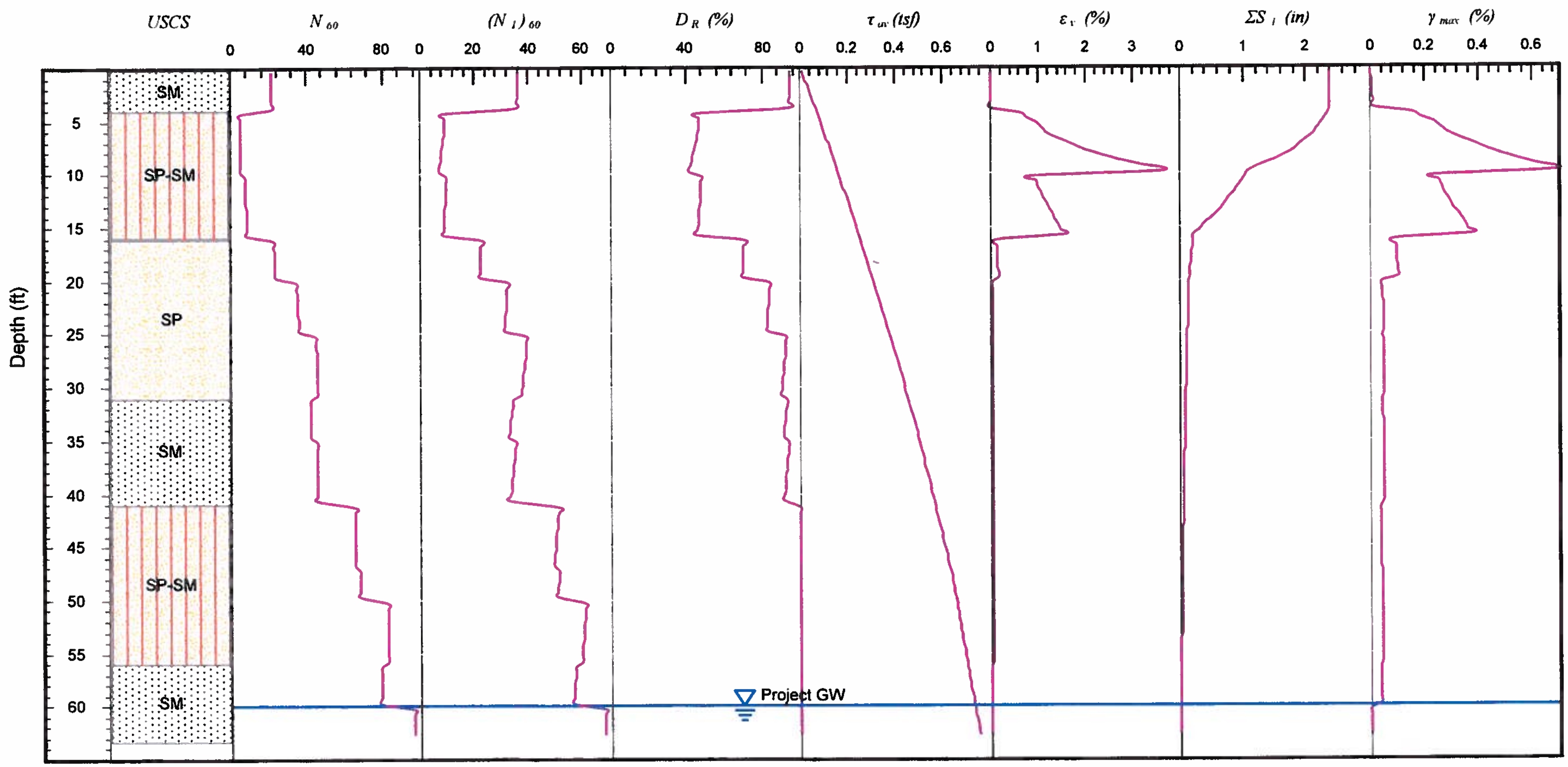

SM

SP

SP-SM

Earthquake & Groundwater Information:
Magnitude = 7.04
Max. Acceleration = 0.4 g
Project GW = 60 ft
Maximum Settlement = 2.39 in
Settlement at Target Depth = 2.39 in

C.H.J. Incorporated

Seismic Settlement - SPT Data

Project:	Proposed Glen Mor 2 Student Apartments - Project No. 956334				
Location:	University of California, Riverside, California				
Job Number:	10325-3	Boring No.:	B-6	Enclosure:	D-4

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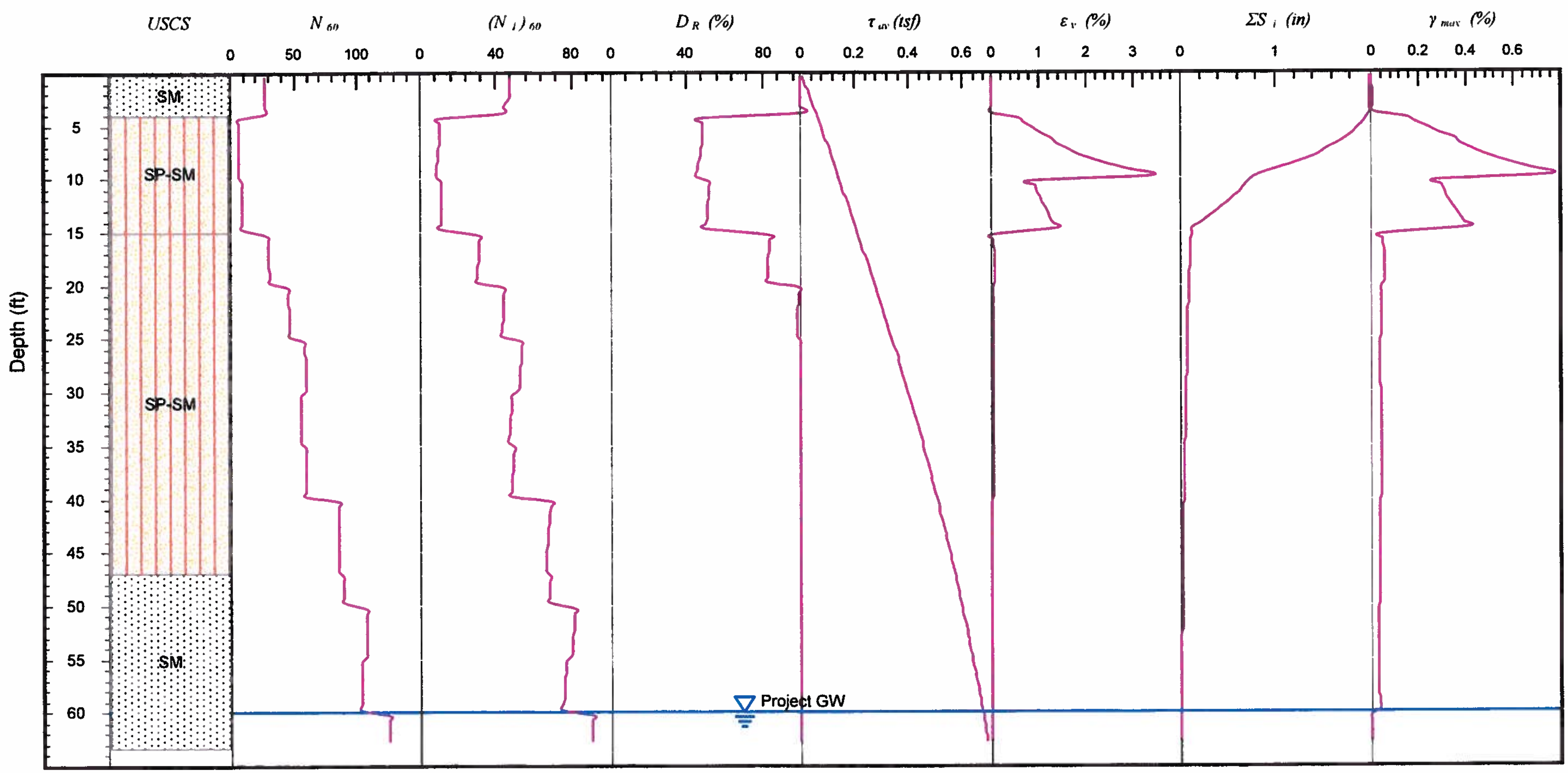

SM

SP-SM

Earthquake & Groundwater Information:
Magnitude = 7.04
Max. Acceleration = 0.4 g
Project GW = 60 ft
Maximum Settlement = 2.00 in
Settlement at Target Depth = 2.00 in

C.H.J. Incorporated

Seismic Settlement - SPT Data

Project:	Proposed Glen Mor 2 Student Apartments - Project No. 956334		
Location:	University of California, Riverside, California		
Job Number:	10325-3	Boring No.:	B-18
Enclosure:	D-5		

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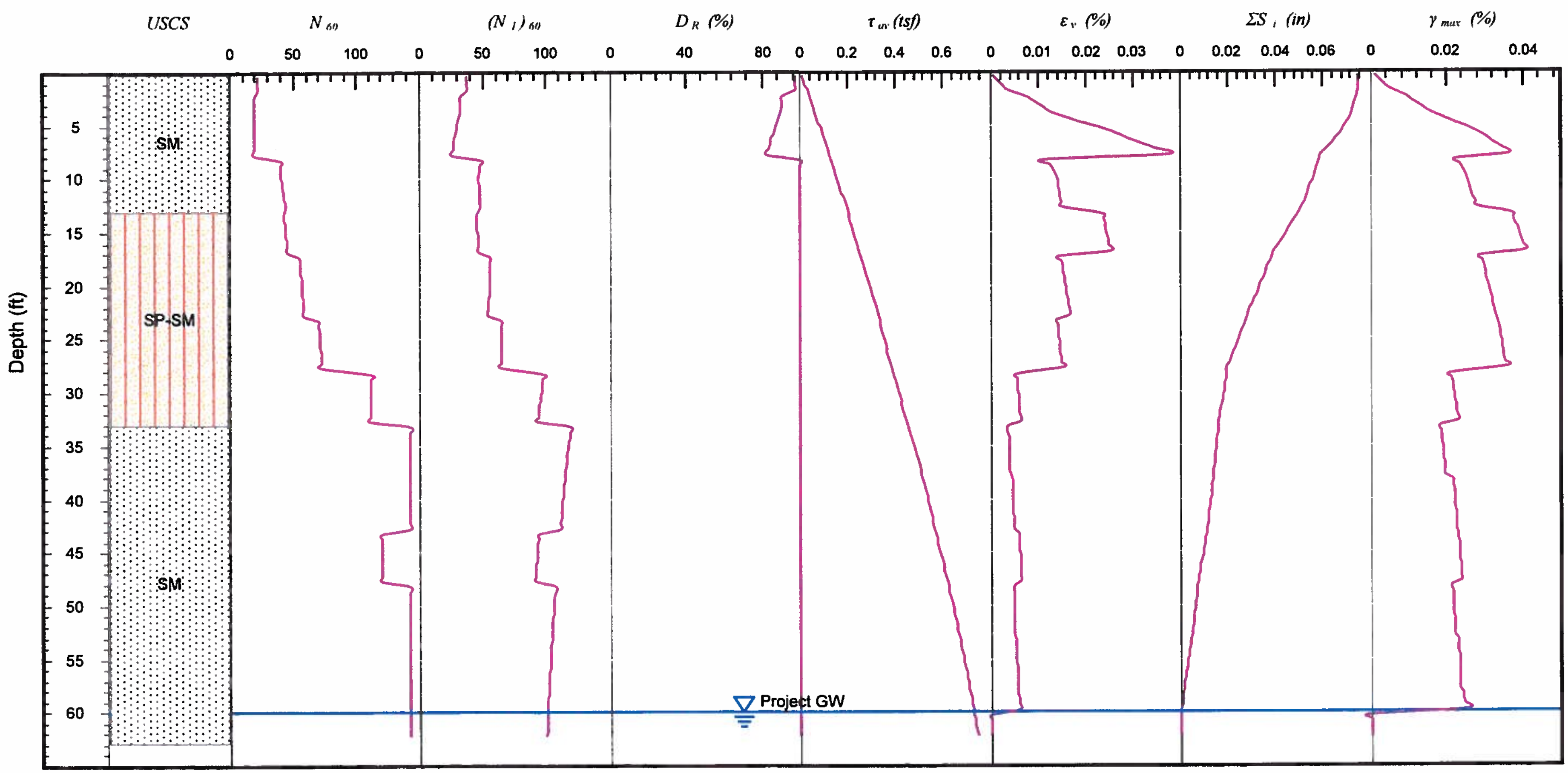

SM

SP-SM

Earthquake & Groundwater Information:
Magnitude = 7.04
Max. Acceleration = 0.4 g
Project GW = 60 ft
Maximum Settlement = 0.08 in
Settlement at Target Depth = 0.08 in

C.H.J. Incorporated

Seismic Settlement - SPT Data			
Project:	Proposed Glen Mor 2 Student Apartments - Project No. 956334		
Location:	University of California, Riverside, California		
Job Number: 10325-3	Boring No.: B-19	Enclosure: D-6	

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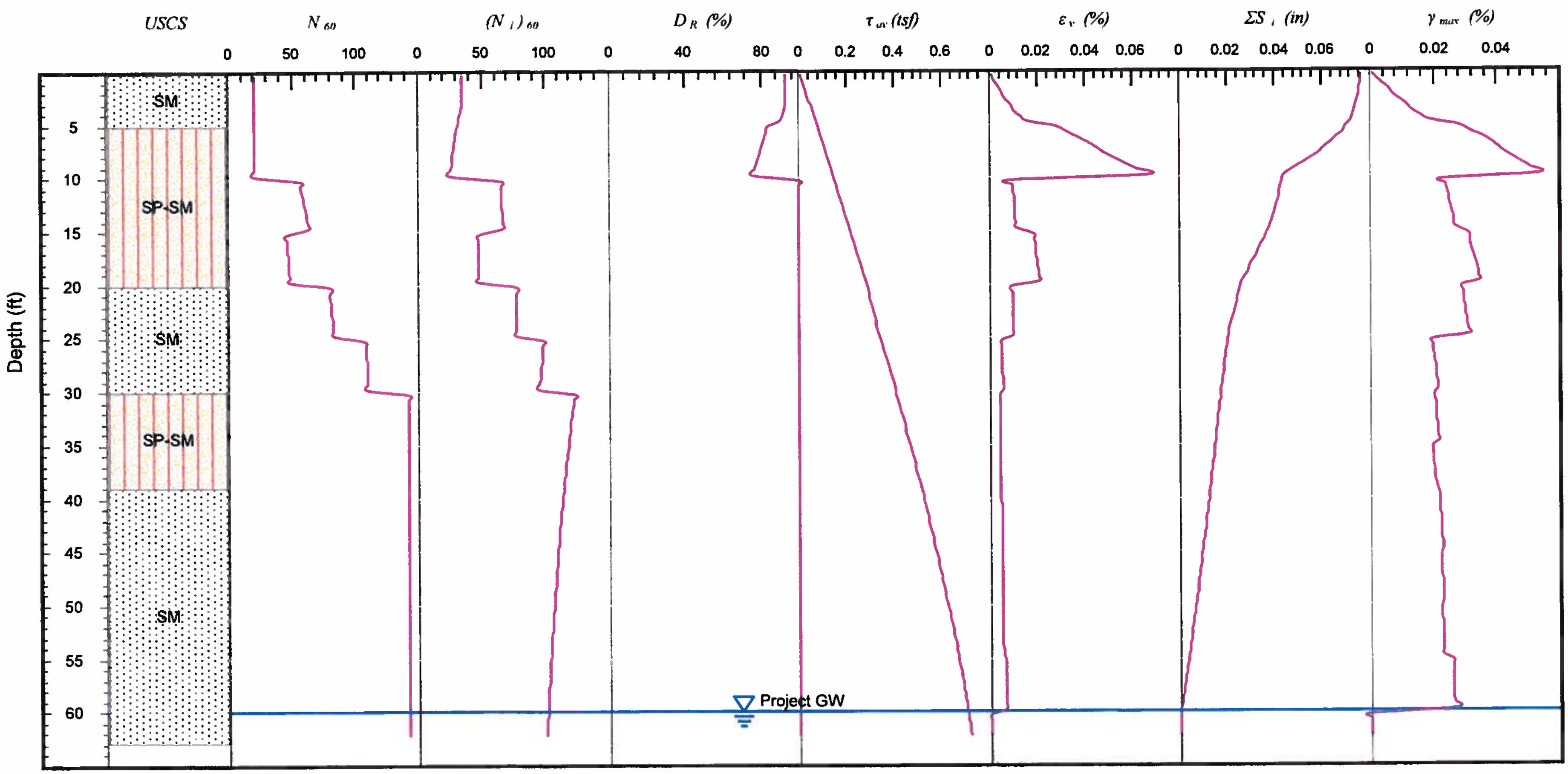

SM

SP-SM

Earthquake & Groundwater Information:
Magnitude = 7.04
Max. Acceleration = 0.4 g
Project GW = 60 ft
Maximum Settlement = 0.08 in
Settlement at Target Depth = 0.08 in

C.H.J. Incorporated

Seismic Settlement - SPT Data			
Project:	Proposed Glen Mor 2 Student Apartments - Project No. 956334		
Location:	University of California, Riverside, California		
Job Number: 10325-3	Boring No.: B-20	Enclosure: D-7	

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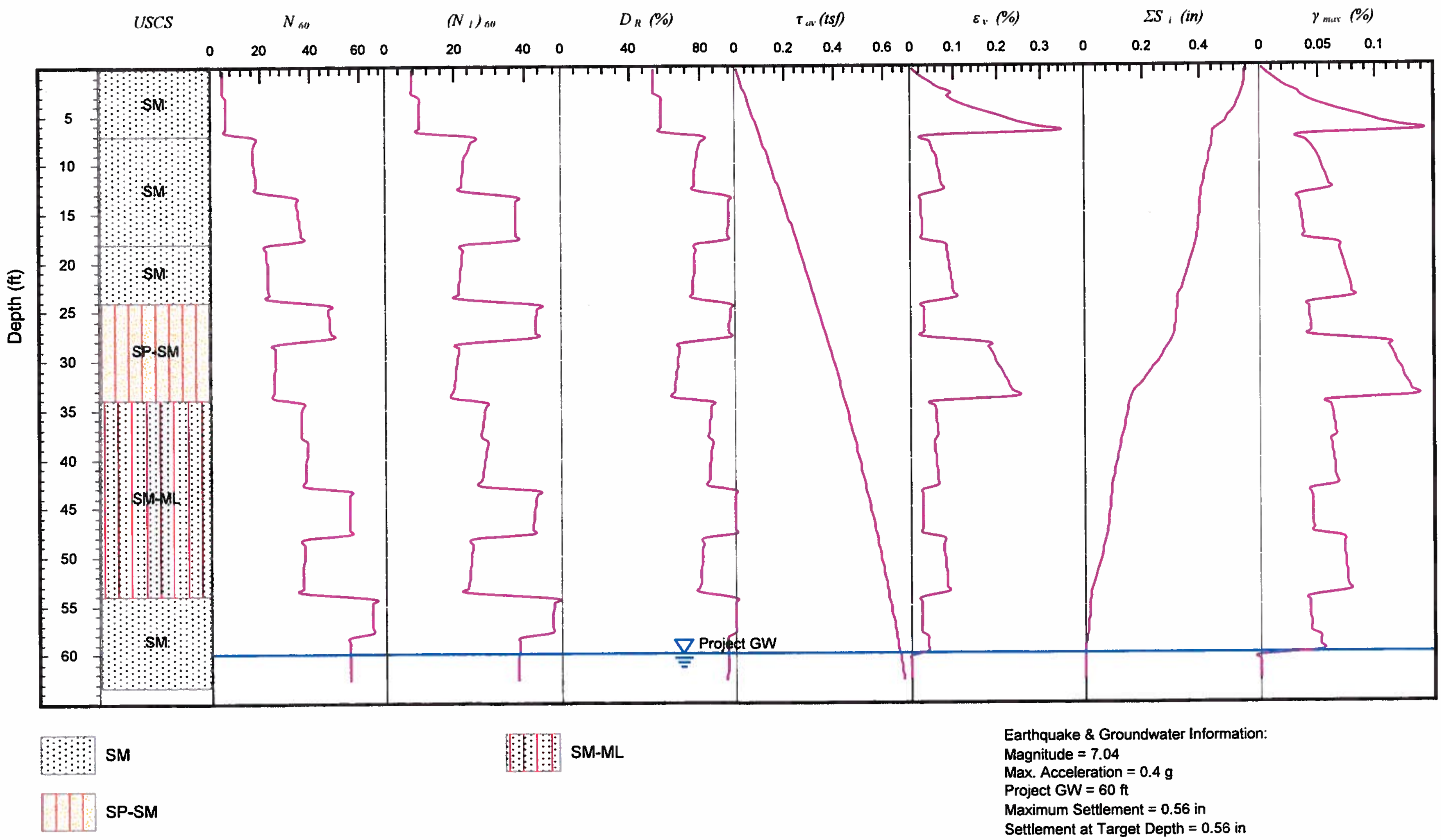

Earthquake & Groundwater Information:
Magnitude = 7.04
Max. Acceleration = 0.4 g
Project GW = 60 ft
Maximum Settlement = 0.56 in
Settlement at Target Depth = 0.56 in

C.H.J. Incorporated

Seismic Settlement - SPT Data			
Project:	Proposed Glen Mor 2 Student Apartments - Project No. 956334		
Location:	University of California, Riverside, California		
Job Number: 10325-3	Boring No.: B-23	Enclosure:	D-8

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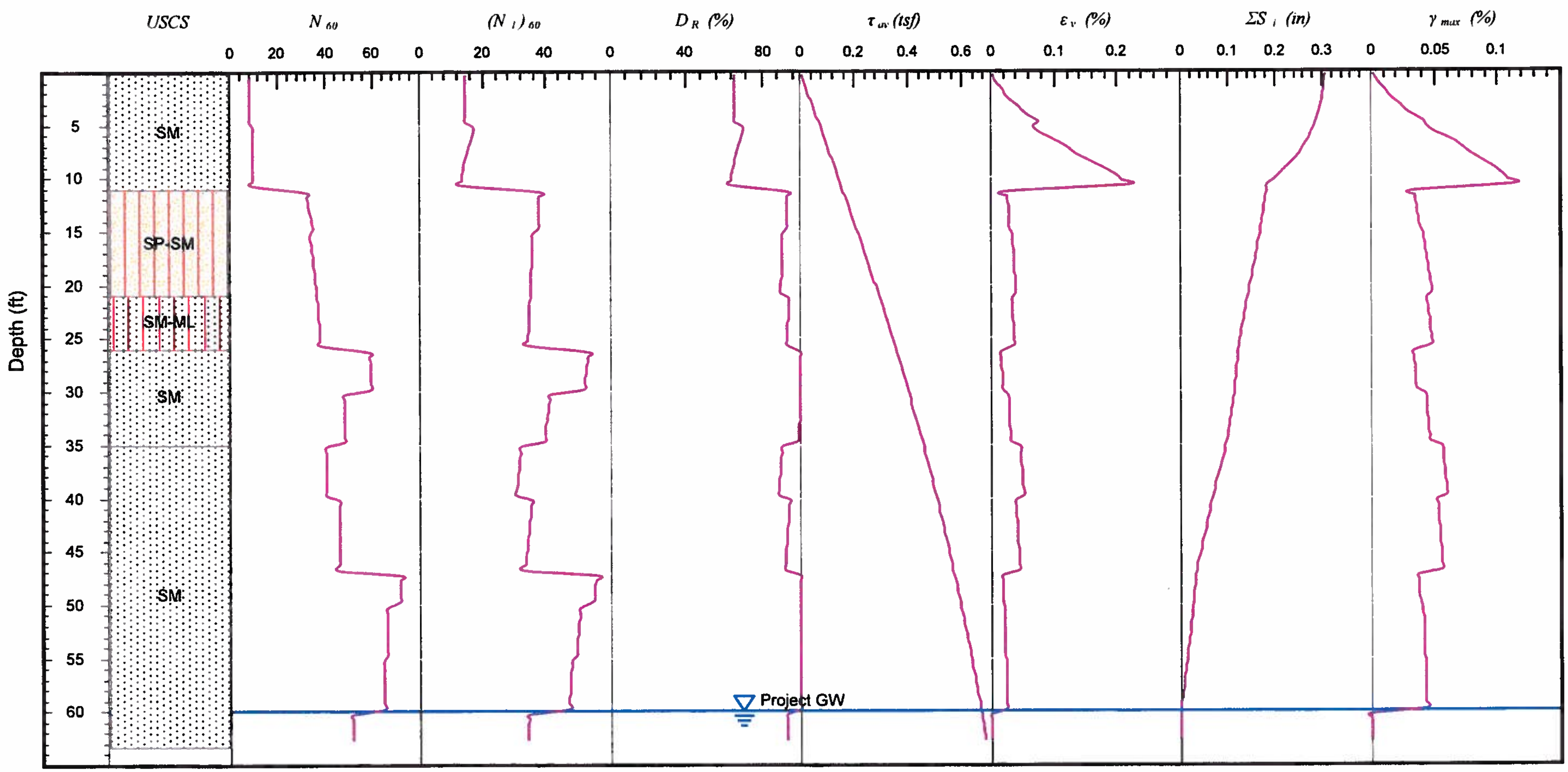

SM
SP-SM
SM-ML

Earthquake & Groundwater Information:
Magnitude = 7.04
Max. Acceleration = 0.4 g
Project GW = 60 ft
Maximum Settlement = 0.31 in
Settlement at Target Depth = 0.31 in

C.H.J. Incorporated

Seismic Settlement - SPT Data

Project:	Proposed Glen Mor 2 Student Apartments - Project No. 956334				
Location:	University of California, Riverside, California				
Job Number:	10325-3	Boring No.:	B-26	Enclosure:	D-9

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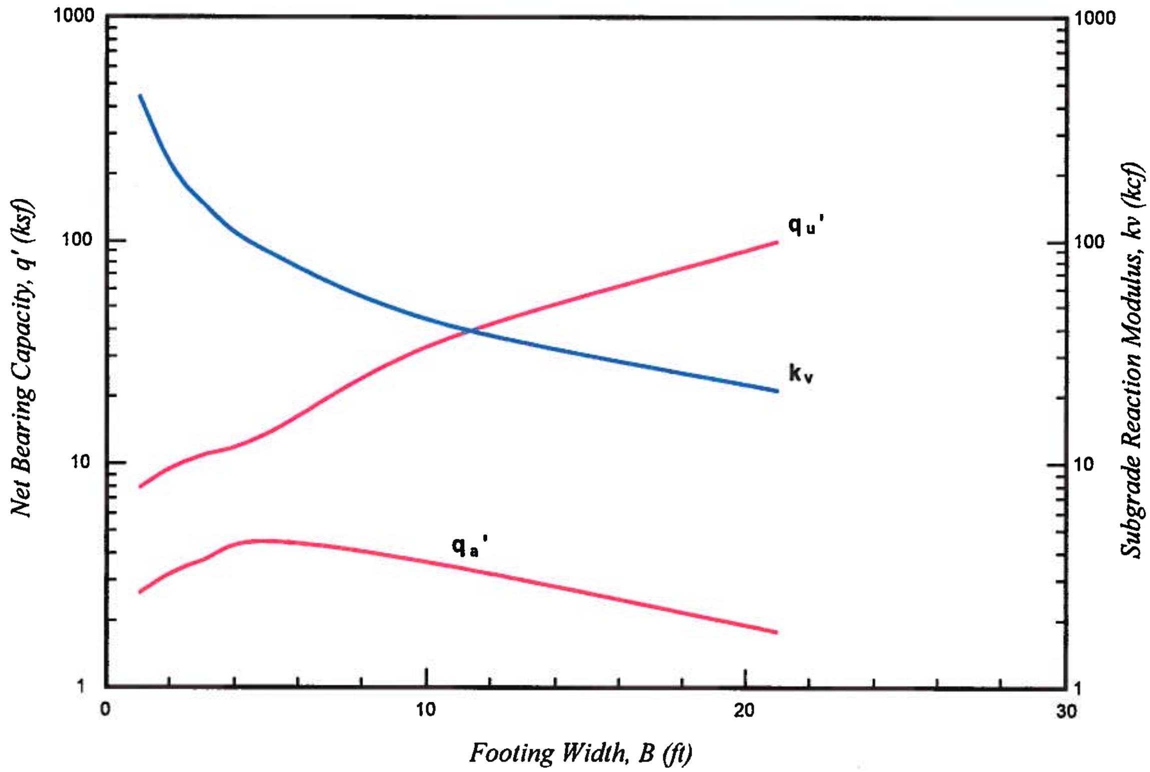
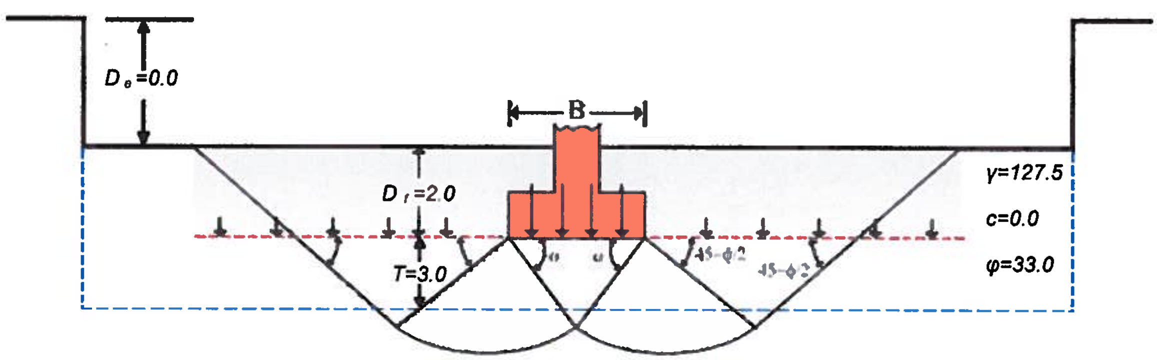


Bearing Capacity vs. Footing Width



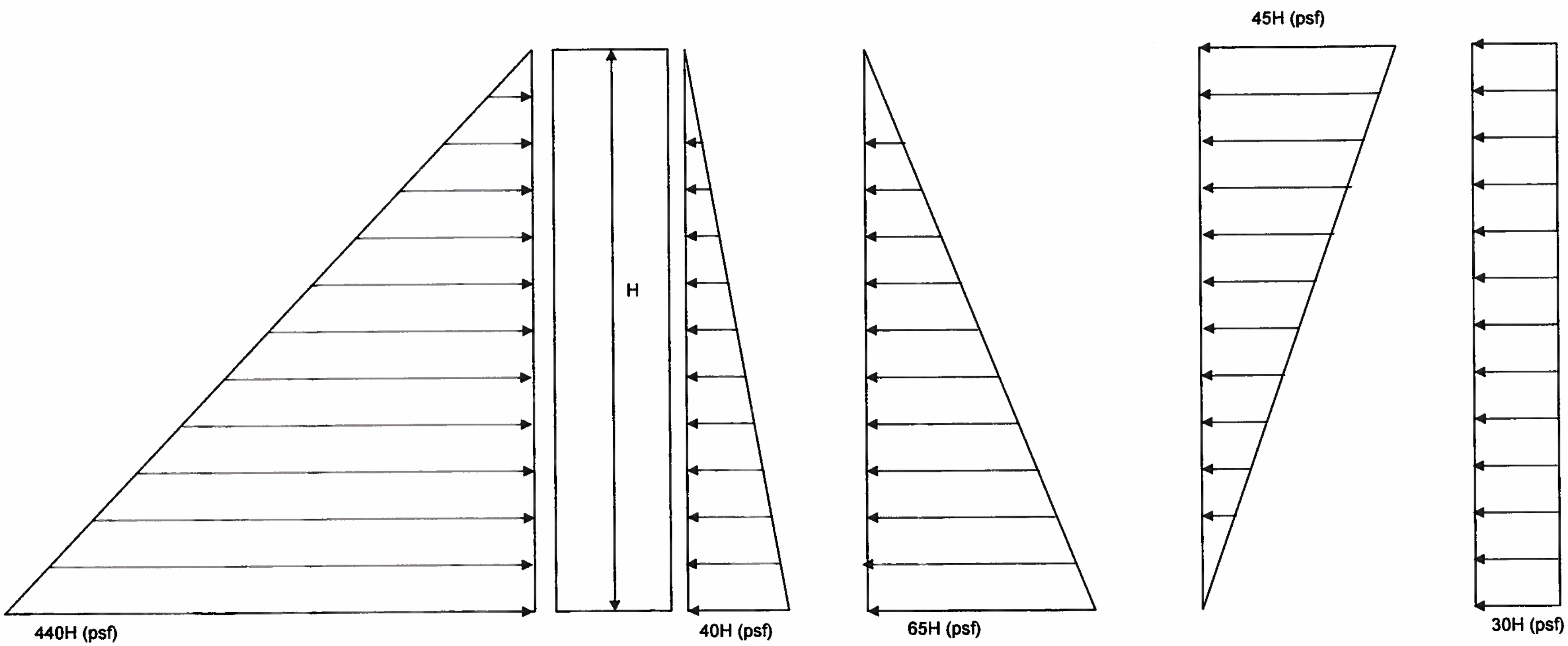
B	1	2	3	5	10.5	21
q_u'	7.84	9.54	10.99	13.51	35.57	98.89
q_a'	2.61	3.18	3.66	4.50	3.53	1.76
k_v	447.1	223.3	148.8	89.2	42.4	21.2

1. Terzaghi's Net Bearing Capacity.
2. FS=3 or δ=1.0in.
3. Footing shape = Square.

G:\2010\10325-3 UCR, Glen Mor 2 Student Apts\GeoCalc\GeoSuite_10325-3_B-23.csv

Bearing Capacity & Subgrade Reaction Modulus - SPT Data			
Project:	Proposed Glen Mor 2 Student Apartments - Project No. 956334		
Location:	University of California, Riverside, California		
Job Number: 10325-3	Boring No.: B-23	Enclosure: D-10	

Prepared at 6/28/2010 2:24:21 PM



(a) Passive Earth

(b) Active Earth

(c) At-rest Earth Pressure

(d) Active Seismic Earth Pressure

(e) Apparent Earth Pressure (Sand)

Ultimate Passive Resistance:	440H (psf)	Ultimate Base Friction:	0.43
Allowable Passive Resistance:	220H (psf)	Allowable Base Friction:	0.29
Factor of Safety:	2.0	Factor of Safety:	1.5

* not scaled

C.H.J. Incorporated

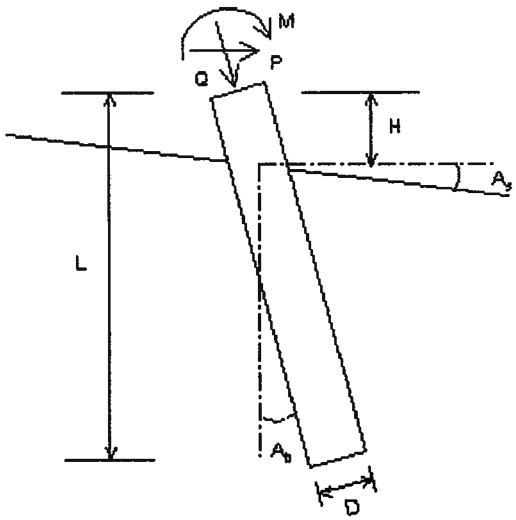
Typical Earth Pressure Distributions

Project:	Proposed Glen Mor 2 Student Apartments - Project No. 956334		
Location	University of California, Riverside, California		
Job Number	10325-3	Enclosure	D-11

APPENDIX "E"

PILE CALCULATIONS

VERTICAL ANALYSIS



Drilled Pile (dia <=24 in. or 61 cm)

Loads:
Load Factor for Vertical Loads= 1.0
Load Factor for Lateral Loads= 1.0
Loads Supported by Pile Cap= 0 %
Shear Condition: Static

Vertical Load, Q= 200.0 -kp
Shear Load, P= 0.0 -kp
Moment, M= 0.0 -kp-f

Profile:
Pile Length, L= 37.0 -ft
Top Height, H= -4 -ft
Slope Angle, As= 0
Batter Angle, Ab= 0

Free Head Condition

Soil Data:

Depth -ft	Gamma -lb/f3	Phi	C -kp/f2	K -lb/i3	e50 or Dr %	Nspt
0	137.7	33	0.00	190.2	71.39	36
4	123	30	.05	34.1	30.24	8
10	129.4	30	.05	41.1	33.23	9
16	115.5	33	0.00	117.2	56.25	22
20	138.9	33	0.00	166.9	66.98	31
25	128.0	33	0.00	202.5	73.59	38
31	135.4	33	0.00	180.5	69.59	34
41	138.0	35	0.00	280.2	85.93	51
50	138	35	0.00	355.1	95.94	60

Pile Data:

Depth -ft	Width -in	Area -in2	Per. -in	I -in4	E -kp/i2	Weight -kp/f
0.0	24	452.4	75.4	16286.0	3000	0.471
37.0						

Vertical capacity:
Weight above Ground= 0.00 Total Weight= 17.41-kp *Soil Weight is not included
Side Resistance (Down)= 227.299-kp Side Resistance (Up)= 115.534-kp
Tip Resistance (Down)= 361.180-kp Tip Resistance (Up)= 0.000-kp
Total Ultimate Capacity (Down)= 588.479-kp Total Ultimate Capacity (Up)= 132.949-kp
Total Allowable Capacity (Down)= 234.043-kp Total Allowable Capacity (Up)= 47.219-kp
OK! Qallow > Q

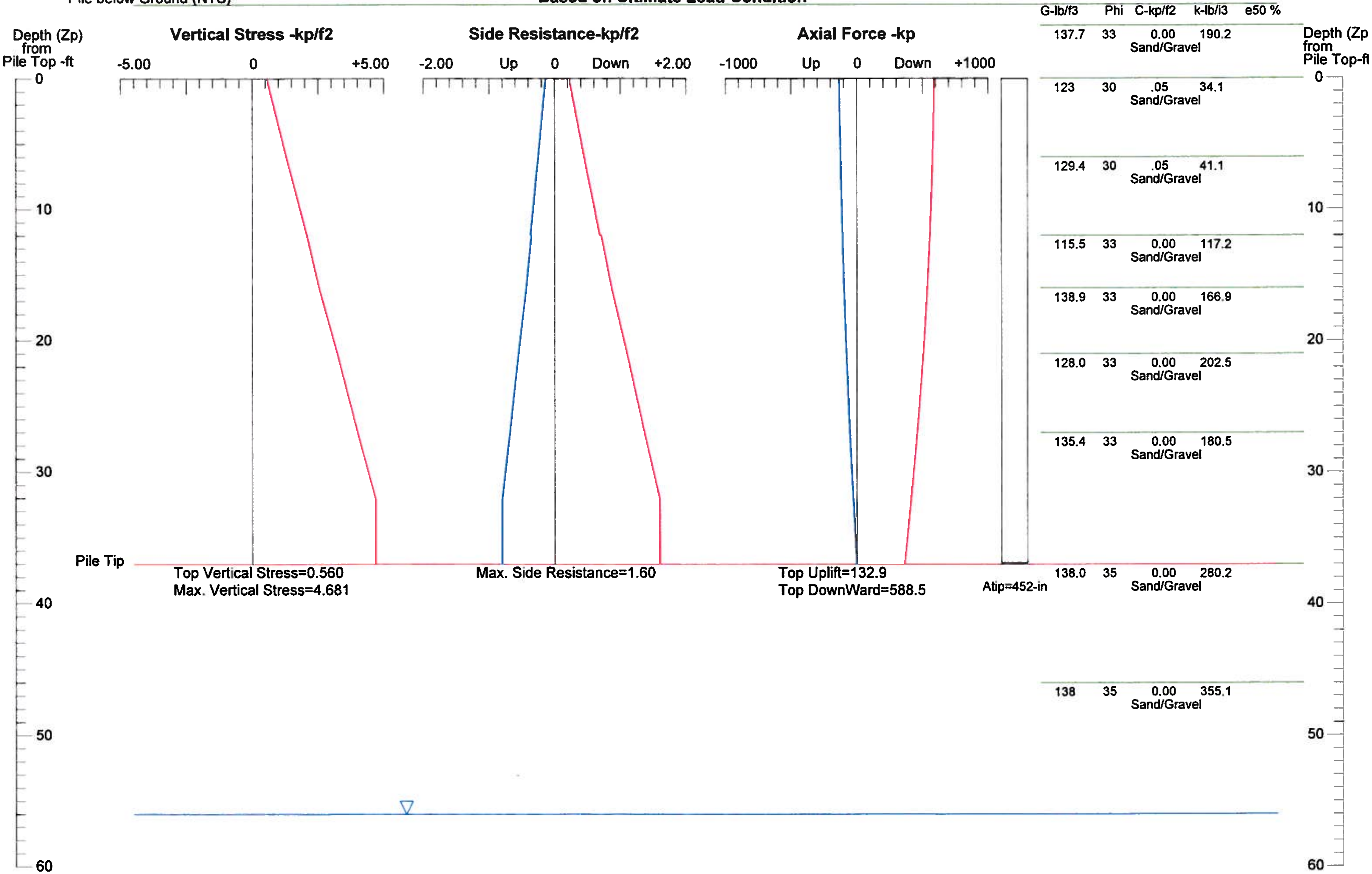
Settlement Calculation:
At Q= 200.00-kp Settlement= 0.12353-in
At Xallow= 0.50-in Qallow= 364.75293-kp

Note: If the program cannot find a result or the result exceeds the upper limit. The result will be displayed as 99999.

Enclosure "E-2"

SOIL STRESS, SIDE RESISTANCE, & AXIAL FORCE vs DEPTH

Based on Ultimate Load Condition



C.H.J. Incorporated

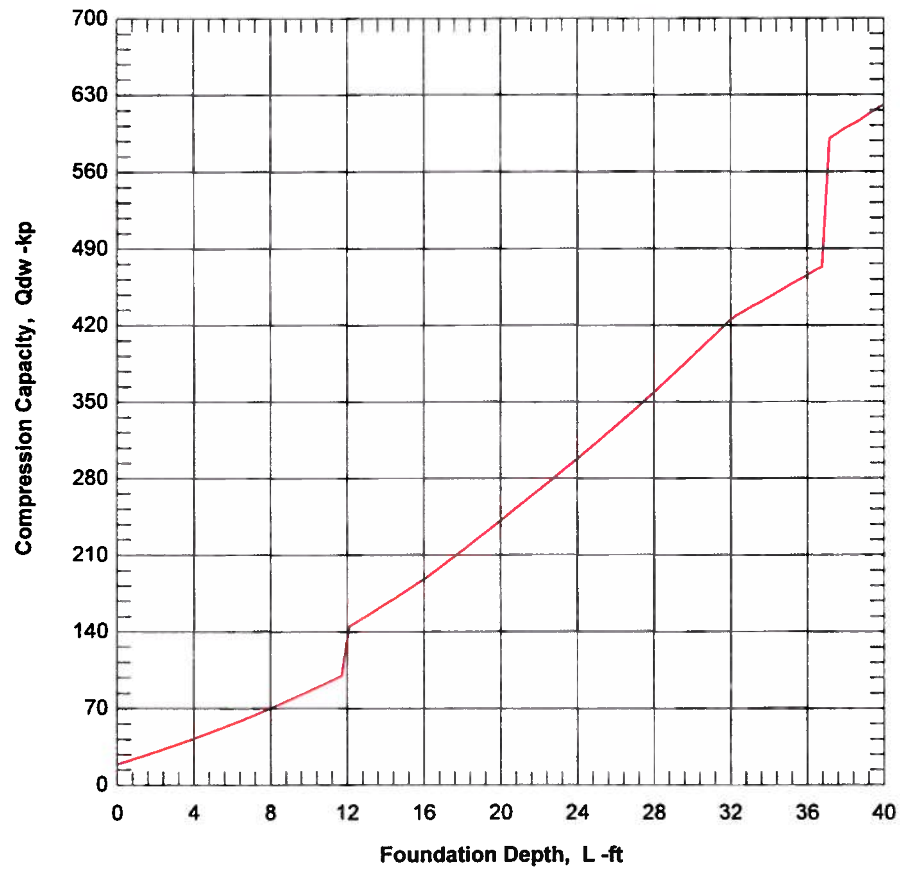
Glen Mor 2 Student Apartments - Project No. 956334

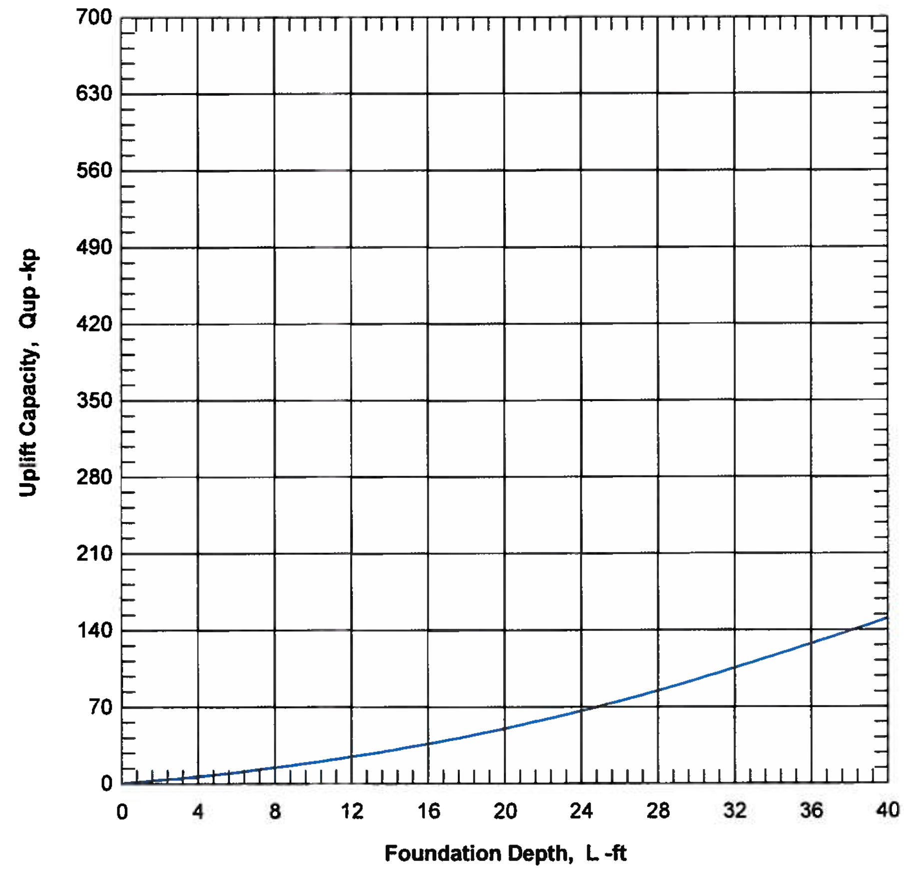
24in CIDH, B-6

Job No. 10325-3

Enclosure "E-3"

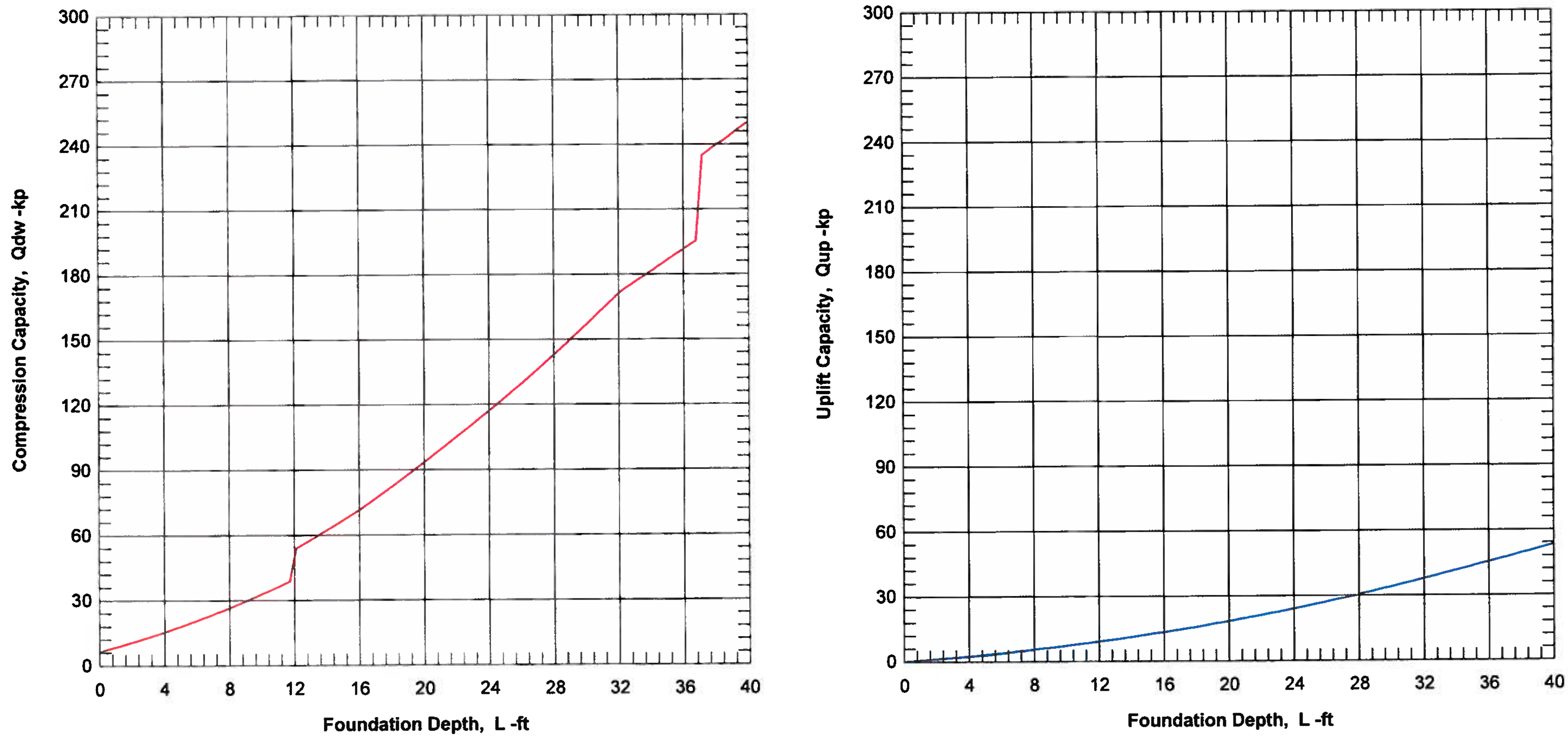
ULTIMATE CAPACITY vs FOUNDATION DEPTH



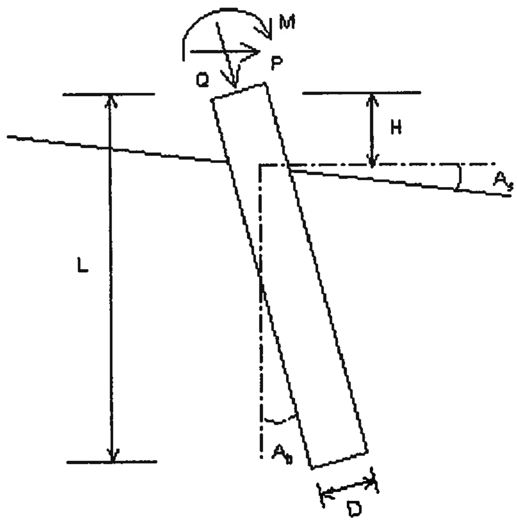


Enclosure "E-4"

ALLOWABLE CAPACITY vs FOUNDATION DEPTH



VERTICAL ANALYSIS



Drilled Pile (dia <=24 in. or 61 cm)

Loads:
Load Factor for Vertical Loads= 1.0
Load Factor for Lateral Loads= 1.0
Loads Supported by Pile Cap= 0 %
Shear Condition: Static

Vertical Load, Q= 200.0 -kp
Shear Load, P= 0.0 -kp
Moment, M= 0.0 -kp-f

Profile:
Pile Length, L= 36.0 -ft
Top Height, H= -4 -ft
Slope Angle, As= 0
Batter Angle, Ab= 0

Free Head Condition

Soil Data:

Depth -ft	Gamma -lb/f3	Phi	C -kp/f2	K -lb/i3	e50 or Dr %	Nspt
0	127.5	33	0.00	246.0	80.80	46
4	113.8	31	0.00	39.2	32.44	9
10	115.9	31	0.00	50.9	37.01	11
15	123.2	33	0.00	165.5	66.69	31
20	126.2	33	0.00	229.0	78.08	43
25	131.6	35	0.00	295.2	88.07	53
30	128.7	33	0.00	261.5	83.19	48
40	136.9	35	0.00	355.1	95.94	60
50	138.0	35	0.00	355.1	95.94	60

Pile Data:

Depth -ft	Width -in	Area -in2	Per. -in	I -in4	E -kp/i2	Weight -kp/f
0.0	24	452.4	75.4	16286.0	3000	0.471
36.0						

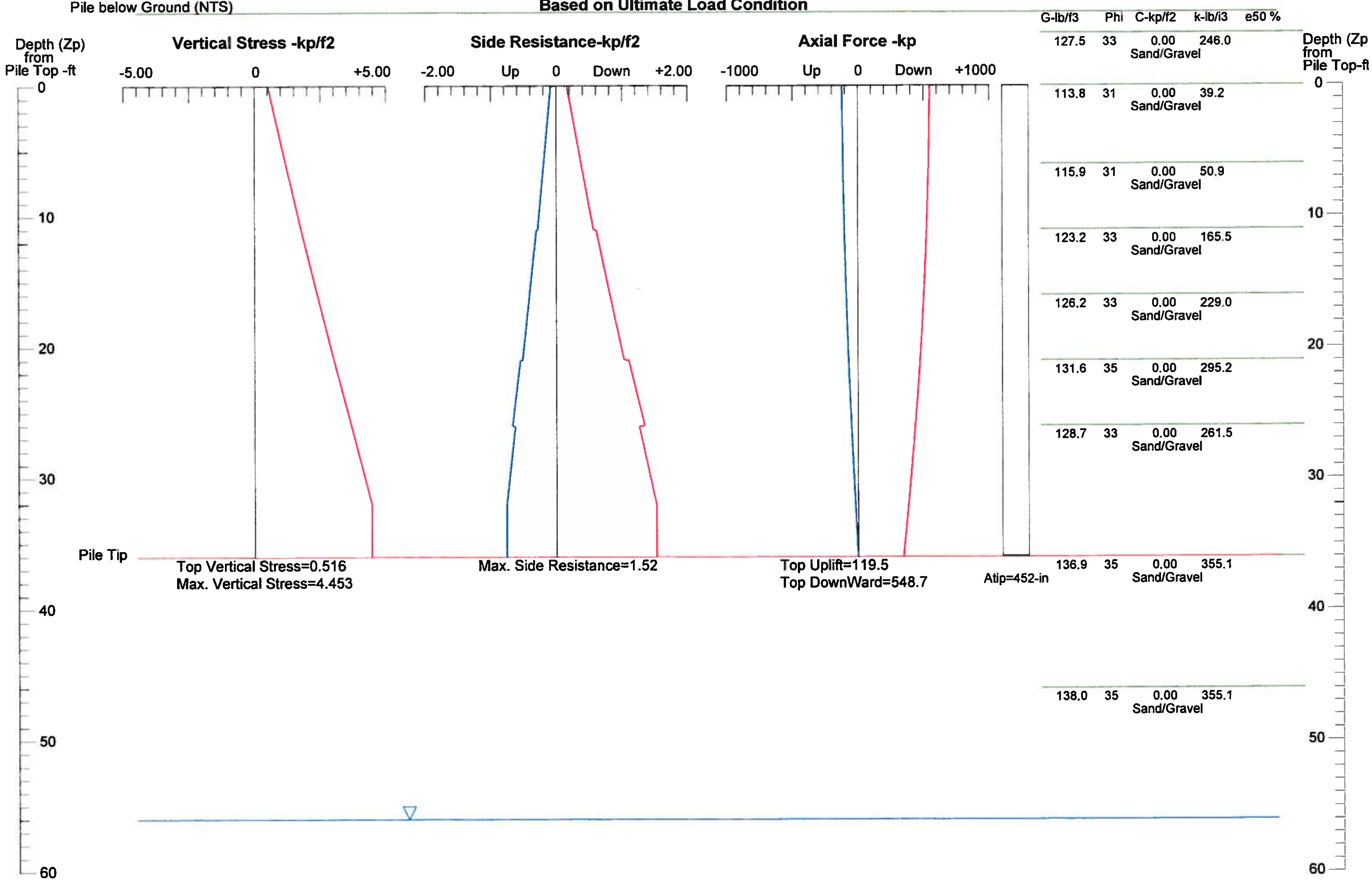
Vertical capacity:
Weight above Ground= 0.00 Total Weight= 16.95-kp *Soil Weight is not included
Side Resistance (Down)= 205.141-kp Side Resistance (Up)= 102.570-kp
Tip Resistance (Down)= 343.563-kp Tip Resistance (Up)= 0.000-kp
Total Ultimate Capacity (Down)= 548.703-kp Total Ultimate Capacity (Up)= 119.523-kp
Total Allowable Capacity (Down)= 217.091-kp Total Allowable Capacity (Up)= 42.666-kp
OK! Qallow > Q

Settlement Calculation:
At Q= 200.00-kp Settlement= 0.13977-in
At Xallow= 0.50-in Qallow= 337.80969-kp

Note: If the program cannot find a result or the result exceeds the upper limit. The result will be displayed as 99999.

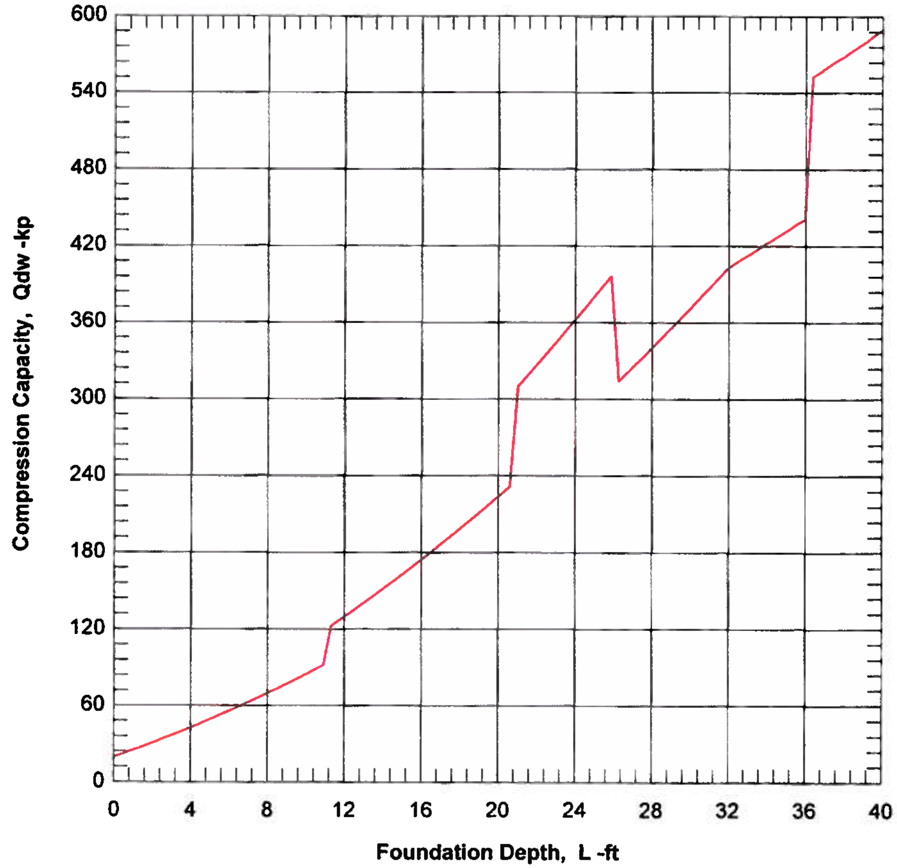
SOIL STRESS, SIDE RESISTANCE, & AXIAL FORCE vs DEPTH

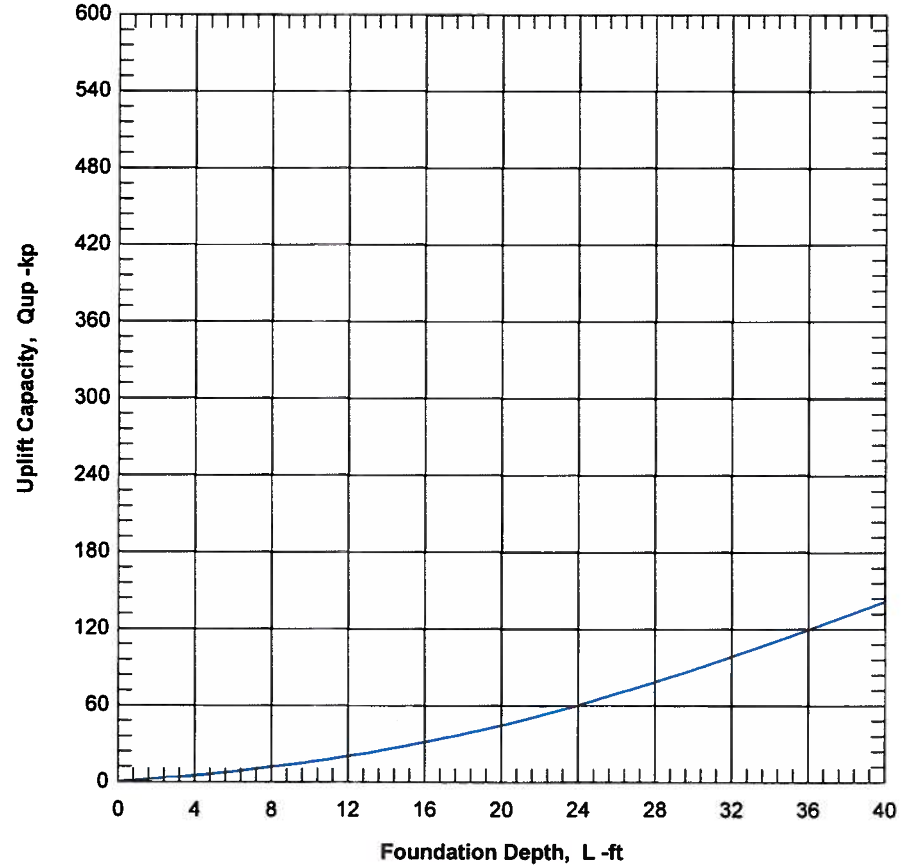
Based on Ultimate Load Condition



Enclosure "E-7"

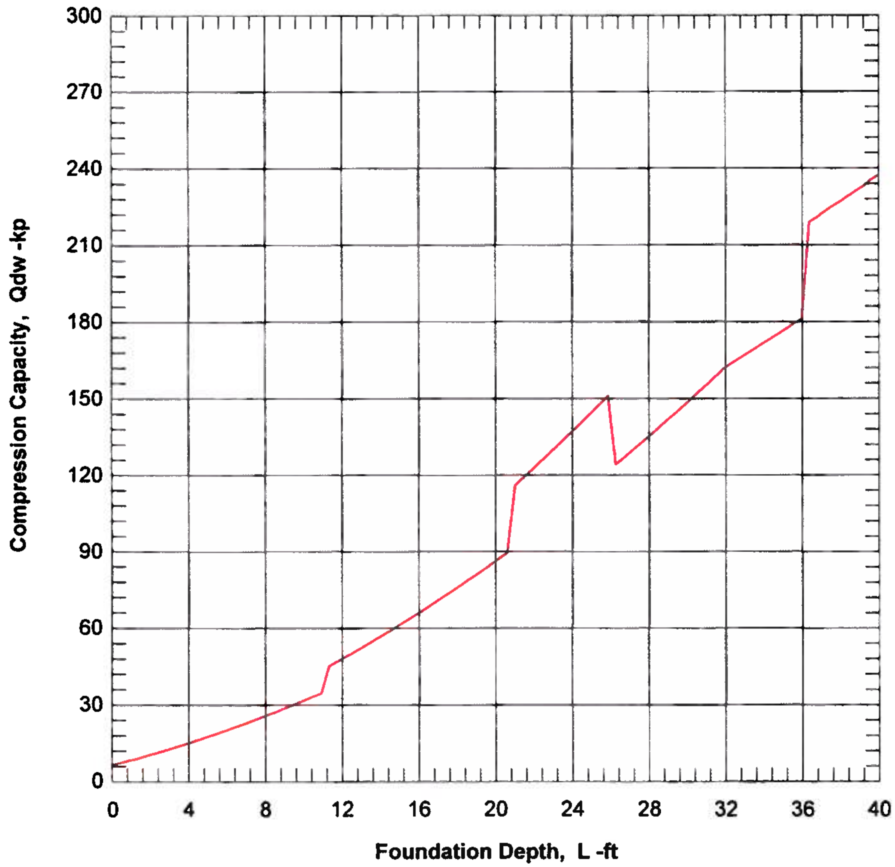
ULTIMATE CAPACITY vs FOUNDATION DEPTH

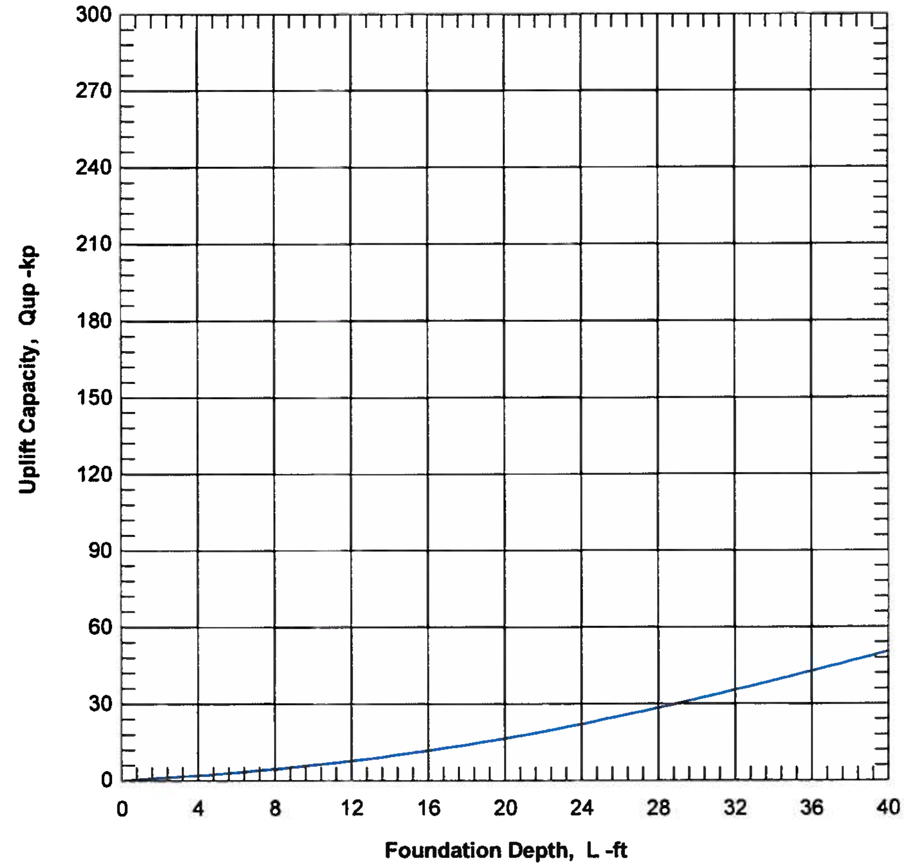




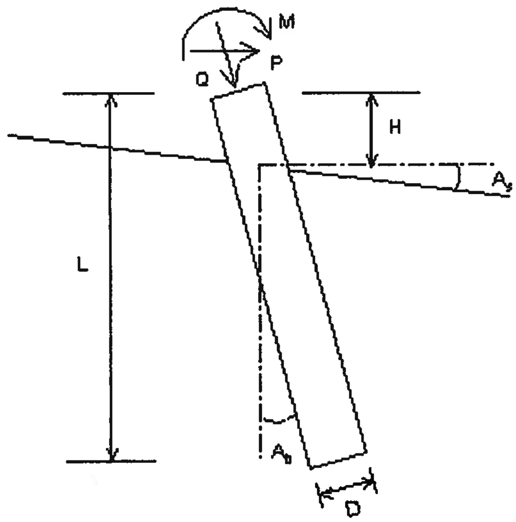
Enclosure "E-8"

ALLOWABLE CAPACITY vs FOUNDATION DEPTH





VERTICAL ANALYSIS



Drilled Pile (dia <=24 in. or 61 cm)

Loads:
Load Factor for Vertical Loads= 1.0
Load Factor for Lateral Loads= 1.0
Loads Supported by Pile Cap= 0 %
Shear Condition: Static

Vertical Load, Q= 200.0 -kp
Shear Load, P= 0.0 -kp
Moment, M= 0.0 -kp-f

Profile:
Pile Length, L= 39.0 -ft
Top Height, H= -4 -ft
Slope Angle, As= 0
Batter Angle, Ab= 0

Free Head Condition

Soil Data:

Depth -ft	Gamma -lb/f3	Phi	C -kp/f2	K -lb/i3	e50 or Dr %	Nspt
0	113.8	30	0.00	39.2	32.44	9
7	122.1	33	0.00	122.7	57.53	23
13	124.2	33	0.00	194.4	72.15	37
18	121.8	33	0.00	115.0	55.72	21
24	126.2	35	0.00	229.0	78.08	43
28	121.4	33	0.00	107.7	53.92	20
34	122.8	33	0.00	150.6	63.67	28
43	126.4	35	0.00	231.4	78.47	43
48	122.3	33	0.00	129.6	59.12	24
54	125.7	35	0.00	221.8	76.89	42

Pile Data:

Depth -ft	Width -in	Area -in2	Per. -in	I -in4	E -kp/i2	Weight -kp/f
0.0	24	452.4	75.4	16286.0	3000	0.471
39.0						

Vertical capacity:
Weight above Ground= 0.00 Total Weight= 18.35-kp *Soil Weight is not included
Side Resistance (Down)= 231.650-kp Side Resistance (Up)= 115.825-kp
Tip Resistance (Down)= 339.320-kp Tip Resistance (Up)= 0.000-kp
Total Ultimate Capacity (Down)= 570.970-kp Total Ultimate Capacity (Up)= 134.171-kp
Total Allowable Capacity (Down)= 228.932-kp Total Allowable Capacity (Up)= 47.781-kp
OK! Qallow > Q

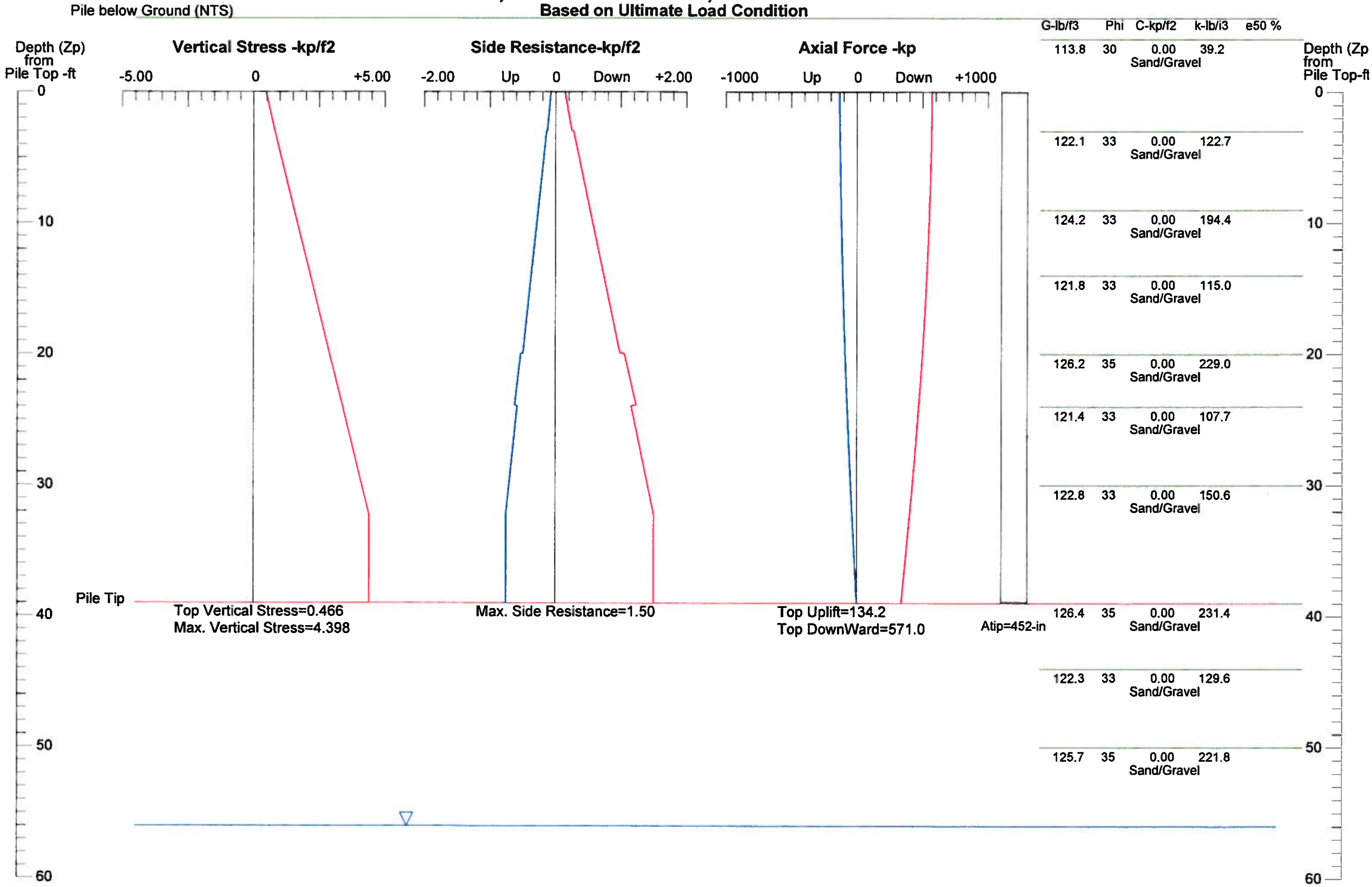
Settlement Calculation:
At Q= 200.00-kp Settlement= 0.12371-in
At Xallow= 0.50-in Qallow= 361.17084-kp

Note: If the program cannot find a result or the result exceeds the upper limit. The result will be displayed as 99999.

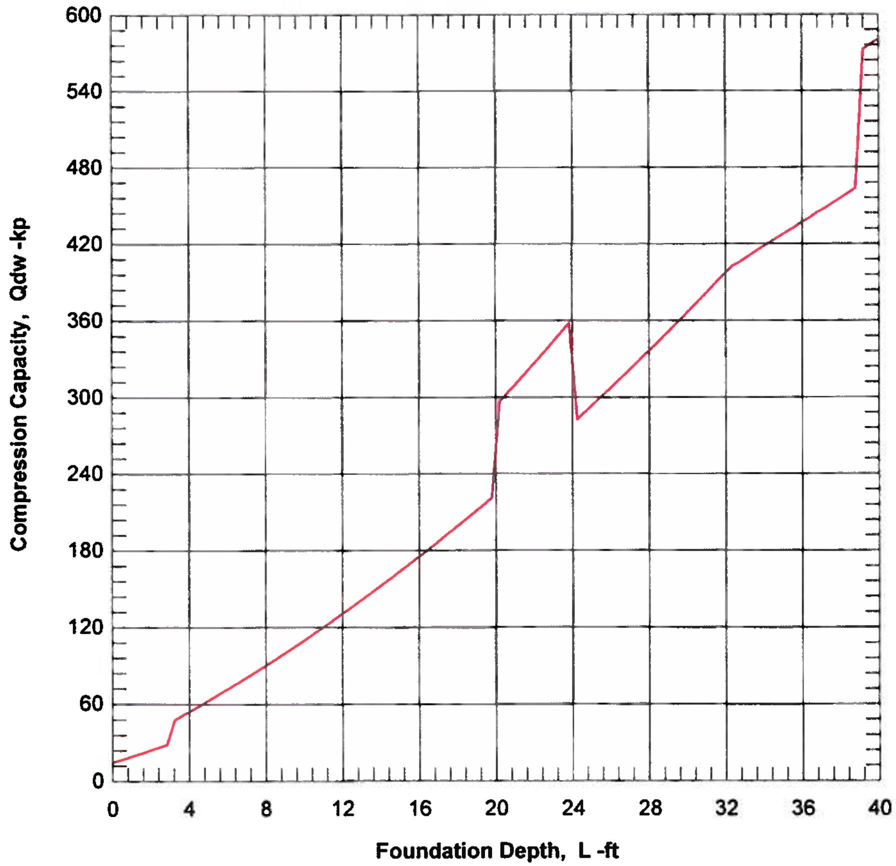
Enclosure "E-10"

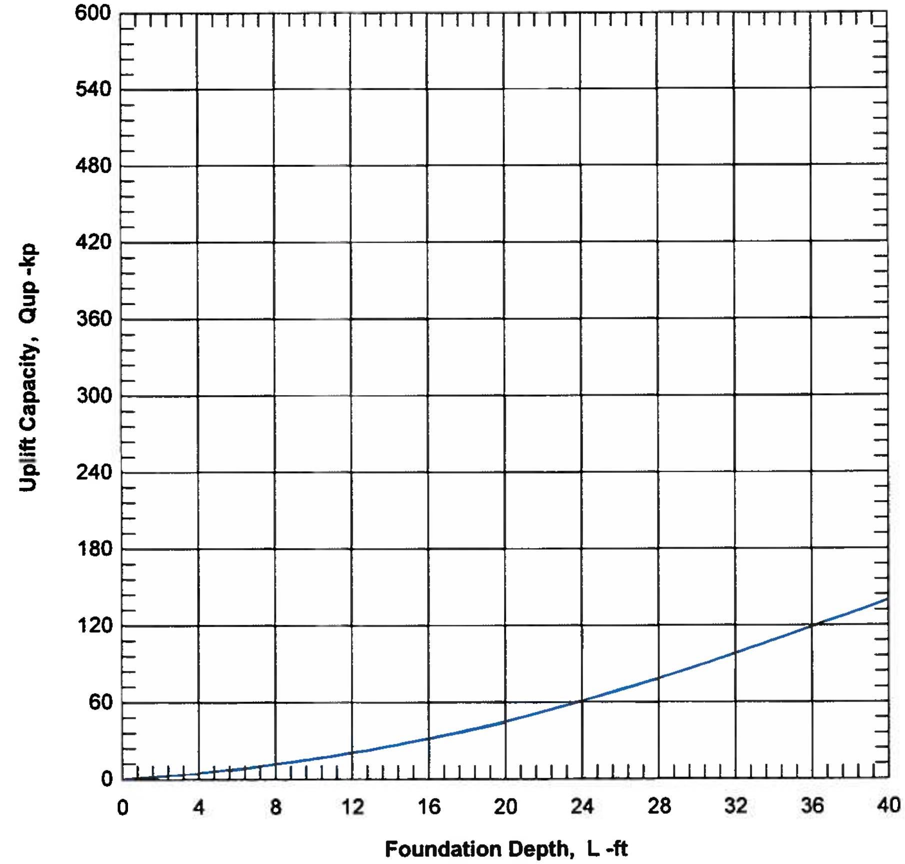
SOIL STRESS, SIDE RESISTANCE, & AXIAL FORCE vs DEPTH

Based on Ultimate Load Condition



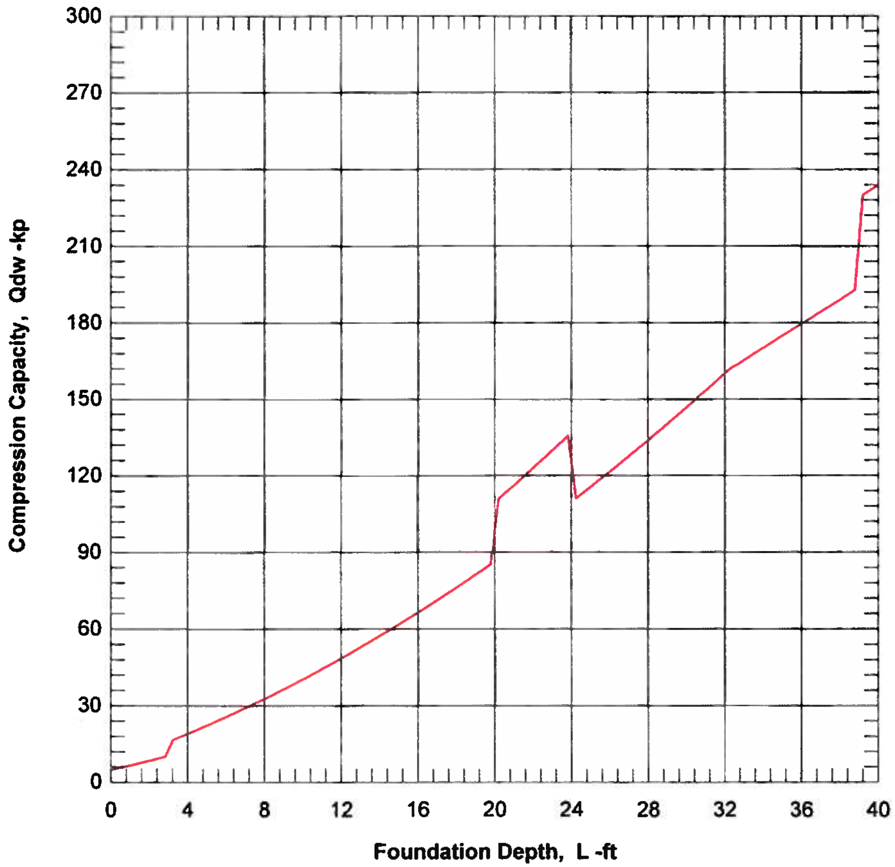
ULTIMATE CAPACITY vs FOUNDATION DEPTH

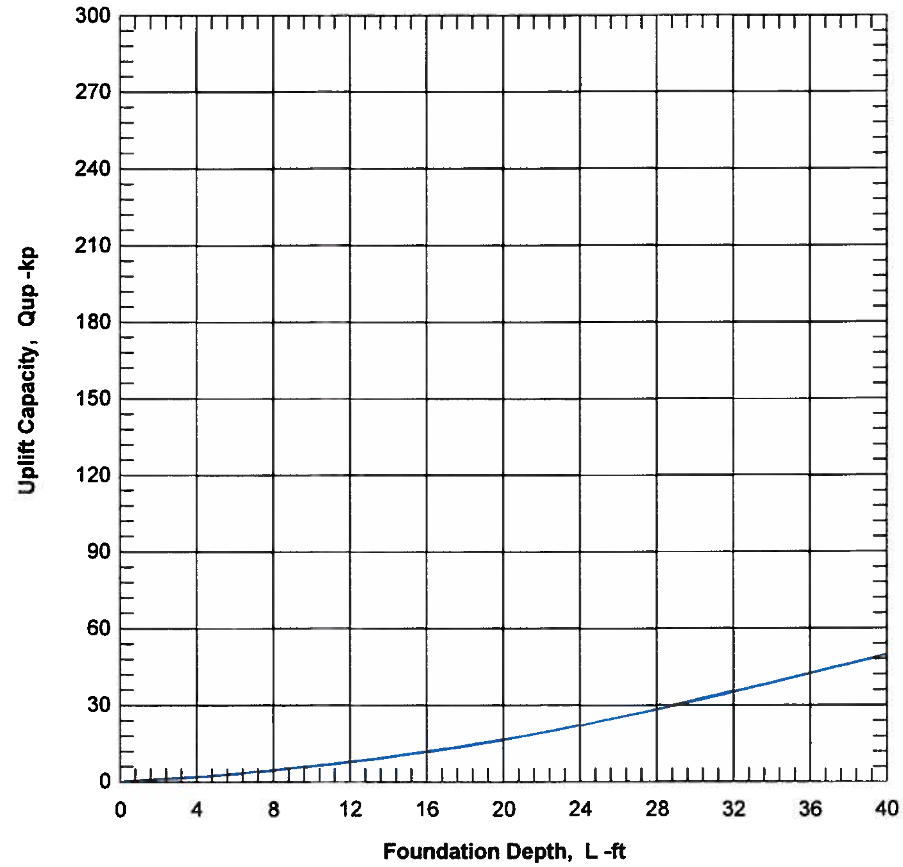




Enclosure "E-12"

ALLOWABLE CAPACITY vs FOUNDATION DEPTH

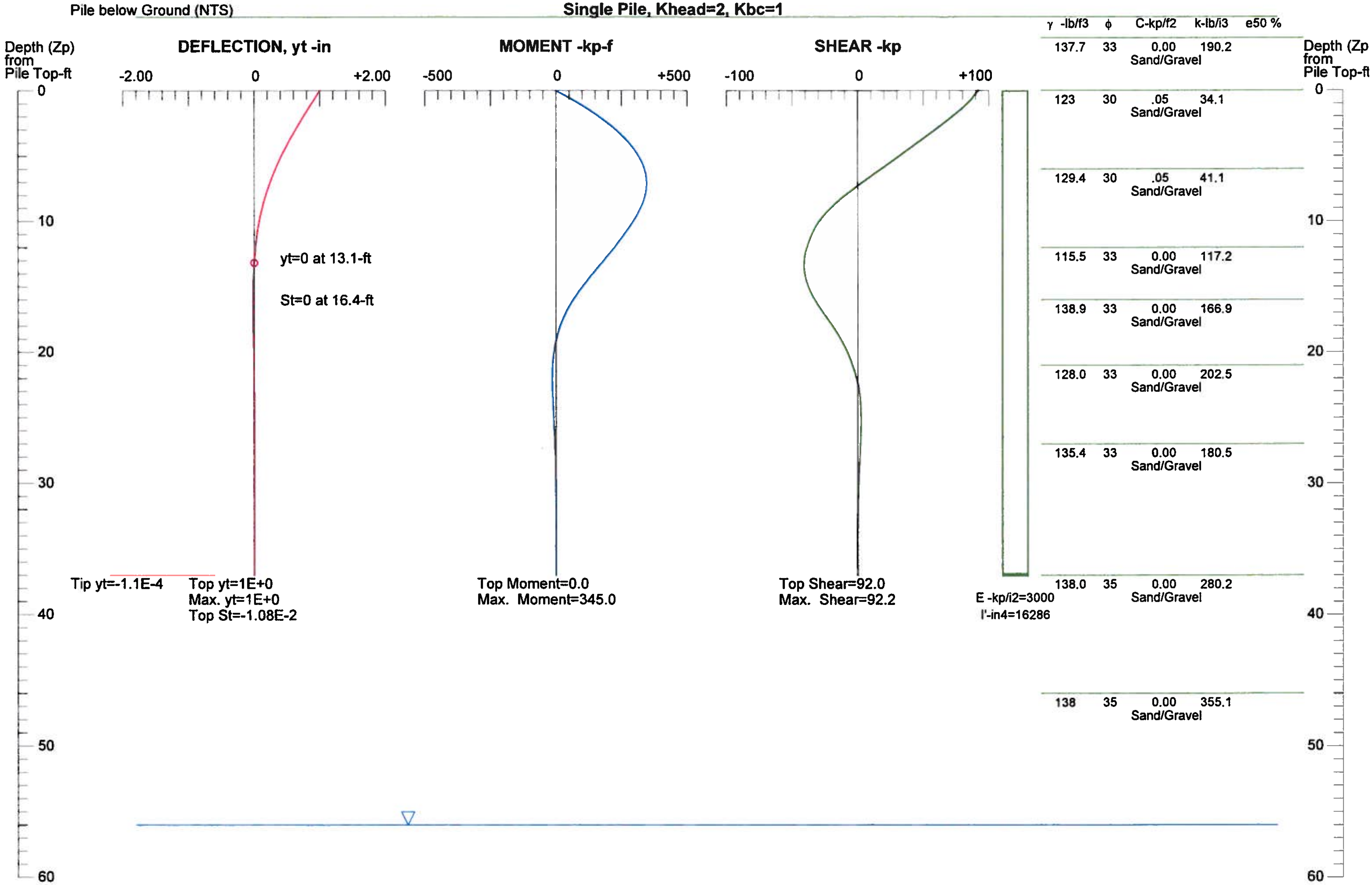




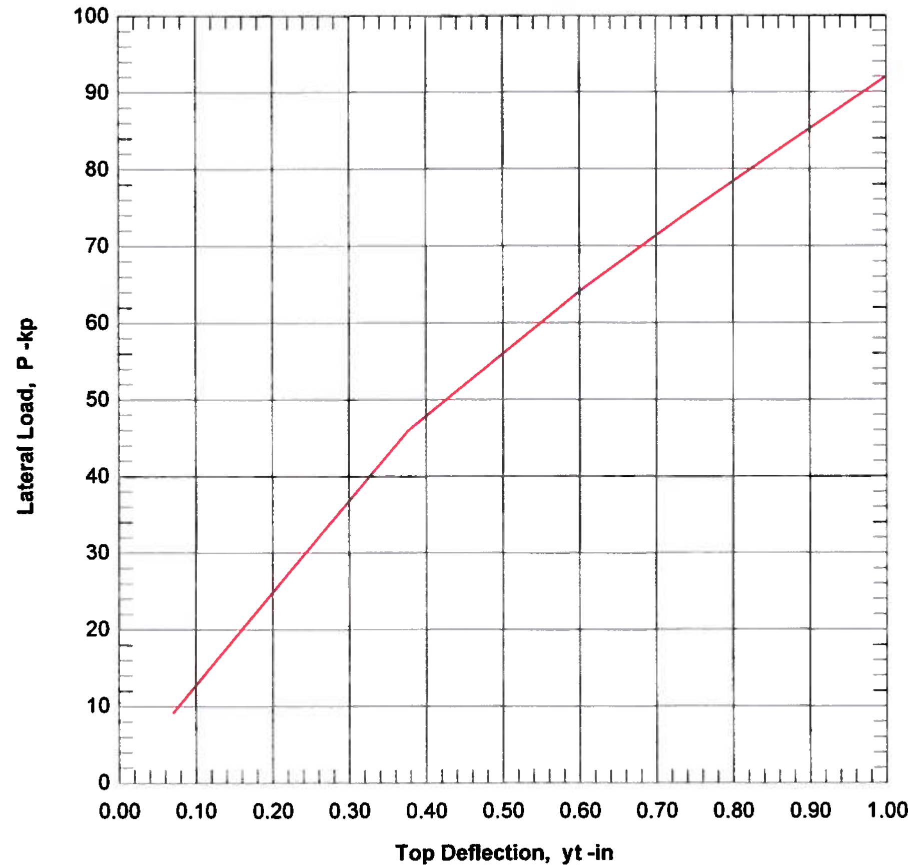
Enclosure "E-13"

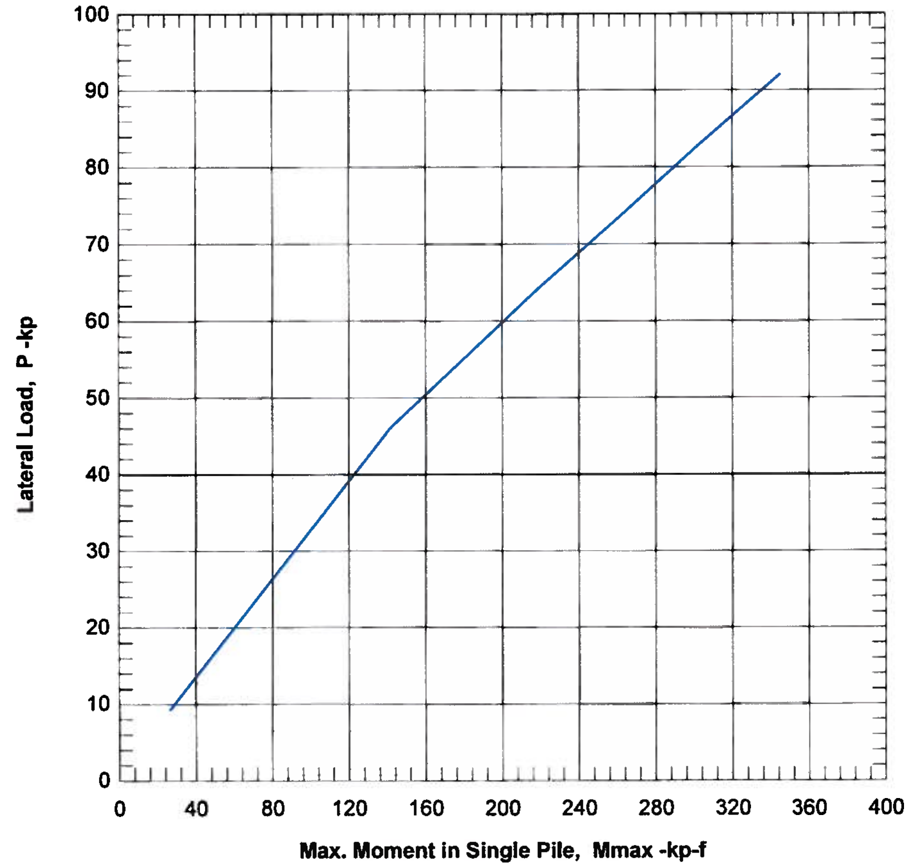
PILE DEFLECTION & FORCE vs DEPTH

Single Pile, Khead=2, Kbc=1



LATERAL LOAD vs DEFLECTION & MAX. MOMENT



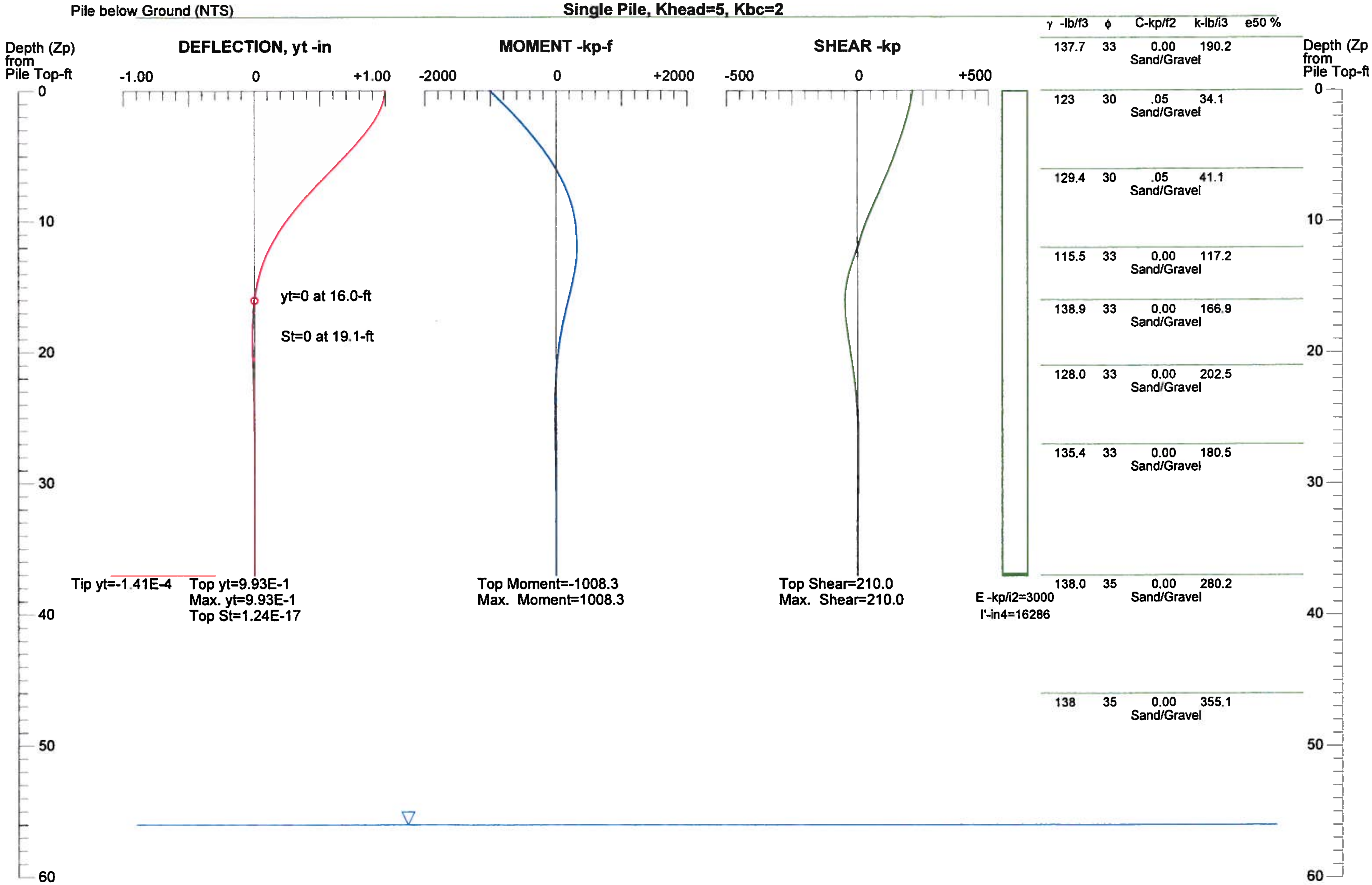


ALL-PILE Version 6   CivilTech Software   www.civiltech.com   Licensed to Fred Yi C.H.J., Incorporated

Enclosure "E-15"

PILE DEFLECTION & FORCE vs DEPTH

Single Pile, Khead=5, Kbc=2

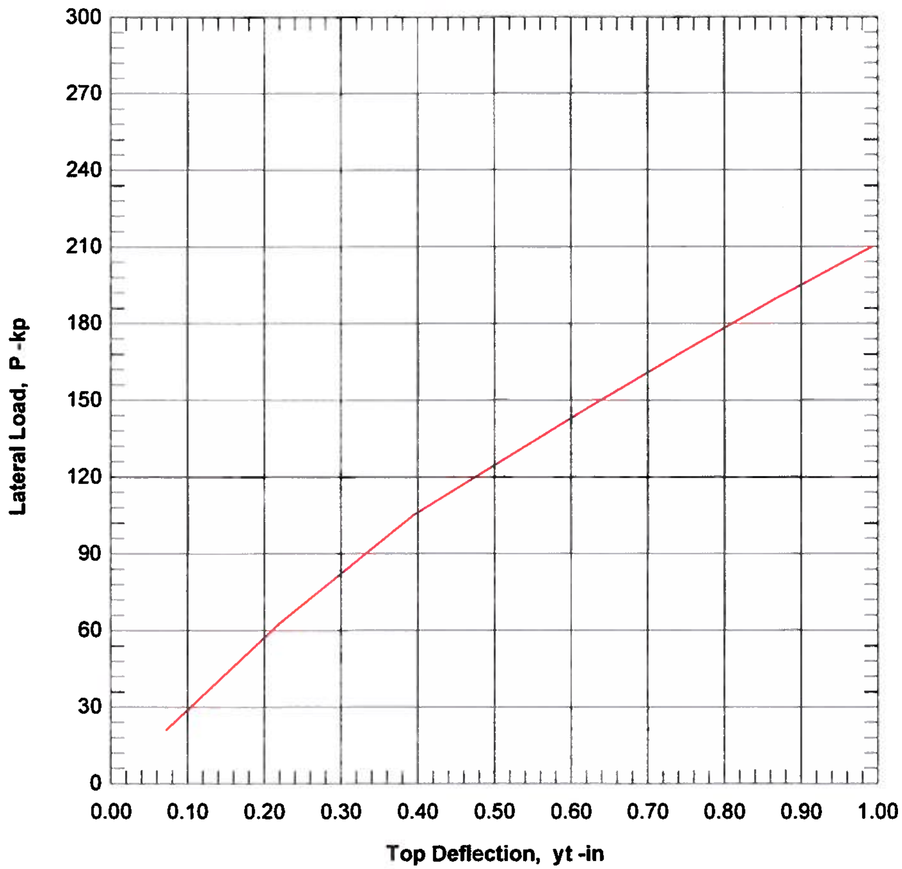


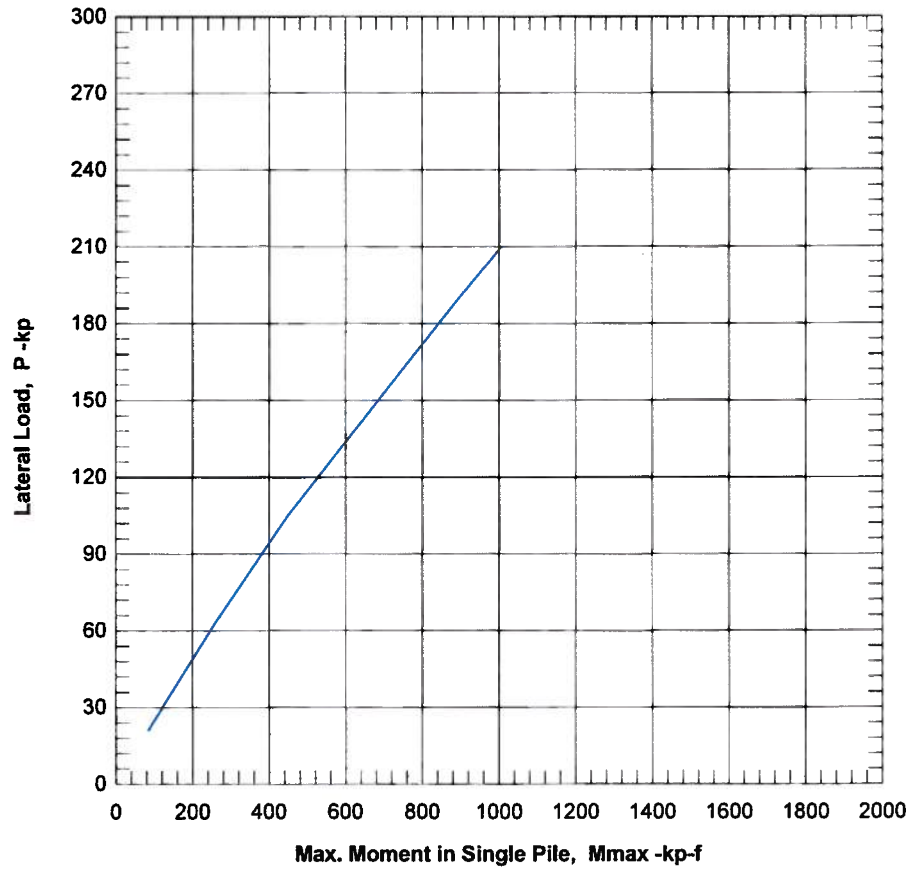
C.H.J. Incorporated

Glen Mor 2 Student Apartments - Project No. 956334
24in CIDH, B-6, Fixed Head

Job No. 10325-3

LATERAL LOAD vs DEFLECTION & MAX. MOMENT





Enclosure "E-17"

PILE DEFLECTION & FORCE vs DEPTH

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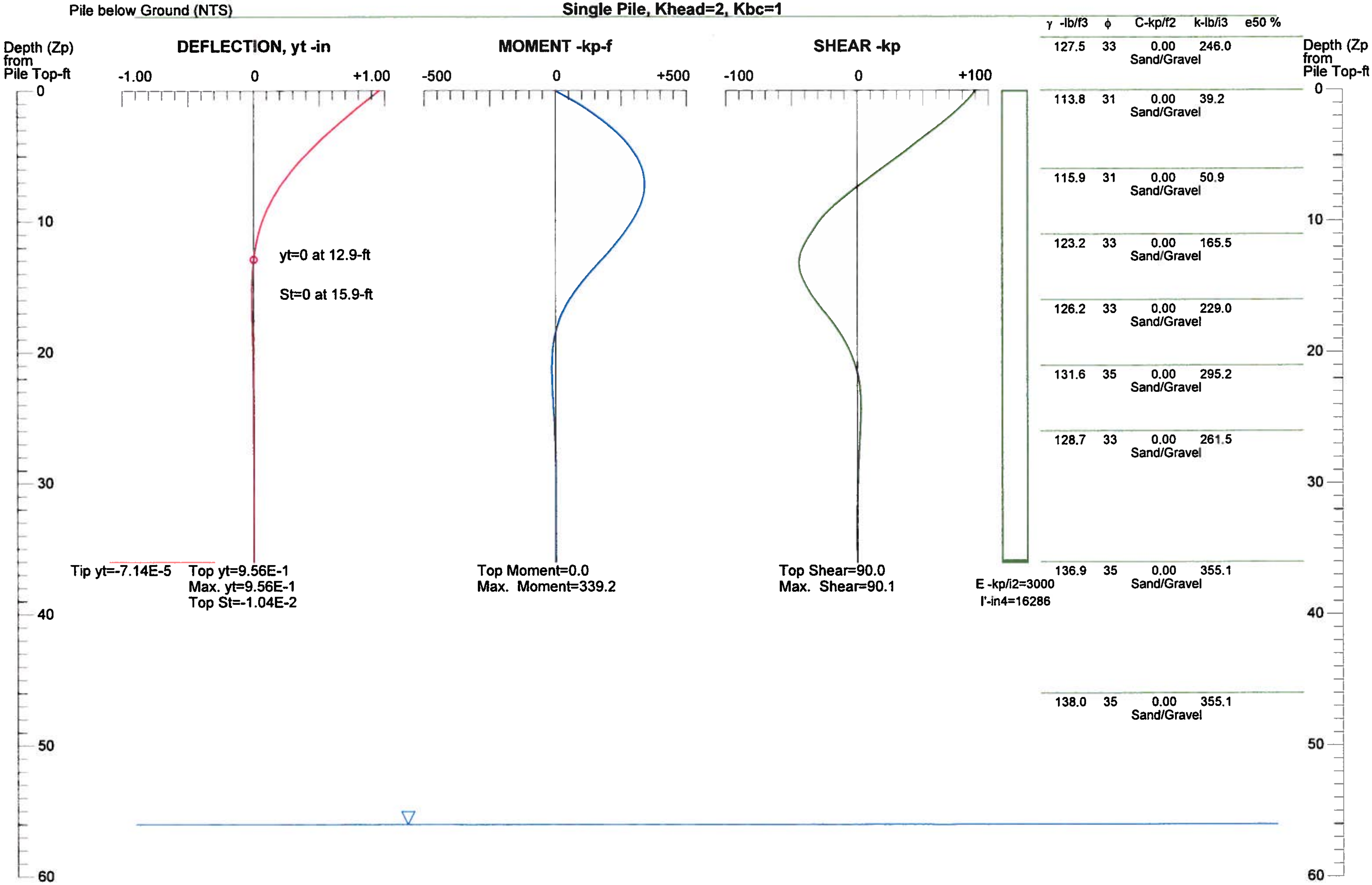


C.H.J. Incorporated

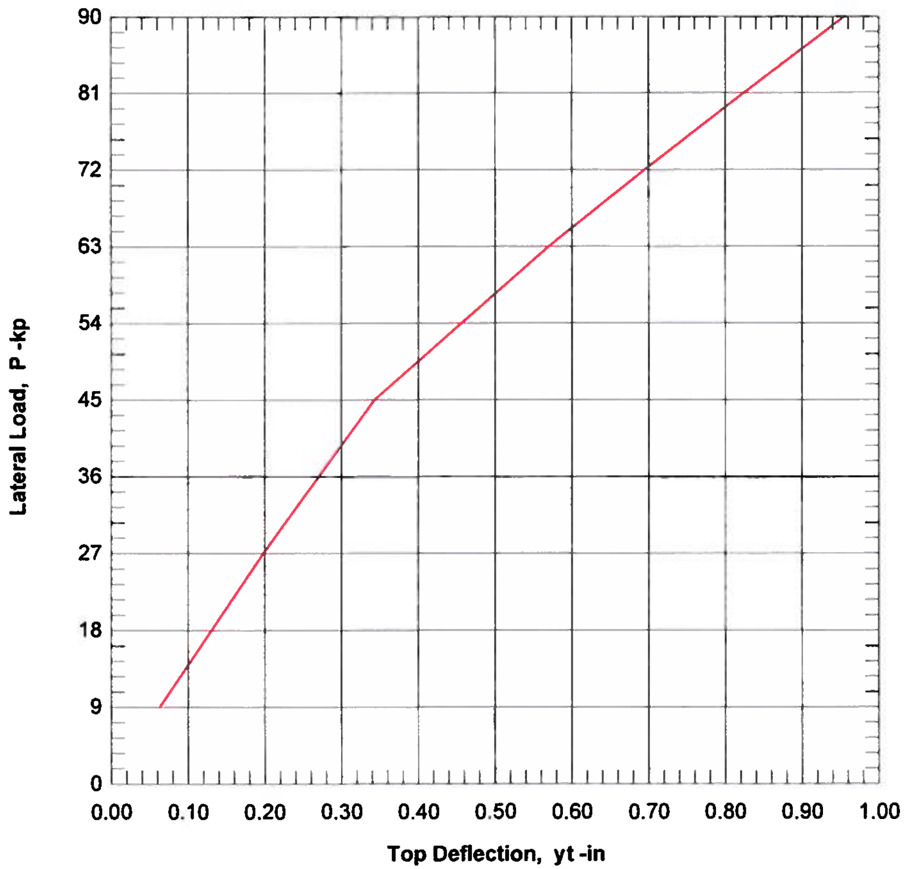
Glen Mor 2 Student Apartments - Project No. 956334

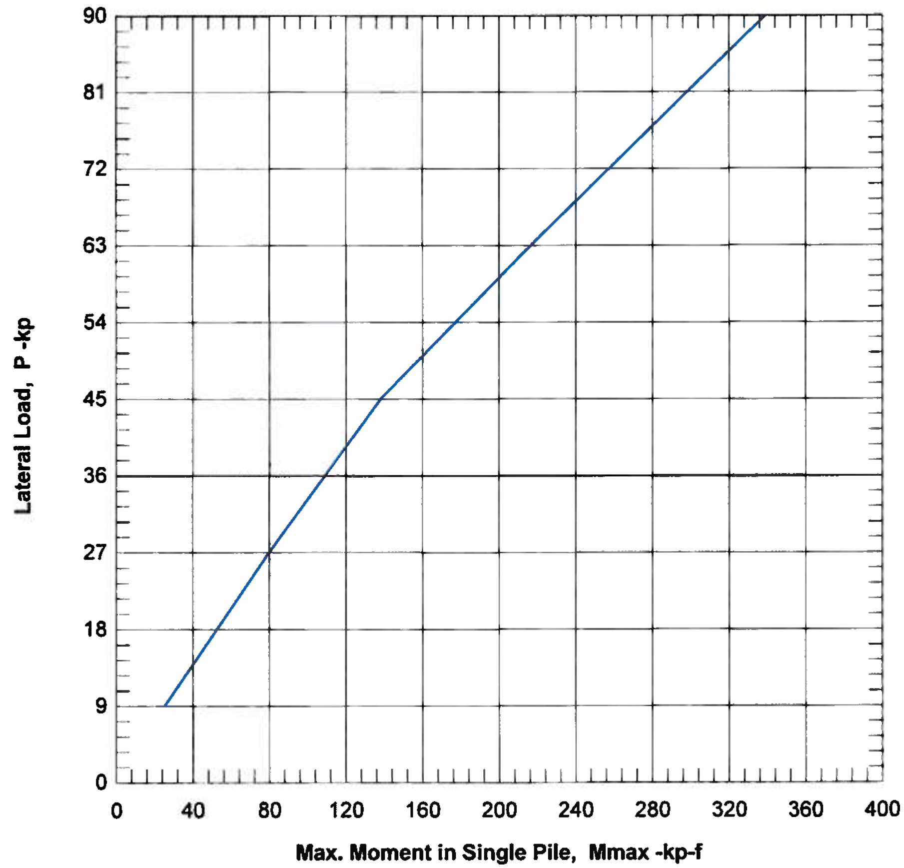
24in CIDH, B-18, Free Head

Job No. 10325-3

Enclosure "E-18"

LATERAL LOAD vs DEFLECTION & MAX. MOMENT





PILE DEFLECTION & FORCE vs DEPTH

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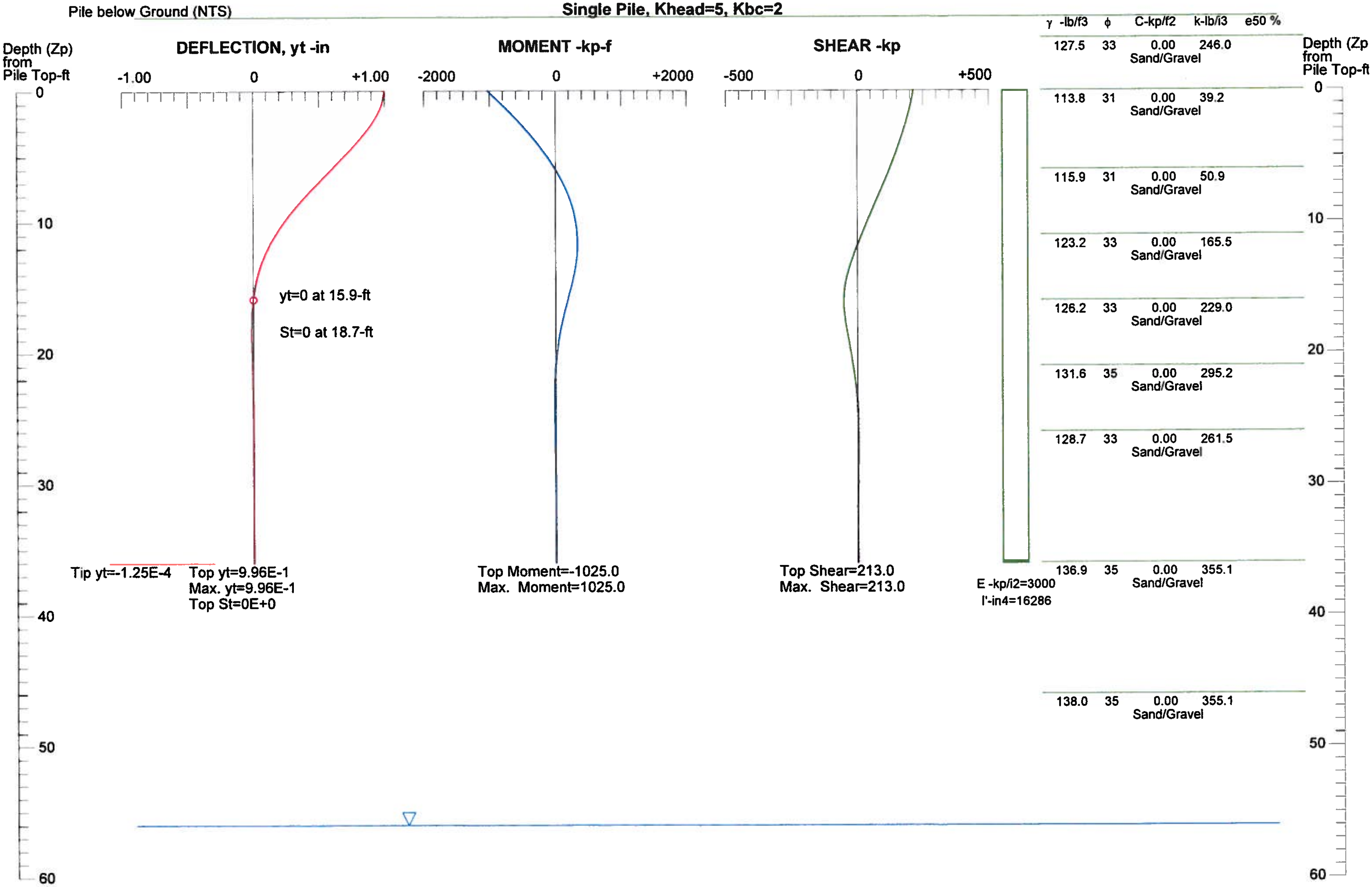
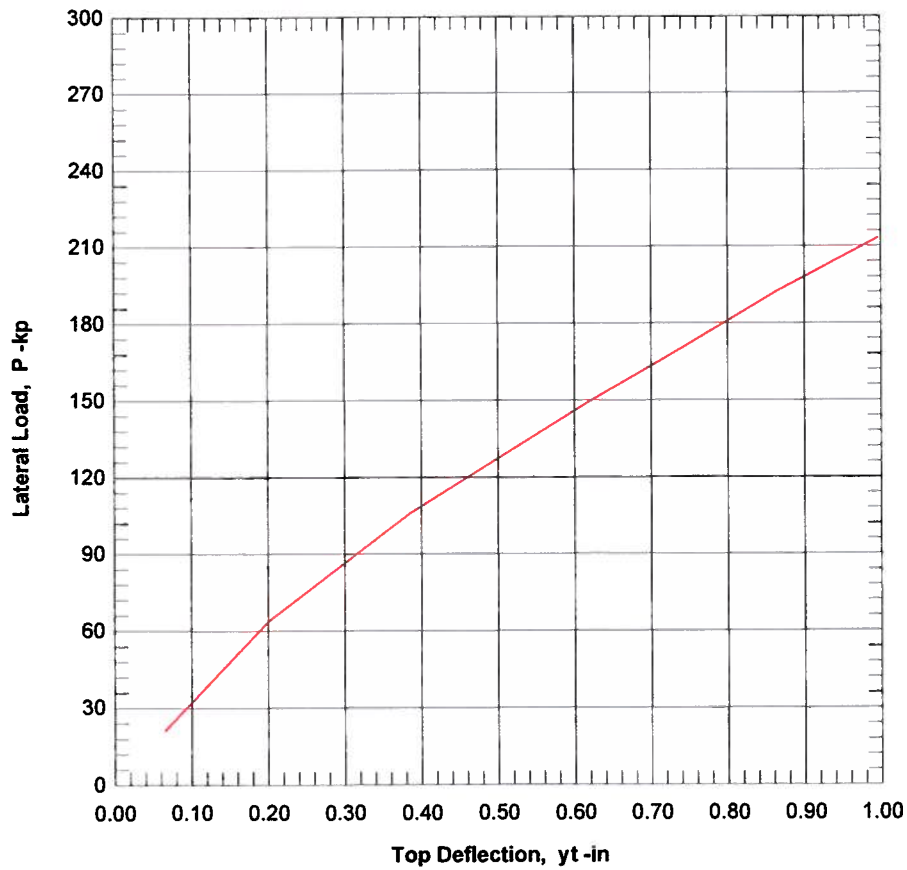
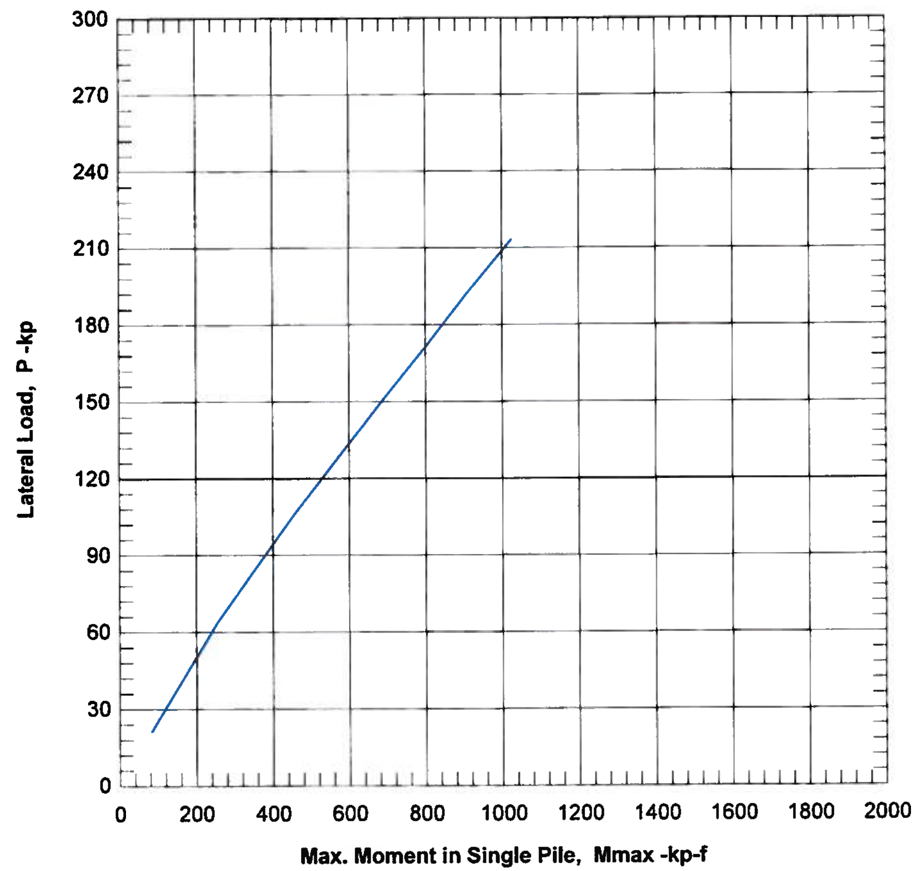


Enclosure "E-20"

LATERAL LOAD vs DEFLECTION & MAX. MOMENT





Enclosure "E-21"

PILE DEFLECTION & FORCE vs DEPTH

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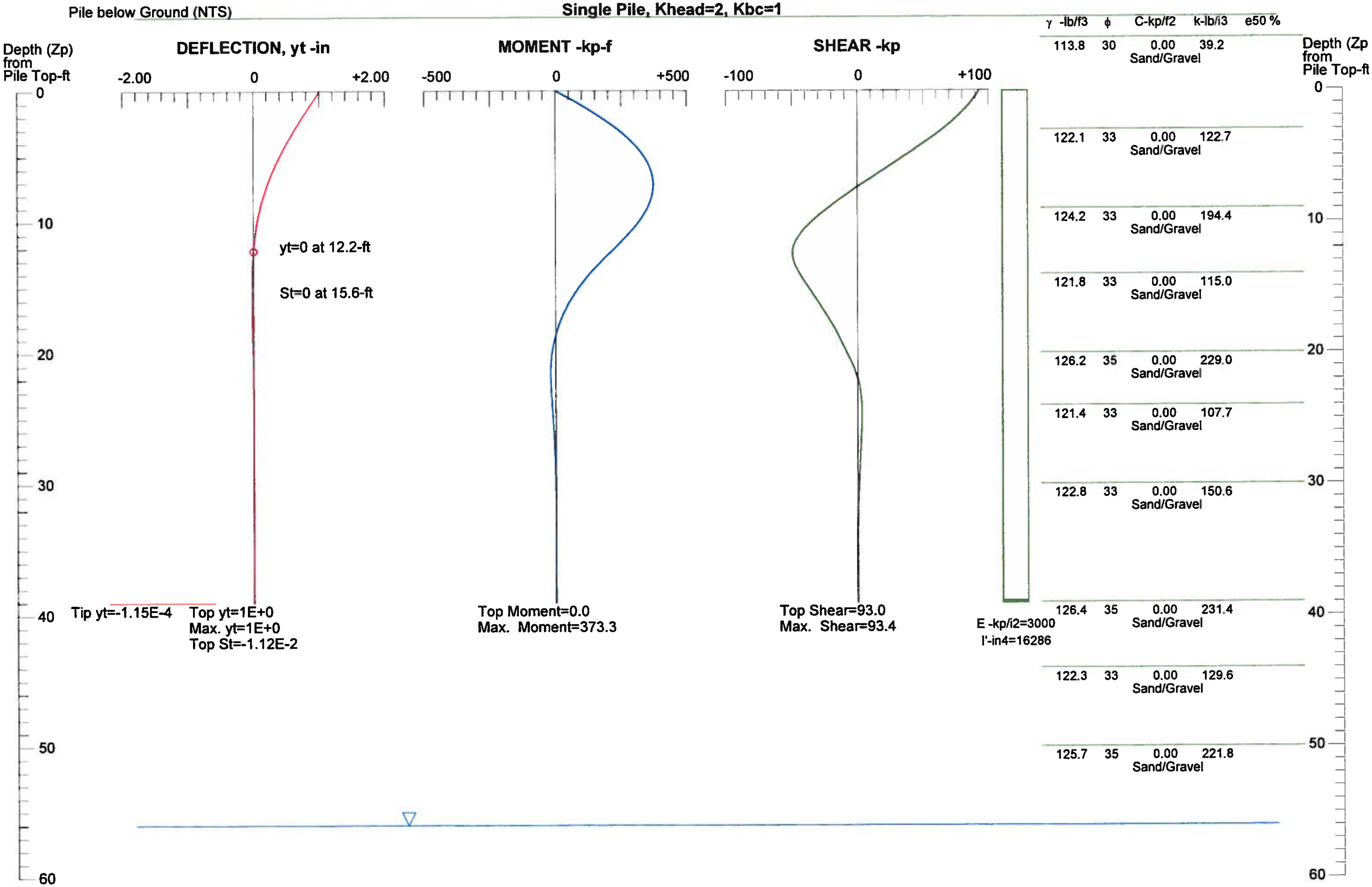
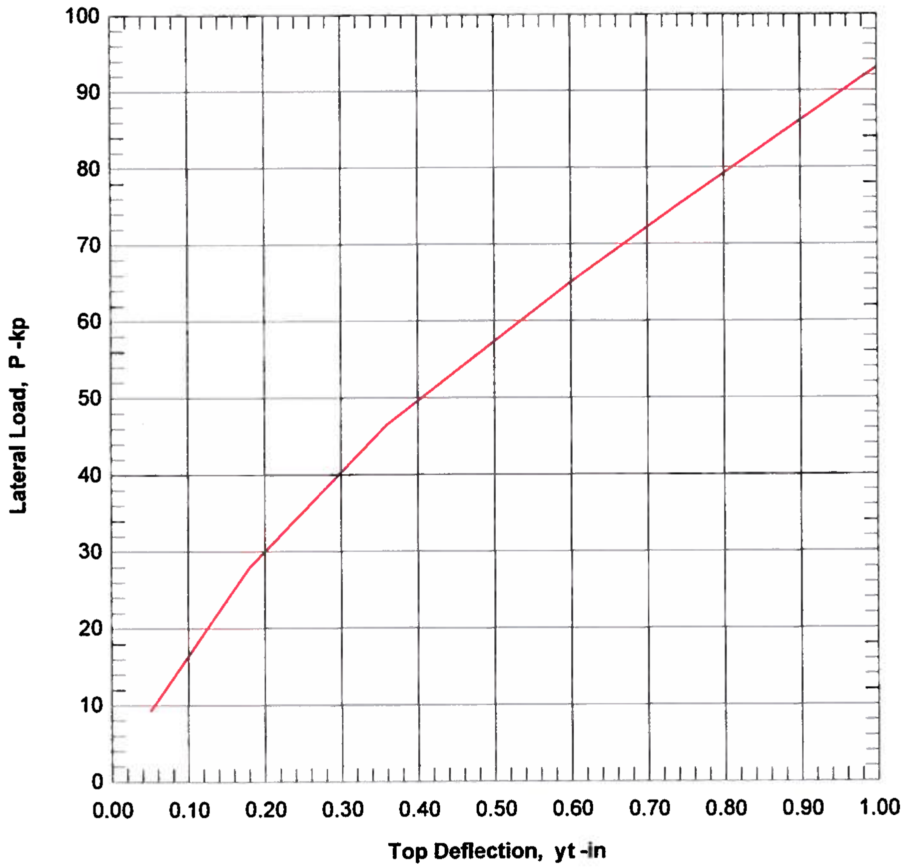
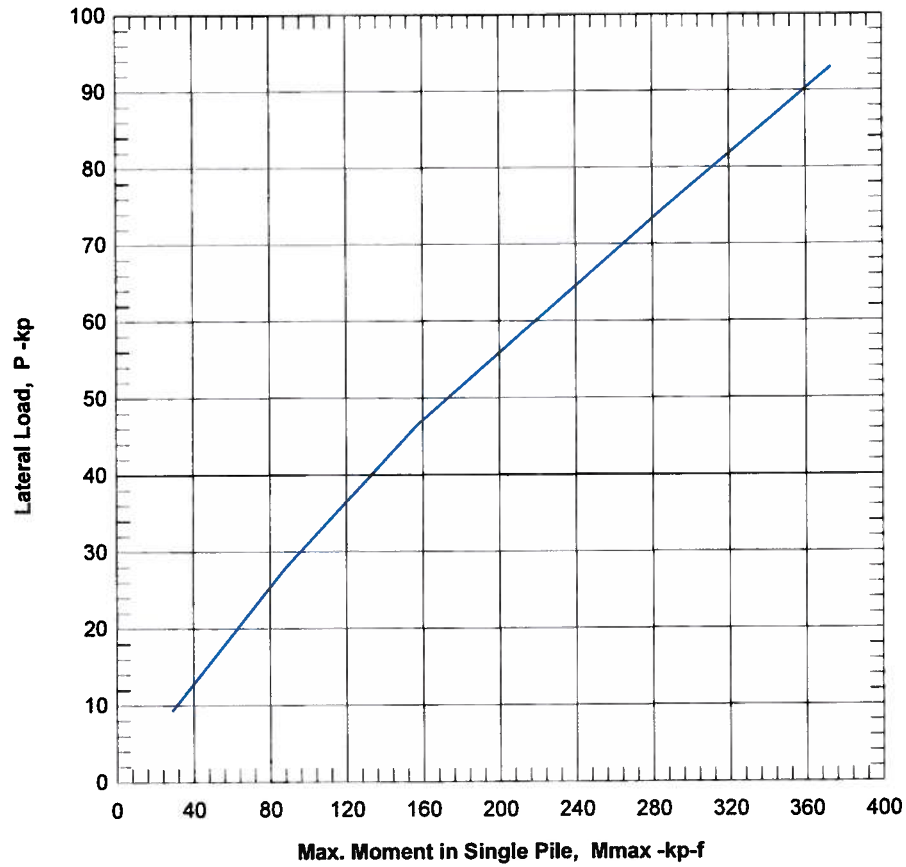


Enclosure "E-22"

LATERAL LOAD vs DEFLECTION & MAX. MOMENT





Enclosure "E-23"

PILE DEFLECTION & FORCE vs DEPTH

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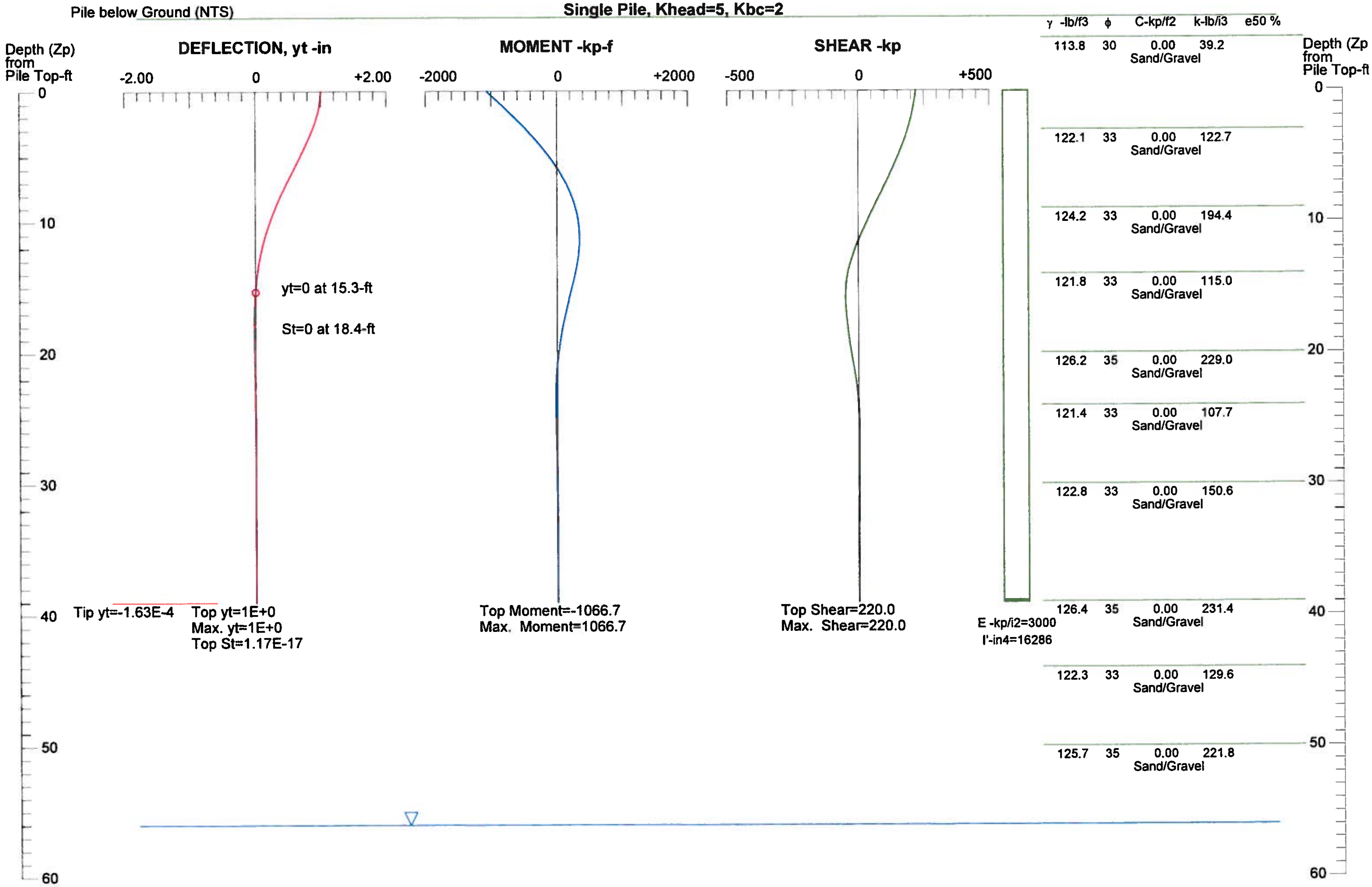
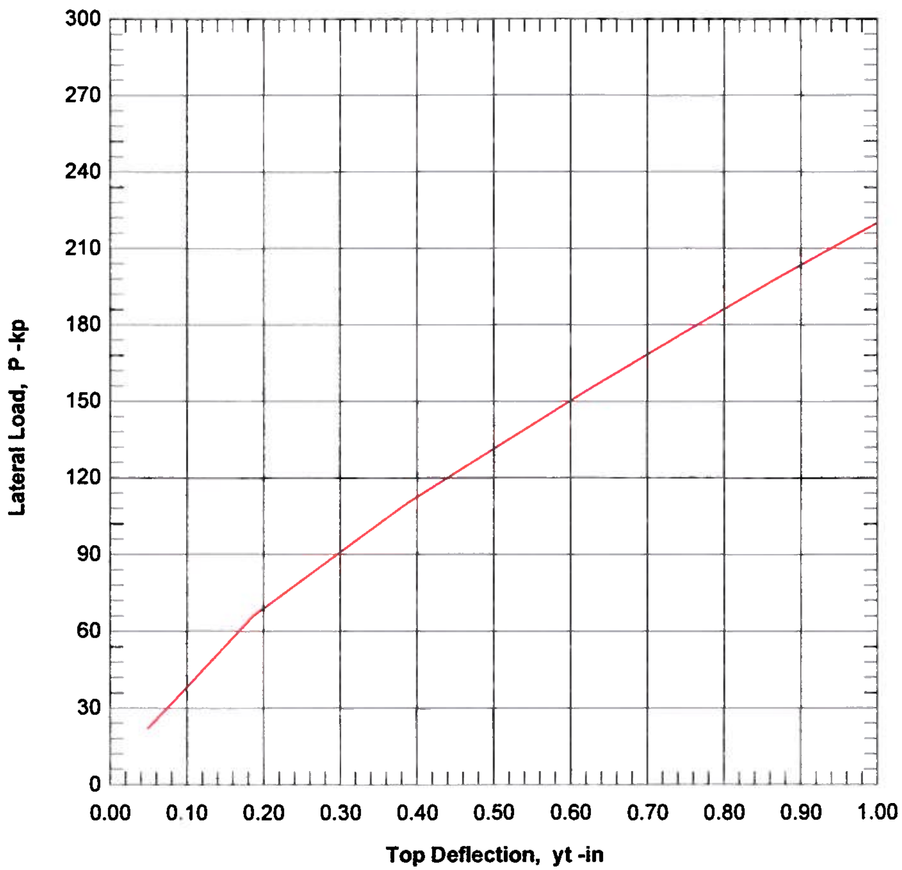
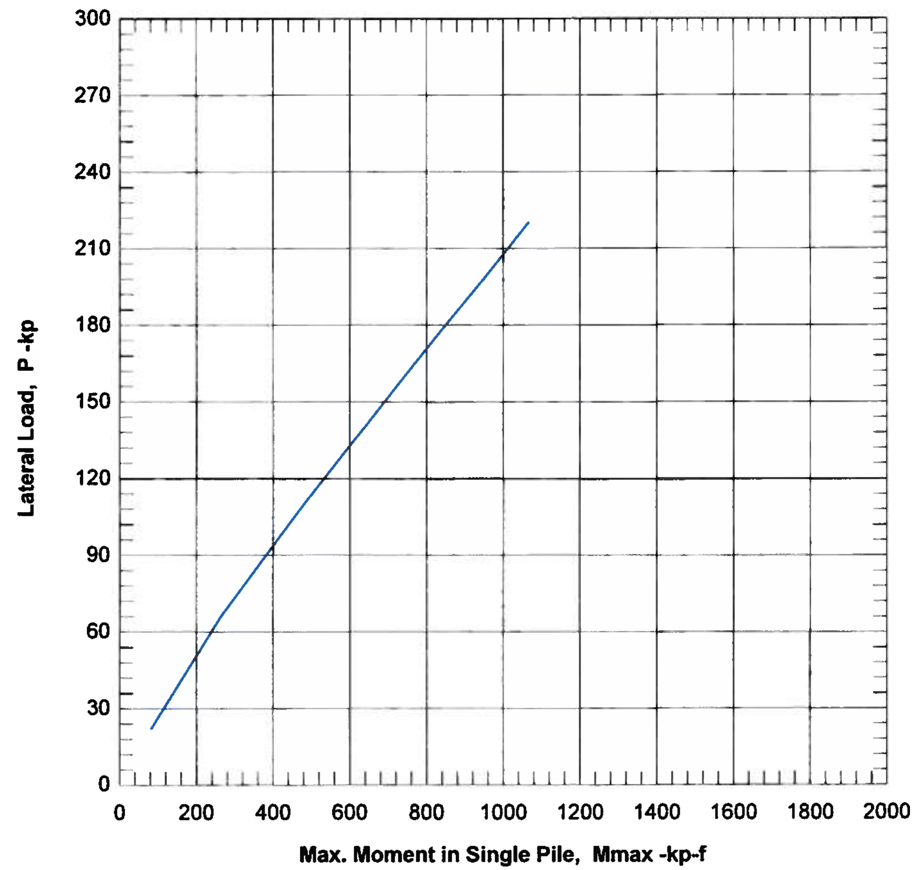


Enclosure "E-24"

LATERAL LOAD vs DEFLECTION & MAX. MOMENT





Appendix M

Phase I Environmental Site Assessment and Limited Subsurface Investigation (Phase I ESA)

PHASE I ENVIRONMENTAL SITE ASSESSMENT
AND LIMITED SUBSURFACE INVESTIGATION
PROPOSED GLEN MOR 2 STUDENT APARTMENTS
UNIVERSITY OF CALIFORNIA, RIVERSIDE
PROJECT NO. 956334

PREPARED FOR

UNIVERSITY OF CALIFORNIA, RIVERSIDE

FACILITIES DESIGN AND CONSTRUCTION

JOB NO. 10326-9

C.H.J. Incorporated
1355 E. Cooley Drive, Colton, CA 92324 ◆ Phone (909) 824-7210 ◆ Fax (909) 824-7209
15345 Anacapa Road, Suite D, Victorville, CA 92392 ◆ Phone (760) 243-0506 ◆ Fax (760) 243-1225
43100 Cook Street, Suite 103, Palm Desert, CA 92211 ◆ Phone (760) 636-8476 ◆ Fax (909) 824-7209

June 30, 2010

University of California, Riverside
Design & Construction
3615A Canyon Crest Drive
Riverside, California 92507
Attention: Mr. Tim Brown

Job No. 10326-9

Dear Mr. Brown:

Attached please find the Preliminary Environmental Site Assessment and Limited Subsurface Investigation report prepared for the proposed Glen Mor 2 Student Apartments, to be located on the northwest corner of Valencia Hill Drive and Big Springs Road, northeast corner of the University of California campus, in the City of Riverside, California.

We appreciate the opportunity to provide environmental assessment services for this project. If you should have questions or comments concerning this report, please contact this firm at your convenience.

Respectfully submitted,
C.H.J., INCORPORATED

Ann Laudermilk, R.E.A.
Environmental Project Manager

AL/RJJ:ndt

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AND LIMITED SUBSURFACE INVESTIGATION
PROPOSED GLEN MOR 2 STUDENT APARTMENTS
UNIVERSITY OF CALIFORNIA, RIVERSIDE
PROJECT NO. 956334
PREPARED FOR
UNIVERSITY OF CALIFORNIA, RIVERSIDE
FACILITIES DESIGN AND CONSTRUCTION
JOB NO. 10326-9

1.0 SUMMARY

The proposed Glen Mor 2 Student Apartments are to be located northwest of Big Springs Road and Valencia Hill Drive on the northeast portion of the University of California (UCR), Riverside campus. A Phase I Environmental Site Assessment and concurrent Limited Subsurface Investigation were conducted for the project site.

Research conducted during the assessment indicated that the subject site and surrounding properties were historically utilized for agricultural purposes. Groves were noted on-site on the 1931 through 1953 aerial photographs. Valencia Hill Drive and the on-site residence were developed in approximately 1925. The groves were removed from the subject site between 1953 and 1963. The terraced hillsides have been generally vacant since that time. The southern portion of the site was developed as a parking lot and landscaped area between 1963 and 1977.

Due to the historical agricultural use of the subject site, the potential for significant concentrations of residual pesticides in the on-site soils was addressed through a concurrent limited subsurface investigation. Soil samples were collected from eight representative locations throughout the undeveloped portions of the site and analyzed for organochlorine pesticides.

The results of the subsurface soil sampling and analysis conducted concurrently with the Phase I site assessment indicated very low concentrations of residual pesticides in shallow on-site soils. Remaining residual pesticides in the surficial site soils represent de minimis site conditions, as defined in ASTM 1527-05, and are not considered to have the potential to significantly impact the subject site. While there

is a potential for higher concentrations throughout the subject site, the sampling is considered to be representative of site conditions, and no further investigation is recommended.

No recognized environmental conditions, as defined in ASTM 1527-05, were identified on the subject site.

2.0 INTRODUCTION

2.1 Purpose

During June of 2010, a Phase I Environmental Site Assessment (Phase I) and Limited Subsurface Investigation were performed by C.H.J., Incorporated (CHJ) for the subject site. The purpose of the Phase I assessment was to identify, to the extent feasible pursuant to the applied American Society of Testing and Materials (ASTM) Standard, RECs in connection with the subject site. An REC is defined in the applicable ASTM Standard as follows:

> "The presence or likely presence of any hazardous substances or petroleum products on a property under conditions that indicate an existing release, a past release, or a material threat of a release of any hazardous substances or petroleum products into structures on the property or into the ground, groundwater, or surface water of the property. The term includes hazardous substances or petroleum products even under conditions in compliance with laws. The term is not intended to include de minimis conditions that generally do not present a threat to human health or the environment and that generally would not be the subject of an enforcement action if brought to the attention of appropriate governmental agencies. Conditions determined to be de minimis are not recognized environmental conditions."

The purpose of the limited subsurface investigation was to address the potential for contamination in near-surface soils associated with former agricultural use of the site and possible historic pesticide application.

The contents of this report are intended to address general lender guidelines for site assessments, as well as specific client concerns.

2.2 Scope of Services

The scope of work for the Phase I was specified in our proposal letter, dated May 12, 2010. CHJ has conducted this Phase I in general accordance with the requirements of the ASTM Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Process, Designation E 1527-05.

In order to complete this investigation, the following services were provided:

- A review of historical aerial photographs and other historical documents, including topographic maps, city directories, and building department records
- Research of federal, state, and local lists of known or potentially hazardous waste sites
- Reconnaissance of the property and adjacent areas
- A review of records on file with pertinent government agencies including, but not limited to, the County of Riverside, Health Services Agency DEH
- A review of previous environmental documents
- Owner interview regarding the current and/or past usage of the property
- Collection of representative soil samples and analysis for organochlorine pesticides

3.0 SITE DESCRIPTION

The subject site includes the grass lawn area east of Lothian Hall, the portion of Parking Lot 14 east of Lothian Hall and the associated landscaped area south to Big Springs Road, the vacant hill, and arroyo areas north of the hill and the narrow 'panhandle' between Lothian and Pentland Hills residential halls extending westward to the driveway east of Parking Lot 15. Terraces from previous agricultural development of the site as groves remain visible on the slopes of the hill.

3.1 Location

The site is located northwest of the intersection of Big Springs Road and Valencia Hills Drive on the northeast portion of the University of California, Riverside campus. An Index Map and Site Map are provided as Enclosures "A-1" and "A-2", respectively.

3.2 Site and Vicinity General Characteristics

The site is located within a residential area of the UCR campus. Parking lots, residence halls, athletic fields, and residential development are located in the site vicinity.

3.3 Current Uses of the Property

Current uses of the property are limited to a parking lot in the southern portion of the site and a grass lawn in the western portion of the site adjacent to a residence hall. A Cingular Wireless tower is located adjacent to the north of the abandoned house on the top of the hill.

Current uses of the subject site do not involve the use, storage, generation, treatment, or disposal of hazardous substances or petroleum products.

3.4 Past Uses of the Property

A review of available aerial photographs and historical maps indicated that the subject site was historically planted as groves from at least 1931 through approximately the 1950s. Parcel information available on the City of Riverside website indicated that the on-site residence was built in 1925. Based on aerial photographs, the southern portion of the subject site was landscaped between 1963 and 1977. The hill area of the subject site has been generally bare of trees since approximately the early 1960s.

3.5 Site Reconnaissance

CHJ personnel conducted the site reconnaissance on June 17, 2010. The hill portion of the subject site was vacant, and the residence was abandoned. A Cingular Wireless tower was located adjacent to the north of the house. An asphalt driveway extended from Valencia Hill Road southwest to the top of the hill where the house was located. A mailbox at the drive entrance displayed the address 3671. A dirt access road extended from the driveway generally toward the west along the top of the hill. The northern margin of the site consisted of the arroyo, which was heavily vegetated on the western portion of the site. The southern portion of the site was developed as a parking lot and landscaped lawn areas.

3.5.1 Storage Tanks

No above ground storage tanks (ASTs) or evidence of underground storage tanks (USTs) were located on the subject site. A large concrete cistern, typically used for grove irrigation, was located near the northwest corner of the residence.

3.5.2 Odors

No unusual odors were noted on the subject site.

3.5.3 Pools of Liquid

Standing surface water was not noted on the subject site.

3.5.4 Drums

No drums were noted on the subject site.

3.5.5 Hazardous Substance and Petroleum Product Containers

No hazardous substance or petroleum product containers were noted on-site.

3.5.6 Unidentified Substance Containers

No unidentified substance containers were noted on-site.

3.5.7 Polychlorinated Biphenyls (PCBs)

No transformers were noted on the subject site. Overhead power lines extended from the house to Valencia Hill Drive.

3.5.8 Pits, Ponds, or Lagoons

No pits, ponds, or lagoons were noted on the subject site.

3.5.9 Stained Soil or Pavement

Stained soil or pavement were not noted on-site.

3.5.10 Distressed Vegetation

Site vegetation included natural vegetation within the arroyo and landscaped areas with grass and trees in the southern parking lot portion of the site. A few trees, bushes, and weeds surrounded the house. The hillsides were generally covered in seasonal grasses and weeds which were dry and brown at the time of the site visit. No distressed vegetation was noted.

3.5.11 Drains and Sumps

No drains or sumps were identified on-site.

3.5.12 Solid Waste

The site was generally free of trash and debris. A pile of wood debris was noted on the hillside northwest of the house. Miscellaneous debris around the house included a hot water heater, an air conditioning unit, and a toilet. Trash cans were located in the parking lot.

3.5.13 Waste Water

There did not appear to be sources of waste water discharge from the subject site.

3.5.14 Septic Systems

A small building with a sign reading MicroSepTec and five access ports marking the location of the septic system were located on the south side of the existing residence on the top of the hill.

3.6 Adjacent Property Land Use

The subject site was bounded to the north by an arroyo, to the east by Valencia Hill Drive, to the south by Big Springs Road, and to the west by the existing Lothian Residence Hall. Existing residence halls were located further to the north, beyond the wash, and residential development, including houses and apartments, was noted further to the east, beyond Valencia Hill Drive. A parking lot was located south of Big Springs Road.

4.0 USER PROVIDED INFORMATION

4.1 Environmental Cleanup Liens and Activity and Use Limitations

An Environmental Lien Search Report was compiled by Environmental Data Resources (EDR). The report indicated that environmental liens or other activity and use limitations were not identified for the subject site. A grant deed transferring title from the City of Riverside to the Regents of the University of California is referred to within the lien search report. The deed is not included because additional administrative fees to recover files older than 1980 would be required. The complete Environmental Lien Search Report, as received from EDR, is attached as Enclosure "B".

4.2 Specialized Knowledge

No specialized knowledge or experience related to the use of chemicals or processes on the subject site or other nearby properties was indicated.

4.3 Valuation Reduction for Environmental Issues

Not applicable

4.4 Commonly Known or Reasonably Ascertainable Information

No information regarding conditions indicative of releases or threatened releases was known. The known historical use of the site is agricultural and residential.

4.5 Obvious Indicators of the Presence of Contamination

No obvious indicators of the presence, or likely presence, of contamination at the subject site were reported.

5.0 RECORDS REVIEW

5.1 Standard Environmental Record Sources

County, State, and Federal listings were compiled and searched for this Phase I by a nationwide regulatory agency database company, EDR, and reviewed by CHJ. The listings/databases were searched for sites located within 1 mile or less from the subject site in accordance with the standards promulgated by the ASTM for Phase I Environmental Site Assessments (ASTM Standard E 1527-05). The actual distance searched for each listing/database is indicated within the information provided in the EDR report included as Enclosure "C" of this report. Due to the varying search distances required for the individual databases, typically there may be facilities identified on the Map Findings Summary for one database, but not others. The EDR report provides information regarding all databases on which a facility is identified. The facility will not, however, be listed in the Map Findings Summary if it lies outside of the search distance for that database. Additional explanations of the federal and state listings/databases are provided in the portion of the EDR report entitled "Description of Databases Searched". Relevant discussions concerning "unmapped" sites, if any, are presented within the respective sections.

5.1.1 State of California

5.1.1.1 The Department of Toxic Substances Control's (DTSC) Site Mitigation and Brownsfields Reuse Program's EnviroStor database (ENVIROSTOR), dated May 2010, includes sites with known contamination or where further investigation may be required. The list includes Federal Superfund (NPL) sites, State Response (Military Facilities and State Superfund), Voluntary Cleanup, and School Sites. The ENVIROSTOR database replaces the CAL-SITES database, previously updated with similar information by the DTSC. This database was searched by EDR to check for inclusion of the subject site and facilities located within a 1-mile minimum search distance of the subject site. The University of California Riverside is listed on the ENVIROSTOR database. Specifically, the former Agricultural

Operations dump site, which is located over 1/2 mile west of the subject site in the area of Parking Lot 24, is the area of concern. Operations were reportedly started in 1948. Based on aerial photographs, Parking Lot 24 was paved by 1977. There is some indication that the EDR references to Agricultural Operations may refer to the facility south of Martin Luther King Boulevard on the southwest portion of the campus in addition to the former site as plotted on the radius map. Due to the distance of both locations from the subject site, the soil and groundwater contamination described is not expected to impact the subject site. The ENVIROSTOR site is further described in the attached EDR report.

5.1.1.2 The California UST Registrations database, dated May 2010, the Riverside County UST List, dated April 2010, the Indian UST Region 9 Database, dated February 2010, the Facility Inventory Database (CA FID UST, dated October 1994), the Statewide Environmental Evaluation and Planning System (SWEEPS UST, dated June 1994), and the Hazardous Substance Storage Container Database (HIST UST, dated October 1990) list registered USTs and historically registered USTs in the State of California and Riverside County. These databases were searched by EDR and reviewed by CHJ to check for the inclusion of the subject site and facilities within a 1/4-mile minimum search distance of the subject site. No current or historical USTs were identified within 1/4 mile of the subject site.

5.1.1.3 The EDR report includes research of four LUST databases: the Leaking Underground Fuel Tank Report (LUST) published by the State Water Resources Control Board on the Geotracker database (dated May 2010); the Region 8 - Leaking Underground Storage Tanks (LUST REG 8) published by the Santa Ana Regional Water Quality Control Board (RWQCB), dated February 2005; the Riverside County Underground Tank Cleanup Sites, compiled by the Department of Public Health and dated April 2010, and the Indian LUST Region 9 Database, published by the EPA (dated February 2010). These databases were searched by EDR to check for the inclusion of the subject site and facilities located within a 1/2-mile minimum search distance of the subject site. The UCR Fleet Services facility, located northwest of the subject site was identified on the LUST databases. The facility had a gasoline soil contamination case in 1998. The case was closed in 2000. Due to the regulatory status and/or the distance from the subject site, soil contamination from the identified LUST case is not expected to impact the subject site.

5.1.1.4 The Solid Waste Information System (SWIS) database maintained by the California Integrated Waste Management Board, dated February 2010, and the Waste Management Unit Data System (WMUDS) provided by the State Water Resources Control Board, dated April 2000, were searched by EDR for landfills and/or transfer stations within a 1/2-mile minimum search distance of the subject site. The subject site was not identified on these databases, and no permitted landfills and/or transfer stations were identified within 1/2 mile of the subject site.

5.1.1.5 The Voluntary Cleanup Program Properties (VCP) database, provided by the Department of Toxic Substances Control, dated May 2010, was reviewed by EDR to search for the subject site and sites within a 1/2-mile minimum search distance of the subject site. The VCP database identifies low threat level properties with either confirmed or unconfirmed releases, where the project proponents have requested that DTSC oversee any investigation or cleanup activities. No VCP sites were identified.

5.1.2 Federal Government

5.1.2.1 The United States Environmental Protection Agency (USEPA) National Priorities List (NPL) or Superfund Listing and the Delisted NPL database, dated March 2010, list all sites receiving or potentially eligible to receive Superfund investigation and/or remediation assistance in California, or sites removed from this list in accordance with the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) criteria. The NPL database was searched by EDR for facilities within a 1-mile minimum search distance of the subject site. No NPL facilities were identified.

5.1.2.2 The Comprehensive Environmental Response, Compensation and Liability Information Source (CERCLIS) database, dated January 2010, lists sites either on, or proposed to be included on, the NPL and sites in the screening and assessment phase for possible inclusion on the NPL. The CERCLIS No Further Remedial Action Planned (NFRAP) database, dated June 2009, lists archived sites which have been removed from the CERCLIS list based on the completion of a site assessment and the determination that the site is not a potential NPL site. The CERCLIS and NFRAP databases were searched by EDR for facilities within a 1/2-mile minimum search distance of the subject site. No CERCLIS or NFRAP facilities were identified.

5.1.2.3 EDR conducted a review of the USEPA RCRA Corrective Action Sites (CORRACTS) database, dated March 2010, to identify facilities within a 1-mile minimum search distance of the subject site. CORRACTS facilities are those that are undergoing corrective action as a result of a release of hazardous waste or constituents into the environment from a RCRA facility. The former Agricultural Dumpsite operations at UCR, located over 1/2 mile west of the subject site, was identified on the CORRACTS database. Due to the relative hydrologic position and distance from the subject site, groundwater contamination at the CORRACTS site, as described in the EDR report, is not expected to impact the subject site.

5.1.2.4 The USEPA Resource Conservation and Recovery Act Information (RCRA) is a comprehensive information system that includes selective information on sites which generate, transport, treat, and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA) of 1976. This database (dated February 2010) was searched by EDR for treatment, storage, or disposal (TSD) facilities within a 1/2-mile minimum search distance of the subject site. TSDF facilities were not identified within the specified search radius.

The RCRA listings were also searched by EDR for small quantity generators (SQG) and large quantity generators (LQG) of hazardous waste within a 1/4-mile minimum search distance of the subject site. No LQGs were identified. Computerized Diagnostic Imaging at 6485 Day Street was identified on the SQG database. The facility address was determined to be plotted in the wrong location. No such facility exists in the area identified on the EDR radius map.

5.1.2.5 The United States Engineering Controls Sites List and the United States Institutional Controls Sites List (dated December 2009) are compiled by the EPA and were reviewed by EDR for facilities within a 1/2-mile minimum search distance of the site. US ENG CONTROLS is a listing of sites with engineering controls in place, including various physical measures to create pathway elimination of regulated substances. US INST CONTROLS is a listing of sites with institutional controls in place, including administrative measures and post remediation care requirements intended to prevent exposure to contaminants remaining on site. No listings were identified within 1/2 mile of the subject site.

5.1.2.6 The USEPA Emergency Response Notification System (ERNS) database (dated December 2009) contains information regarding spills and reported releases of oil and hazardous substances. This database was searched by EDR to check for the inclusion of the subject site. The subject site was not identified on this database.

5.1.2.7 Federal Emergency Management Agency flood zone data (1999) was depicted on the EDR Overview and Detail Maps. The subject site is not located within a flood zone. The 100-year flood zone is mapped adjacent to the south of the subject site.

5.1.3 Unmapped Facilities

EDR identified 53 facilities on regulatory databases that were considered to be unmappable. Based on the information in the EDR report and the site reconnaissance, these unmapped facilities were considered to be located outside of the specified search distances.

5.2 Additional Environmental Records Sources

5.2.1 County of Riverside, Health Services Agency, Department of Environmental Health

A request for records review specific to the subject site parcels was submitted to the DEH on June 9, 2010. This request for review includes any recorded information regarding ASTs, USTs, hazardous waste generators, hazardous material handlers, and emergency response records specific to the subject site. The presence of underground tanks, hazardous waste generators, and hazardous material handlers does not necessarily indicate the existence of contamination. However, this information may indicate if there are potential contamination sources at the subject site or in the vicinity of the subject site.

A verbal response from the County DEH on June 22, 2010, regarding the request for records indicated that no records were found for the subject site property. Records were on file for other areas of UCR that are considered to be of a significant distance and/or downgradient of the subject site.

5.3 Physical Setting Sources

5.3.1 General Geologic and Hydrologic Setting

The site is located on the Perris Block, a portion of the Peninsular Ranges Geomorphic Province. The Perris Block is a fault-bounded region of relative tectonic stability composed of crystalline bedrock of the Southern California Batholith that is thinly and discontinuously mantled by sedimentary material. Several geomorphic surfaces are well developed on the Perris Block that represent former, local, erosional/depositional base levels. The site lies in the northern portion of the Perris Block in an area of relatively low-lying Pleistocene-age and Holocene-age alluvium surrounded by elevated erosion surfaces. The project area is situated in an area of 'very old alluvial-fan deposits' dissected and bounded by the historic 'University arroyo' on the south and a smaller tributary arroyo on the north. As mapped by Morton and Cox (2001), the native geologic materials underlying the majority of the site consist of very old alluvial-fan deposits (Qvoa). Localized areas of young axial-channel deposits (Qya) mantle Qvoa along existing and historic arroyo bottoms within the site.

The subject site lies within the Riverside-Arlington Subbasin of the Upper Santa Ana Valley groundwater basin. The depth to groundwater in State Well No. 2S4W29M, located approximately 0.5 mile southwest of the subject site, was 65.93 feet below ground surface (bgs) in November of 2008 (Western Municipal Water District, 2008). Groundwater was not encountered within the maximum depth of 63.5 feet drilled during the concurrent geotechnical investigation.

Site maps provided in the attached EDR report indicate that the subject site is not located within 100-year or 500-year flood plain areas. The 100-year flood plain is mapped along the southern site boundary, generally coinciding with Big Springs Road.

5.3.3 Site Topography

The United States Geological Survey (USGS), Riverside East 7.5 Minute Quadrangle indicates that site elevations range from approximately 1,145 feet in the hillside portion to approximately 1,070 feet near the southwest corner of Parking Lot 14 and the western panhandle portion of the site. Typical slope gradients in the hillside portion vary from approximately 3 horizontal to 1 vertical [3(h):1(v)] to 5(h):1(v) with locally steep erosional slopes (up to approximately 4 feet tall) adjacent to the active channel of the arroyo in the hillside and panhandle portions of the site. The southern portion of the subject site is generally planar.

5.4 Historical Use Information

5.4.1 Aerial Photograph Review

Aerial photographs taken in **1931, 1938, 1953, 1963, 1977, 1989, 1994, 2002,** and **2005** were reviewed and are included in Enclosure "D". Our review of these photographs indicated that the subject site and adjacent properties were historically utilized for agricultural purposes. Groves were noted on-site on the 1931 through 1953 photographs. Valencia Hill Drive and the on-site residence were developed prior to 1931. Continued development on the UCR campus was evident on each succeeding photograph. The groves were removed from the subject site between 1953 and 1963.

Review of the **1931** aerial photograph indicated that the subject site and surrounding properties were utilized for agricultural purposes. Groves on terraced hillsides were evident on the subject site, north of the arroyo on the northern site boundary, and to the south and east. The on-site residence was built, and no trees were planted east or west of the structure. Valencia Hill Drive was developed. Vacant and undeveloped land was noted east of Valencia Hill Drive.

Review of the **1938** photograph indicated no significant changes to the subject site other than additional trees noted west of the house. Development on the UCR campus was noted southwest of the subject site.

Review of the **1953** photograph indicated no significant changes to the subject site or adjacent properties. Additional campus buildings were noted to the southwest.

Review of the **1963** aerial photograph indicated the removal of groves from the site and adjacent properties. Only a small patch of trees remained adjacent to the house, northwest of the driveway. Big Springs Road was developed. The original portion of Lothian Hall was developed, and Parking Lot 14 construction appeared to be in progress southeast of the site. Residential development was noted east of Valencia Hill Drive. The UCR Corporate Yard was developed northwest of the subject site, beyond Linden Street.

Review of the **1977** aerial photograph indicated landscaping on the southern portion of the subject site along Big Springs Road.

Review of the **1989** aerial photograph indicated no significant changes to the subject site or adjacent properties.

Review of the **1994** aerial photograph indicated the expansion of Parking Lot 14 onto the southwest portion of the subject site and the expansion of Lothian Hall west of the site.

Review of the **2002** aerial photograph indicated the expansion of Parking Lot 14 to its current coverage on the southern portion of the subject site. Expanding UCR development in the area included residence halls to the northwest and parking lots to the south.

Review of the **2005** aerial photograph indicated no significant changes to the subject site or adjacent properties.

5.4.2 Topographic Map Review

Historical topographic maps published by the USGS for the subject site and vicinity were obtained from EDR. The Riverside Quadrangle (scale 1:62,500), dated **1901**, the Riverside Vicinity Quadrangle (scale 1:31,680), dated **1943**, the Riverside Quadrangle (scale 1:50,000), dated **1947**, and the Riverside East Quadrangle (scale 1:24,000), dated **1953** and **1967** and photo revised in **1973** were reviewed for information pertaining to historical usage of the subject site.

Review of the **1901** topographic map indicated that the subject site and adjacent properties were vacant and undeveloped. Roads in the site vicinity and the ATSF railroad were developed.

Review of the **1943** topographic map indicated a residential structure on the subject site and a dirt road on the eastern site boundary.

Review of the **1947** topographic map indicated additional roads in the site vicinity and groves on the subject site and adjacent properties to the north, south, and west.

Review of the **1953** topographic map indicated agricultural use (groves) of the subject site and adjacent properties. The expansion of the University of California Citrus Experiment Station expanded to the University of California Riverside, southwest of the subject site.

Review of the **1967** topographic map indicated no groves remaining on-site or on adjacent properties. Residential development was noted east of Valencia Hills Drive. Residence halls were developed in the site vicinity.

Review of the **1973** topographic map indicated no changes for the subject site or adjacent properties.

5.4.3 City Directory Review

A search of available reverse street directories between 1921 and 2002 (generally two to four years for each decade) was conducted by EDR. Street directories provide information of historical occupancy and usage of the subject property and properties in the immediate vicinity. Data from various sources was available from 1960, 1966, 1970, 1977, 1981, 1986, 1996, 2001, and 2002.

Residential listings for the subject site residence at 3671 Valencia Hill Drive were Chalmers in 1960, 1966, and 1977, Polo and Dayton in 1986, and Jones in 2002. Several residential addresses on Goins Street, Valencia Hill Drive, and Valencia Way, all east of the project site were listed between 1960 and 2002.

5.4.4 Sanborn Fire Insurance Map Review

A search of historical Sanborn Fire Insurance Map coverage was conducted by EDR. However, based upon the historically rural nature of the subject site vicinity, Sanborn Fire Insurance Maps for the subject site and vicinity were not available.

6.0 INTERVIEWS

6.1 Interview With Owner

The owner interview questions were forwarded via email to UCR personnel. Mr. Mike Terry provided his knowledge of the subject site and campus dating back to 1974. Mr. Terry lived in the on-site residence until the early 1980s. He also had some knowledge of the site based on discussions with previous occupants of the house. Mr. Terry is currently the Assistant Director of Plant Services for the UCR physical plant.

Mr. Terry reported a general history of the site parcel as follows: The house was built in the 1920s and was used by the U.S. Army as a residence for one of the commanding officers at March Air Base. The house was transferred to the University around 1955. The trees remaining on the terraced slopes in the early to mid 1970s were avocado trees, indicating that the groves that once covered the majority of the site were also avocado groves.

Mr. Terry did not indicate any knowledge of pesticide use or smudge pot use on-site. The trees were generally gone before his occupancy.

Mr. Terry indicated that to his knowledge, no areas adjacent to the residence or any other part of the campus was used as a waste dump site. He recalled the Agricultural Operations dumpsite (referred to in the EDR database report) as being located in the arroyo near the Insecticide Compound Building, which is on the southwest portion of UCR, west of the 60 Freeway and south of Martin Luther King Boulevard.

Mr. Tim Brown of UCR indicated that there have been no previous environmental assessments conducted on the subject site acreage. There are no pending, threatened, or past litigation or administrative proceedings relevant to hazardous substances or petroleum products in, on, or from the property. Mr. Brown reported no knowledge of any prior handling, storage, or disposal of hazardous materials or petroleum products or any ASTs or USTs on the subject site.

6.2 Interview With Site Manager

Same as owner.

6.3 Interview With Occupants

Same as owner.

6.4 Interviews With Local Government Officials

None were conducted.

7.0 LIMITED SUBSURFACE INVESTIGATION

7.1 Soil Sampling and Analysis

Based on the historical usage of the site for agriculture (groves), a limited soil sampling program was initiated to investigate the potential for significant concentrations of residual pesticides within surficial on-site soils.

7.2 Sample Locations and Procedures

Eight representative sample locations (S-1 through S-8) were selected on site areas undeveloped since the groves were removed, generally the hillsides, as indicated on Enclosure "A-2". Shallow samples were collected from a depth of approximately 8 inches below the level of undisturbed soils, with the aid of a stainless steel hand auger. Deeper samples were collected from a depth of approximately 30 inches bgs. Prior to sampling and between samples, all equipment was decontaminated in a detergent solution and rinsed with potable and deionized water to ensure that cross-contamination of samples did not occur.

The sample packaging consisted of placing the soil directly into laboratory cleaned glass jars with Teflon-lined lids. The samples were labeled with the job number, date, sample number, and depth, and placed on ice in a thermally-insulated container. The samples were transported under chain-of-custody protocol (Enclosure "E") to Microbac Laboratories in Riverside, a State of California Department of Health Services-certified laboratory for analytical testing.

7.3 Laboratory Analysis

The eight shallow soil samples were analyzed for organochlorine pesticides by EPA Test Method 8081A. The 30-inch samples were held in the laboratory pending initial results.

7.4 Analytical Results

The laboratory results for five of the eight samples indicated very low concentrations of the organochlorine pesticide, DDT and/or one of its related breakdown products, DDE, ranging from 0.0032 to 0.0092 ppm. Dieldrin was also detected in two samples from 0.0048 to 0.0091 ppm. The following table summarizes the results:

SUMMARY OF RESULTS IN 8-INCH SAMPLES

Sample Identification	DDT (mg/Kg or ppm)	DDE (mg/Kg or ppm)	DDD (mg/Kg or ppm)	Dieldrin (mg/Kg or ppm)
S-1 8"	ND	0.0032	ND	ND
S-2 8"	ND	ND	ND	ND
S-3 8"	ND	ND	ND	ND
S-4 8"	ND	ND	ND	ND
S-5 8"	ND	ND	ND	0.0048
S-6 8"	0.0051	0.0092	ND	ND
S-7 8"	0.0035	0.0046	ND	ND
S-8 8"	ND	ND	ND	0.0091

The Cal/EPA's California Human Health Screening Levels (CHHSLs) (January 2005) were referenced for this investigation. The CHHSLs are concentrations of hazardous chemicals in soil or soil gas that the Cal/EPA considers to be below thresholds of concern for risks to human health. The CHHSLs were developed by the Office of Environmental Health Hazard Assessment (OEHHA) on behalf of Cal/EPA. The CHHSLs were developed using standard exposure assumptions and chemical toxicity values published by the USEPA and Cal/EPA.

The CHHSLs can be used to screen sites for potential human health concerns where releases of hazardous chemicals to soils have occurred. Under most circumstances, the presence of a chemical in soil, soil gas or indoor air at concentrations below the corresponding CHHSLs can be assumed to not pose a significant health risk to people who may live (residential CHHSLs) or work (commercial/industrial CHHSLs) at the site. The presence of a chemical at concentrations in excess of a CHHSL does not indicate that adverse impacts to human health are occurring or will occur, but suggests that further evaluation is warranted.

The listed residential CHHSLs for DDT, DDE, DDD, and Dieldrin in residential soils are 1.6 ppm, 1.6 ppm, 2.3 ppm, and 0.035 ppm, respectively. The residual concentrations in the subject site samples were not found to exceed the CHHSLs for DDT, DDE, DDD, or Dieldrin.

The specific analytical results are provided in Enclosure "E".

8.0 FINDINGS AND OPINION

The results of the subsurface soil sampling and analysis conducted concurrently with the Phase I site assessment indicated very low concentrations of residual pesticides in shallow on-site soils. Remaining residual pesticides in the surficial site soils represent de minimis site conditions, as defined in ASTM 1527-05, and are not considered to have the potential to significantly impact the subject site. While there is a potential for higher concentrations throughout the subject site, the sampling is considered to be representative of site conditions, and no further investigation is recommended.

No recognized environmental conditions, as defined in ASTM 1527-05, were identified on the subject site.

9.0 DATA GAPS

CHJ did not identify significant data gaps that have affected our ability to identify RECs in connection with the subject site.

10.0 CONCLUSIONS

We have performed this Phase I Environmental Site Assessment of the subject site located in Riverside, California, identified as Proposed Glen Mor 2 Student Apartments, UCR Project No. 956334, the property, in general conformance with the scope and limitations of ASTM Practice E 1527-05. This assessment has revealed no evidence of recognized environmental conditions in connection with the property.

11.0 LIMITATIONS

C.H.J., Incorporated has performed our services within the limits prescribed by our client with no vested interest in the site or in the subject matter contained in the report and with the usual thoroughness and competence of the engineering profession. C.H.J., Incorporated makes no other warranty or representation, either express or implied.

The findings and opinions presented in this report are based upon the research, site reconnaissance, sampling, and analysis described in this report. Should conditions be encountered in the field that appear different from those described in this report, we should be contacted immediately in order that we might evaluate their effect. Site conditions are subject to change with time, and should be evaluated within this context. C.H.J., Incorporated shall not be responsible for conditions or consequences arising from relevant facts that were concealed, withheld, or not fully disclosed at the time the assessment was performed.

If this report or portions thereof are provided to others, it should be understood by all parties that it is provided for information only, and should be used as such.

This report and its contents resulting from this investigation are not intended or represented to be suitable for reuse on extensions or modifications of the project or for use on any other projects.

12.0 CLOSURE

To the best of my professional knowledge and belief, I meet the definition of an Environmental Professional as defined in Section 312.10 of CFR 312.

I have the specific qualifications based on education, training, and experience to assess a property of the nature, history, and setting of the subject property. I have developed and performed the all appropriate inquiries in general conformance with the standards and practices set forth in 40 CFR Part 312.

We appreciate this opportunity to provide environmental services for this project. If you should have questions or comments regarding this report, please contact this firm at your convenience.

Respectfully submitted,
C.H.J., INCORPORATED

Ann Laudermilk

REGISTERED ENVIRONMENTAL ASSESSOR
ANN M. LAUDERMILK
No. 30067
Exp. 4/30/2013
STATE OF CALIFORNIA

06-30-10

Ann M. Laudermilk, R.E.A. 30067
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CIVIL
STATE OF CALIFORNIA

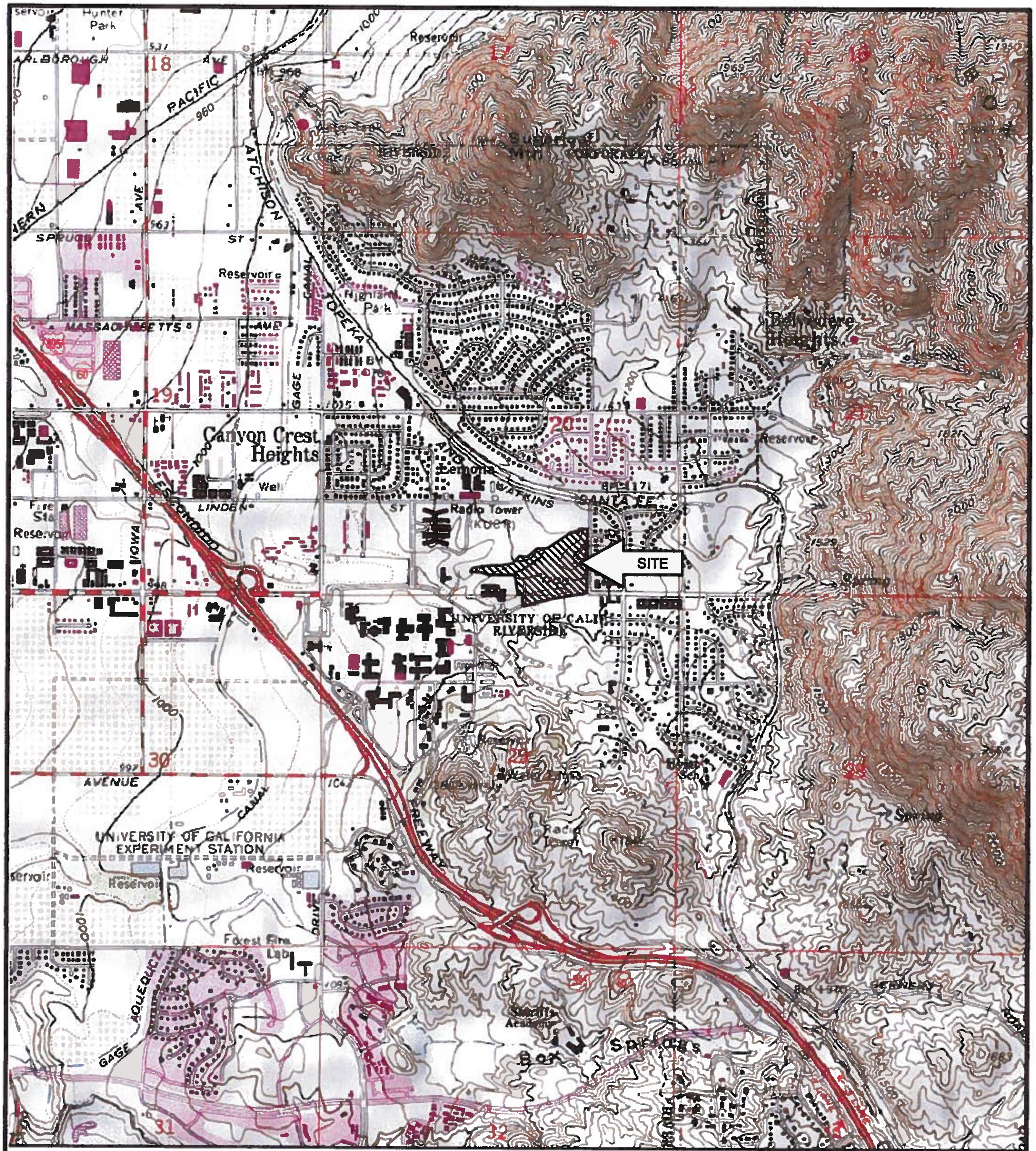
06-30-10

Robert J. Johnson, R.C.E. 27060, R.E.A. 859
President

AML/RJJ:ndt

ENCLOSURE "A"

MAPS



0 .5 1 MILE

0 1000 FEET 0 500 1000 METERS

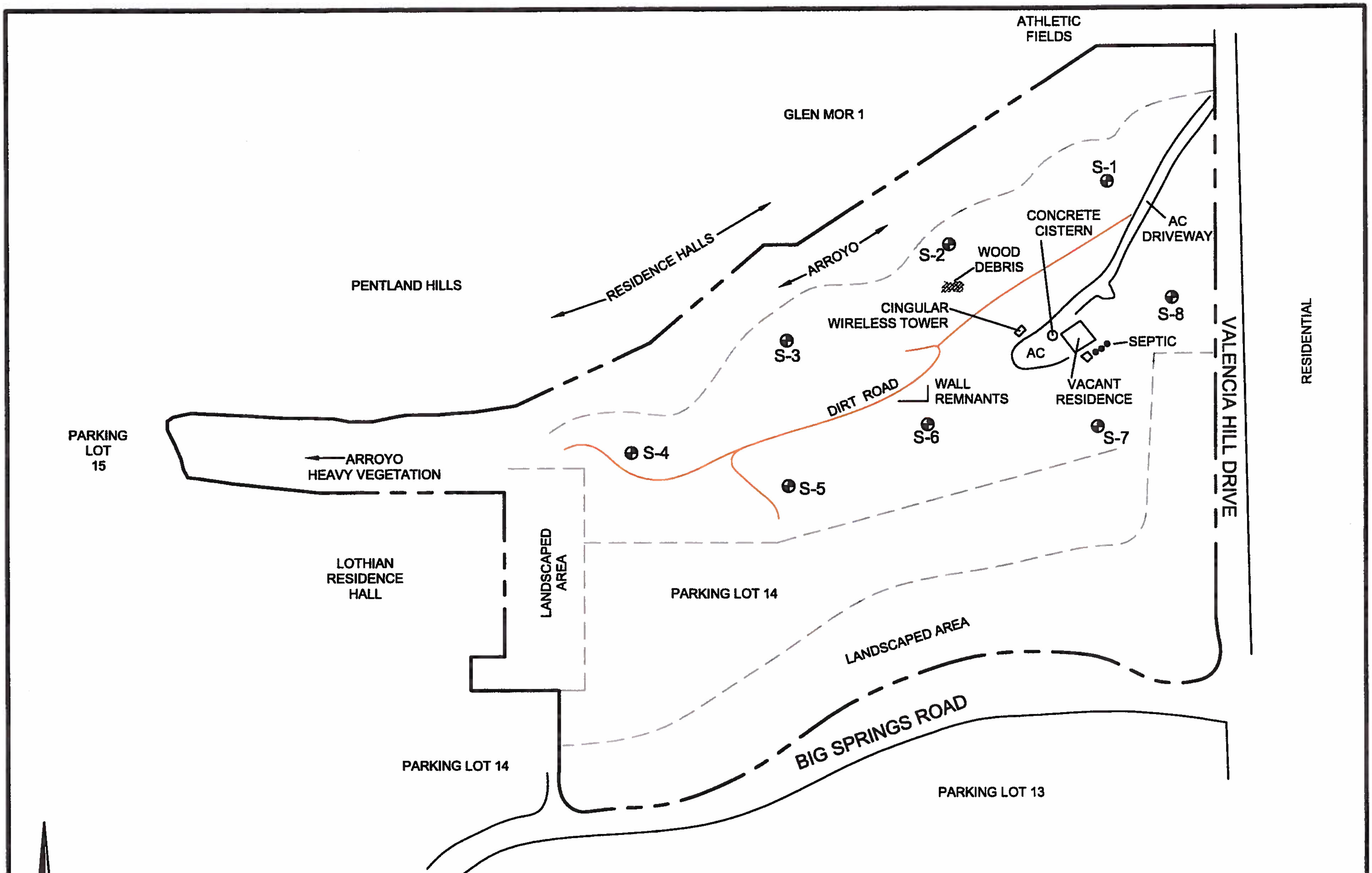
SCALE: 1" = 2,000'

-N-

INDEX MAP

FOR: UNIVERSITY OF CALIFORNIA, RIVERSIDE FACILITIES DESIGN AND CONSTRUCTION	PHASE I ENVIRONMENTAL SITE ASSESSMENT AND LIMITED SUBSURFACE INVESTIGATION PROPOSED GLEN MOR 2 STUDENT APARTMENTS UNIVERSITY OF CALIFORNIA, PROJECT NO. 956334 RIVERSIDE, CALIFORNIA	ENCLOSURE "A-1"
DATE: JUNE 2010		JOB NUMBER 10326-9

C.H.J. Incorporated



LEGEND:	SITE MAP AND SAMPLE LOCATION MAP		
S-8 ⊕ SAMPLE LOCATION	FOR: UNIVERSITY OF CALIFORNIA, RIVERSIDE FACILITIES DESIGN AND CONSTRUCTION	PHASE I ENVIRONMENTAL SITE ASSESSMENT AND LIMITED SUBSURFACE INVESTIGATION PROPOSED GLEN MOR 2 STUDENT APARTMENTS UNIVERSITY OF CALIFORNIA, PROJECT NO. 956334 RIVERSIDE, CALIFORNIA	ENCLOSURE "A-2"
	DATE: JUNE 2010		JOB NUMBER 10326-9
		C.H.J. Incorporated	

ENCLOSURE "B"

ENVIRONMENTAL LIEN SEARCH REPORT

UCR GLEN MOR 2
UCR GLEN MOR 2
Riverside, Ca 92507

Inquiry Number: 2788149.7
June 11, 2010

The EDR Environmental LienSearch™ Report

EDR® Environmental Data Resources Inc

440 Wheelers Farms Road
Milford, CT 06461
800.352.0050
www.edrnet.com

EDR Environmental LienSearch™ Report

The EDR Environmental LienSearch Report provides results from a search of available current land title records for environmental cleanup liens and other activity and use limitations, such as engineering controls and institutional controls.

A network of professional, trained researchers, following established procedures, uses client supplied address information to:

- search for parcel information and/or legal description;
- search for ownership information;
- research official land title documents recorded at jurisdictional agencies such as recorders' offices, registries of deeds, county clerks' offices, etc.;
- access a copy of the deed;
- search for environmental encumbering instrument(s) associated with the deed;
- provide a copy of any environmental encumbrance(s) based upon a review of key words in the instrument(s) (title, parties involved, and description); and
- provide a copy of the deed or cite documents reviewed.

Thank you for your business.
Please contact EDR at 1-800-352-0050
with any questions or comments.

EDR Environmental LienSearch™ Report

TARGET PROPERTY INFORMATION

ADDRESS

UCR GLEN MOR 2
UCR GLEN MOR 2
RIVERSIDE, CA 92507

RESEARCH SOURCE

Source 1:	Riverside County Recorder of Deeds
Source 2:	N/A
Examiner's Note:	Public records of Riverside County, CA were searched from January 1, 1980 to June 11, 2010, and no other deeds vesting title in the subject property were found of record during the period searched.

PROPERTY DESCRIPTION

Current Owner:	Regents of University of California
Legal Description:	See Deed Attached
Property Identifiers:	APN: 251-180-005
General Comments	N/A

PROPERTY INFORMATION

Deed 1:

Type of Deed:	Grant Deed
Title is vested in:	Regents of University of California
Title received from:	City of Riverside
Date Executed:	N/A
Date Recorded:	N/A
Book:	
Page:	
Volume:	
Instrument:	N/A
Docket:	

Land Record Comments: According to the County this property is owned by the City and has been since 1925. No deed attached due to administration fees.

ENVIRONMENTAL LIEN

Environmental Lien:	Found	Not Found	X

If found:

1st Party:

EDR Environmental LienSearch™ Report

2nd Party:

Dated:
Recorded:
Book:
Page:
Docket:
Volume:
Instrument:
Comments:
Miscellaneous:

OTHER ACTIVITY AND USE LIMITATIONS (AULs)

Other AUL's:	Found	Not Found	X

If found:

1st Party:

2nd Party:

Dated:
Recorded:
Book:
Page:
Docket:
Volume:
Instrument:
Comments:
Miscellaneous:

DEED EXHIBIT

ENCLOSURE "C"

ENVIRONMENTAL DATABASE SEARCH REPORT

UCR Glen Mor 2
UCR Glen Mor 2
Riverside, CA 92521

Inquiry Number: 2788149.2s
June 22, 2010

The EDR Radius Map™ Report with GeoCheck®

Prepared using the EDR FieldCheck® System

EDR® Environmental Data Resources Inc

440 Wheelers Farms Road
Milford, CT 06461
Toll Free: 800.352.0050
www.edrnet.com

TABLE OF CONTENTS

SECTION **PAGE**

GEOCHECK ADDENDUM

Thank you for your business.
Please contact EDR at 1-800-352-0050
with any questions or comments.

EXECUTIVE SUMMARY

A search of the environmental records was conducted by Environmental Data Resources, Inc. (EDR). CHJ, INC. used the EDR FieldCheck System to review and/or revise the results of this search, based on independent data verification by CHJ, INC.. The report was designed to assist parties seeking to meet the search requirements of EPA's Standards and Practices for All Appropriate Inquiries (40 CFR Part 312), the ASTM Standard Practice for Environmental Site Assessments (E 1527-05) or custom requirements developed for the evaluation of environmental risk associated with a parcel of real estate.

TARGET PROPERTY INFORMATION

ADDRESS

UCR GLEN MOR 2
RIVERSIDE, CA 92521

COORDINATES

Latitude (North):	33.977000 - 33° 58' 37.2"
Longitude (West):	117.319500 - 117° 19' 10.2"
Universal Tranverse Mercator:	Zone 11
UTM X (Meters):	470486.2
UTM Y (Meters):	3759457.5
Elevation:	1122 ft. above sea level

USGS TOPOGRAPHIC MAP ASSOCIATED WITH TARGET PROPERTY

Target Property Map:	33117-H3 RIVERSIDE EAST, CA
Most Recent Revision:	1980

AERIAL PHOTOGRAPHY IN THIS REPORT

Photo Year:	2005
Source:	USDA

TARGET PROPERTY SEARCH RESULTS

The target property was not listed in any of the databases searched by EDR.

DATABASES WITH NO MAPPED SITES

No sites were identified in following databases.

STANDARD ENVIRONMENTAL RECORDS

Federal NPL site list

NPL........................... National Priority List
Proposed NPL.................. Proposed National Priority List Sites

EXECUTIVE SUMMARY

NPL LIENS.................. Federal Superfund Liens

Federal Delisted NPL site list

Delisted NPL................ National Priority List Deletions

Federal CERCLIS list

CERCLIS.................... Comprehensive Environmental Response, Compensation, and Liability Information System
FEDERAL FACILITY......... Federal Facility Site Information listing

Federal CERCLIS NFRAP site List

CERC-NFRAP.............. CERCLIS No Further Remedial Action Planned

Federal RCRA non-CORRACTS TSD facilities list

RCRA-TSDF................ RCRA - Treatment, Storage and Disposal

Federal RCRA generators list

RCRA-LQG.................. RCRA - Large Quantity Generators
RCRA-CESQG.............. RCRA - Conditionally Exempt Small Quantity Generator

Federal institutional controls / engineering controls registries

US ENG CONTROLS......... Engineering Controls Sites List
US INST CONTROL.......... Sites with Institutional Controls

Federal ERNS list

ERNS........................ Emergency Response Notification System

State- and tribal - equivalent NPL

RESPONSE.................. State Response Sites

State and tribal landfill and/or solid waste disposal site lists

SWF/LF...................... Solid Waste Information System

State and tribal leaking storage tank lists

SLIC......................... Statewide SLIC Cases
INDIAN LUST................ Leaking Underground Storage Tanks on Indian Land

State and tribal registered storage tank lists

UST.......................... Active UST Facilities
AST.......................... Aboveground Petroleum Storage Tank Facilities
INDIAN UST................. Underground Storage Tanks on Indian Land
FEMA UST.................. Underground Storage Tank Listing

State and tribal voluntary cleanup sites

INDIAN VCP................. Voluntary Cleanup Priority Listing

VCP........................ Voluntary Cleanup Program Properties

ADDITIONAL ENVIRONMENTAL RECORDS

Local Brownfield lists

US BROWNFIELDS........... A Listing of Brownfields Sites

Local Lists of Landfill / Solid Waste Disposal Sites

DEBRIS REGION 9........... Torres Martinez Reservation Illegal Dump Site Locations
ODI.......................... Open Dump Inventory
WMUDS/SWAT............... Waste Management Unit Database
SWRCY...................... Recycler Database
HAULERS.................... Registered Waste Tire Haulers Listing
INDIAN ODI.................. Report on the Status of Open Dumps on Indian Lands

Local Lists of Hazardous waste / Contaminated Sites

US CDL....................... Clandestine Drug Labs
HIST Cal-Sites............... Historical Calsites Database
SCH.......................... School Property Evaluation Program
Toxic Pits.................... Toxic Pits Cleanup Act Sites
CDL.......................... Clandestine Drug Labs
US HIST CDL................ National Clandestine Laboratory Register

Local Lists of Registered Storage Tanks

CA FID UST.................. Facility Inventory Database
HIST UST.................... Hazardous Substance Storage Container Database
SWEEPS UST................ SWEEPS UST Listing

Local Land Records

LIENS 2...................... CERCLA Lien Information
LUCIS........................ Land Use Control Information System
LIENS........................ Environmental Liens Listing
DEED......................... Deed Restriction Listing

Records of Emergency Release Reports

HMIRS....................... Hazardous Materials Information Reporting System
CHMIRS..................... California Hazardous Material Incident Report System
LDS.......................... Land Disposal Sites Listing
MCS......................... Military Cleanup Sites Listing

Other Ascertainable Records

RCRA-NonGen.............. RCRA - Non Generators
DOT OPS.................... Incident and Accident Data
DOD......................... Department of Defense Sites
FUDS........................ Formerly Used Defense Sites
CONSENT.................... Superfund (CERCLA) Consent Decrees
ROD.......................... Records Of Decision

EXECUTIVE SUMMARY

UMTRA	Uranium Mill Tailings Sites
MINES	Mines Master Index File
TRIS	Toxic Chemical Release Inventory System
TSCA	Toxic Substances Control Act
FTTS	FIFRA/ TSCA Tracking System - FIFRA (Federal Insecticide, Fungicide, & Rodenticide Act)/TSCA (Toxic Substances Control Act)
HIST FTTS	FIFRA/TSCA Tracking System Administrative Case Listing
SSTS	Section 7 Tracking Systems
ICIS	Integrated Compliance Information System
PADS	PCB Activity Database System
MLTS	Material Licensing Tracking System
RADINFO	Radiation Information Database
FINDS	Facility Index System/Facility Registry System
RAATS	RCRA Administrative Action Tracking System
CA BOND EXP. PLAN	Bond Expenditure Plan
CA WDS	Waste Discharge System
NPDES	NPDES Permits Listing
Cortese	"Cortese" Hazardous Waste & Substances Sites List
HIST CORTESE	Hazardous Waste & Substance Site List
Notify 65	Proposition 65 Records
DRYCLEANERS	Cleaner Facilities
WIP	Well Investigation Program Case List
HAZNET	Facility and Manifest Data
EMI	Emissions Inventory Data
INDIAN RESERV	Indian Reservations
SCRD DRYCLEANERS	State Coalition for Remediation of Drycleaners Listing
FINANCIAL ASSURANCE	Financial Assurance Information Listing
HWT	Registered Hazardous Waste Transporter Database
COAL ASH EPA	Coal Combustion Residues Surface Impoundments List
PCB TRANSFORMER	PCB Transformer Registration Database
COAL ASH DOE	Sleam-Electric Plan Operation Data
MWMP	Medical Waste Management Program Listing
PROC	Certified Processors Database

EDR PROPRIETARY RECORDS

EDR Proprietary Records

Manufactured Gas Plants	EDR Proprietary Manufactured Gas Plants
EDR Historical Auto Stations	EDR Proprietary Historic Gas Stations
EDR Historical Cleaners	EDR Proprietary Historic Dry Cleaners

SURROUNDING SITES: SEARCH RESULTS

Surrounding sites were identified in the following databases.

Elevations have been determined from the USGS Digital Elevation Model and should be evaluated on a relative (not an absolute) basis. Relative elevation information between sites of close proximity should be field verified. Sites with an elevation equal to or higher than the target property have been differentiated below from sites with an elevation lower than the target property.
Page numbers and map identification numbers refer to the EDR Radius Map report where detailed data on individual sites can be reviewed.

Sites listed in ***bold italics*** are in multiple databases.

Unmappable (orphan) sites are not considered in the foregoing analysis.

EXECUTIVE SUMMARY

STANDARD ENVIRONMENTAL RECORDS

Federal RCRA CORRACTS facilities list

CORRACTS: CORRACTS is a list of handlers with RCRA Corrective Action Activity. This report shows which nationally-defined corrective action core events have occurred for every handler that has had corrective action activity.

An online review and analysis by CHJ, INC. of the CORRACTS list, as provided by EDR, and dated 03/25/2010 has revealed that there is 1 CORRACTS site within approximately 1 mile of the target property.

Lower Elevation	Address	Direction / Distance	Map ID	Page
UNIVERSITY OF CA RIVERSIDE	*RIVERSIDE CAMPUS*	*W 1/2 - 1 (0.625 mi.)*	*4*	*11*

Federal RCRA generators list

RCRA-SQG: RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Small quantity generators (SQGs) generate between 100 kg and 1,000 kg of hazardous waste per month.

An online review and analysis by CHJ, INC. of the RCRA-SQG list, as provided by EDR, and dated 02/17/2010 has revealed that there is 1 RCRA-SQG site within approximately 0.25 miles of the target property.

Equal/Higher Elevation	Address	Direction / Distance	Map ID	Page
COMPUTERIZED DIAGNOSTIC IMAGIN	*6485 DAY ST STE 101*	*NNW 1/8 - 1/4 (0.149 mi.)*	*1*	*7*

State- and tribal - equivalent CERCLIS

ENVIROSTOR: The Department of Toxic Substances Control's (DTSC's) Site Mitigation and Brownfields Reuse Program's (SMBRP's) EnviroStor database identifes sites that have known contamination or sites for which there may be reasons to investigate further. The database includes the following site types: Federal Superfund sites (National Priorities List (NPL)); State Response, including Military Facilities and State Superfund; Voluntary Cleanup; and School sites. EnviroStor provides similar information to the information that was available in CalSites, and provides additional site information, including, but not limited to, identification of formerly-contaminated properties that have been released for reuse, properties where environmental deed restrictions have been recorded to prevent inappropriate land uses, and risk characterization information that is used to assess potential impacts to public health and the environment at contaminated sites.

An online review and analysis by CHJ, INC. of the ENVIROSTOR list, as provided by EDR, and dated 05/11/2010 has revealed that there is 1 ENVIROSTOR site within approximately 1 mile of the target property.

Lower Elevation	Address	Direction / Distance	Map ID	Page
UNIVERSITY OF CA RIVERSIDE Status: * Inactive	*RIVERSIDE CAMPUS*	*W 1/2 - 1 (0.625 mi.)*	*4*	*11*

EXECUTIVE SUMMARY

State and tribal leaking storage tank lists

LUST: The Leaking Underground Storage Tank Incident Reports contain an inventory of reported leaking underground storage tank incidents. The data come from the State Water Resources Control Board Leaking Underground Storage Tank Information System.

An online review and analysis by CHJ, INC. of the LUST list, as provided by EDR, and dated 05/05/2010 has revealed that there are 2 LUST sites within approximately 0.5 miles of the target property.

Equal/Higher Elevation	Address	Direction / Distance	Map ID	Page
UCR - FLEET SERVICE	3401 WATKINS DR	NNW 1/4 - 1/2 (0.277 mi.)	A2	9
U C RIVERSIDE FLEET SERVICES Status: Completed - Case Closed	3401 WATKINS AVE	NNW 1/4 - 1/2 (0.277 mi.)	A3	9

ADDITIONAL ENVIRONMENTAL RECORDS

Other Ascertainable Records

HWP: Detailed information on permitted hazardous waste facilities and corrective action (a??cleanupsa??) tracked in EnviroStor.

An online review and analysis by CHJ, INC. of the HWP list, as provided by EDR, and dated 05/11/2010 has revealed that there is 1 HWP site within approximately 1 mile of the target property.

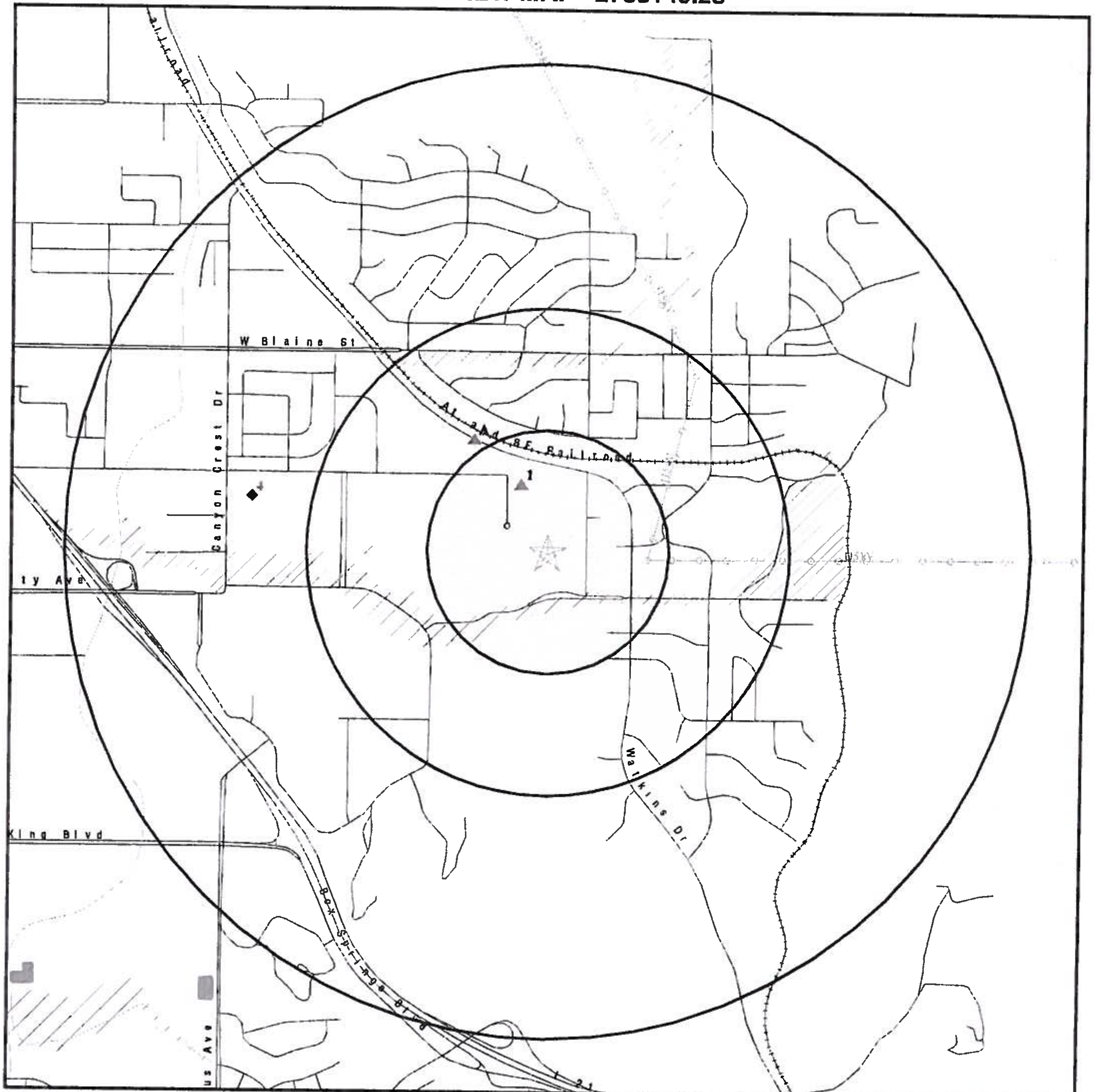
Lower Elevation	Address	Direction / Distance	Map ID	Page
UNIVERSITY OF CA RIVERSIDE	*RIVERSIDE CAMPUS*	*W 1/2 - 1 (0.625 mi.)*	*4*	*11*

EXECUTIVE SUMMARY

Due to poor or inadequate address information, the following sites were not mapped:

Site Name	Database(s)
344 N STATE APT 148	US HIST CDL
GARDEN	NPDES
SUNFIELD	NPDES
CANYON CROSSING AT CANYON SPRINGS	NPDES
PARCEL 7	NPDES
UCR ARROYO FLOOD CONTROL AND ENHANCEMENT	NPDES
PHILADELPHIA HOUSING LLC	NPDES
MERIDIAN BUILDINGS 1 & 2	NPDES
TRACT 30599 FRENCH VALLEY	NPDES
TRACT 32037	NPDES
MATERIALS SCIENCE & ENGINEERING	NPDES
EAST OF WYDHAM HILLS DR & SOUTH OF OVERLOOK PKWY	NPDES
LA RIVERA 2 TR 30922 3 30922 4 33051	NPDES
LA RIVERA	NPDES
ENTROMOLOGY & INSECTARY DEMOLITION	NPDES
SPRING MOUNTAIN RNCH	NPDES
W OF VIA VISTA DR & E OF OVERLOOK PKWY & S OF RNCH	NPDES
OVERLOOK PKWY	NPDES
THOMPSON RD E OF HWY 79	NPDES
BRINE FAC,LA SIERRA	LDS
I-15 NEAR GLEN ELLEN PARKWAY	CDL
CRAFTON REDLANDS AREA	CERCLIS, FINDS
SAM'S CLUB #6378	UST
EDGEMONT SHELL	HIST UST
STATE OF CALIFORNIA-STRINGFELL	WMUDS/SWAT
RIVERSIDE CITY-PEDLEY SITE	WMUDS/SWAT
SHELL SERVICE STATION	RCRA-LQG, FINDS, HAZNET
SHELL	HAZNET
CAROL BUXBON	HAZNET
MICHAEL KEITH SMITH	HAZNET
CALTRANS DIST 8/CONSTR/EA08-334844	HAZNET
KIDDIE KANDIDS #642	HAZNET
JAYNES CORPROATION	HAZNET
WASTE MANAGEMENT OF MORENO VALLEY	HAZNET
GENERAL TELEPHONE OF CALIFORNIA	RCRA-SQG, FINDS
STRINGFELLOW HAZARDOUS WASTE SITE	CA BOND EXP. PLAN, EMI
344 N STATE 148	US CDL

OVERVIEW MAP - 2788149.2s

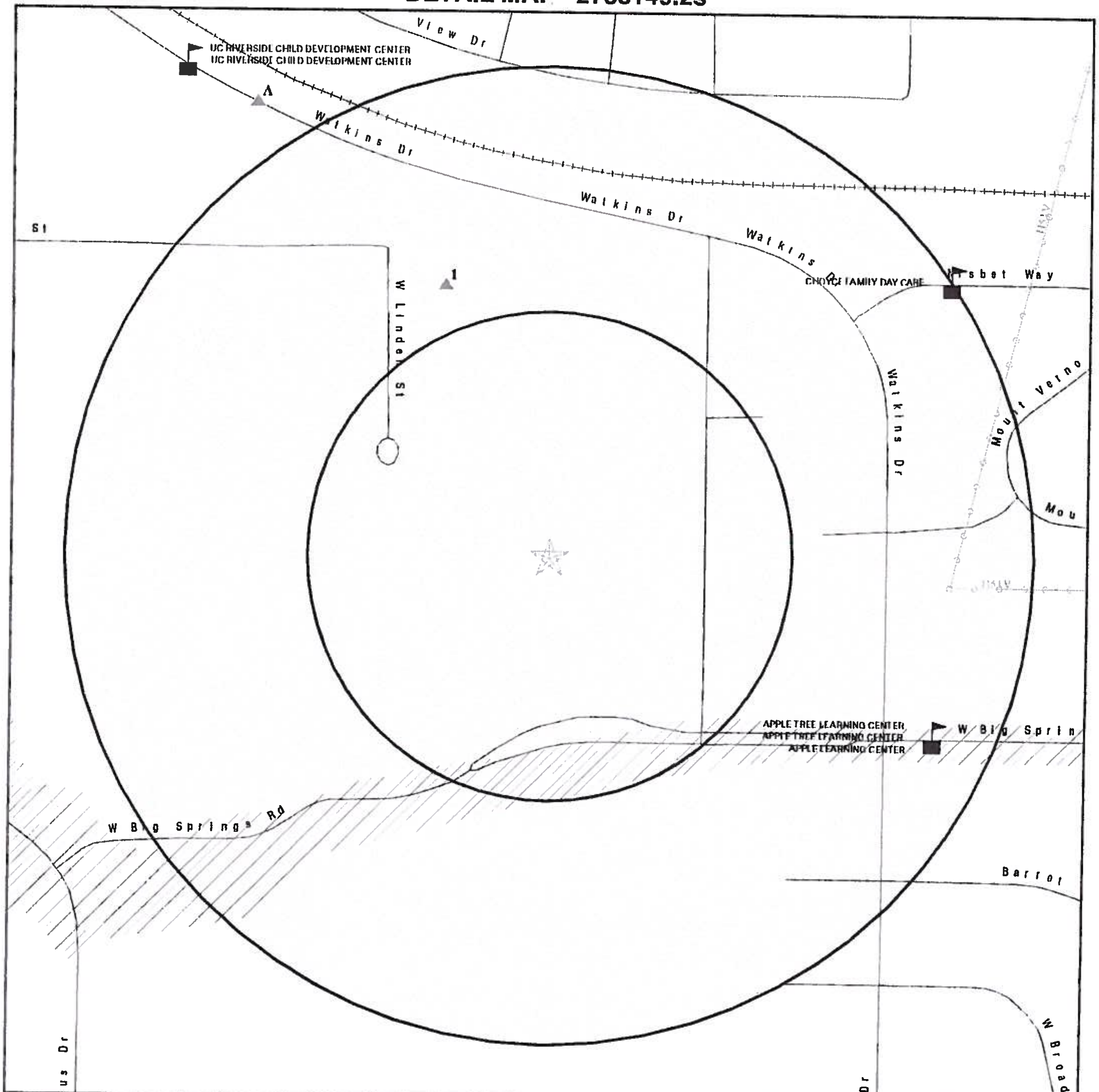


- Target Property
- Sites at elevations higher than or equal to the target property
- Sites at elevations lower than the target property
- Manufactured Gas Plants
- National Priority List Sites
- Dept. Defense Sites
- Indian Reservations BIA
- Power transmission lines
- Oil & Gas pipelines
- 100-year flood zone
- 500-year flood zone
- Areas of Concern

This report includes Interactive Map Layers to display and/or hide map information. The legend includes only those icons for the default map view.

SITE NAME: UCR Glen Mor 2 ADDRESS: UCR Glen Mor 2 Riverside CA 92521 LAT/LONG: 33.9770 / 117.3195	CLIENT: CHJ, Inc. CONTACT: Ann Laudermilk INQUIRY #: 2788149.2s DATE: June 22, 2010 1:05 pm

DETAIL MAP - 2788149.2s



☆	Target Property
▲	Sites at elevations higher than or equal to the target property
◆	Sites at elevations lower than the target property
▲	Manufactured Gas Plants
	Sensitive Receptors
	National Priority List Sites
	Dept. Defense Sites

0 — 1/16 — 1/8 — 1/4 Miles

Indian Reservations BIA
Power transmission lines
Oil & Gas pipelines
100-year flood zone
500-year flood zone

Areas of Concern

This report includes Interactive Map Layers to display and/or hide map information. The legend includes only those icons for the default map view.

SITE NAME:	UCR Glen Mor 2	CLIENT:	CHJ, Inc.
ADDRESS:	UCR Glen Mor 2 Riverside CA 92521	CONTACT:	Ann Laudermilk
		INQUIRY #:	2788149.2s
LAT/LONG:	33.9770 / 117.3195	DATE:	June 22, 2010 1:05 pm

MAP FINDINGS SUMMARY

Database	Target Property	Search Distance (Miles)	< 1/8	1/8 - 1/4	1/4 - 1/2	1/2 - 1	> 1	Total Plotted
STANDARD ENVIRONMENTAL RECORDS								
Federal NPL site list								
NPL		1.000	0	0	0	0	NR	0
Proposed NPL		1.000	0	0	0	0	NR	0
NPL LIENS		TP	NR	NR	NR	NR	NR	0
Federal Delisted NPL site list								
Delisted NPL		1.000	0	0	0	0	NR	0
Federal CERCLIS list								
CERCLIS		0.500	0	0	0	NR	NR	0
FEDERAL FACILITY		1.000	0	0	0	0	NR	0
Federal CERCLIS NFRAP site List								
CERC-NFRAP		0.500	0	0	0	NR	NR	0
Federal RCRA CORRACTS facilities list								
CORRACTS		1.000	0	0	0	1	NR	1
Federal RCRA non-CORRACTS TSD facilities list								
RCRA-TSDF		0.500	0	0	0	NR	NR	0
Federal RCRA generators list								
RCRA-LQG		0.250	0	0	NR	NR	NR	0
RCRA-SQG		0.250	0	1	NR	NR	NR	1
RCRA-CESQG		0.250	0	0	NR	NR	NR	0
Federal institutional controls / engineering controls registries								
US ENG CONTROLS		0.500	0	0	0	NR	NR	0
US INST CONTROL		0.500	0	0	0	NR	NR	0
Federal ERNS list								
ERNS		TP	NR	NR	NR	NR	NR	0
State- and tribal - equivalent NPL								
RESPONSE		1.000	0	0	0	0	NR	0
State- and tribal - equivalent CERCLIS								
ENVIROSTOR		1.000	0	0	0	1	NR	1
State and tribal landfill and/or solid waste disposal site lists								
SWF/LF		0.500	0	0	0	NR	NR	0
State and tribal leaking storage tank lists								
LUST		0.500	0	0	2	NR	NR	2
SLIC		0.500	0	0	0	NR	NR	0

MAP FINDINGS SUMMARY

Database	Target Property	Search Distance (Miles)	< 1/8	1/8 - 1/4	1/4 - 1/2	1/2 - 1	> 1	Total Plotted
INDIAN LUST		0.500	0	0	0	NR	NR	0
State and tribal registered storage tank lists								
UST		0.250	0	0	NR	NR	NR	0
AST		0.250	0	0	NR	NR	NR	0
INDIAN UST		0.250	0	0	NR	NR	NR	0
FEMA UST		0.250	0	0	NR	NR	NR	0
State and tribal voluntary cleanup sites								
INDIAN VCP		0.500	0	0	0	NR	NR	0
VCP		0.500	0	0	0	NR	NR	0
ADDITIONAL ENVIRONMENTAL RECORDS								
Local Brownfield lists								
US BROWNFIELDS		0.500	0	0	0	NR	NR	0
Local Lists of Landfill / Solid Waste Disposal Sites								
DEBRIS REGION 9		0.500	0	0	0	NR	NR	0
ODI		0.500	0	0	0	NR	NR	0
WMUDS/SWAT		0.500	0	0	0	NR	NR	0
SWRCY		0.500	0	0	0	NR	NR	0
HAULERS		TP	NR	NR	NR	NR	NR	0
INDIAN ODI		0.500	0	0	0	NR	NR	0
Local Lists of Hazardous waste / Contaminated Sites								
US CDL		TP	NR	NR	NR	NR	NR	0
HIST Cal-Sites		1.000	0	0	0	0	NR	0
SCH		0.250	0	0	NR	NR	NR	0
Toxic Pits		1.000	0	0	0	0	NR	0
CDL		TP	NR	NR	NR	NR	NR	0
US HIST CDL		TP	NR	NR	NR	NR	NR	0
Local Lists of Registered Storage Tanks								
CA FID UST		0.250	0	0	NR	NR	NR	0
HIST UST		0.250	0	0	NR	NR	NR	0
SWEEPS UST		0.250	0	0	NR	NR	NR	0
Local Land Records								
LIENS 2		TP	NR	NR	NR	NR	NR	0
LUCIS		0.500	0	0	0	NR	NR	0
LIENS		TP	NR	NR	NR	NR	NR	0
DEED		0.500	0	0	0	NR	NR	0
Records of Emergency Release Reports								
HMIRS		TP	NR	NR	NR	NR	NR	0
CHMIRS		TP	NR	NR	NR	NR	NR	0
LDS		TP	NR	NR	NR	NR	NR	0

MAP FINDINGS SUMMARY

Database	Target Property	Search Distance (Miles)	< 1/8	1/8 - 1/4	1/4 - 1/2	1/2 - 1	> 1	Total Plotted
MCS		TP	NR	NR	NR	NR	NR	0
Other Ascertainable Records								
RCRA-NonGen		0.250	0	0	NR	NR	NR	0
DOT OPS		TP	NR	NR	NR	NR	NR	0
DOD		1.000	0	0	0	0	NR	0
FUDS		1.000	0	0	0	0	NR	0
CONSENT		1.000	0	0	0	0	NR	0
ROD		1.000	0	0	0	0	NR	0
UMTRA		0.500	0	0	0	NR	NR	0
MINES		0.250	0	0	NR	NR	NR	0
TRIS		TP	NR	NR	NR	NR	NR	0
TSCA		TP	NR	NR	NR	NR	NR	0
FTTS		TP	NR	NR	NR	NR	NR	0
HIST FTTS		TP	NR	NR	NR	NR	NR	0
SSTS		TP	NR	NR	NR	NR	NR	0
ICIS		TP	NR	NR	NR	NR	NR	0
PADS		TP	NR	NR	NR	NR	NR	0
MLTS		TP	NR	NR	NR	NR	NR	0
RADINFO		TP	NR	NR	NR	NR	NR	0
FINDS		TP	NR	NR	NR	NR	NR	0
RAATS		TP	NR	NR	NR	NR	NR	0
CA BOND EXP. PLAN		1.000	0	0	0	0	NR	0
CA WDS		TP	NR	NR	NR	NR	NR	0
NPDES		TP	NR	NR	NR	NR	NR	0
Cortese		0.500	0	0	0	NR	NR	0
HIST CORTESE		0.500	0	0	0	NR	NR	0
Notify 65		1.000	0	0	0	0	NR	0
DRYCLEANERS		0.250	0	0	NR	NR	NR	0
WIP		0.250	0	0	NR	NR	NR	0
HAZNET		TP	NR	NR	NR	NR	NR	0
EMI		TP	NR	NR	NR	NR	NR	0
INDIAN RESERV		1.000	0	0	0	0	NR	0
SCRD DRYCLEANERS		0.500	0	0	0	NR	NR	0
FINANCIAL ASSURANCE		TP	NR	NR	NR	NR	NR	0
HWP		1.000	0	0	0	1	NR	1
HWT		0.250	0	0	NR	NR	NR	0
COAL ASH EPA		0.500	0	0	0	NR	NR	0
PCB TRANSFORMER		TP	NR	NR	NR	NR	NR	0
COAL ASH DOE		TP	NR	NR	NR	NR	NR	0
MWMP		0.250	0	0	NR	NR	NR	0
PROC		0.500	0	0	0	NR	NR	0
EDR PROPRIETARY RECORDS								
EDR Proprietary Records								
Manufactured Gas Plants		1.000	0	0	0	0	NR	0
EDR Historical Auto Stations		0.250	0	0	NR	NR	NR	0
EDR Historical Cleaners		0.250	0	0	NR	NR	NR	0

NOTES:

TP = Target Property

NR = Not Requested at this Search Distance

Sites may be listed in more than one database

Map ID / Direction / Distance / Elevation	Site	Database(s)	EDR ID Number / EPA ID Number
1 **NNW** **1/8-1/4** **0.149 mi.** **787 ft.**	**COMPUTERIZED DIAGNOSTIC IMAGING** **6485 DAY ST STE 101** **RIVERSIDE, CA 92507**	**RCRA-SQG** **FINDS** **HAZNET**	**1000905006** **CA0000259705**

Relative:
Higher

Actual:
1127 ft.

RCRA-SQG:

Date form received by agency:	04/13/1994
Facility name:	COMPUTERIZED DIAGNOSTIC IMAGING
Facility address:	6485 DAY ST STE 101 RIVERSIDE, CA 92507
EPA ID:	CA0000259705
Mailing address:	CHICAGO AVE STE N15 RIVERSIDE, CA 92507
Contact:	DENISE LESLIE
Contact address:	1660 CHICAGO AVE STE N15 RIVERSIDE, CA 92507
Contact country:	US
Contact telephone:	(909) 276-7500
Contact email:	Not reported
EPA Region:	09
Classification:	Small Small Quantity Generator
Description:	Handler: generates more than 100 and less than 1000 kg of hazardous waste during any calendar month and accumulates less than 6000 kg of hazardous waste at any time; or generates 100 kg or less of hazardous waste during any calendar month, and accumulates more than 1000 kg of hazardous waste at any time

Owner/Operator Summary:

Owner/operator name:	COMPUTERIZED DIAGNOSTIC IMAGING
Owner/operator address:	1660 CHICAGO AVE STE N15 RIVERSIDE, CA 92507
Owner/operator country:	Not reported
Owner/operator telephone:	(909) 781-2270
Legal status:	Private
Owner/Operator Type:	Owner
Owner/Op start date:	Not reported
Owner/Op end date:	Not reported

Handler Activities Summary:

U.S. importer of hazardous waste:	No
Mixed waste (haz. and radioactive):	Unknown
Recycler of hazardous waste:	No
Transporter of hazardous waste:	No
Treater, storer or disposer of HW:	No
Underground injection activity:	No
On-site burner exemption:	No
Furnace exemption:	No
Used oil fuel burner:	No
Used oil processor:	No
User oil refiner:	No
Used oil fuel marketer to burner:	No
Used oil Specification marketer:	No
Used oil transfer facility:	No
Used oil transporter:	No
Off-site waste receiver:	Verified to be non-commercial

Violation Status: No violations found

COMPUTERIZED DIAGNOSTIC IMAGING (Continued) **1000905006**

FINDS:

Registry ID: 110002616116

Environmental Interest/Information System
RCRAInfo is a national information system that supports the Resource Conservation and Recovery Act (RCRA) program through the tracking of events and activities related to facilities that generate, transport, and treat, store, or dispose of hazardous waste. RCRAInfo allows RCRA program staff to track the notification, permit, compliance, and corrective action activities required under RCRA.

HAZNET:

Gepaid: CA0000259705
Contact: COMPUTERIZED DIAGNOSTIC IMAGIN
Telephone: 9097812270
Facility Addr2: Not reported
Mailing Name: Not reported
Mailing Address: 4000 14TH ST STE 109
Mailing City,St,Zip: RIVERSIDE, CA 925014009
Gen County: Riverside
TSD EPA ID: CAD983604000
TSD County: San Bernardino
Waste Category: Photochemicals/photoprocessing waste
Disposal Method: Recycler
Tons: .0959
Facility County: Riverside

Gepaid: CA0000259705
Contact: COMPUTERIZED DIAGNOSTIC IMAGIN
Telephone: 9097812270
Facility Addr2: Not reported
Mailing Name: Not reported
Mailing Address: 4000 14TH ST STE 109
Mailing City,St,Zip: RIVERSIDE, CA 925014009
Gen County: Riverside
TSD EPA ID: CAD983604000
TSD County: San Bernardino
Waste Category: Photochemicals/photoprocessing waste
Disposal Method: Recycler
Tons: .0954
Facility County: Riverside

Gepaid: CA0000259705
Contact: COMPUTERIZED DIAGNOSTIC IMAGIN
Telephone: 9097812270
Facility Addr2: Not reported
Mailing Name: Not reported
Mailing Address: 4000 14TH ST STE 109
Mailing City,St,Zip: RIVERSIDE, CA 925014009
Gen County: Riverside
TSD EPA ID: CAD983604000
TSD County: San Bernardino
Waste Category: Photochemicals/photoprocessing waste
Disposal Method: Recycler

COMPUTERIZED DIAGNOSTIC IMAGING (Continued) **1000905006**

Tons:	.1004
Facility County:	Riverside

Gepaid:	CA0000259705
Contact:	COMPUTERIZED DIAGNOSTIC IMAGIN
Telephone:	9097812270
Facility Addr2:	Not reported
Mailing Name:	Not reported
Mailing Address:	4000 14TH ST STE 109
Mailing City,St,Zip:	RIVERSIDE, CA 925014009
Gen County:	Riverside
TSD EPA ID:	CAD983604000
TSD County:	San Bernardino
Waste Category:	Photochemicals/photoprocessing waste
Disposal Method:	Not reported
Tons:	.0492
Facility County:	Riverside

Click this hyperlink while viewing on your computer to access
-1 additional CA_HAZNET: record(s) in the EDR Site Report.

A2
NNW
1/4-1/2
0.277 mi.
1462 ft.

UCR - FLEET SERVICE
3401 WATKINS DR
RIVERSIDE, CA

LUST **S103821093**
N/A

Site 1 of 2 in cluster A

Relative:
Equal

Actual:
1122 ft.

RIVERSIDE CO. LUST:

Region:	RIVERSIDE
Facility ID:	980244
Site Closed:	Yes
Date Closed:	10/6/2000
Case Type:	Soil only
Site Number:	RO6600329

A3
NNW
1/4-1/2
0.277 mi.
1462 ft.

U C RIVERSIDE FLEET SERVICES
3401 WATKINS AVE
RIVERSIDE, CA 92521

LUST **S103249180**
N/A

Site 2 of 2 in cluster A

Relative:
Equal

Actual:
1122 ft.

LUST:

Region:	STATE
Global Id:	T0606500519
Latitude:	33.9754056
Longitude:	-117.3311906
Case Type:	LUST Cleanup Site
Status:	Completed - Case Closed
Status Date:	2000-10-06 00:00:00
Lead Agency:	RIVERSIDE COUNTY LOP
Case Worker:	Not reported
Local Agency:	RIVERSIDE COUNTY LOP
RB Case Number:	083303140T
LOC Case Number:	980244
File Location:	Local Agency Warehouse
Potential Media Affect:	Soil

U C RIVERSIDE FLEET SERVICES (Continued) **S103249180**

Potential Contaminants of Concern: Gasoline
Site History: Not reported

LUST REG 8:

Region:	8
County:	Riverside
Regional Board:	Santa Ana Region
Facility Status:	Case Closed
Case Number:	083303140T
Local Case Num:	980244
Case Type:	Soil only
Substance:	Gasoline
Qty Leaked:	Not reported
Abate Method:	Not reported
Cross Street:	Not reported
Enf Type:	Not reported
Funding:	Not reported
How Discovered:	Not reported
How Stopped:	Not reported
Leak Cause:	Not reported
Leak Source:	Not reported
Global ID:	T0606500519
How Stopped Date:	Not reported
Enter Date:	3/31/1998
Review Date:	3/17/1998
Prelim Assess:	Not reported
Discover Date:	3/17/1998
Enforcement Date:	Not reported
Close Date:	10/6/2000
Workplan:	Not reported
Pollution Char:	Not reported
Remed Plan:	Not reported
Remed Action:	Not reported
Monitoring:	Not reported
Enter Date:	3/31/1998
GW Qualifies:	Not reported
Soil Qualifies:	Not reported
Operator:	Not reported
Facility Contact:	Not reported
Interim:	Not reported
Oversite Program:	LUST
Latitude:	33.9754056
Longitude:	-117.3311906
MTBE Date:	Not reported
Max MTBE GW:	Not reported
MTBE Concentration:	0
Max MTBE Soil:	Not reported
MTBE Fuel:	1
MTBE Tested:	Site NOT Tested for MTBE.Includes Unknown and Not Analyzed.
MTBE Class:	*
Staff:	TME
Staff Initials:	UNK
Lead Agency:	Local Agency
Local Agency:	33000L
Hydr Basin #:	UPPER SANTA ANA VALL
Beneficial:	Not reported
Priority:	Not reported

U C RIVERSIDE FLEET SERVICES (Continued) **S103249180**

Cleanup Fund Id: Not reported
Work Suspended: Not reported
Summary: Not reported

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4 **West** **1/2-1** **0.625 mi.** **3299 ft.** **Relative:** **Lower** **Actual:** **1050 ft.**	**UNIVERSITY OF CA RIVERSIDE** **RIVERSIDE CAMPUS** **RIVERSIDE, CA 92521**	**RCRA-TSDF** **CERC-NFRAP** **CORRACTS** **RCRA-LQG** **FINDS** **RAATS** **HAZNET** **ENVIROSTOR** **HWP**	**1000431600** **CAD073134777**

RCRA-TSDF:

Date form received by agency: 02/27/2008
Facility name: UNIVERSITY OF CALIFORNIA RIVERSIDE
Facility address: 900 UNIVERSITY AVENUE
RIVERSIDE, CA 92521
EPA ID: CAD073134777
Contact: EDUARDO TRUJILLO
Contact address: Not reported
Not reported
Contact country: Not reported
Contact telephone: (951) 827-4248
Contact email: ED.TRUJILLO@UCR.EDU
EPA Region: 09
Land type: Private
Classification: TSDF
Description: Handler is engaged in the treatment, storage or disposal of hazardous waste
TSD commencement date: Not reported
Classification: Large Quantity Generator
Description: Handler: generates 1,000 kg or more of hazardous waste during any calendar month; or generates more than 1 kg of acutely hazardous waste during any calendar month; or generates more than 100 kg of any residue or contaminated soil, waste or other debris resulting from the cleanup of a spill, into or on any land or water, of acutely hazardous waste during any calendar month; or generates 1 kg or less of acutely hazardous waste during any calendar month, and accumulates more than 1 kg of acutely hazardous waste at any time; or generates 100 kg or less of any residue or contaminated soil, waste or other debris resulting from the cleanup of a spill, into or on any land or water, of acutely hazardous waste during any calendar month, and accumulates more than 100 kg of that material at any time

Owner/Operator Summary:

Owner/operator name: REGENTS UC
Owner/operator address: 900 UNIVERSITY AVENUE
RIVERSIDE, CA 92521
Owner/operator country: US
Owner/operator telephone: Not reported
Legal status: Private
Owner/Operator Type: Owner
Owner/Op start date: 01/01/1948
Owner/Op end date: Not reported

UNIVERSITY OF CA RIVERSIDE (Continued) **1000431600**

Owner/operator name:	UNIVERSITY OF CALIFORNIA RIVERSIDE
Owner/operator address:	Not reported Not reported
Owner/operator country:	US
Owner/operator telephone:	Not reported
Legal status:	Private
Owner/Operator Type:	Operator
Owner/Op start date:	01/01/1990
Owner/Op end date:	Not reported

Handler Activities Summary:

U.S. importer of hazardous waste:	No
Mixed waste (haz. and radioactive):	No
Recycler of hazardous waste:	No
Transporter of hazardous waste:	No
Treater, storer or disposer of HW:	No
Underground injection activity:	No
On-site burner exemption:	No
Furnace exemption:	No
Used oil fuel burner:	No
Used oil processor:	No
User oil refiner:	No
Used oil fuel marketer to burner:	No
Used oil Specification marketer:	No
Used oil transfer facility:	No
Used oil transporter:	No
Off-site waste receiver:	Commercial status unknown

Universal Waste Summary:

Waste type:	Batteries
Accumulated waste on-site:	No
Generated waste on-site:	Not reported
Waste type:	Lamps
Accumulated waste on-site:	No
Generated waste on-site:	Not reported
Waste type:	Pesticides
Accumulated waste on-site:	No
Generated waste on-site:	Not reported
Waste type:	Thermostats
Accumulated waste on-site:	No
Generated waste on-site:	Not reported

Historical Generators:

Date form received by agency:	02/27/2006
Facility name:	UNIVERSITY OF CALIFORNIA RIVERSIDE
Classification:	Large Quantity Generator
Date form received by agency:	03/24/2004
Facility name:	UNIVERSITY OF CALIFORNIA RIVERSIDE
Classification:	Large Quantity Generator
Date form received by agency:	02/26/2002
Facility name:	UNIVERSITY OF CALIFORNIA RIVERSIDE

UNIVERSITY OF CA RIVERSIDE (Continued) **1000431600**

Classification: Large Quantity Generator

Date form received by agency: 10/12/2000
Facility name: UNIVERSITY OF CALIFORNIA RIVERSIDE
Classification: Large Quantity Generator

Date form received by agency: 03/04/1999
Facility name: UNIVERSITY OF CALIFORNIA RIVERSIDE
Site name: UNIVERSITY OF CALIFORNIA, RIVERSIDE
Classification: Large Quantity Generator

Date form received by agency: 09/01/1996
Facility name: UNIVERSITY OF CALIFORNIA RIVERSIDE
Classification: Large Quantity Generator

Date form received by agency: 04/01/1996
Facility name: UNIVERSITY OF CALIFORNIA RIVERSIDE
Site name: UNIVERSITY OF CALIFORNIA, RIVERSIDE
Classification: Large Quantity Generator

Date form received by agency: 03/31/1994
Facility name: UNIVERSITY OF CALIFORNIA RIVERSIDE
Site name: UNIVERSITY OF CALIFORNIA, RIVERSIDE
Classification: Large Quantity Generator

Date form received by agency: 02/26/1992
Facility name: UNIVERSITY OF CALIFORNIA RIVERSIDE
Site name: UNIVERSITY OF CALIFORNIA RIVER
Classification: Large Quantity Generator

Date form received by agency: 04/13/1990
Facility name: UNIVERSITY OF CALIFORNIA RIVERSIDE
Classification: Large Quantity Generator

Date form received by agency: 08/18/1980
Facility name: UNIVERSITY OF CALIFORNIA RIVERSIDE
Classification: Large Quantity Generator

Hazardous Waste Summary:
Waste code: D001
Waste name: IGNITABLE HAZARDOUS WASTES ARE THOSE WASTES WHICH HAVE A FLASHPOINT OF LESS THAN 140 DEGREES FAHRENHEIT AS DETERMINED BY A PENSKY-MARTENS CLOSED CUP FLASH POINT TESTER. ANOTHER METHOD OF DETERMINING THE FLASH POINT OF A WASTE IS TO REVIEW THE MATERIAL SAFETY DATA SHEET, WHICH CAN BE OBTAINED FROM THE MANUFACTURER OR DISTRIBUTOR OF THE MATERIAL. LACQUER THINNER IS AN EXAMPLE OF A COMMONLY USED SOLVENT WHICH WOULD BE CONSIDERED AS IGNITABLE HAZARDOUS WASTE.

Waste code: D002
Waste name: A WASTE WHICH HAS A PH OF LESS THAN 2 OR GREATER THAN 12.5 IS CONSIDERED TO BE A CORROSIVE HAZARDOUS WASTE. SODIUM HYDROXIDE, A CAUSTIC SOLUTION WITH A HIGH PH, IS OFTEN USED BY INDUSTRIES TO CLEAN OR DEGREASE PARTS. HYDROCHLORIC ACID, A SOLUTION WITH A LOW PH, IS USED BY MANY INDUSTRIES TO CLEAN METAL PARTS PRIOR TO PAINTING. WHEN THESE CAUSTIC OR ACID SOLUTIONS BECOME CONTAMINATED AND MUST BE DISPOSED, THE WASTE WOULD BE A CORROSIVE HAZARDOUS WASTE.

UNIVERSITY OF CA RIVERSIDE (Continued) **1000431600**

Waste code:	D003
Waste name:	A MATERIAL IS CONSIDERED TO BE A REACTIVE HAZARDOUS WASTE IF IT IS NORMALLY UNSTABLE, REACTS VIOLENTLY WITH WATER, GENERATES TOXIC GASES WHEN EXPOSED TO WATER OR CORROSIVE MATERIALS, OR IF IT IS CAPABLE OF DETONATION OR EXPLOSION WHEN EXPOSED TO HEAT OR A FLAME. ONE EXAMPLE OF SUCH WASTE WOULD BY WASTE GUNPOWDER.
Waste code:	D004
Waste name:	ARSENIC
Waste code:	D005
Waste name:	BARIUM
Waste code:	D006
Waste name:	CADMIUM
Waste code:	D007
Waste name:	CHROMIUM
Waste code:	D008
Waste name:	LEAD
Waste code:	D009
Waste name:	MERCURY
Waste code:	D010
Waste name:	SELENIUM
Waste code:	D011
Waste name:	SILVER
Waste code:	D018
Waste name:	BENZENE
Waste code:	D022
Waste name:	CHLOROFORM
Waste code:	D023
Waste name:	O-CRESOL
Waste code:	D024
Waste name:	M-CRESOL
Waste code:	D027
Waste name:	1,4-DICHLOROBENZENE
Waste code:	D028
Waste name:	1,2-DICHLOROETHANE
Waste code:	F002
Waste name:	THE FOLLOWING SPENT HALOGENATED SOLVENTS: TETRACHLOROETHYLENE, METHYLENE CHLORIDE, TRICHLOROETHYLENE, 1,1,1-TRICHLOROETHANE, CHLOROBENZENE, 1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE, ORTHO-DICHLOROBENZENE, TRICHLOROFLUOROMETHANE, AND 1,1,2-TRICHLOROETHANE; ALL SPENT SOLVENT MIXTURES/BLENDS CONTAINING, BEFORE USE, A TOTAL OF TEN PERCENT OR MORE (BY VOLUME) OF ONE OR MORE OF THE ABOVE HALOGENATED SOLVENTS OR THOSE LISTED IN F001, F004, OR

UNIVERSITY OF CA RIVERSIDE (Continued) **1000431600**

F005, AND STILL BOTTOMS FROM THE RECOVERY OF THESE SPENT SOLVENTS AND SPENT SOLVENT MIXTURES.

Waste code:	F003
Waste name:	THE FOLLOWING SPENT NON-HALOGENATED SOLVENTS: XYLENE, ACETONE, ETHYL ACETATE, ETHYL BENZENE, ETHYL ETHER, METHYL ISOBUTYL KETONE, N-BUTYL ALCOHOL, CYCLOHEXANONE, AND METHANOL; ALL SPENT SOLVENT MIXTURES/BLENDS CONTAINING, BEFORE USE, ONLY THE ABOVE SPENT NON-HALOGENATED SOLVENTS; AND ALL SPENT SOLVENT MIXTURES/BLENDS CONTAINING, BEFORE USE, ONE OR MORE OF THE ABOVE NON-HALOGENATED SOLVENTS, AND, A TOTAL OF TEN PERCENT OR MORE (BY VOLUME) OF ONE OR MORE OF THOSE SOLVENTS LISTED IN F001, F002, F004, AND F005, AND STILL BOTTOMS FROM THE RECOVERY OF THESE SPENT SOLVENTS AND SPENT SOLVENT MIXTURES.
Waste code:	F005
Waste name:	THE FOLLOWING SPENT NON-HALOGENATED SOLVENTS: TOLUENE, METHYL ETHYL KETONE, CARBON DISULFIDE, ISOBUTANOL, PYRIDINE, BENZENE, 2-ETHOXYETHANOL, AND 2-NITROPROPANE; ALL SPENT SOLVENT MIXTURES/BLENDS CONTAINING, BEFORE USE, A TOTAL OF TEN PERCENT OR MORE (BY VOLUME) OF ONE OR MORE OF THE ABOVE NON-HALOGENATED SOLVENTS OR THOSE SOLVENTS LISTED IN F001, F002, OR F004; AND STILL BOTTOMS FROM THE RECOVERY OF THESE SPENT SOLVENTS AND SPENT SOLVENT MIXTURES.
Waste code:	P001
Waste name:	2H-1-BENZOPYRAN-2-ONE, 4-HYDROXY-3-(3-OXO-1-PHENYLBUTYL)-, & SALTS, WHEN PRESENT AT CONCENTRATIONS GREATER THAN 0.3%
Waste code:	P020
Waste name:	DINOSEB
Waste code:	P022
Waste name:	CARBON DISULFIDE
Waste code:	P087
Waste name:	OSMIUM OXIDE OSO4, (T-4)-
Waste code:	P098
Waste name:	POTASSIUM CYANIDE
Waste code:	P105
Waste name:	SODIUM AZIDE
Waste code:	P106
Waste name:	SODIUM CYANIDE
Waste code:	P120
Waste name:	VANADIUM OXIDE V2O5
Waste code:	U002
Waste name:	ACETONE (I)
Waste code:	U006
Waste name:	ACETYL CHLORIDE (C,R,T)
Waste code:	U007
Waste name:	ACRYLAMIDE

UNIVERSITY OF CA RIVERSIDE (Continued) 1000431600

Waste code: U019
Waste name: BENZENE (I,T)

Waste code: U031
Waste name: 1-BUTANOL (I)

Waste code: U044
Waste name: CHLOROFORM

Waste code: U052
Waste name: CRESOL (CRESYLIC ACID)

Waste code: U072
Waste name: BENZENE, 1,4-DICHLORO-

Waste code: U078
Waste name: 1,1-DICHLOROETHYLENE

Waste code: U080
Waste name: METHANE, DICHLORO-

Waste code: U081
Waste name: 2,4-DICHLOROPHENOL

Waste code: U103
Waste name: DIMETHYL SULFATE

Waste code: U112
Waste name: ACETIC ACID ETHYL ESTER (I)

Waste code: U130
Waste name: 1,3-CYCLOPENTADIENE, 1,2,3,4,5,5-HEXACHLORO-

Waste code: U133
Waste name: HYDRAZINE (R,T)

Waste code: U134
Waste name: HYDROFLUORIC ACID (C,T)

Waste code: U138
Waste name: METHANE, IODO-

Waste code: U140
Waste name: ISOBUTYL ALCOHOL (I,T)

Waste code: U154
Waste name: METHANOL (I)

Waste code: U161
Waste name: METHYL ISOBUTYL KETONE (I)

Waste code: U169
Waste name: BENZENE, NITRO-

Waste code: U188
Waste name: PHENOL

UNIVERSITY OF CA RIVERSIDE (Continued) **1000431600**

Waste code: U210
Waste name: ETHENE, TETRACHLORO-

Waste code: U211
Waste name: CARBON TETRACHLORIDE

Waste code: U217
Waste name: NITRIC ACID, THALLIUM(1+) SALT

Waste code: U220
Waste name: BENZENE, METHYL-

Waste code: U239
Waste name: BENZENE, DIMETHYL- (I,T)

Waste code: U353
Waste name: BENZENAMINE, 4-METHYL-

Biennial Reports:

Last Biennial Reporting Year: 2009

Annual Waste Handled:

Waste code: D001
Waste name: IGNITABLE HAZARDOUS WASTES ARE THOSE WASTES WHICH HAVE A FLASHPOINT OF LESS THAN 140 DEGREES FAHRENHEIT AS DETERMINED BY A PENSKY-MARTENS CLOSED CUP FLASH POINT TESTER. ANOTHER METHOD OF DETERMINING THE FLASH POINT OF A WASTE IS TO REVIEW THE MATERIAL SAFETY DATA SHEET, WHICH CAN BE OBTAINED FROM THE MANUFACTURER OR DISTRIBUTOR OF THE MATERIAL. LACQUER THINNER IS AN EXAMPLE OF A COMMONLY USED SOLVENT WHICH WOULD BE CONSIDERED AS IGNITABLE HAZARDOUS WASTE.
Amount (Lbs): 158152.5

Waste code: D002
Waste name: A WASTE WHICH HAS A PH OF LESS THAN 2 OR GREATER THAN 12.5 IS CONSIDERED TO BE A CORROSIVE HAZARDOUS WASTE. SODIUM HYDROXIDE, A CAUSTIC SOLUTION WITH A HIGH PH, IS OFTEN USED BY INDUSTRIES TO CLEAN OR DEGREASE PARTS. HYDROCHLORIC ACID, A SOLUTION WITH A LOW PH, IS USED BY MANY INDUSTRIES TO CLEAN METAL PARTS PRIOR TO PAINTING. WHEN THESE CAUSTIC OR ACID SOLUTIONS BECOME CONTAMINATED AND MUST BE DISPOSED, THE WASTE WOULD BE A CORROSIVE HAZARDOUS WASTE.
Amount (Lbs): 211678.2

Waste code: D003
Waste name: A MATERIAL IS CONSIDERED TO BE A REACTIVE HAZARDOUS WASTE IF IT IS NORMALLY UNSTABLE, REACTS VIOLENTLY WITH WATER, GENERATES TOXIC GASES WHEN EXPOSED TO WATER OR CORROSIVE MATERIALS, OR IF IT IS CAPABLE OF DETONATION OR EXPLOSION WHEN EXPOSED TO HEAT OR A FLAME. ONE EXAMPLE OF SUCH WASTE WOULD BY WASTE GUNPOWDER.
Amount (Lbs): 85779

Waste code: D004
Waste name: ARSENIC
Amount (Lbs): 85653

Waste code: D005
Waste name: BARIUM
Amount (Lbs): 138340.8

UNIVERSITY OF CA RIVERSIDE (Continued) 1000431600

Waste code: D006
Waste name: CADMIUM
Amount (Lbs): 86086

Waste code: D007
Waste name: CHROMIUM
Amount (Lbs): 85653

Waste code: D008
Waste name: LEAD
Amount (Lbs): 86718

Waste code: D009
Waste name: MERCURY
Amount (Lbs): 86086

Waste code: D010
Waste name: SELENIUM
Amount (Lbs): 85653

Waste code: D011
Waste name: SILVER
Amount (Lbs): 162182.6

Waste code: D018
Waste name: BENZENE
Amount (Lbs): 85653

Waste code: D022
Waste name: CHLOROFORM
Amount (Lbs): 86086

Waste code: D023
Waste name: O-CRESOL
Amount (Lbs): 85653

Waste code: D024
Waste name: M-CRESOL
Amount (Lbs): 85653

Waste code: D027
Waste name: 1,4-DICHLOROBENZENE
Amount (Lbs): 85653

Waste code: D028
Waste name: 1,2-DICHLOROETHANE
Amount (Lbs): 85653

Waste code: F002
Waste name: THE FOLLOWING SPENT HALOGENATED SOLVENTS: TETRACHLOROETHYLENE, METHYLENE CHLORIDE, TRICHLOROETHYLENE, 1,1,1-TRICHLOROETHANE, CHLOROBENZENE, 1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE, ORTHO-DICHLOROBENZENE, TRICHLOROFLUOROMETHANE, AND 1,1,2-TRICHLOROETHANE; ALL SPENT SOLVENT MIXTURES/BLENDS CONTAINING, BEFORE USE, A TOTAL OF TEN PERCENT OR MORE (BY VOLUME) OF ONE OR MORE OF THE ABOVE HALOGENATED SOLVENTS OR THOSE LISTED IN F001, F004, OR F005, AND STILL BOTTOMS FROM THE RECOVERY OF THESE SPENT SOLVENTS AND

UNIVERSITY OF CA RIVERSIDE (Continued) **1000431600**

	SPENT SOLVENT MIXTURES.
Amount (Lbs):	85653
Waste code:	F003
Waste name:	THE FOLLOWING SPENT NON-HALOGENATED SOLVENTS: XYLENE, ACETONE, ETHYL ACETATE, ETHYL BENZENE, ETHYL ETHER, METHYL ISOBUTYL KETONE, N-BUTYL ALCOHOL, CYCLOHEXANONE, AND METHANOL; ALL SPENT SOLVENT MIXTURES/BLENDS CONTAINING, BEFORE USE, ONLY THE ABOVE SPENT NON-HALOGENATED SOLVENTS; AND ALL SPENT SOLVENT MIXTURES/BLENDS CONTAINING, BEFORE USE, ONE OR MORE OF THE ABOVE NON-HALOGENATED SOLVENTS, AND, A TOTAL OF TEN PERCENT OR MORE (BY VOLUME) OF ONE OR MORE OF THOSE SOLVENTS LISTED IN F001, F002, F004, AND F005, AND STILL BOTTOMS FROM THE RECOVERY OF THESE SPENT SOLVENTS AND SPENT SOLVENT MIXTURES.
Amount (Lbs):	86086
Waste code:	F005
Waste name:	THE FOLLOWING SPENT NON-HALOGENATED SOLVENTS: TOLUENE, METHYL ETHYL KETONE, CARBON DISULFIDE, ISOBUTANOL, PYRIDINE, BENZENE, 2-ETHOXYETHANOL, AND 2-NITROPROPANE; ALL SPENT SOLVENT MIXTURES/BLENDS CONTAINING, BEFORE USE, A TOTAL OF TEN PERCENT OR MORE (BY VOLUME) OF ONE OR MORE OF THE ABOVE NON-HALOGENATED SOLVENTS OR THOSE SOLVENTS LISTED IN F001, F002, OR F004; AND STILL BOTTOMS FROM THE RECOVERY OF THESE SPENT SOLVENTS AND SPENT SOLVENT MIXTURES.
Amount (Lbs):	85653
Waste code:	P001
Waste name:	2H-1-BENZOPYRAN-2-ONE, 4-HYDROXY-3-(3-OXO-1-PHENYLBUTYL)-, & SALTS, WHEN PRESENT AT CONCENTRATIONS GREATER THAN 0.3%
Amount (Lbs):	85653
Waste code:	P105
Waste name:	SODIUM AZIDE
Amount (Lbs):	85653
Waste code:	U002
Waste name:	ACETONE (I)
Amount (Lbs):	85653
Waste code:	U006
Waste name:	ACETYL CHLORIDE (C,R,T)
Amount (Lbs):	85653
Waste code:	U007
Waste name:	ACRYLAMIDE
Amount (Lbs):	85653
Waste code:	U019
Waste name:	BENZENE (I,T)
Amount (Lbs):	85653
Waste code:	U031
Waste name:	1-BUTANOL (I)
Amount (Lbs):	85653
Waste code:	U044
Waste name:	CHLOROFORM

UNIVERSITY OF CA RIVERSIDE (Continued) **1000431600**

Amount (Lbs): 85653

Waste code: U052
Waste name: CRESOL (CRESYLIC ACID)
Amount (Lbs): 85653

Waste code: U072
Waste name: BENZENE, 1,4-DICHLORO-
Amount (Lbs): 85653

Waste code: U078
Waste name: 1,1-DICHLOROETHYLENE
Amount (Lbs): 227

Waste code: U080
Waste name: METHANE, DICHLORO-
Amount (Lbs): 85653

Waste code: U081
Waste name: 2,4-DICHLOROPHENOL
Amount (Lbs): 85653

Waste code: U103
Waste name: DIMETHYL SULFATE
Amount (Lbs): 85653

Waste code: U112
Waste name: ACETIC ACID ETHYL ESTER (I)
Amount (Lbs): 85653

Waste code: U130
Waste name: 1,3-CYCLOPENTADIENE, 1,2,3,4,5,5-HEXACHLORO-
Amount (Lbs): 85653

Waste code: U133
Waste name: HYDRAZINE (R,T)
Amount (Lbs): 85653

Waste code: U134
Waste name: HYDROFLUORIC ACID (C,T)
Amount (Lbs): 85653

Waste code: U138
Waste name: METHANE, IODO-
Amount (Lbs): 85653

Waste code: U140
Waste name: ISOBUTYL ALCOHOL (I,T)
Amount (Lbs): 85653

Waste code: U154
Waste name: METHANOL (I)
Amount (Lbs): 85653

Waste code: U161
Waste name: METHYL ISOBUTYL KETONE (I)
Amount (Lbs): 85653

UNIVERSITY OF CA RIVERSIDE (Continued) **1000431600**

Waste code: U169
Waste name: BENZENE, NITRO-
Amount (Lbs): 85653

Waste code: U188
Waste name: PHENOL
Amount (Lbs): 85653

Waste code: U210
Waste name: ETHENE, TETRACHLORO-
Amount (Lbs): 85653

Waste code: U211
Waste name: CARBON TETRACHLORIDE
Amount (Lbs): 85653

Waste code: U217
Waste name: NITRIC ACID, THALLIUM(1+) SALT
Amount (Lbs): 85653

Waste code: U220
Waste name: BENZENE, METHYL-
Amount (Lbs): 85653

Waste code: U239
Waste name: BENZENE, DIMETHYL- (I,T)
Amount (Lbs): 85653

Corrective Action Summary:

Event date: 07/01/1985
Event: CA029ST

Event date: 07/01/1985
Event: CA074ME

Event date: 07/01/1985
Event: CA Prioritization, Facility or area was assigned a medium corrective action priority.

Event date: 07/01/1985
Event: CA049PA

Event date: 01/06/1989
Event: CMS Imposition

Event date: 01/06/1989
Event: RFI Imposition

Event date: 07/20/1990
Event: CA049SI

Event date: 12/01/1990
Event: Stabilization Measures Implemented, Primary measure is exposure control by barrier and/or institutional control (e.g., capping, fencing, deed restrictions).

UNIVERSITY OF CA RIVERSIDE (Continued) **1000431600**

Event date:	12/31/1990
Event:	Stabilization Construction Completed
Event date:	03/15/1994
Event:	RFI Workplan Approved
Event date:	05/23/1994
Event:	Stabilization Measures Evaluation,This facility is amenable to stabilization activity based on the status of corrective action work at the facility, technical factors, the degree of risk, timing considerations and administrative considerations.
Event date:	05/23/1994
Event:	CA Prioritization, Facility or area was assigned a low corrective action priority.
Event date:	10/10/1995
Event:	CMS Approved
Event date:	10/10/1995
Event:	RFI Approved
Event date:	10/10/1995
Event:	CMS Workplan Approved
Event date:	05/16/1996
Event:	Date For Remedy Selection (CM Imposed)
Event date:	09/06/1996
Event:	CMI Workplan Approved
Event date:	09/06/1996
Event:	Corrective Measures Design Approved
Event date:	03/30/1998
Event:	RFA Completed, Assessment was an RFA.
Event date:	06/03/1998
Event:	Igration of Contaminated Groundwater under Control, Yes, Migration of Contaminated Groundwater Under Control has been verified. Based on a review of information contained in the EI determination, it has been determined that migration of contaminated groundwater is under control at the facility. Specifically, this determination indicates that the migration of contaminated groundwater is under control, and that monitoring will be conducted to confirm that contaminated groundwater remains within the existing area of contaminated groundwater. This determination will be re-evaluated when the Agency becomes aware of significant changes at the facility.
Event date:	06/03/1998
Event:	CA Responsibility Referred To A Non-RCRA Federal Authority
Event date:	06/03/1998
Event:	Current Human Exposures under Control, Yes, Current Human Exposures Under Control has been verified. Based on a review of information contained in the EI determination, current human exposures are expected to be under control at the facility under current and

UNIVERSITY OF CA RIVERSIDE (Continued) **1000431600**

reasonably expected conditions. This determination will be re-evaluated when the Agency/State becomes aware of significant changes at the facility.

Event date: 06/03/1998
Event: Stabilization Measures Evaluation,This facility is not amenable to stabilization activity at the present time for reasons other than 1- it appears to be technically infeasible or inappropriate (NF) or 2- there is a lack of technical information (IN). Reasons for this conclusion may be the status of closure at the facility, the degree of risk, timing considerations, the status of corrective action work at the facility, or other administrative considerations.

Event date: Not reported
Event: CA03192

Facility Has Received Notices of Violations:
Regulation violated: - 262.10-12.A
Area of violation: Generators - General
Date violation determined: 07/30/2002
Date achieved compliance: 07/30/2002
Violation lead agency: EPA
Enforcement action: FINAL 3008(A) COMPLIANCE ORDER
Enforcement action date: 09/30/2004
Enf. disposition status: Not reported
Enf. disp. status date: Not reported
Enforcement lead agency: EPA
Proposed penalty amount: Not reported
Final penalty amount: Not reported
Paid penalty amount: Not reported

Regulation violated: - 262.30-34.C
Area of violation: Generators - General
Date violation determined: 07/30/2002
Date achieved compliance: 07/30/2002
Violation lead agency: EPA
Enforcement action: FINAL 3008(A) COMPLIANCE ORDER
Enforcement action date: 09/30/2004
Enf. disposition status: Not reported
Enf. disp. status date: Not reported
Enforcement lead agency: EPA
Proposed penalty amount: Not reported
Final penalty amount: Not reported
Paid penalty amount: Not reported

Regulation violated: - 262.10-12.A
Area of violation: Generators - General
Date violation determined: 07/30/2002
Date achieved compliance: 07/30/2002
Violation lead agency: EPA
Enforcement action: Not reported
Enforcement action date: 07/30/2002
Enf. disposition status: Not reported
Enf. disp. status date: Not reported
Enforcement lead agency: EPA
Proposed penalty amount: Not reported
Final penalty amount: Not reported

UNIVERSITY OF CA RIVERSIDE (Continued) **1000431600**

Paid penalty amount: Not reported

Regulation violated: - 262.30-34.C
Area of violation: Generators - General
Date violation determined: 07/30/2002
Date achieved compliance: 07/30/2002
Violation lead agency: EPA
Enforcement action: Not reported
Enforcement action date: 07/30/2002
Enf. disposition status: Not reported
Enf. disp. status date: Not reported
Enforcement lead agency: EPA
Proposed penalty amount: Not reported
Final penalty amount: Not reported
Paid penalty amount: Not reported

Regulation violated: FR - 264.170-177.I
Area of violation: TSD - General
Date violation determined: 06/22/1991
Date achieved compliance: 10/21/1991
Violation lead agency: EPA
Enforcement action: WRITTEN INFORMAL
Enforcement action date: 09/10/1991
Enf. disposition status: Not reported
Enf. disp. status date: Not reported
Enforcement lead agency: EPA
Proposed penalty amount: Not reported
Final penalty amount: Not reported
Paid penalty amount: Not reported

Regulation violated: FR - 264.30-37.C
Area of violation: TSD - General
Date violation determined: 06/22/1991
Date achieved compliance: 10/21/1991
Violation lead agency: EPA
Enforcement action: WRITTEN INFORMAL
Enforcement action date: 09/10/1991
Enf. disposition status: Not reported
Enf. disp. status date: Not reported
Enforcement lead agency: EPA
Proposed penalty amount: Not reported
Final penalty amount: Not reported
Paid penalty amount: Not reported

Regulation violated: FR - 264.50-56.D
Area of violation: TSD - General
Date violation determined: 06/22/1991
Date achieved compliance: 10/21/1991
Violation lead agency: EPA
Enforcement action: WRITTEN INFORMAL
Enforcement action date: 09/10/1991
Enf. disposition status: Not reported
Enf. disp. status date: Not reported
Enforcement lead agency: EPA
Proposed penalty amount: Not reported
Final penalty amount: Not reported
Paid penalty amount: Not reported

UNIVERSITY OF CA RIVERSIDE (Continued) **1000431600**

Regulation violated:	FR - 262.30-34.C
Area of violation:	Generators - General
Date violation determined:	06/22/1991
Date achieved compliance:	10/21/1991
Violation lead agency:	EPA
Enforcement action:	WRITTEN INFORMAL
Enforcement action date:	09/10/1991
Enf. disposition status:	Not reported
Enf. disp. status date:	Not reported
Enforcement lead agency:	EPA
Proposed penalty amount:	Not reported
Final penalty amount:	Not reported
Paid penalty amount:	Not reported

Regulation violated:	F - 270
Area of violation:	TSD - General
Date violation determined:	06/27/1990
Date achieved compliance:	04/30/1991
Violation lead agency:	EPA
Enforcement action:	INITIAL 3008(A) COMPLIANCE
Enforcement action date:	11/09/1990
Enf. disposition status:	Not reported
Enf. disp. status date:	Not reported
Enforcement lead agency:	EPA
Proposed penalty amount:	76800
Final penalty amount:	76800
Paid penalty amount:	Not reported

Regulation violated:	F - 270
Area of violation:	TSD - General
Date violation determined:	06/27/1990
Date achieved compliance:	04/30/1991
Violation lead agency:	EPA
Enforcement action:	WRITTEN INFORMAL
Enforcement action date:	08/15/1990
Enf. disposition status:	Not reported
Enf. disp. status date:	Not reported
Enforcement lead agency:	EPA
Proposed penalty amount:	Not reported
Final penalty amount:	Not reported
Paid penalty amount:	Not reported

Regulation violated:	F - 270
Area of violation:	TSD - General
Date violation determined:	09/11/1989
Date achieved compliance:	04/30/1991
Violation lead agency:	EPA
Enforcement action:	EPA TO STATE ADMINISTRATIVE REFERRAL
Enforcement action date:	11/13/1989
Enf. disposition status:	Not reported
Enf. disp. status date:	Not reported
Enforcement lead agency:	EPA
Proposed penalty amount:	Not reported
Final penalty amount:	Not reported
Paid penalty amount:	Not reported

Regulation violated:	F - 270

UNIVERSITY OF CA RIVERSIDE (Continued) 1000431600

Area of violation:	TSD - General
Date violation determined:	09/11/1989
Date achieved compliance:	04/30/1991
Violation lead agency:	EPA
Enforcement action:	WRITTEN INFORMAL
Enforcement action date:	11/13/1989
Enf. disposition status:	Not reported
Enf. disp. status date:	Not reported
Enforcement lead agency:	EPA
Proposed penalty amount:	Not reported
Final penalty amount:	Not reported
Paid penalty amount:	Not reported

Regulation violated:	F - 270
Area of violation:	TSD - General
Date violation determined:	09/11/1989
Date achieved compliance:	04/30/1991
Violation lead agency:	EPA
Enforcement action:	INITIAL 3008(A) COMPLIANCE
Enforcement action date:	11/09/1990
Enf. disposition status:	Not reported
Enf. disp. status date:	Not reported
Enforcement lead agency:	EPA
Proposed penalty amount:	76800
Final penalty amount:	76800
Paid penalty amount:	Not reported

Regulation violated:	FR - 270
Area of violation:	TSD - General
Date violation determined:	09/15/1988
Date achieved compliance:	05/20/1989
Violation lead agency:	EPA
Enforcement action:	WRITTEN INFORMAL
Enforcement action date:	04/14/1989
Enf. disposition status:	Not reported
Enf. disp. status date:	Not reported
Enforcement lead agency:	EPA
Proposed penalty amount:	Not reported
Final penalty amount:	Not reported
Paid penalty amount:	Not reported

Regulation violated:	FR - 264.110-120.G
Area of violation:	TSD - Closure/Post-Closure
Date violation determined:	09/15/1988
Date achieved compliance:	05/20/1989
Violation lead agency:	EPA
Enforcement action:	WRITTEN INFORMAL
Enforcement action date:	04/14/1989
Enf. disposition status:	Not reported
Enf. disp. status date:	Not reported
Enforcement lead agency:	EPA
Proposed penalty amount:	Not reported
Final penalty amount:	Not reported
Paid penalty amount:	Not reported

Evaluation Action Summary:

Evaluation date:	04/05/2005

UNIVERSITY OF CA RIVERSIDE (Continued) **1000431600**

Evaluation:	NOT A SIGNIFICANT NON-COMPLIER
Area of violation:	Not reported
Date achieved compliance:	Not reported
Evaluation lead agency:	EPA
Evaluation date:	04/01/2004
Evaluation:	SIGNIFICANT NON-COMPLIER
Area of violation:	Not reported
Date achieved compliance:	Not reported
Evaluation lead agency:	EPA
Evaluation date:	04/01/2004
Evaluation:	NOT A SIGNIFICANT NON-COMPLIER
Area of violation:	Not reported
Date achieved compliance:	Not reported
Evaluation lead agency:	EPA
Evaluation date:	07/30/2002
Evaluation:	NON-FINANCIAL RECORD REVIEW
Area of violation:	Generators - General
Date achieved compliance:	07/30/2002
Evaluation lead agency:	EPA
Evaluation date:	04/30/1991
Evaluation:	COMPLIANCE EVALUATION INSPECTION ON-SITE
Area of violation:	Not reported
Date achieved compliance:	Not reported
Evaluation lead agency:	EPA
Evaluation date:	04/30/1991
Evaluation:	COMPLIANCE EVALUATION INSPECTION ON-SITE
Area of violation:	Generators - General
Date achieved compliance:	10/21/1991
Evaluation lead agency:	EPA Contractor/Grantee
Evaluation date:	04/30/1991
Evaluation:	COMPLIANCE EVALUATION INSPECTION ON-SITE
Area of violation:	TSD - General
Date achieved compliance:	10/21/1991
Evaluation lead agency:	EPA Contractor/Grantee
Evaluation date:	06/27/1990
Evaluation:	COMPLIANCE EVALUATION INSPECTION ON-SITE
Area of violation:	TSD - General
Date achieved compliance:	04/30/1991
Evaluation lead agency:	EPA
Evaluation date:	09/11/1989
Evaluation:	COMPLIANCE EVALUATION INSPECTION ON-SITE
Area of violation:	TSD - General
Date achieved compliance:	04/30/1991
Evaluation lead agency:	EPA
Evaluation date:	09/15/1988
Evaluation:	COMPLIANCE EVALUATION INSPECTION ON-SITE
Area of violation:	TSD - Closure/Post-Closure
Date achieved compliance:	05/20/1989

UNIVERSITY OF CA RIVERSIDE (Continued) **1000431600**

Evaluation lead agency: EPA

Evaluation date: 09/15/1988
Evaluation: COMPLIANCE EVALUATION INSPECTION ON-SITE
Area of violation: TSD - General
Date achieved compliance: 05/20/1989
Evaluation lead agency: EPA

CERC-NFRAP:
Site ID: 0901566
Federal Facility: Not a Federal Facility
NPL Status: Not on the NPL
Non NPL Status: NFRAP

CERCLIS-NFRAP Site Contact Name(s):
Contact Title: Not reported
Contact Name: Carl Brickner
Contact Tel: (415) 972-3814

Contact Title: Not reported
Contact Name: Brunilda Davila
Contact Tel: (415) 972-3162

Contact Title: Not reported
Contact Name: Jeff Inglis
Contact Tel: (415) 972-3095

Contact Title: Not reported
Contact Name: Karen Jurist
Contact Tel: (415) 972-3219

Contact Title: Not reported
Contact Name: Matt Mitguard
Contact Tel: (415) 972-3096

CERCLIS-NFRAP Site Alias Name(s):
Alias Name: AGRICULTURAL OPER DUMPSITE
Alias Address: Not reported
CA

CERCLIS-NFRAP Assessment History:
Action: DISCOVERY
Date Started: Not reported
Date Completed: 08/01/1980
Priority Level: Not reported

Action: PRELIMINARY ASSESSMENT
Date Started: 04/01/1985
Date Completed: 07/01/1985
Priority Level: Low priority for further assessment

Action: SITE INSPECTION
Date Started: Not reported
Date Completed: 09/01/1986
Priority Level: Higher priority for further assessment

UNIVERSITY OF CA RIVERSIDE (Continued) **1000431600**

Action: ARCHIVE SITE
Date Started: Not reported
Date Completed: 07/20/1990
Priority Level: Not reported

Action: SITE INSPECTION
Date Started: Not reported
Date Completed: 07/20/1990
Priority Level: NFRAP: No further Remedial Action planned

CORRACTS:

EPA ID: CAD073134777
EPA Region: 09
Area Name: ENTIRE FACILITY
Actual Date: 01/06/1989
Action: CA250 - CMS Imposition
NAICS Code(s): 61131
Colleges, Universities, and Professional Schools
Original schedule date: Not reported
Schedule end date: Not reported

EPA ID: CAD073134777
EPA Region: 09
Area Name: ENTIRE FACILITY
Actual Date: 01/06/1989
Action: CA100 - RFI Imposition
NAICS Code(s): 61131
Colleges, Universities, and Professional Schools
Original schedule date: Not reported
Schedule end date: Not reported

EPA ID: CAD073134777
EPA Region: 09
Area Name: ENTIRE FACILITY
Actual Date: 03/15/1994
Action: CA150 - RFI Workplan Approved
NAICS Code(s): 61131
Colleges, Universities, and Professional Schools
Original schedule date: Not reported
Schedule end date: Not reported

EPA ID: CAD073134777
EPA Region: 09
Area Name: ENTIRE FACILITY
Actual Date: 03/30/1998
Action: CA050RF - RFA Completed, Assessment was an RFA
NAICS Code(s): 61131
Colleges, Universities, and Professional Schools
Original schedule date: Not reported
Schedule end date: Not reported

EPA ID: CAD073134777
EPA Region: 09
Area Name: ENTIRE FACILITY
Actual Date: 05/16/1996

UNIVERSITY OF CA RIVERSIDE (Continued) **1000431600**

Action:	CA400 - Date For Remedy Selection (CM Imposed)
NAICS Code(s):	61131 Colleges, Universities, and Professional Schools
Original schedule date:	Not reported
Schedule end date:	Not reported

EPA ID:	CAD073134777
EPA Region:	09
Area Name:	ENTIRE FACILITY
Actual Date:	05/23/1994
Action:	CA075LO - CA Prioritization, Facility or area was assigned a low corrective action priority
NAICS Code(s):	61131 Colleges, Universities, and Professional Schools
Original schedule date:	Not reported
Schedule end date:	Not reported

EPA ID:	CAD073134777
EPA Region:	09
Area Name:	ENTIRE FACILITY
Actual Date:	05/23/1994
Action:	CA225YE - Stabilization Measures Evaluation, This facility ,is amenable to stabilization activity based on the, status of corrective action work at the facility, technical factors, the degree of risk, timing considerations and administrative considerations
NAICS Code(s):	61131 Colleges, Universities, and Professional Schools
Original schedule date:	Not reported
Schedule end date:	Not reported

EPA ID:	CAD073134777
EPA Region:	09
Area Name:	ENTIRE FACILITY
Actual Date:	06/03/1998
Action:	CA225NR - Stabilization Measures Evaluation, This facility is, not amenable to stabilization activity at the, present time for reasons other than (1) it appears to be technically, infeasible or inappropriate (NF) or (2) there is a lack of technical, information (IN). Reasons for this conclusion may be the status of, closure at the facility, the degree of risk, timing considerations, the status of corrective action work at the facility, or other, administrative considerations
NAICS Code(s):	61131 Colleges, Universities, and Professional Schools
Original schedule date:	Not reported
Schedule end date:	Not reported

EPA ID:	CAD073134777
EPA Region:	09
Area Name:	ENTIRE FACILITY
Actual Date:	06/03/1998
Action:	CA725YE - Current Human Exposures Under Control, Yes, Current Human Exposures Under Control has been verified
NAICS Code(s):	61131 Colleges, Universities, and Professional Schools
Original schedule date:	Not reported
Schedule end date:	Not reported

UNIVERSITY OF CA RIVERSIDE (Continued) **1000431600**

EPA ID: CAD073134777
EPA Region: 09
Area Name: ENTIRE FACILITY
Actual Date: 06/03/1998
Action: CA750YE - Migration of Contaminated Groundwater under Control, Yes, Migration of Contaminated Groundwater Under Control has been verified
NAICS Code(s): 61131
Colleges, Universities, and Professional Schools
Original schedule date: Not reported
Schedule end date: Not reported

EPA ID: CAD073134777
EPA Region: 09
Area Name: ENTIRE FACILITY
Actual Date: 06/03/1998
Action: CA210 - CA Responsibility Referred To A Non-RCRA Federal Authority
NAICS Code(s): 61131
Colleges, Universities, and Professional Schools
Original schedule date: Not reported
Schedule end date: Not reported

EPA ID: CAD073134777
EPA Region: 09
Area Name: ENTIRE FACILITY
Actual Date: 07/01/1985
Action: CA075ME - CA Prioritization, Facility or area was assigned a medium corrective action priority
NAICS Code(s): 61131
Colleges, Universities, and Professional Schools
Original schedule date: Not reported
Schedule end date: Not reported

EPA ID: CAD073134777
EPA Region: 09
Area Name: ENTIRE FACILITY
Actual Date: 09/06/1996
Action: CA450 - Corrective Measures Design Approved
NAICS Code(s): 61131
Colleges, Universities, and Professional Schools
Original schedule date: Not reported
Schedule end date: Not reported

EPA ID: CAD073134777
EPA Region: 09
Area Name: ENTIRE FACILITY
Actual Date: 09/06/1996
Action: CA500 - CMI Workplan Approved
NAICS Code(s): 61131
Colleges, Universities, and Professional Schools
Original schedule date: Not reported
Schedule end date: Not reported

EPA ID: CAD073134777
EPA Region: 09
Area Name: ENTIRE FACILITY
Actual Date: 10/10/1995
Action: CA350 - CMS Approved

UNIVERSITY OF CA RIVERSIDE (Continued) **1000431600**

NAICS Code(s): 61131
Colleges, Universities, and Professional Schools
Original schedule date: Not reported
Schedule end date: Not reported

EPA ID: CAD073134777
EPA Region: 09
Area Name: ENTIRE FACILITY
Actual Date: 10/10/1995
Action: CA200 - RFI Approved
NAICS Code(s): 61131
Colleges, Universities, and Professional Schools
Original schedule date: Not reported
Schedule end date: Not reported

EPA ID: CAD073134777
EPA Region: 09
Area Name: ENTIRE FACILITY
Actual Date: 10/10/1995
Action: CA300 - CMS Workplan Approved
NAICS Code(s): 61131
Colleges, Universities, and Professional Schools
Original schedule date: Not reported
Schedule end date: Not reported

EPA ID: CAD073134777
EPA Region: 09
Area Name: ENTIRE FACILITY
Actual Date: 12/01/1990
Action: CA600EC - Stabilization Measures Implemented, Primary measure is exposure control by barrier and/or institutional control
NAICS Code(s): 61131
Colleges, Universities, and Professional Schools
Original schedule date: Not reported
Schedule end date: Not reported

EPA ID: CAD073134777
EPA Region: 09
Area Name: ENTIRE FACILITY
Actual Date: 12/31/1990
Action: CA650 - Stabilization Construction Completed
NAICS Code(s): 61131
Colleges, Universities, and Professional Schools
Original schedule date: Not reported
Schedule end date: Not reported

FINDS:

Registry ID: 110000609761

Environmental Interest/Information System
US Geographic Names Information System (GNIS) is the official vehicle for geographic names used by the federal government and the source for applying geographic names to federal maps and other printed and electronic documents.

The NEI (National Emissions Inventory) database contains information

UNIVERSITY OF CA RIVERSIDE (Continued) **1000431600**

on stationary and mobile sources that emit criteria air pollutants and their precursors, as well as hazardous air pollutants (HAPs).

California Hazardous Waste Tracking System - Datamart (HWTS-DATAMART) provides California with information on hazardous waste shipments for generators, transporters, and treatment, storage, and disposal facilities.

RCRAInfo Is a national Information system that supports the Resource Conservation and Recovery Act (RCRA) program through the tracking of events and activities related to facilities that generate, transport, and treat, store, or dispose of hazardous waste. RCRAInfo allows RCRA program staff to track the notification, permit, compliance, and corrective action activities required under RCRA.

ICIS (Integrated Compliance Information System) Is the Integrated Compliance Information System and provides a database that, when complete, will contain Integrated Enforcement and Compliance information across most of EPA's programs. The vision for ICIS Is to replace EPA's independent databases that contain Enforcement data with a single repository for that information. Currently, ICIS contains all Federal Administrative and Judicial enforcement actions. This information is maintained in ICIS by EPA In the Regional offices and It Headquarters. A future release of ICIS will replace the Permit Compliance System (PCS) which supports the NPDES and will integrate that information with Federal actions already in the system. ICIS also has the capability to track other activities occurring in the Region that support Compliance and Enforcement programs. These Include; Incident Tracking, Compliance Assistance, and Compliance Monitoring.

HAZNET:

Gepaid:	CAD073134777
Contact:	UNIV OF CA
Telephone:	9097875518
Facility Addr2:	Not reported
Mailing Name:	Not reported
Mailing Address:	900 UNIVERSITY AVE
Mailing City,St,Zip:	RIVERSIDE, CA 925210306
Gen County:	Riverside
TSD EPA ID:	CAD050806850
TSD County:	Los Angeles
Waste Category:	Paint sludge
Disposal Method:	Recycler
Tons:	.2000
Facility County:	Riverside

Gepaid:	CAD073134777
Contact:	UNIV OF CA
Telephone:	9097875518
Facility Addr2:	Not reported
Mailing Name:	Not reported
Mailing Address:	900 UNIVERSITY AVE
Mailing City,St,Zip:	RIVERSIDE, CA 925210306
Gen County:	Riverside
TSD EPA ID:	CAD050806850
TSD County:	Los Angeles

UNIVERSITY OF CA RIVERSIDE (Continued) **1000431600**

Waste Category:	Other inorganic solid waste
Disposal Method:	Transfer Station
Tons:	.0060
Facility County:	Riverside

Gepaid:	CAD073134777
Contact:	UNIV OF CA
Telephone:	9097875518
Facility Addr2:	Not reported
Mailing Name:	Not reported
Mailing Address:	900 UNIVERSITY AVE
Mailing City,St,Zip:	RIVERSIDE, CA 925210306
Gen County:	Riverside
TSD EPA ID:	CAD050806850
TSD County:	Los Angeles
Waste Category:	Liquids with pH <UN-> 2
Disposal Method:	Treatment, Tank
Tons:	.0430
Facility County:	Riverside

Gepaid:	CAD073134777
Contact:	UNIV OF CA
Telephone:	9097875518
Facility Addr2:	Not reported
Mailing Name:	Not reported
Mailing Address:	900 UNIVERSITY AVE
Mailing City,St,Zip:	RIVERSIDE, CA 925210306
Gen County:	Riverside
TSD EPA ID:	CAD050806850
TSD County:	Los Angeles
Waste Category:	Laboratory waste chemicals
Disposal Method:	Recycler
Tons:	4.3135
Facility County:	Riverside

Gepaid:	CAD073134777
Contact:	UNIV OF CA
Telephone:	9097875518
Facility Addr2:	Not reported
Mailing Name:	Not reported
Mailing Address:	900 UNIVERSITY AVE
Mailing City,St,Zip:	RIVERSIDE, CA 925210306
Gen County:	Riverside
TSD EPA ID:	CAD050806850
TSD County:	Los Angeles
Waste Category:	Laboratory waste chemicals
Disposal Method:	Treatment, Tank
Tons:	.0160
Facility County:	Riverside

Click this hyperlink while viewing on your computer to access
393 additional CA_HAZNET: record(s) in the EDR Site Report.

ENVIROSTOR:

Site Type:	Corrective Action
Site Type Detailed:	Corrective Action
Acres:	0

UNIVERSITY OF CA RIVERSIDE (Continued) **1000431600**

NPL: NO
Regulatory Agencies: SMBRP
Lead Agency: MBR
Program Manager: Not reported
Supervisor: * Unknown
Division Branch: Cypress
Facility ID: 80001663
Site Code: Not reported
Assembly: 64
Senate: 64
Special Program: Not reported
Status: * Inactive
Status Date: 2008-01-01 00:00:00
Restricted Use: NO
Site Mgmt. Req.: NONE SPECIFIED
Funding: Not reported
Latitude: 33.9754
Longitude: -117.323997
APN: NONE SPECIFIED
Past Use: NONE SPECIFIED
Potential COC: NONE SPECIFIED
Confirmed COC: NONE SPECIFIED
Potential Description: NONE SPECIFIED
Alias Name: 80001663
Alias Type: Envirostor ID Number
Alias Name: CAD073134777
Alias Type: EPA Identification Number

Completed Info:
Completed Area Name: Sites With No Operable Unit
Completed Sub Area Name: ENTIRE FACILITY
Completed Document Type: Preliminary Assessment Report
Completed Date: 1985-07-01 00:00:00
Comments: Not reported

Completed Area Name: Sites With No Operable Unit
Completed Sub Area Name: ENTIRE FACILITY
Completed Document Type: Design/Implementation Workplan
Completed Date: 1996-09-06 00:00:00
Comments: Not reported

Completed Area Name: Sites With No Operable Unit
Completed Sub Area Name: ENTIRE FACILITY
Completed Document Type: Corrective Measures Study Report
Completed Date: 1995-10-10 00:00:00
Comments: Not reported

Completed Area Name: Sites With No Operable Unit
Completed Sub Area Name: ENTIRE FACILITY
Completed Document Type: RFI Report
Completed Date: 1995-10-10 00:00:00
Comments: Not reported

Completed Area Name: Sites With No Operable Unit
Completed Sub Area Name: ENTIRE FACILITY
Completed Document Type: RFI Workplan
Completed Date: 1994-03-15 00:00:00
Comments: Not reported

UNIVERSITY OF CA RIVERSIDE (Continued) **1000431600**

Completed Area Name: Sites With No Operable Unit
Completed Sub Area Name: ENTIRE FACILITY
Completed Document Type: Corrective Measure Implementation Workplan
Completed Date: 1996-09-06 00:00:00
Comments: Not reported

Completed Area Name: Sites With No Operable Unit
Completed Sub Area Name: ENTIRE FACILITY
Completed Document Type: Preliminary Assessment Report
Completed Date: 1990-07-20 00:00:00
Comments: Not reported

Completed Area Name: Sites With No Operable Unit
Completed Sub Area Name: ENTIRE FACILITY
Completed Document Type: Corrective Measures Study Workplan
Completed Date: 1995-10-10 00:00:00
Comments: Not reported

Completed Area Name: Sites With No Operable Unit
Completed Sub Area Name: ENTIRE FACILITY
Completed Document Type: Interim Measures Implementation Report
Completed Date: 1990-12-31 00:00:00
Comments: Not reported

Completed Area Name: Sites With No Operable Unit
Completed Sub Area Name: ENTIRE FACILITY
Completed Document Type: Interim Measures Workplan
Completed Date: 1990-12-01 00:00:00
Comments: Not reported

Completed Area Name: Sites With No Operable Unit
Completed Sub Area Name: ENTIRE FACILITY
Completed Document Type: RCRA Facility Assessment Report
Completed Date: 1998-03-30 00:00:00
Comments: Not reported

Completed Area Name: Sites With No Operable Unit
Completed Sub Area Name: ENTIRE FACILITY
Completed Document Type: Interim Measures Questionnaire
Completed Date: 1994-05-23 00:00:00
Comments: Not reported

Completed Area Name: Sites With No Operable Unit
Completed Sub Area Name: ENTIRE FACILITY
Completed Document Type: Interim Measures Questionnaire
Completed Date: 1998-06-03 00:00:00
Comments: Not reported

Completed Area Name: Sites With No Operable Unit
Completed Sub Area Name: ENTIRE FACILITY
Completed Document Type: Remedy Selection and Statement of Basis
Completed Date: 1996-05-16 00:00:00
Comments: Not reported

Completed Area Name: Sites With No Operable Unit
Completed Sub Area Name: ENTIRE FACILITY
Completed Document Type: Consent Agreement

UNIVERSITY OF CA RIVERSIDE (Continued) **1000431600**

Completed Date:	1989-11-06 00:00:00
Comments:	Not reported
Future Area Name:	Not reported
Future Sub Area Name:	Not reported
Future Document Type:	Not reported
Future Due Date:	Not reported
Schedule Area Name:	Not reported
Schedule Sub Area Name:	Not reported
Schedule Document Type:	Not reported
Schedule Due Date:	Not reported
Schedule Revised Date:	Not reported

HWP:

EPA Id:	CAD073134777
Latitude:	33.9754
Longitude:	-117.323997
Facility Type:	HAZ WASTE - UNDERGOING CLOSURE
Cleanup Status:	Not reported
Region:	CYPRESS, GEOLOGY CAL SUPPORT
Permit Maintenance Lead:	Not reported
Permit Renewal Lead:	Not reported
Corrective Action Lead:	Not reported
Supervisor:	Not reported
Site Code:	Not reported
Assembly District:	Not reported
Senate District:	Not reported
Public Information Officer:	Not reported
Facility Status:	Not reported
Site History:	Not reported

HWP:

EPA Id:	CAD073134777
Unit Names:	CONTAIN1, WASTPILE1
Event Description:	Initial Submittal
Actual Date:	1980-11-17 00:00:00
Doc Comments:	Not reported
EPA Id:	CAD073134777
Unit Names:	CONTAIN1, WASTPILE1
Event Description:	INTENDS/CLOSED ALL WASTE HANDLING FACILITY
Actual Date:	1989-02-23 00:00:00
Doc Comments:	Not reported
EPA Id:	CAD073134777
Unit Names:	CONTAIN1, WASTPILE1
Event Description:	Notice of Deficiency
Actual Date:	1988-09-29 00:00:00
Doc Comments:	Not reported
EPA Id:	CAD073134777
Unit Names:	CONTAIN1, WASTPILE1
Event Description:	Part A Determination
Actual Date:	1981-10-02 00:00:00
Doc Comments:	Not reported
EPA Id:	CAD073134777

UNIVERSITY OF CA RIVERSIDE (Continued) **1000431600**

Unit Names: CONTAIN1, WASTPILE1
Event Description: Approved Request
Actual Date: 1990-12-14 00:00:00
Doc Comments: Not reported

EPA Id: CAD073134777
Unit Names: CONTAIN1, WASTPILE1
Event Description: Part B Call-In
Actual Date: 1982-11-15 00:00:00
Doc Comments: Not reported

HWP:
EPA Id: CAD073134777
Unit Names: CONTAIN1
Event Description: Receive Closure Certification
Actual Date: 1991-06-12 00:00:00
Doc Comments: Not reported

EPA Id: CAD073134777
Unit Names: CONTAIN1
Event Description: Public Notice - Closure
Actual Date: 1990-05-21 00:00:00
Doc Comments: Not reported

EPA Id: CAD073134777
Unit Names: CONTAIN1
Event Description: Clean Closure Acceptable
Actual Date: 1992-02-04 00:00:00
Doc Comments: Not reported

EPA Id: CAD073134777
Unit Names: CONTAIN1
Event Description: Notice of Deficiency - Closure Plan
Actual Date: 1990-02-06 00:00:00
Doc Comments: Not reported

City	EDR ID	Site Name	Site Address	Zip	Database(s)
BOX SPRINGS	1000213838	GENERAL TELEPHONE OF CALIFORNIA	PIGEON PASS ROAD OFF HIGHWAY 60	92507	RCRA-SQG, FINDS
DEVORE	S107538887		I-15 NEAR GLEN ELLEN PARKWAY	92407	CDL
GLEN AVON	S103442690	STATE OF CALIFORNIA-STRINGFELL	NORTH END OF PYRITE ROAD	92509	WMUDS/SWAT
GLEN AVON	1006805292	SHELL SERVICE STATION	10171 MISSION / HWY 60	92509	RCRA-LQG, FINDS, HAZNET
GLEN AVON	S105126852	SHELL	10171 MISSION/HWY 60	92509	HAZNET
GLEN AVON	S105960468	STRINGFELLOW HAZARDOUS WASTE SITE	3940 PYRITE STREET, PYRITE CANYON NORTH OF GLEN AV	92509	CA BOND EXP. PLAN, EMI
MORENO VALLEY	S109444258	GARDEN	W MERIDIAN PKWY W OF LOT 3	92507	NPDES
MORENO VALLEY	S109459929	SUNFIELD	W MERIDIAN PKWY E OF LOT 2	92507	NPDES
RIVERSIDE	S109438816	CANYON CROSSING AT CANYON SPRINGS	I 215 AT SR 60	92507	NPDES
RIVERSIDE	U001576700	EDGEMONT SHELL	13260 HWY. 345	92598	HIST UST
RIVERSIDE	S103954971	CAROL BUXBON	115 HWY 60	92507	HAZNET
RIVERSIDE	S109453611	PARCEL 7	6245 / 6247 VALLEY SPRINGS PKWY	92507	NPDES
RIVERSIDE	S103647162	MICHAEL KEITH SMITH	25806 HWY 74	92573	HAZNET
RIVERSIDE	S109424284	CALTRANS DIST 8/CONSTR/EA08-334844	RTE 91 KP 33.64	92507	HAZNET
RIVERSIDE	S109694109	UCR ARROYO FLOOD CONTROL AND ENHANCEMEN	ABERDEEN STREET UCR CAMPUS	92507	NPDES
RIVERSIDE	S109935858	KIDDIE KANDIDS #642	2550 CANYON SPRINGS PKWY	92507	HAZNET
RIVERSIDE	S109427627	JAYNES CORPROATION	2585 CANYON SPRINGS PKWY	92507	HAZNET
RIVERSIDE	S109454245	PHILADELPHIA HOUSING LLC	SE CNR MT VERNON / BIG SPRINGS	92507	NPDES
RIVERSIDE	S109450327	MERIDIAN BUILDINGS 1 & 2	NE CORNER OF MERIDIAN PKWY / INNOVATION DR		NPDES
RIVERSIDE	S109461919	TRACT 30599 FRENCH VALLEY	ELLIOT RD PAT RD HWY 79		NPDES
RIVERSIDE	S109462051	TRACT 32037	MINNESOTA AVE / LINDEN ST		NPDES
RIVERSIDE	1000231013	CRAFTON REDLANDS AREA	NEAR RIVERSIDE	92516	CERCLIS, FINDS
RIVERSIDE	S109449942	MATERIALS SCIENCE & ENGINEERING	NWC OF ABERDEEN DR / N CAMPUS DR	92507	NPDES
RIVERSIDE	S109442376	EAST OF WYDHAM HILLS DR & SOUTH OF OVERLOOK PKWY	EAST OF WYDHAM HILLS DR / SOUTH OF OVERLOOK PKWY		NPDES
RIVERSIDE	S109447861	LA RIVERA 2 TR 30922 3 30922 4 33051	W OF INT OF STRONG / RIVERA ST		NPDES
RIVERSIDE	S109447860	LA RIVERA	W OF INT OF STRONG / RIVERA ST		NPDES
RIVERSIDE	S109442909	ENTROMOLOGY & INSECTARY DEMOLITION	NE OF S CAMPUS DR / CITRUS DR	92507	NPDES
RIVERSIDE	S109459165	SPRING MOUNTAIN RNCH	EAST OF MOUNT VERNON AVE	92507	NPDES
RIVERSIDE	S109464610	W OF VIA VISTA DR & E OF OVERLOOK PKWY & S OF RNCH	W OF VIA VISTA DR / E OVERLOOK PKWY & S RANCH VI		NPDES
RIVERSIDE	S103442659	RIVERSIDE CITY-PEDLEY SITE	SW OF VAN BUREN BLVD. / SANTA		WMUDS/SWAT
RIVERSIDE	S109453081	OVERLOOK PKWY	OVERLOOK PKWY		NPDES
RIVERSIDE	S109287527	BRINE FAC,LA SIERRA	RALEY STREET - WEST CAMPUS	92515	LDS
RIVERSIDE	1012055936	344 N STATE 148	344 N STATE 148		US CDL
RIVERSIDE	1009619572	344 N STATE APT 148	344 N STATE APT 148		US HIST CDL
RIVERSIDE	S109694004	THOMPSON RD E OF HWY 79	THOMPSON RD E OF HWY 79		NPDES
RIVERSIDE	U004138319	SAM'S CLUB #6378	6363 VALLEY SPRGS PKWY STE.B	92507	UST
RIVERSIDE	S109928445	WASTE MANAGEMENT OF MORENO VALLEY	WESTBOUND HIGHWAY 60 @ EXIT 58	92507	HAZNET

To maintain currency of the following federal and state databases, EDR contacts the appropriate governmental agency on a monthly or quarterly basis, as required.

Number of Days to Update: Provides confirmation that EDR is reporting records that have been updated within 90 days from the date the government agency made the information available to the public.

STANDARD ENVIRONMENTAL RECORDS

Federal NPL site list

NPL: National Priority List
National Priorities List (Superfund). The NPL is a subset of CERCLIS and identifies over 1,200 sites for priority cleanup under the Superfund Program. NPL sites may encompass relatively large areas. As such, EDR provides polygon coverage for over 1,000 NPL site boundaries produced by EPA's Environmental Photographic Interpretation Center (EPIC) and regional EPA offices.

Date of Government Version: 03/31/2010	Source: EPA
Date Data Arrived at EDR: 04/02/2010	Telephone: N/A
Date Made Active in Reports: 04/12/2010	Last EDR Contact: 05/07/2010
Number of Days to Update: 10	Next Scheduled EDR Contact: 07/26/2010
	Data Release Frequency: Quarterly

NPL Site Boundaries

Sources:

EPA's Environmental Photographic Interpretation Center (EPIC)
Telephone: 202-564-7333

EPA Region 1 Telephone 617-918-1143	EPA Region 6 Telephone: 214-655-6659
EPA Region 3 Telephone 215-814-5418	EPA Region 7 Telephone: 913-551-7247
EPA Region 4 Telephone 404-562-8033	EPA Region 8 Telephone: 303-312-6774
EPA Region 5 Telephone 312-886-6686	EPA Region 9 Telephone: 415-947-4246
EPA Region 10 Telephone 206-553-8665	

Proposed NPL: Proposed National Priority List Sites
A site that has been proposed for listing on the National Priorities List through the issuance of a proposed rule in the Federal Register. EPA then accepts public comments on the site, responds to the comments, and places on the NPL those sites that continue to meet the requirements for listing.

Date of Government Version: 03/31/2010	Source: EPA
Date Data Arrived at EDR: 04/02/2010	Telephone: N/A
Date Made Active in Reports: 04/12/2010	Last EDR Contact: 05/07/2010
Number of Days to Update: 10	Next Scheduled EDR Contact: 07/26/2010
	Data Release Frequency: Quarterly

NPL LIENS: Federal Superfund Liens
Federal Superfund Liens. Under the authority granted the USEPA by CERCLA of 1980, the USEPA has the authority to file liens against real property in order to recover remedial action expenditures or when the property owner received notification of potential liability. USEPA compiles a listing of filed notices of Superfund Liens.

Date of Government Version: 10/15/1991	Source: EPA
Date Data Arrived at EDR: 02/02/1994	Telephone: 202-564-4267
Date Made Active in Reports: 03/30/1994	Last EDR Contact: 05/17/2010
Number of Days to Update: 56	Next Scheduled EDR Contact: 08/30/2010
	Data Release Frequency: No Update Planned

Federal Delisted NPL site list

DELISTED NPL: National Priority List Deletions
The National Oil and Hazardous Substances Pollution Contingency Plan (NCP) establishes the criteria that the EPA uses to delete sites from the NPL. In accordance with 40 CFR 300.425.(e), sites may be deleted from the NPL where no further response is appropriate.

Date of Government Version: 03/31/2010	Source: EPA
Date Data Arrived at EDR: 04/02/2010	Telephone: N/A
Date Made Active in Reports: 04/12/2010	Last EDR Contact: 05/07/2010
Number of Days to Update: 10	Next Scheduled EDR Contact: 07/26/2010
	Data Release Frequency: Quarterly

Federal CERCLIS list

CERCLIS: Comprehensive Environmental Response, Compensation, and Liability Information System
CERCLIS contains data on potentially hazardous waste sites that have been reported to the USEPA by states, municipalities, private companies and private persons, pursuant to Section 103 of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). CERCLIS contains sites which are either proposed to or on the National Priorities List (NPL) and sites which are in the screening and assessment phase for possible inclusion on the NPL.

Date of Government Version: 01/29/2010	Source: EPA
Date Data Arrived at EDR: 02/09/2010	Telephone: 703-412-9810
Date Made Active in Reports: 04/12/2010	Last EDR Contact: 06/11/2010
Number of Days to Update: 62	Next Scheduled EDR Contact: 07/12/2010
	Data Release Frequency: Quarterly

FEDERAL FACILITY: Federal Facility Site Information listing
A listing of NPL and Base Realignment & Closure sites found in the CERCLIS database where FERRO is involved in cleanup projects.

Date of Government Version: 06/23/2009	Source: Environmental Protection Agency
Date Data Arrived at EDR: 01/15/2010	Telephone: 703-603-8704
Date Made Active in Reports: 02/10/2010	Last EDR Contact: 04/30/2010
Number of Days to Update: 26	Next Scheduled EDR Contact: 07/26/2010
	Data Release Frequency: Varies

Federal CERCLIS NFRAP site List

CERCLIS-NFRAP: CERCLIS No Further Remedial Action Planned
Archived sites are sites that have been removed and archived from the inventory of CERCLIS sites. Archived status indicates that, to the best of EPA's knowledge, assessment at a site has been completed and that EPA has determined no further steps will be taken to list this site on the National Priorities List (NPL), unless information indicates this decision was not appropriate or other considerations require a recommendation for listing at a later time. This decision does not necessarily mean that there is no hazard associated with a given site; it only means that, based upon available information, the location is not judged to be a potential NPL site.

Date of Government Version: 06/23/2009	Source: EPA
Date Data Arrived at EDR: 09/02/2009	Telephone: 703-412-9810
Date Made Active in Reports: 09/21/2009	Last EDR Contact: 06/11/2010
Number of Days to Update: 19	Next Scheduled EDR Contact: 09/13/2010
	Data Release Frequency: Quarterly

Federal RCRA CORRACTS facilities list

CORRACTS: Corrective Action Report
CORRACTS identifies hazardous waste handlers with RCRA corrective action activity.

Date of Government Version: 03/25/2010	Source: EPA
Date Data Arrived at EDR: 03/31/2010	Telephone: 800-424-9346
Date Made Active in Reports: 05/27/2010	Last EDR Contact: 05/17/2010
Number of Days to Update: 57	Next Scheduled EDR Contact: 08/30/2010
	Data Release Frequency: Quarterly

Federal RCRA non-CORRACTS TSD facilities list

RCRA-TSDF: RCRA - Treatment, Storage and Disposal
RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Transporters are individuals or entities that move hazardous waste from the generator offsite to a facility that can recycle, treat, store, or dispose of the waste. TSDFs treat, store, or dispose of the waste.

Date of Government Version: 02/17/2010	Source: Environmental Protection Agency
Date Data Arrived at EDR: 02/19/2010	Telephone: (415) 495-8895
Date Made Active in Reports: 05/17/2010	Last EDR Contact: 04/29/2010
Number of Days to Update: 87	Next Scheduled EDR Contact: 07/19/2010
	Data Release Frequency: Quarterly

Federal RCRA generators list

RCRA-LQG: RCRA - Large Quantity Generators
RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Large quantity generators (LQGs) generate over 1,000 kilograms (kg) of hazardous waste, or over 1 kg of acutely hazardous waste per month.

Date of Government Version: 02/17/2010	Source: Environmental Protection Agency
Date Data Arrived at EDR: 02/19/2010	Telephone: (415) 495-8895
Date Made Active in Reports: 05/17/2010	Last EDR Contact: 04/29/2010
Number of Days to Update: 87	Next Scheduled EDR Contact: 07/19/2010
	Data Release Frequency: Quarterly

RCRA-SQG: RCRA - Small Quantity Generators
RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Small quantity generators (SQGs) generate between 100 kg and 1,000 kg of hazardous waste per month.

Date of Government Version: 02/17/2010	Source: Environmental Protection Agency
Date Data Arrived at EDR: 02/19/2010	Telephone: (415) 495-8895
Date Made Active in Reports: 05/17/2010	Last EDR Contact: 04/29/2010
Number of Days to Update: 87	Next Scheduled EDR Contact: 07/19/2010
	Data Release Frequency: Quarterly

RCRA-CESQG: RCRA - Conditionally Exempt Small Quantity Generators
RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Conditionally exempt small quantity generators (CESQGs) generate less than 100 kg of hazardous waste, or less than 1 kg of acutely hazardous waste per month.

Date of Government Version: 02/17/2010	Source: Environmental Protection Agency
Date Data Arrived at EDR: 02/19/2010	Telephone: (415) 495-8895
Date Made Active in Reports: 05/17/2010	Last EDR Contact: 04/29/2010
Number of Days to Update: 87	Next Scheduled EDR Contact: 07/19/2010
	Data Release Frequency: Varies

Federal institutional controls / engineering controls registries

US ENG CONTROLS: Engineering Controls Sites List
A listing of sites with engineering controls in place. Engineering controls include various forms of caps, building foundations, liners, and treatment methods to create pathway elimination for regulated substances to enter environmental media or effect human health.

Date of Government Version: 12/20/2009	Source: Environmental Protection Agency
Date Data Arrived at EDR: 01/20/2010	Telephone: 703-603-0695
Date Made Active in Reports: 04/12/2010	Last EDR Contact: 06/14/2010
Number of Days to Update: 82	Next Scheduled EDR Contact: 09/27/2010
	Data Release Frequency: Varies

US INST CONTROL: Sites with Institutional Controls
A listing of sites with institutional controls in place. Institutional controls include administrative measures, such as groundwater use restrictions, construction restrictions, property use restrictions, and post remediation care requirements intended to prevent exposure to contaminants remaining on site. Deed restrictions are generally required as part of the institutional controls.

Date of Government Version: 12/20/2009	Source: Environmental Protection Agency
Date Data Arrived at EDR: 01/20/2010	Telephone: 703-603-0695
Date Made Active in Reports: 04/12/2010	Last EDR Contact: 06/14/2010
Number of Days to Update: 82	Next Scheduled EDR Contact: 09/27/2010
	Data Release Frequency: Varies

Federal ERNS list

ERNS: Emergency Response Notification System
Emergency Response Notification System. ERNS records and stores information on reported releases of oil and hazardous substances.

Date of Government Version: 12/31/2009	Source: National Response Center, United States Coast Guard
Date Data Arrived at EDR: 01/22/2010	Telephone: 202-267-2180
Date Made Active in Reports: 02/11/2010	Last EDR Contact: 04/07/2010
Number of Days to Update: 20	Next Scheduled EDR Contact: 07/19/2010
	Data Release Frequency: Annually

State- and tribal - equivalent NPL

RESPONSE: State Response Sites
Identifies confirmed release sites where DTSC is involved in remediation, either in a lead or oversight capacity. These confirmed release sites are generally high-priority and high potential risk.

Date of Government Version: 05/11/2010	Source: Department of Toxic Substances Control
Date Data Arrived at EDR: 05/12/2010	Telephone: 916-323-3400
Date Made Active in Reports: 05/18/2010	Last EDR Contact: 06/17/2010
Number of Days to Update: 6	Next Scheduled EDR Contact: 08/23/2010
	Data Release Frequency: Quarterly

State- and tribal - equivalent CERCLIS

ENVIROSTOR: EnviroStor Database
The Department of Toxic Substances Control's (DTSC's) Site Mitigation and Brownfields Reuse Program's (SMBRP's) EnviroStor database identifies sites that have known contamination or sites for which there may be reasons to investigate further. The database includes the following site types: Federal Superfund sites (National Priorities List (NPL)); State Response, including Military Facilities and State Superfund; Voluntary Cleanup; and School sites. EnviroStor provides similar information to the information that was available in CalSites, and provides additional site information, including, but not limited to, identification of formerly-contaminated properties that have been released for reuse, properties where environmental deed restrictions have been recorded to prevent inappropriate land uses, and risk characterization information that is used to assess potential impacts to public health and the environment at contaminated sites.

Date of Government Version. 05/11/2010	Source: Department of Toxic Substances Control
Date Data Arrived at EDR: 05/12/2010	Telephone: 916-323-3400
Date Made Active in Reports: 05/18/2010	Last EDR Contact: 06/17/2010
Number of Days to Update: 6	Next Scheduled EDR Contact: 08/23/2010
	Data Release Frequency: Quarterly

State and tribal landfill and/or solid waste disposal site lists

SWF/LF (SWIS): Solid Waste Information System
Active, Closed and Inactive Landfills. SWF/LF records typically contain an inve ntory of solid waste disposal facilities or landfills. These may be active or i nactive facilities or open dumps that failed to meet RCRA Section 4004 criteria for solid waste landfills or disposal sites.

Date of Government Version: 02/22/2010	Source: Department of Resources Recycling and Recovery
Date Data Arrived at EDR. 02/24/2010	Telephone: 916-341-6320
Date Made Active in Reports: 03/04/2010	Last EDR Contact. 05/25/2010
Number of Days to Update: 8	Next Scheduled EDR Contact. 09/06/2010
	Data Release Frequency: Quarterly

State and tribal leaking storage tank lists

LUST REG 9: Leaking Underground Storage Tank Report
Orange, Riverside, San Diego counties. For more current information, please refer to the State Water Resources Control Board's LUST database.

Date of Government Version. 03/01/2001	Source: California Regional Water Quality Control Board San Diego Region (9)
Date Data Arrived at EDR: 04/23/2001	Telephone: 858-637-5595
Date Made Active in Reports: 05/21/2001	Last EDR Contact: 03/29/2010
Number of Days to Update: 28	Next Scheduled EDR Contact: 07/12/2010
	Data Release Frequency: No Update Planned

LUST REG 7. Leaking Underground Storage Tank Case Listing
Leaking Underground Storage Tank locations. Imperial, Riverside, San Diego, Santa Barbara counties.

Date of Government Version: 02/26/2004	Source: California Regional Water Quality Control Board Colorado River Basin Region (7)
Date Data Arrived at EDR: 02/26/2004	Telephone: 760-776-8943
Date Made Active in Reports: 03/24/2004	Last EDR Contact. 05/03/2010
Number of Days to Update: 27	Next Scheduled EDR Contact: 08/16/2010
	Data Release Frequency: No Update Planned

LUST REG 6V: Leaking Underground Storage Tank Case Listing
Leaking Underground Storage Tank locations. Inyo, Kern, Los Angeles, Mono, San Bernardino counties.

Date of Government Version: 06/07/2005	Source: California Regional Water Quality Control Board Victorville Branch Office (6)
Date Data Arrived at EDR: 06/07/2005	Telephone: 760-241-7365
Date Made Active in Reports. 06/29/2005	Last EDR Contact: 06/14/2010
Number of Days to Update: 22	Next Scheduled EDR Contact: 09/27/2010
	Data Release Frequency: No Update Planned

LUST REG 6L: Leaking Underground Storage Tank Case Listing
For more current information, please refer to the State Water Resources Control Board's LUST database.

Date of Government Version. 09/09/2003	Source: California Regional Water Quality Control Board Lahontan Region (6)
Date Data Arrived at EDR: 09/10/2003	Telephone: 530-542-5572
Date Made Active in Reports. 10/07/2003	Last EDR Contact: 05/17/2010
Number of Days to Update: 27	Next Scheduled EDR Contact: 08/30/2010
	Data Release Frequency: No Update Planned

LUST REG 5. Leaking Underground Storage Tank Database
Leaking Underground Storage Tank locations. Alameda, Alpine, Amador, Butte, Colusa, Contra Costa, Calveras, El Dorado, Fresno, Glenn, Kern, Kings, Lake, Lassen, Madera, Mariposa, Merced, Modoc, Napa, Nevada, Placer, Plumas, Sacramento, San Joaquin, Shasta, Solano, Stanislaus, Sutter, Tehama, Tulare, Tuolumne, Yolo, Yuba counties.

Date of Government Version. 07/01/2008	Source: California Regional Water Quality Control Board Central Valley Region (5)
Date Data Arrived at EDR: 07/22/2008	Telephone: 916-464-4834
Date Made Active in Reports: 07/31/2008	Last EDR Contact: 04/06/2010
Number of Days to Update: 9	Next Scheduled EDR Contact: 07/19/2010
	Data Release Frequency: Quarterly

LUST REG 4: Underground Storage Tank Leak List
Los Angeles, Ventura counties. For more current information, please refer to the State Water Resources Control Board's LUST database.

Date of Government Version: 09/07/2004	Source: California Regional Water Quality Control Board Los Angeles Region (4)
Date Data Arrived at EDR: 09/07/2004	Telephone: 213-576-6710
Date Made Active in Reports: 10/12/2004	Last EDR Contact: 06/07/2010
Number of Days to Update: 35	Next Scheduled EDR Contact: 09/20/2010
	Data Release Frequency: No Update Planned

LUST REG 3: Leaking Underground Storage Tank Database
Leaking Underground Storage Tank locations. Monterey, San Benito, San Luis Obispo, Santa Barbara, Santa Cruz counties.

Date of Government Version: 05/19/2003	Source: California Regional Water Quality Control Board Central Coast Region (3)
Date Data Arrived at EDR: 05/19/2003	Telephone: 805-542-4786
Date Made Active in Reports: 06/02/2003	Last EDR Contact: 04/19/2010
Number of Days to Update: 14	Next Scheduled EDR Contact: 08/02/2010
	Data Release Frequency: No Update Planned

LUST REG 2: Fuel Leak List
Leaking Underground Storage Tank locations. Alameda, Contra Costa, Marin, Napa, San Francisco, San Mateo, Santa Clara, Solano, Sonoma counties.

Date of Government Version: 09/30/2004	Source: California Regional Water Quality Control Board San Francisco Bay Region (2)
Date Data Arrived at EDR: 10/20/2004	Telephone: 510-622-2433
Date Made Active in Reports: 11/19/2004	Last EDR Contact: 06/21/2010
Number of Days to Update: 30	Next Scheduled EDR Contact: 10/04/2010
	Data Release Frequency: Quarterly

LUST REG 1: Active Toxic Site Investigation
Del Norte, Humboldt, Lake, Mendocino, Modoc, Siskiyou, Sonoma, Trinity counties. For more current information, please refer to the State Water Resources Control Board's LUST database.

Date of Government Version: 02/01/2001	Source: California Regional Water Quality Control Board North Coast (1)
Date Data Arrived at EDR: 02/28/2001	Telephone: 707-570-3769
Date Made Active in Reports: 03/29/2001	Last EDR Contact: 05/03/2010
Number of Days to Update: 29	Next Scheduled EDR Contact: 08/16/2010
	Data Release Frequency: No Update Planned

LUST: Geotracker's Leaking Underground Fuel Tank Report
Leaking Underground Storage Tank Incident Reports. LUST records contain an inventory of reported leaking underground storage tank incidents. Not all states maintain these records, and the information stored varies by state. For more information on a particular leaking underground storage tank sites, please contact the appropriate regulatory agency.

Date of Government Version: 05/05/2010	Source: State Water Resources Control Board
Date Data Arrived at EDR: 05/05/2010	Telephone: see region list
Date Made Active in Reports: 05/18/2010	Last EDR Contact: 05/05/2010
Number of Days to Update: 13	Next Scheduled EDR Contact. 07/05/2010
	Data Release Frequency: Quarterly

LUST REG 8: Leaking Underground Storage Tanks
California Regional Water Quality Control Board Santa Ana Region (8). For more current information, please refer to the State Water Resources Control Board's LUST database.

Date of Government Version: 02/14/2005	Source: California Regional Water Quality Control Board Santa Ana Region (8)
Date Data Arrived at EDR: 02/15/2005	Telephone: 909-782-4498
Date Made Active in Reports: 03/28/2005	Last EDR Contact: 04/19/2010
Number of Days to Update: 41	Next Scheduled EDR Contact: 08/02/2010
	Data Release Frequency: Varies

SLIC: Statewide SLIC Cases
The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 05/05/2010	Source: State Water Resources Control Board
Date Data Arrived at EDR: 05/05/2010	Telephone: 866-480-1028
Date Made Active in Reports: 05/18/2010	Last EDR Contact. 05/05/2010
Number of Days to Update: 13	Next Scheduled EDR Contact: 07/05/2010
	Data Release Frequency: Varies

SLIC REG 1: Active Toxic Site Investigations
The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 04/03/2003	Source: California Regional Water Quality Control Board, North Coast Region (1)
Date Data Arrived at EDR: 04/07/2003	Telephone: 707-576-2220
Date Made Active in Reports: 04/25/2003	Last EDR Contact: 05/03/2010
Number of Days to Update: 18	Next Scheduled EDR Contact. 08/16/2010
	Data Release Frequency. No Update Planned

SLIC REG 2: Spills, Leaks, Investigation & Cleanup Cost Recovery Listing
The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 09/30/2004	Source: Regional Water Quality Control Board San Francisco Bay Region (2)
Date Data Arrived at EDR: 10/20/2004	Telephone: 510-286-0457
Date Made Active in Reports: 11/19/2004	Last EDR Contact. 06/21/2010
Number of Days to Update: 30	Next Scheduled EDR Contact: 10/04/2010
	Data Release Frequency: Quarterly

SLIC REG 3: Spills, Leaks, Investigation & Cleanup Cost Recovery Listing
The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 05/18/2006	Source: California Regional Water Quality Control Board Central Coast Region (3)
Date Data Arrived at EDR: 05/18/2006	Telephone: 805-549-3147
Date Made Active in Reports: 06/15/2006	Last EDR Contact: 04/19/2010
Number of Days to Update: 28	Next Scheduled EDR Contact. 08/02/2010
	Data Release Frequency: Semi-Annually

SLIC REG 4: Spills, Leaks, Investigation & Cleanup Cost Recovery Listing
The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 11/17/2004	Source: Region Water Quality Control Board Los Angeles Region (4)
Date Data Arrived at EDR. 11/18/2004	Telephone: 213-576-6600
Date Made Active in Reports: 01/04/2005	Last EDR Contact. 04/05/2010
Number of Days to Update: 47	Next Scheduled EDR Contact. 07/19/2010
	Data Release Frequency: Varies

SLIC REG 5: Spills, Leaks, Investigation & Cleanup Cost Recovery Listing
The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges

Date of Government Version: 04/01/2005	Source. Regional Water Quality Control Board Central Valley Region (5)
Date Data Arrived at EDR: 04/05/2005	Telephone: 916-464-3291
Date Made Active in Reports: 04/21/2005	Last EDR Contact: 06/14/2010
Number of Days to Update: 16	Next Scheduled EDR Contact: 09/27/2010
	Data Release Frequency: Semi-Annually

SLIC REG 6V: Spills, Leaks, Investigation & Cleanup Cost Recovery Listing
The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 05/24/2005	Source: Regional Water Quality Control Board, Victorville Branch
Date Data Arrived at EDR: 05/25/2005	Telephone: 619-241-6583
Date Made Active in Reports: 06/16/2005	Last EDR Contact: 05/17/2010
Number of Days to Update: 22	Next Scheduled EDR Contact: 08/30/2010
	Data Release Frequency: Semi-Annually

SLIC REG 6L: SLIC Sites
The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 09/07/2004	Source: California Regional Water Quality Control Board, Lahontan Region
Date Data Arrived at EDR: 09/07/2004	Telephone: 530-542-5574
Date Made Active in Reports: 10/12/2004	Last EDR Contact: 05/17/2010
Number of Days to Update: 35	Next Scheduled EDR Contact: 08/30/2010
	Data Release Frequency: No Update Planned

SLIC REG 7: SLIC List
The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 11/24/2004	Source: California Regional Quality Control Board, Colorado River Basin Region
Date Data Arrived at EDR: 11/29/2004	Telephone: 760-346-7491
Date Made Active in Reports: 01/04/2005	Last EDR Contact: 05/03/2010
Number of Days to Update: 36	Next Scheduled EDR Contact: 08/16/2010
	Data Release Frequency: No Update Planned

SLIC REG 8: Spills, Leaks, Investigation & Cleanup Cost Recovery Listing
The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 04/03/2008	Source: California Region Water Quality Control Board Santa Ana Region (8)
Date Data Arrived at EDR: 04/03/2008	Telephone: 951-782-3298
Date Made Active in Reports: 04/14/2008	Last EDR Contact. 06/14/2010
Number of Days to Update: 11	Next Scheduled EDR Contact: 09/27/2010
	Data Release Frequency: Semi-Annually

SLIC REG 9: Spills, Leaks, Investigation & Cleanup Cost Recovery Listing
The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 09/10/2007	Source: California Regional Water Quality Control Board San Diego Region (9)
Date Data Arrived at EDR: 09/11/2007	Telephone: 858-467-2980
Date Made Active in Reports: 09/28/2007	Last EDR Contact: 05/10/2010
Number of Days to Update: 17	Next Scheduled EDR Contact: 08/23/2010
	Data Release Frequency: Annually

INDIAN LUST R10: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in Alaska, Idaho, Oregon and Washington.

Date of Government Version: 05/04/2010	Source: EPA Region 10
Date Data Arrived at EDR: 05/05/2010	Telephone: 206-553-2857
Date Made Active in Reports: 05/27/2010	Last EDR Contact: 05/03/2010
Number of Days to Update: 22	Next Scheduled EDR Contact: 08/16/2010
	Data Release Frequency: Quarterly

INDIAN LUST R1: Leaking Underground Storage Tanks on Indian Land
A listing of leaking underground storage tank locations on Indian Land.

Date of Government Version: 02/19/2009	Source: EPA Region 1
Date Data Arrived at EDR: 02/18/2009	Telephone: 617-918-1313
Date Made Active in Reports: 03/16/2009	Last EDR Contact: 05/03/2010
Number of Days to Update: 25	Next Scheduled EDR Contact: 08/16/2010
	Data Release Frequency: Varies

INDIAN LUST R8: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in Colorado, Montana, North Dakota, South Dakota, Utah and Wyoming.

Date of Government Version: 02/25/2010	Source: EPA Region 8
Date Data Arrived at EDR: 02/25/2010	Telephone: 303-312-6271
Date Made Active in Reports: 04/12/2010	Last EDR Contact: 05/03/2010
Number of Days to Update: 46	Next Scheduled EDR Contact: 08/16/2010
	Data Release Frequency: Quarterly

INDIAN LUST R6: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in New Mexico and Oklahoma.

Date of Government Version: 05/03/2010	Source: EPA Region 6
Date Data Arrived at EDR: 05/05/2010	Telephone: 214-665-6597
Date Made Active in Reports: 05/27/2010	Last EDR Contact: 05/03/2010
Number of Days to Update: 22	Next Scheduled EDR Contact: 08/16/2010
	Data Release Frequency: Varies

INDIAN LUST R4: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in Florida, Mississippi and North Carolina.

Date of Government Version: 03/10/2010	Source: EPA Region 4
Date Data Arrived at EDR: 03/16/2010	Telephone: 404-562-8677
Date Made Active in Reports: 04/12/2010	Last EDR Contact: 05/03/2010
Number of Days to Update: 27	Next Scheduled EDR Contact: 08/16/2010
	Data Release Frequency: Semi-Annually

INDIAN LUST R9: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in Arizona, California, New Mexico and Nevada

Date of Government Version: 02/01/2010	Source: Environmental Protection Agency
Date Data Arrived at EDR: 03/03/2010	Telephone: 415-972-3372
Date Made Active in Reports: 04/12/2010	Last EDR Contact: 05/03/2010
Number of Days to Update: 40	Next Scheduled EDR Contact: 08/16/2010
	Data Release Frequency: Quarterly

INDIAN LUST R7: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in Iowa, Kansas, and Nebraska

Date of Government Version: 03/24/2009	Source: EPA Region 7
Date Data Arrived at EDR: 05/20/2009	Telephone: 913-551-7003
Date Made Active in Reports: 06/17/2009	Last EDR Contact: 05/04/2010
Number of Days to Update: 28	Next Scheduled EDR Contact: 08/16/2010
	Data Release Frequency: Varies

State and tribal registered storage tank lists

UST: Active UST Facilities
Active UST facilities gathered from the local regulatory agencies

Date of Government Version: 05/05/2010	Source: SWRCB
Date Data Arrived at EDR: 05/05/2010	Telephone: 916-480-1028
Date Made Active in Reports: 05/18/2010	Last EDR Contact: 05/05/2010
Number of Days to Update: 13	Next Scheduled EDR Contact: 07/05/2010
	Data Release Frequency: Semi-Annually

AST: Aboveground Petroleum Storage Tank Facilities
Registered Aboveground Storage Tanks.

Date of Government Version: 08/01/2009	Source: State Water Resources Control Board
Date Data Arrived at EDR: 09/10/2009	Telephone: 916-341-5712
Date Made Active in Reports: 10/01/2009	Last EDR Contact: 04/12/2010
Number of Days to Update: 21	Next Scheduled EDR Contact: 07/26/2010
	Data Release Frequency: Quarterly

INDIAN UST R10: Underground Storage Tanks on Indian Land
The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 10 (Alaska, Idaho, Oregon, Washington, and Tribal Nations).

Date of Government Version: 05/04/2010	Source: EPA Region 10
Date Data Arrived at EDR: 05/05/2010	Telephone: 206-553-2857
Date Made Active in Reports: 05/27/2010	Last EDR Contact: 05/03/2010
Number of Days to Update: 22	Next Scheduled EDR Contact: 08/16/2010
	Data Release Frequency: Quarterly

INDIAN UST R9: Underground Storage Tanks on Indian Land
The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 9 (Arizona, California, Hawaii, Nevada, the Pacific Islands, and Tribal Nations).

Date of Government Version: 02/01/2010	Source: EPA Region 9
Date Data Arrived at EDR: 03/03/2010	Telephone: 415-972-3368
Date Made Active in Reports: 04/12/2010	Last EDR Contact: 05/03/2010
Number of Days to Update: 40	Next Scheduled EDR Contact: 08/16/2010
	Data Release Frequency: Quarterly

INDIAN UST R8: Underground Storage Tanks on Indian Land
The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 8 (Colorado, Montana, North Dakota, South Dakota, Utah, Wyoming and 27 Tribal Nations).

Date of Government Version: 02/25/2010	Source: EPA Region 8
Date Data Arrived at EDR: 02/25/2010	Telephone: 303-312-6137
Date Made Active in Reports: 04/12/2010	Last EDR Contact: 05/03/2010
Number of Days to Update: 46	Next Scheduled EDR Contact: 08/16/2010
	Data Release Frequency: Quarterly

INDIAN UST R7: Underground Storage Tanks on Indian Land
The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 7 (Iowa, Kansas, Missouri, Nebraska, and 9 Tribal Nations).

Date of Government Version: 04/01/2008	Source: EPA Region 7
Date Data Arrived at EDR: 12/30/2008	Telephone: 913-551-7003
Date Made Active in Reports: 03/16/2009	Last EDR Contact: 05/12/2010
Number of Days to Update: 76	Next Scheduled EDR Contact: 08/16/2010
	Data Release Frequency: Varies

INDIAN UST R6: Underground Storage Tanks on Indian Land
The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 6 (Louisiana, Arkansas, Oklahoma, New Mexico, Texas and 65 Tribes).

Date of Government Version: 05/03/2010	Source: EPA Region 6
Date Data Arrived at EDR: 05/05/2010	Telephone: 214-665-7591
Date Made Active in Reports: 05/27/2010	Last EDR Contact: 05/03/2010
Number of Days to Update: 22	Next Scheduled EDR Contact: 08/16/2010
	Data Release Frequency: Semi-Annually

INDIAN UST R5: Underground Storage Tanks on Indian Land
The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 5 (Michigan, Minnesota and Wisconsin and Tribal Nations).

Date of Government Version: 02/11/2010	Source: EPA Region 5
Date Data Arrived at EDR: 02/11/2010	Telephone: 312-886-6136
Date Made Active in Reports: 04/12/2010	Last EDR Contact: 05/03/2010
Number of Days to Update: 60	Next Scheduled EDR Contact: 08/16/2010
	Data Release Frequency: Varies

INDIAN UST R4: Underground Storage Tanks on Indian Land
The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 4 (Alabama, Florida, Georgia, Kentucky, Mississippi, North Carolina, South Carolina, Tennessee and Tribal Nations)

Date of Government Version: 03/10/2010	Source: EPA Region 4
Date Data Arrived at EDR: 03/16/2010	Telephone: 404-562-9424
Date Made Active in Reports: 04/12/2010	Last EDR Contact: 05/03/2010
Number of Days to Update: 27	Next Scheduled EDR Contact: 08/16/2010
	Data Release Frequency: Semi-Annually

INDIAN UST R1: Underground Storage Tanks on Indian Land
The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 1 (Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island, Vermont and ten Tribal Nations).

Date of Government Version: 02/19/2009	Source: EPA, Region 1
Date Data Arrived at EDR: 02/19/2009	Telephone: 617-918-1313
Date Made Active in Reports: 03/16/2009	Last EDR Contact: 05/03/2010
Number of Days to Update: 25	Next Scheduled EDR Contact: 08/16/2010
	Data Release Frequency: Varies

FEMA UST: Underground Storage Tank Listing
A listing of all FEMA owned underground storage tanks.

Date of Government Version: 01/01/2010	Source: FEMA
Date Data Arrived at EDR: 02/16/2010	Telephone: 202-646-5797
Date Made Active in Reports: 04/12/2010	Last EDR Contact: 04/19/2010
Number of Days to Update: 55	Next Scheduled EDR Contact: 08/02/2010
	Data Release Frequency: Varies

State and tribal voluntary cleanup sites

INDIAN VCP R7: Voluntary Cleanup Priority Listing
A listing of voluntary cleanup priority sites located on Indian Land located in Region 7.

Date of Government Version: 03/20/2008	Source: EPA, Region 7
Date Data Arrived at EDR: 04/22/2008	Telephone: 913-551-7365
Date Made Active in Reports: 05/19/2008	Last EDR Contact: 04/20/2009
Number of Days to Update: 27	Next Scheduled EDR Contact: 07/20/2009
	Data Release Frequency: Varies

VCP: Voluntary Cleanup Program Properties
Contains low threat level properties with either confirmed or unconfirmed releases and the project proponents have request that DTSC oversee investigation and/or cleanup activities and have agreed to provide coverage for DTSC's costs.

Date of Government Version: 05/11/2010	Source: Department of Toxic Substances Control
Date Data Arrived at EDR: 05/12/2010	Telephone: 916-323-3400
Date Made Active in Reports: 05/18/2010	Last EDR Contact: 06/17/2010
Number of Days to Update: 6	Next Scheduled EDR Contact: 08/23/2010
	Data Release Frequency: Quarterly

INDIAN VCP R1: Voluntary Cleanup Priority Listing
A listing of voluntary cleanup priority sites located on Indian Land located in Region 1.

Date of Government Version: 04/02/2008	Source: EPA, Region 1
Date Data Arrived at EDR: 04/22/2008	Telephone: 617-918-1102
Date Made Active in Reports: 05/19/2008	Last EDR Contact: 04/05/2010
Number of Days to Update: 27	Next Scheduled EDR Contact: 07/19/2010
	Data Release Frequency: Varies

<u>**ADDITIONAL ENVIRONMENTAL RECORDS**</u>

Local Brownfield lists

US BROWNFIELDS: A Listing of Brownfields Sites
Included in the listing are brownfields properties addresses by Cooperative Agreement Recipients and brownfields properties addressed by Targeted Brownfields Assessments. Targeted Brownfields Assessments-EPA's Targeted Brownfields Assessments (TBA) program is designed to help states, tribes, and municipalities--especially those without EPA Brownfields Assessment Demonstration Pilots--minimize the uncertainties of contamination often associated with brownfields. Under the TBA program, EPA provides funding and/or technical assistance for environmental assessments at brownfields sites throughout the country. Targeted Brownfields Assessments supplement and work with other efforts under EPA's Brownfields Initiative to promote cleanup and redevelopment of brownfields. Cooperative Agreement Recipients-States, political subdivisions, territories, and Indian tribes become Brownfields Cleanup Revolving Loan Fund (BCRLF) cooperative agreement recipients when they enter into BCRLF cooperative agreements with the U.S. EPA. EPA selects BCRLF cooperative agreement recipients based on a proposal and application process. BCRLF cooperative agreement recipients must use EPA funds provided through BCRLF cooperative agreement for specified brownfields-related cleanup activities.

Date of Government Version: 03/02/2010	Source: Environmental Protection Agency
Date Data Arrived at EDR: 03/23/2010	Telephone: 202-566-2777
Date Made Active in Reports: 05/17/2010	Last EDR Contact: 03/23/2010
Number of Days to Update: 55	Next Scheduled EDR Contact: 07/12/2010
	Data Release Frequency: Semi-Annually

Local Lists of Landfill / Solid Waste Disposal Sites

ODI: Open Dump Inventory
An open dump is defined as a disposal facility that does not comply with one or more of the Part 257 or Part 258 Subtitle D Criteria.

Date of Government Version: 06/30/1985	Source: Environmental Protection Agency
Date Data Arrived at EDR: 08/09/2004	Telephone: 800-424-9346
Date Made Active in Reports: 09/17/2004	Last EDR Contact: 06/09/2004
Number of Days to Update: 39	Next Scheduled EDR Contact: N/A
	Data Release Frequency: No Update Planned

DEBRIS REGION 9: Torres Martinez Reservation Illegal Dump Site Locations
A listing of illegal dump sites location on the Torres Martinez Indian Reservation located in eastern Riverside County and northern Imperial County, California.

Date of Government Version: 01/12/2009	Source: EPA, Region 9
Date Data Arrived at EDR: 05/07/2009	Telephone: 415-972-3336
Date Made Active in Reports: 09/21/2009	Last EDR Contact: 06/21/2010
Number of Days to Update: 137	Next Scheduled EDR Contact: 09/20/2010
	Data Release Frequency: Varies

WMUDS/SWAT: Waste Management Unit Database

Waste Management Unit Database System. WMUDS is used by the State Water Resources Control Board staff and the Regional Water Quality Control Boards for program tracking and inventory of waste management units. WMUDS is composed of the following databases: Facility Information, Scheduled Inspections Information, Waste Management Unit Information, SWAT Program Information, SWAT Report Summary Information, SWAT Report Summary Data, Chapter 15 (formerly Subchapter 15) Information, Chapter 15 Monitoring Parameters, TPCA Program Information, RCRA Program Information, Closure Information, and Interested Parties Information.

Date of Government Version: 04/01/2000	Source: State Water Resources Control Board
Date Data Arrived at EDR: 04/10/2000	Telephone: 916-227-4448
Date Made Active in Reports: 05/10/2000	Last EDR Contact: 05/17/2010
Number of Days to Update: 30	Next Scheduled EDR Contact: 08/30/2010
	Data Release Frequency: Quarterly

SWRCY: Recycler Database

A listing of recycling facilities in California.

Date of Government Version: 01/06/2010	Source: Department of Conservation
Date Data Arrived at EDR: 03/24/2010	Telephone: 916-323-3836
Date Made Active in Reports: 04/09/2010	Last EDR Contact: 03/24/2010
Number of Days to Update: 16	Next Scheduled EDR Contact: 07/05/2010
	Data Release Frequency: Quarterly

HAULERS: Registered Waste Tire Haulers Listing

A listing of registered waste tire haulers.

Date of Government Version: 03/09/2010	Source: Integrated Waste Management Board
Date Data Arrived at EDR: 03/10/2010	Telephone: 916-341-6422
Date Made Active in Reports: 04/09/2010	Last EDR Contact: 06/21/2010
Number of Days to Update: 30	Next Scheduled EDR Contact: 09/06/2010
	Data Release Frequency: Varies

INDIAN ODI: Report on the Status of Open Dumps on Indian Lands

Location of open dumps on Indian land.

Date of Government Version: 12/31/1998	Source: Environmental Protection Agency
Date Data Arrived at EDR: 12/03/2007	Telephone: 703-308-8245
Date Made Active in Reports: 01/24/2008	Last EDR Contact: 06/08/2010
Number of Days to Update: 52	Next Scheduled EDR Contact: 08/23/2010
	Data Release Frequency: Varies

Local Lists of Hazardous waste / Contaminated Sites

US CDL: Clandestine Drug Labs

A listing of clandestine drug lab locations. The U.S. Department of Justice ("the Department") provides this web site as a public service. It contains addresses of some locations where law enforcement agencies reported they found chemicals or other items that indicated the presence of either clandestine drug laboratories or dumpsites. In most cases, the source of the entries is not the Department, and the Department has not verified the entry and does not guarantee its accuracy. Members of the public must verify the accuracy of all entries by, for example, contacting local law enforcement and local health departments.

Date of Government Version: 08/19/2009	Source: Drug Enforcement Administration
Date Data Arrived at EDR: 12/29/2009	Telephone: 202-307-1000
Date Made Active in Reports: 02/10/2010	Last EDR Contact: 03/08/2010
Number of Days to Update: 43	Next Scheduled EDR Contact: 09/20/2010
	Data Release Frequency: Quarterly

HIST CAL-SITES: Calsites Database

The Calsites database contains potential or confirmed hazardous substance release properties. In 1996, California EPA reevaluated and significantly reduced the number of sites in the Calsites database. No longer updated by the state agency. It has been replaced by ENVIROSTOR.

Date of Government Version: 08/08/2005	Source: Department of Toxic Substance Control
Date Data Arrived at EDR: 08/03/2006	Telephone: 916-323-3400
Date Made Active in Reports: 08/24/2006	Last EDR Contact: 02/23/2009
Number of Days to Update: 21	Next Scheduled EDR Contact: 05/25/2009
	Data Release Frequency: No Update Planned

SCH: School Property Evaluation Program

This category contains proposed and existing school sites that are being evaluated by DTSC for possible hazardous materials contamination. In some cases, these properties may be listed in the CalSites category depending on the level of threat to public health and safety or the environment they pose.

Date of Government Version: 05/11/2010	Source: Department of Toxic Substances Control
Date Data Arrived at EDR: 05/12/2010	Telephone: 916-323-3400
Date Made Active in Reports: 05/18/2010	Last EDR Contact: 06/17/2010
Number of Days to Update: 6	Next Scheduled EDR Contact: 08/23/2010
	Data Release Frequency: Quarterly

TOXIC PITS: Toxic Pits Cleanup Act Sites

Toxic PITS Cleanup Act Sites. TOXIC PITS identifies sites suspected of containing hazardous substances where cleanup has not yet been completed.

Date of Government Version: 07/01/1995	Source: State Water Resources Control Board
Date Data Arrived at EDR: 08/30/1995	Telephone: 916-227-4364
Date Made Active in Reports: 09/26/1995	Last EDR Contact: 01/26/2009
Number of Days to Update: 27	Next Scheduled EDR Contact: 04/27/2009
	Data Release Frequency: No Update Planned

CDL: Clandestine Drug Labs

A listing of drug lab locations. Listing of a location in this database does not indicate that any illegal drug lab materials were or were not present there, and does not constitute a determination that the location either requires or does not require additional cleanup work.

Date of Government Version: 12/31/2009	Source: Department of Toxic Substances Control
Date Data Arrived at EDR: 02/25/2010	Telephone: 916-255-6504
Date Made Active in Reports: 03/04/2010	Last EDR Contact: 04/05/2010
Number of Days to Update: 7	Next Scheduled EDR Contact: 07/19/2010
	Data Release Frequency: Varies

US HIST CDL: National Clandestine Laboratory Register

A listing of clandestine drug lab locations. The U.S. Department of Justice ("the Department") provides this web site as a public service. It contains addresses of some locations where law enforcement agencies reported they found chemicals or other items that indicated the presence of either clandestine drug laboratories or dumpsites. In most cases, the source of the entries is not the Department, and the Department has not verified the entry and does not guarantee its accuracy. Members of the public must verify the accuracy of all entries by, for example, contacting local law enforcement and local health departments.

Date of Government Version: 09/01/2007	Source: Drug Enforcement Administration
Date Data Arrived at EDR: 11/19/2008	Telephone: 202-307-1000
Date Made Active in Reports: 03/30/2009	Last EDR Contact: 03/23/2009
Number of Days to Update: 131	Next Scheduled EDR Contact: 06/22/2009
	Data Release Frequency: No Update Planned

Local Lists of Registered Storage Tanks

CA FID UST: Facility Inventory Database

The Facility Inventory Database (FID) contains a historical listing of active and inactive underground storage tank locations from the State Water Resource Control Board. Refer to local/county source for current data.

Date of Government Version: 10/31/1994	Source: California Environmental Protection Agency
Date Data Arrived at EDR: 09/05/1995	Telephone: 916-341-5851
Date Made Active in Reports: 09/29/1995	Last EDR Contact: 12/28/1998
Number of Days to Update: 24	Next Scheduled EDR Contact: N/A
	Data Release Frequency: No Update Planned

UST MENDOCINO: Mendocino County UST Database

A listing of underground storage tank locations in Mendocino County.

Date of Government Version: 09/23/2009	Source: Department of Public Health
Date Data Arrived at EDR: 09/23/2009	Telephone: 707-463-4466
Date Made Active in Reports: 10/01/2009	Last EDR Contact: 06/07/2010
Number of Days to Update: 8	Next Scheduled EDR Contact: 09/20/2010
	Data Release Frequency: Annually

HIST UST: Hazardous Substance Storage Container Database

The Hazardous Substance Storage Container Database is a historical listing of UST sites. Refer to local/county source for current data.

Date of Government Version: 10/15/1990	Source: State Water Resources Control Board
Date Data Arrived at EDR: 01/25/1991	Telephone: 916-341-5851
Date Made Active in Reports: 02/12/1991	Last EDR Contact: 07/26/2001
Number of Days to Update: 18	Next Scheduled EDR Contact: N/A
	Data Release Frequency: No Update Planned

SWEEPS UST: SWEEPS UST Listing

Statewide Environmental Evaluation and Planning System. This underground storage tank listing was updated and maintained by a company contacted by the SWRCB in the early 1990's. The listing is no longer updated or maintained. The local agency is the contact for more information on a site on the SWEEPS list.

Date of Government Version: 06/01/1994	Source: State Water Resources Control Board
Date Data Arrived at EDR: 07/07/2005	Telephone: N/A
Date Made Active in Reports: 08/11/2005	Last EDR Contact: 06/03/2005
Number of Days to Update: 35	Next Scheduled EDR Contact: N/A
	Data Release Frequency: No Update Planned

Local Land Records

LIENS 2: CERCLA Lien Information

A Federal CERCLA ('Superfund') lien can exist by operation of law at any site or property at which EPA has spent Superfund monies. These monies are spent to investigate and address releases and threatened releases of contamination. CERCLIS provides information as to the identity of these sites and properties.

Date of Government Version: 02/05/2010	Source: Environmental Protection Agency
Date Data Arrived at EDR: 02/11/2010	Telephone: 202-564-6023
Date Made Active in Reports: 04/12/2010	Last EDR Contact: 05/03/2010
Number of Days to Update: 60	Next Scheduled EDR Contact: 08/16/2010
	Data Release Frequency: Varies

LUCIS: Land Use Control Information System

LUCIS contains records of land use control information pertaining to the former Navy Base Realignment and Closure properties.

Date of Government Version: 12/09/2005	Source: Department of the Navy
Date Data Arrived at EDR: 12/11/2006	Telephone: 843-820-7326
Date Made Active in Reports: 01/11/2007	Last EDR Contact: 05/24/2010
Number of Days to Update: 31	Next Scheduled EDR Contact: 09/06/2010
	Data Release Frequency: Varies

LIENS: Environmental Liens Listing

A listing of property locations with environmental liens for California where DTSC is a lien holder.

Date of Government Version: 05/05/2010	Source: Department of Toxic Substances Control
Date Data Arrived at EDR: 05/07/2010	Telephone: 916-323-3400
Date Made Active in Reports: 05/18/2010	Last EDR Contact: 05/03/2010
Number of Days to Update: 11	Next Scheduled EDR Contact: 08/02/2010
	Data Release Frequency: Varies

DEED: Deed Restriction Listing

Site Mitigation and Brownfields Reuse Program Facility Sites with Deed Restrictions & Hazardous Waste Management Program Facility Sites with Deed / Land Use Restriction. The DTSC Site Mitigation and Brownfields Reuse Program (SMBRP) list includes sites cleaned up under the program's oversight and generally does not include current or former hazardous waste facilities that required a hazardous waste facility permit. The list represents deed restrictions that are active. Some sites have multiple deed restrictions. The DTSC Hazardous Waste Management Program (HWMP) has developed a list of current or former hazardous waste facilities that have a recorded land use restriction at the local county recorder's office. The land use restrictions on this list were required by the DTSC HWMP as a result of the presence of hazardous substances that remain on site after the facility (or part of the facility) has been closed or cleaned up. The types of land use restriction include deed notice, deed restriction, or a land use restriction that binds current and future owners.

Date of Government Version: 03/15/2010	Source: Department of Toxic Substances Control
Date Data Arrived at EDR: 03/16/2010	Telephone: 916-323-3400
Date Made Active in Reports: 04/09/2010	Last EDR Contact: 06/15/2010
Number of Days to Update: 24	Next Scheduled EDR Contact: 09/27/2010
	Data Release Frequency: Semi-Annually

Records of Emergency Release Reports

HMIRS: Hazardous Materials Information Reporting System

Hazardous Materials Incident Report System. HMIRS contains hazardous material spill incidents reported to DOT.

Date of Government Version: 04/06/2010	Source: U.S. Department of Transportation
Date Data Arrived at EDR: 04/07/2010	Telephone: 202-366-4555
Date Made Active in Reports: 05/27/2010	Last EDR Contact: 04/07/2010
Number of Days to Update: 50	Next Scheduled EDR Contact: 07/19/2010
	Data Release Frequency: Annually

CHMIRS: California Hazardous Material Incident Report System

California Hazardous Material Incident Reporting System. CHMIRS contains information on reported hazardous material incidents (accidental releases or spills).

Date of Government Version: 12/31/2007	Source: Office of Emergency Services
Date Data Arrived at EDR: 05/09/2008	Telephone: 916-845-8400
Date Made Active in Reports: 06/20/2008	Last EDR Contact: 05/03/2010
Number of Days to Update: 42	Next Scheduled EDR Contact: 08/16/2010
	Data Release Frequency: Varies

LDS: Land Disposal Sites Listing

The Land Disposal program regulates of waste discharge to land for treatment, storage and disposal in waste management units.

Date of Government Version: 05/05/2010	Source: State Water Quality Control Board
Date Data Arrived at EDR: 05/05/2010	Telephone: 866-480-1028
Date Made Active in Reports: 05/18/2010	Last EDR Contact: 05/05/2010
Number of Days to Update: 13	Next Scheduled EDR Contact: 07/05/2010
	Data Release Frequency: Quarterly

MCS: Military Cleanup Sites Listing

The State Water Resources Control Board and nine Regional Water Quality Control Boards partner with the Department of Defense (DoD) through the Defense and State Memorandum of Agreement (DSMOA) to oversee the investigation and remediation of water quality issues at military facilities.

Date of Government Version: 05/05/2010	Source: State Water Resources Control Board
Date Data Arrived at EDR: 05/05/2010	Telephone: 866-480-1028
Date Made Active in Reports: 05/18/2010	Last EDR Contact: 05/06/2010
Number of Days to Update: 13	Next Scheduled EDR Contact: 07/05/2010
	Data Release Frequency: Quarterly

Other Ascertainable Records

RCRA-NonGen: RCRA - Non Generators

RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Non-Generators do not presently generate hazardous waste.

Date of Government Version: 02/17/2010
Date Data Arrived at EDR: 02/19/2010
Date Made Active in Reports: 05/17/2010
Number of Days to Update: 87

Source: Environmental Protection Agency
Telephone: (415) 495-8895
Last EDR Contact: 04/29/2010
Next Scheduled EDR Contact: 07/19/2010
Data Release Frequency: Varies

DOT OPS: Incident and Accident Data

Department of Transporation, Office of Pipeline Safety Incident and Accident data.

Date of Government Version: 01/12/2010
Date Data Arrived at EDR: 02/09/2010
Date Made Active in Reports: 04/12/2010
Number of Days to Update: 62

Source: Department of Transporation, Office of Pipeline Safety
Telephone: 202-366-4595
Last EDR Contact: 05/12/2010
Next Scheduled EDR Contact: 08/23/2010
Data Release Frequency: Varies

DOD: Department of Defense Sites

This data set consists of federally owned or administered lands, administered by the Department of Defense, that have any area equal to or greater than 640 acres of the United States, Puerto Rico, and the U.S. Virgin Islands.

Date of Government Version: 12/31/2005
Date Data Arrived at EDR: 11/10/2006
Date Made Active in Reports: 01/11/2007
Number of Days to Update: 62

Source: USGS
Telephone: 703-692-8801
Last EDR Contact: 04/21/2010
Next Scheduled EDR Contact: 08/02/2010
Data Release Frequency: Semi-Annually

FUDS: Formerly Used Defense Sites

The listing includes locations of Formerly Used Defense Sites properties where the US Army Corps of Engineers is actively working or will take necessary cleanup actions.

Date of Government Version: 12/31/2008
Date Data Arrived at EDR: 09/30/2009
Date Made Active in Reports: 12/01/2009
Number of Days to Update: 62

Source: U.S. Army Corps of Engineers
Telephone: 202-528-4285
Last EDR Contact: 06/18/2010
Next Scheduled EDR Contact: 09/27/2010
Data Release Frequency: Varies

CONSENT: Superfund (CERCLA) Consent Decrees

Major legal settlements that establish responsibility and standards for cleanup at NPL (Superfund) sites. Released periodically by United States District Courts after settlement by parties to litigation matters.

Date of Government Version: 04/11/2010
Date Data Arrived at EDR: 04/19/2010
Date Made Active in Reports: 05/17/2010
Number of Days to Update: 28

Source: Department of Justice, Consent Decree Library
Telephone: Varies
Last EDR Contact: 04/05/2010
Next Scheduled EDR Contact: 07/19/2010
Data Release Frequency: Varies

ROD: Records Of Decision

Record of Decision. ROD documents mandate a permanent remedy at an NPL (Superfund) site containing technical and health information to aid in the cleanup.

Date of Government Version: 04/29/2010
Date Data Arrived at EDR: 05/07/2010
Date Made Active in Reports: 06/27/2010
Number of Days to Update: 20

Source: EPA
Telephone: 703-416-0223
Last EDR Contact: 06/18/2010
Next Scheduled EDR Contact: 09/27/2010
Data Release Frequency: Annually

UMTRA: Uranium Mill Tailings Sites

Uranium ore was mined by private companies for federal government use in national defense programs. When the mills shut down, large piles of the sand-like material (mill tailings) remain after uranium has been extracted from the ore. Levels of human exposure to radioactive materials from the piles are low; however, in some cases tailings were used as construction materials before the potential health hazards of the tailings were recognized.

Date of Government Version: 01/05/2009
Date Data Arrived at EDR: 05/07/2009
Date Made Active in Reports: 05/08/2009
Number of Days to Update: 1

Source: Department of Energy
Telephone: 505-845-0011
Last EDR Contact: 06/01/2010
Next Scheduled EDR Contact: 09/13/2010
Data Release Frequency: Varies

MINES: Mines Master Index File

Contains all mine identification numbers issued for mines active or opened since 1971. The data also includes violation information.

Date of Government Version: 02/12/2010
Date Data Arrived at EDR: 03/10/2010
Date Made Active in Reports: 05/17/2010
Number of Days to Update: 68

Source: Department of Labor, Mine Safety and Health Administration
Telephone: 303-231-5959
Last EDR Contact: 06/09/2010
Next Scheduled EDR Contact: 09/20/2010
Data Release Frequency: Semi-Annually

TRIS: Toxic Chemical Release Inventory System

Toxic Release Inventory System. TRIS identifies facilities which release toxic chemicals to the air, water and land in reportable quantities under SARA Title III Section 313.

Date of Government Version: 12/31/2008
Date Data Arrived at EDR: 01/13/2010
Date Made Active in Reports: 02/18/2010
Number of Days to Update: 36

Source: EPA
Telephone: 202-566-0250
Last EDR Contact: 06/04/2010
Next Scheduled EDR Contact: 09/13/2010
Data Release Frequency: Annually

TSCA: Toxic Substances Control Act

Toxic Substances Control Act. TSCA identifies manufacturers and importers of chemical substances included on the TSCA Chemical Substance Inventory list. It includes data on the production volume of these substances by plant site.

Date of Government Version: 12/31/2002
Date Data Arrived at EDR: 04/14/2006
Date Made Active in Reports: 05/30/2006
Number of Days to Update: 46

Source: EPA
Telephone: 202-260-5521
Last EDR Contact: 04/21/2010
Next Scheduled EDR Contact: 07/12/2010
Data Release Frequency: Every 4 Years

FTTS: FIFRA/ TSCA Tracking System - FIFRA (Federal Insecticide, Fungicide, & Rodenticide Act)/TSCA (Toxic Substances Control Act)

FTTS tracks administrative cases and pesticide enforcement actions and compliance activities related to FIFRA, TSCA and EPCRA (Emergency Planning and Community Right-to-Know Act). To maintain currency, EDR contacts the Agency on a quarterly basis.

Date of Government Version: 04/09/2009
Date Data Arrived at EDR: 04/16/2009
Date Made Active in Reports: 05/11/2009
Number of Days to Update: 25

Source: EPA/Office of Prevention, Pesticides and Toxic Substances
Telephone: 202-566-1667
Last EDR Contact: 06/01/2010
Next Scheduled EDR Contact: 09/13/2010
Data Release Frequency: Quarterly

FTTS INSP: FIFRA/ TSCA Tracking System - FIFRA (Federal Insecticide, Fungicide, & Rodenticide Act)/TSCA (Toxic Substances Control Act)

A listing of FIFRA/TSCA Tracking System (FTTS) inspections and enforcements.

Date of Government Version: 04/09/2009
Date Data Arrived at EDR: 04/16/2009
Date Made Active in Reports: 05/11/2009
Number of Days to Update: 25

Source: EPA
Telephone: 202-566-1667
Last EDR Contact: 06/01/2010
Next Scheduled EDR Contact: 09/13/2010
Data Release Frequency: Quarterly

HIST FTTS: FIFRA/TSCA Tracking System Administrative Case Listing

A complete administrative case listing from the FIFRA/TSCA Tracking System (FTTS) for all ten EPA regions. The information was obtained from the National Compliance Database (NCDB). NCDB supports the implementation of FIFRA (Federal Insecticide, Fungicide, and Rodenticide Act) and TSCA (Toxic Substances Control Act). Some EPA regions are now closing out records. Because of that, and the fact that some EPA regions are not providing EPA Headquarters with updated records, it was decided to create a HIST FTTS database. It included records that may not be included in the newer FTTS database updates. This database is no longer updated.

Date of Government Version: 10/19/2006
Date Data Arrived at EDR: 03/01/2007
Date Made Active in Reports: 04/10/2007
Number of Days to Update: 40

Source: Environmental Protection Agency
Telephone: 202-564-2501
Last EDR Contact: 12/17/2007
Next Scheduled EDR Contact: 03/17/2008
Data Release Frequency: No Update Planned

HIST FTTS INSP: FIFRA/TSCA Tracking System Inspection & Enforcement Case Listing

A complete inspection and enforcement case listing from the FIFRA/TSCA Tracking System (FTTS) for all ten EPA regions. The information was obtained from the National Compliance Database (NCDB). NCDB supports the implementation of FIFRA (Federal Insecticide, Fungicide, and Rodenticide Act) and TSCA (Toxic Substances Control Act). Some EPA regions are now closing out records. Because of that, and the fact that some EPA regions are not providing EPA Headquarters with updated records, it was decided to create a HIST FTTS database. It included records that may not be included in the newer FTTS database updates. This database is no longer updated.

Date of Government Version: 10/19/2006
Date Data Arrived at EDR: 03/01/2007
Date Made Active in Reports: 04/10/2007
Number of Days to Update: 40

Source: Environmental Protection Agency
Telephone: 202-564-2501
Last EDR Contact: 12/17/2008
Next Scheduled EDR Contact: 03/17/2008
Data Release Frequency: No Update Planned

SSTS: Section 7 Tracking Systems

Section 7 of the Federal Insecticide, Fungicide and Rodenticide Act, as amended (92 Stat. 829) requires all registered pesticide-producing establishments to submit a report to the Environmental Protection Agency by March 1st each year. Each establishment must report the types and amounts of pesticides, active ingredients and devices being produced, and those having been produced and sold or distributed in the past year.

Date of Government Version: 12/31/2008
Date Data Arrived at EDR: 01/06/2010
Date Made Active in Reports: 02/10/2010
Number of Days to Update: 35

Source: EPA
Telephone: 202-564-4203
Last EDR Contact: 05/03/2010
Next Scheduled EDR Contact: 08/16/2010
Data Release Frequency: Annually

ICIS: Integrated Compliance Information System

The Integrated Compliance Information System (ICIS) supports the information needs of the national enforcement and compliance program as well as the unique needs of the National Pollutant Discharge Elimination System (NPDES) program.

Date of Government Version: 04/24/2010
Date Data Arrived at EDR: 04/29/2010
Date Made Active in Reports: 05/17/2010
Number of Days to Update: 18

Source: Environmental Protection Agency
Telephone: 202-564-5088
Last EDR Contact: 03/29/2010
Next Scheduled EDR Contact: 07/12/2010
Data Release Frequency: Quarterly

PADS: PCB Activity Database System

PCB Activity Database. PADS Identifies generators, transporters, commercial storers and/or brokers and disposers of PCB's who are required to notify the EPA of such activities.

Date of Government Version: 09/01/2009
Date Data Arrived at EDR: 10/21/2009
Date Made Active in Reports: 12/01/2009
Number of Days to Update: 41

Source: EPA
Telephone: 202-566-0500
Last EDR Contact: 04/22/2010
Next Scheduled EDR Contact: 08/02/2010
Data Release Frequency: Annually

MLTS: Material Licensing Tracking System

MLTS is maintained by the Nuclear Regulatory Commission and contains a list of approximately 8,100 sites which possess or use radioactive materials and which are subject to NRC licensing requirements. To maintain currency, EDR contacts the Agency on a quarterly basis.

Date of Government Version: 03/16/2010
Date Data Arrived at EDR: 04/06/2010
Date Made Active in Reports: 05/27/2010
Number of Days to Update: 51

Source: Nuclear Regulatory Commission
Telephone: 301-415-7169
Last EDR Contact: 06/14/2010
Next Scheduled EDR Contact: 09/27/2010
Data Release Frequency: Quarterly

RADINFO: Radiation Information Database

The Radiation Information Database (RADINFO) contains information about facilities that are regulated by U.S. Environmental Protection Agency (EPA) regulations for radiation and radioactivity.

Date of Government Version: 04/13/2010
Date Data Arrived at EDR: 04/14/2010
Date Made Active in Reports: 05/17/2010
Number of Days to Update: 33

Source: Environmental Protection Agency
Telephone: 202-343-9775
Last EDR Contact: 04/14/2010
Next Scheduled EDR Contact: 07/26/2010
Data Release Frequency: Quarterly

FINDS: Facility Index System/Facility Registry System

Facility Index System. FINDS contains both facility information and 'pointers' to other sources that contain more detail. EDR includes the following FINDS databases in this report: PCS (Permit Compliance System), AIRS (Aerometric Information Retrieval System), DOCKET (Enforcement Docket used to manage and track information on civil judicial enforcement cases for all environmental statutes), FURS (Federal Underground Injection Control), C-DOCKET (Criminal Docket System used to track criminal enforcement actions for all environmental statutes), FFIS (Federal Facilities Information System), STATE (State Environmental Laws and Statutes), and PADS (PCB Activity Data System).

Date of Government Version: 04/14/2010
Date Data Arrived at EDR: 04/16/2010
Date Made Active in Reports: 05/27/2010
Number of Days to Update: 41

Source: EPA
Telephone: (415) 947-8000
Last EDR Contact: 06/14/2010
Next Scheduled EDR Contact: 09/27/2010
Data Release Frequency: Quarterly

RAATS: RCRA Administrative Action Tracking System

RCRA Administration Action Tracking System. RAATS contains records based on enforcement actions issued under RCRA pertaining to major violators and includes administrative and civil actions brought by the EPA. For administration actions after September 30, 1995, data entry in the RAATS database was discontinued. EPA will retain a copy of the database for historical records. It was necessary to terminate RAATS because a decrease in agency resources made it impossible to continue to update the information contained in the database.

Date of Government Version: 04/17/1995
Date Data Arrived at EDR: 07/03/1995
Date Made Active in Reports: 08/07/1995
Number of Days to Update: 35

Source: EPA
Telephone: 202-564-4104
Last EDR Contact: 06/02/2008
Next Scheduled EDR Contact: 09/01/2008
Data Release Frequency: No Update Planned

BRS: Biennial Reporting System

The Biennial Reporting System is a national system administered by the EPA that collects data on the generation and management of hazardous waste. BRS captures detailed data from two groups: Large Quantity Generators (LQG) and Treatment, Storage, and Disposal Facilities.

Date of Government Version: 12/31/2007
Date Data Arrived at EDR: 02/25/2010
Date Made Active in Reports: 05/12/2010
Number of Days to Update: 76

Source: EPA/NTIS
Telephone: 800-424-9346
Last EDR Contact: 05/25/2010
Next Scheduled EDR Contact: 09/06/2010
Data Release Frequency: Biennially

CA BOND EXP. PLAN: Bond Expenditure Plan
Department of Health Services developed a site-specific expenditure plan as the basis for an appropriation of Hazardous Substance Cleanup Bond Act funds. It is not updated.

Date of Government Version: 01/01/1989
Date Data Arrived at EDR: 07/27/1994
Date Made Active in Reports: 08/02/1994
Number of Days to Update: 6

Source: Department of Health Services
Telephone: 916-255-2118
Last EDR Contact: 05/31/1994
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

CA WDS: Waste Discharge System
Sites which have been issued waste discharge requirements.

Date of Government Version: 06/19/2007
Date Data Arrived at EDR: 06/20/2007
Date Made Active in Reports: 06/29/2007
Number of Days to Update: 9

Source: State Water Resources Control Board
Telephone: 916-341-5227
Last EDR Contact: 06/01/2010
Next Scheduled EDR Contact: 09/13/2010
Data Release Frequency: Quarterly

NPDES: NPDES Permits Listing
A listing of NPDES permits, including stormwater.

Date of Government Version: 02/22/2010
Date Data Arrived at EDR: 02/24/2010
Date Made Active in Reports: 03/04/2010
Number of Days to Update: 8

Source: State Water Resources Control Board
Telephone: 916-445-9379
Last EDR Contact: 05/25/2010
Next Scheduled EDR Contact: 09/06/2010
Data Release Frequency: Quarterly

CORTESE: "Cortese" Hazardous Waste & Substances Sites List
The sites for the list are designated by the State Water Resource Control Board (LUST), the Integrated Waste Board (SWF/LS), and the Department of Toxic Substances Control (Cal-Sites). This listing is no longer updated by the state agency.

Date of Government Version: 04/05/2010
Date Data Arrived at EDR: 04/07/2010
Date Made Active in Reports: 05/18/2010
Number of Days to Update: 41

Source: CAL EPA/Office of Emergency Information
Telephone: 916-323-3400
Last EDR Contact: 04/07/2010
Next Scheduled EDR Contact: 07/19/2010
Data Release Frequency: Quarterly

HIST CORTESE: Hazardous Waste & Substance Site List
The sites for the list are designated by the State Water Resource Control Board [LUST], the Integrated Waste Board [SWF/LS], and the Department of Toxic Substances Control [CALSITES].

Date of Government Version: 04/01/2001
Date Data Arrived at EDR: 01/22/2009
Date Made Active in Reports: 04/08/2009
Number of Days to Update: 76

Source: Department of Toxic Substances Control
Telephone: 916-323-3400
Last EDR Contact: 01/22/2009
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

NOTIFY 65: Proposition 65 Records
Proposition 65 Notification Records. NOTIFY 65 contains facility notifications about any release which could impact drinking water and thereby expose the public to a potential health risk.

Date of Government Version: 10/21/1993
Date Data Arrived at EDR: 11/01/1993
Date Made Active in Reports: 11/19/1993
Number of Days to Update: 18

Source: State Water Resources Control Board
Telephone: 916-445-3846
Last EDR Contact: 03/29/2010
Next Scheduled EDR Contact: 07/12/2010
Data Release Frequency: No Update Planned

DRYCLEANERS: Cleaner Facilities
A list of drycleaner related facilities that have EPA ID numbers. These are facilities with certain SIC codes: power laundries, family and commercial; garment pressing and cleaner's agents; linen supply; coin-operated laundries and cleaning; drycleaning plants, except rugs; carpet and upholster cleaning; industrial launderers; laundry and garment services.

Date of Government Version: 12/22/2009
Date Data Arrived at EDR: 01/25/2010
Date Made Active in Reports: 01/29/2010
Number of Days to Update: 4

Source: Department of Toxic Substance Control
Telephone: 916-327-4498
Last EDR Contact: 06/14/2010
Next Scheduled EDR Contact: 09/27/2010
Data Release Frequency: Annually

WIP: Well Investigation Program Case List
Well Investigation Program case in the San Gabriel and San Fernando Valley area.

Date of Government Version: 07/03/2009
Date Data Arrived at EDR: 07/21/2009
Date Made Active in Reports: 08/03/2009
Number of Days to Update: 13

Source: Los Angeles Water Quality Control Board
Telephone: 213-576-6726
Last EDR Contact: 04/14/2010
Next Scheduled EDR Contact: 07/19/2010
Data Release Frequency: Varies

HAZNET: Facility and Manifest Data
Facility and Manifest Data. The data is extracted from the copies of hazardous waste manifests received each year by the DTSC. The annual volume of manifests is typically 700,000 - 1,000,000 annually, representing approximately 350,000 - 500,000 shipments. Data are from the manifests submitted without correction, and therefore many contain some invalid values for data elements such as generator ID, TSD ID, waste category, and disposal method.

Date of Government Version: 12/31/2008
Date Data Arrived at EDR: 10/21/2009
Date Made Active in Reports: 10/28/2009
Number of Days to Update: 7

Source: California Environmental Protection Agency
Telephone: 916-255-1136
Last EDR Contact: 04/26/2010
Next Scheduled EDR Contact: 08/02/2010
Data Release Frequency: Annually

EMI: Emissions Inventory Data
Toxics and criteria pollutant emissions data collected by the ARB and local air pollution agencies.

Date of Government Version: 12/31/2007
Date Data Arrived at EDR: 07/14/2009
Date Made Active in Reports: 07/23/2009
Number of Days to Update: 9

Source: California Air Resources Board
Telephone: 916-322-2990
Last EDR Contact: 04/09/2010
Next Scheduled EDR Contact: 07/12/2010
Data Release Frequency: Varies

INDIAN RESERV: Indian Reservations
This map layer portrays Indian administered lands of the United States that have any area equal to or greater than 640 acres.

Date of Government Version: 12/31/2005
Date Data Arrived at EDR: 12/08/2006
Date Made Active in Reports: 01/11/2007
Number of Days to Update: 34

Source: USGS
Telephone: 202-208-3710
Last EDR Contact: 04/21/2010
Next Scheduled EDR Contact: 08/02/2010
Data Release Frequency: Semi-Annually

SCRD DRYCLEANERS: State Coalition for Remediation of Drycleaners Listing
The State Coalition for Remediation of Drycleaners was established in 1998, with support from the U.S. EPA Office of Superfund Remediation and Technology Innovation. It is comprised of representatives of states with established drycleaner remediation programs. Currently the member states are Alabama, Connecticut, Florida, Illinois, Kansas, Minnesota, Missouri, North Carolina, Oregon, South Carolina, Tennessee, Texas, and Wisconsin.

Date of Government Version: 02/10/2010
Date Data Arrived at EDR: 02/11/2010
Date Made Active in Reports: 04/12/2010
Number of Days to Update: 60

Source: Environmental Protection Agency
Telephone: 615-532-8599
Last EDR Contact: 05/10/2010
Next Scheduled EDR Contact: 08/09/2010
Data Release Frequency: Varies

PROC: Certified Processors Database
A listing of certified processors.

Date of Government Version: 01/06/2010
Date Data Arrived at EDR: 03/24/2010
Date Made Active in Reports: 04/09/2010
Number of Days to Update: 16

Source: Department of Conservation
Telephone: 916-323-3836
Last EDR Contact: 03/24/2010
Next Scheduled EDR Contact: 07/05/2010
Data Release Frequency: Quarterly

MWMP: Medical Waste Management Program Listing
The Medical Waste Management Program (MWMP) ensures the proper handling and disposal of medical waste by permitting and inspecting medical waste Offsite Treatment Facilities (PDF) and Transfer Stations (PDF) throughout the state. MWMP also oversees all Medical Waste Transporters.

Date of Government Version: 02/24/2010
Date Data Arrived at EDR: 03/17/2010
Date Made Active in Reports: 04/08/2010
Number of Days to Update: 23

Source: Department of Public Health
Telephone: 916-558-1784
Last EDR Contact: 06/14/2010
Next Scheduled EDR Contact: 09/27/2010
Data Release Frequency: Varies

COAL ASH DOE: Steam-Electric Plan Operation Data
A listing of power plants that store ash in surface ponds.

Date of Government Version: 12/31/2005
Date Data Arrived at EDR: 08/07/2009
Date Made Active in Reports: 10/22/2009
Number of Days to Update: 76

Source: Department of Energy
Telephone: 202-586-8719
Last EDR Contact: 04/21/2010
Next Scheduled EDR Contact: 08/02/2010
Data Release Frequency: Varies

COAL ASH EPA: Coal Combustion Residues Surface Impoundments List
A listing of coal combustion residues surface impoundments with high hazard potential ratings.

Date of Government Version: 11/09/2009
Date Data Arrived at EDR: 12/18/2009
Date Made Active in Reports: 02/10/2010
Number of Days to Update: 54

Source: Environmental Protection Agency
Telephone: N/A
Last EDR Contact: 06/14/2010
Next Scheduled EDR Contact: 09/27/2010
Data Release Frequency: Varies

HWT: Registered Hazardous Waste Transporter Database
A listing of hazardous waste transporters. In California, unless specifically exempted, it is unlawful for any person to transport hazardous wastes unless the person holds a valid registration issued by DTSC. A hazardous waste transporter registration is valid for one year and is assigned a unique registration number.

Date of Government Version: 04/21/2010
Date Data Arrived at EDR: 04/21/2010
Date Made Active in Reports: 05/18/2010
Number of Days to Update: 27

Source: Department of Toxic Substances Control
Telephone: 916-440-7145
Last EDR Contact: 04/21/2010
Next Scheduled EDR Contact: 08/02/2010
Data Release Frequency: Quarterly

HWP: EnviroStor Permitted Facilities Listing
Detailed information on permitted hazardous waste facilities and corrective action (a??cleanups a??) tracked in EnviroStor.

Date of Government Version: 05/11/2010
Date Data Arrived at EDR: 05/12/2010
Date Made Active in Reports: 05/18/2010
Number of Days to Update: 6

Source: Department of Toxic Substances Control
Telephone: 916-323-3400
Last EDR Contact: 05/12/2010
Next Scheduled EDR Contact: 08/23/2010
Data Release Frequency: Quarterly

FINANCIAL ASSURANCE 2: Financial Assurance Information Listing
A listing of financial assurance information for solid waste facilities. Financial assurance is intended to ensure that resources are available to pay for the cost of closure, post-closure care, and corrective measures if the owner or operator of a regulated facility is unable or unwilling to pay.

Date of Government Version: 03/09/2010
Date Data Arrived at EDR: 03/10/2010
Date Made Active in Reports: 04/09/2010
Number of Days to Update: 30

Source: California Integrated Waste Management Board
Telephone: 916-341-6066
Last EDR Contact: 06/21/2010
Next Scheduled EDR Contact: 09/06/2010
Data Release Frequency: Varies

FINANCIAL ASSURANCE: Financial Assurance Information Listing
Financial Assurance information

Date of Government Version: 03/01/2007
Date Data Arrived at EDR: 06/01/2007
Date Made Active in Reports: 06/29/2007
Number of Days to Update: 28

Source: Department of Toxic Substances Control
Telephone: 916-255-3628
Last EDR Contact: 05/05/2010
Next Scheduled EDR Contact: 08/16/2010
Data Release Frequency: Varies

FEDLAND: Federal and Indian Lands
Federally and Indian administrated lands of the United States. Lands included are administrated by: Army Corps of Engineers, Bureau of Reclamation, National Wild and Scenic River, National Wildlife Refuge, Public Domain Land, Wilderness, Wilderness Study Area, Wildlife Management Area, Bureau of Indian Affairs, Bureau of Land Management, Department of Justice, Forest Service, Fish and Wildlife Service, National Park Service.

Date of Government Version: 12/31/2005
Date Data Arrived at EDR: 02/06/2006
Date Made Active in Reports: 01/11/2007
Number of Days to Update: 339

Source: U.S. Geological Survey
Telephone: 888-275-8747
Last EDR Contact: 04/21/2010
Next Scheduled EDR Contact: 08/02/2010
Data Release Frequency: N/A

PCB TRANSFORMER: PCB Transformer Registration Database
The database of PCB transformer registrations that includes all PCB registration submittals.

Date of Government Version: 01/01/2008
Date Data Arrived at EDR: 02/18/2009
Date Made Active in Reports: 05/29/2009
Number of Days to Update: 100

Source: Environmental Protection Agency
Telephone: 202-566-0517
Last EDR Contact: 05/14/2010
Next Scheduled EDR Contact: 08/16/2010
Data Release Frequency: Varies

EDR PROPRIETARY RECORDS

EDR Proprietary Records

Manufactured Gas Plants: EDR Proprietary Manufactured Gas Plants
The EDR Proprietary Manufactured Gas Plant Database includes records of coal gas plants (manufactured gas plants) compiled by EDR's researchers. Manufactured gas sites were used in the United States from the 1800's to 1950's to produce a gas that could be distributed and used as fuel. These plants used whale oil, rosin, coal, or a mixture of coal, oil, and water that also produced a significant amount of waste. Many of the byproducts of the gas production, such as coal tar (oily waste containing volatile and non-volatile chemicals), sludges, oils and other compounds are potentially hazardous to human health and the environment. The byproduct from this process was frequently disposed of directly at the plant site and can remain or spread slowly, serving as a continuous source of soil and groundwater contamination.

Date of Government Version: N/A
Date Data Arrived at EDR: N/A
Date Made Active in Reports: N/A
Number of Days to Update: N/A

Source: EDR, Inc.
Telephone: N/A
Last EDR Contact: N/A
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

EDR Historical Auto Stations: EDR Proprietary Historic Gas Stations

EDR has searched selected national collections of business directories and has collected listings of potential gas station/filling station/service station sites that were available to EDR researchers. EDR's review was limited to those categories of sources that might, in EDR's opinion, include gas station/filling station/service station establishments. The categories reviewed included, but were not limited to gas, gas station, gasoline station, filling station, auto, automobile repair, auto service station, service station, etc.

Date of Government Version: N/A
Date Data Arrived at EDR: N/A
Date Made Active in Reports: N/A
Number of Days to Update: N/A

Source: EDR, Inc.
Telephone: N/A
Last EDR Contact: N/A
Next Scheduled EDR Contact: N/A
Data Release Frequency: Varies

EDR Historical Cleaners: EDR Proprietary Historic Dry Cleaners

EDR has searched selected national collections of business directories and has collected listings of potential dry cleaner sites that were available to EDR researchers. EDR's review was limited to those categories of sources that might, in EDR's opinion, include dry cleaning establishments. The categories reviewed included, but were not limited to dry cleaners, cleaners, laundry, laundromat, cleaning/laundry, wash & dry etc.

Date of Government Version: N/A
Date Data Arrived at EDR: N/A
Date Made Active in Reports: N/A
Number of Days to Update: N/A

Source: EDR, Inc.
Telephone: N/A
Last EDR Contact: N/A
Next Scheduled EDR Contact: N/A
Data Release Frequency: Varies

COUNTY RECORDS

ALAMEDA COUNTY:

Contaminated Sites

A listing of contaminated sites overseen by the Toxic Release Program (oil and groundwater contamination from chemical releases and spills) and the Leaking Underground Storage Tank Program (soil and ground water contamination from leaking petroleum USTs).

Date of Government Version: 04/12/2010
Date Data Arrived at EDR: 04/14/2010
Date Made Active in Reports: 05/18/2010
Number of Days to Update: 34

Source: Alameda County Environmental Health Services
Telephone: 510-567-6700
Last EDR Contact: 04/05/2010
Next Scheduled EDR Contact: 07/19/2010
Data Release Frequency: Semi-Annually

Underground Tanks

Underground storage tank sites located in Alameda county.

Date of Government Version: 04/12/2010
Date Data Arrived at EDR: 04/14/2010
Date Made Active in Reports: 05/18/2010
Number of Days to Update: 34

Source: Alameda County Environmental Health Services
Telephone: 510-567-6700
Last EDR Contact: 04/05/2010
Next Scheduled EDR Contact: 07/19/2010
Data Release Frequency: Semi-Annually

CONTRA COSTA COUNTY:

Site List

List includes sites from the underground tank, hazardous waste generator and business plan/2185 programs.

Date of Government Version: 02/10/2010
Date Data Arrived at EDR: 02/11/2010
Date Made Active in Reports: 02/18/2010
Number of Days to Update: 7

Source: Contra Costa Health Services Department
Telephone: 925-646-2286
Last EDR Contact: 05/24/2010
Next Scheduled EDR Contact: 08/23/2010
Data Release Frequency: Semi-Annually

FRESNO COUNTY:

CUPA Resources List

Certified Unified Program Agency. CUPA's are responsible for implementing a unified hazardous materials and hazardous waste management regulatory program. The agency provides oversight of businesses that deal with hazardous materials, operate underground storage tanks or aboveground storage tanks.

Date of Government Version: 04/15/2010
Date Data Arrived at EDR: 04/16/2010
Date Made Active in Reports: 05/18/2010
Number of Days to Update: 32

Source: Dept. of Community Health
Telephone: 559-445-3271
Last EDR Contact: 04/16/2010
Next Scheduled EDR Contact: 08/02/2010
Data Release Frequency: Semi-Annually

KERN COUNTY:

Underground Storage Tank Sites & Tank Listing

Kern County Sites and Tanks Listing.

Date of Government Version: 03/16/2010
Date Data Arrived at EDR: 03/17/2010
Date Made Active in Reports: 04/14/2010
Number of Days to Update: 28

Source: Kern County Environment Health Services Department
Telephone: 661-862-8700
Last EDR Contact: 05/17/2010
Next Scheduled EDR Contact: 08/30/2010
Data Release Frequency: Quarterly

LOS ANGELES COUNTY:

San Gabriel Valley Areas of Concern

San Gabriel Valley areas where VOC contamination is at or above the MCL as designated by region 9 EPA office.

Date of Government Version: 03/30/2009
Date Data Arrived at EDR: 03/31/2009
Date Made Active in Reports: 10/23/2009
Number of Days to Update: 206

Source: EPA Region 9
Telephone: 415-972-3178
Last EDR Contact: 03/29/2010
Next Scheduled EDR Contact: 07/12/2010
Data Release Frequency: No Update Planned

HMS: Street Number List

Industrial Waste and Underground Storage Tank Sites.

Date of Government Version: 12/31/2009
Date Data Arrived at EDR: 04/13/2010
Date Made Active in Reports: 05/18/2010
Number of Days to Update: 35

Source: Department of Public Works
Telephone: 626-458-3517
Last EDR Contact: 04/19/2010
Next Scheduled EDR Contact: 08/02/2010
Data Release Frequency: Semi-Annually

List of Solid Waste Facilities

Solid Waste Facilities in Los Angeles County.

Date of Government Version: 04/23/2010
Date Data Arrived at EDR: 04/26/2010
Date Made Active in Reports: 05/18/2010
Number of Days to Update: 22

Source: La County Department of Public Works
Telephone: 818-458-5185
Last EDR Contact: 04/23/2010
Next Scheduled EDR Contact: 08/09/2010
Data Release Frequency: Varies

City of Los Angeles Landfills

Landfills owned and maintained by the City of Los Angeles.

Date of Government Version: 03/05/2009
Date Data Arrived at EDR: 03/10/2009
Date Made Active in Reports: 04/08/2009
Number of Days to Update: 29

Source: Engineering & Construction Division
Telephone: 213-473-7869
Last EDR Contact: 06/18/2010
Next Scheduled EDR Contact: 09/06/2010
Data Release Frequency: Varies

Site Mitigation List

Industrial sites that have had some sort of spill or complaint.

Date of Government Version: 02/09/2010
Date Data Arrived at EDR: 02/12/2010
Date Made Active in Reports: 03/04/2010
Number of Days to Update: 20

Source: Community Health Services
Telephone: 323-890-7806
Last EDR Contact: 04/22/2010
Next Scheduled EDR Contact: 08/09/2010
Data Release Frequency: Annually

City of El Segundo Underground Storage Tank

Underground storage tank sites located in El Segundo city.

Date of Government Version: 04/28/2010
Date Data Arrived at EDR: 04/29/2010
Date Made Active in Reports: 05/18/2010
Number of Days to Update: 19

Source: City of El Segundo Fire Department
Telephone: 310-524-2236
Last EDR Contact: 04/23/2010
Next Scheduled EDR Contact: 08/09/2010
Data Release Frequency: Semi-Annually

City of Long Beach Underground Storage Tank

Underground storage tank sites located in the city of Long Beach.

Date of Government Version: 03/28/2003
Date Data Arrived at EDR: 10/23/2003
Date Made Active in Reports: 11/26/2003
Number of Days to Update: 34

Source: City of Long Beach Fire Department
Telephone: 562-570-2563
Last EDR Contact: 05/03/2010
Next Scheduled EDR Contact: 08/16/2010
Data Release Frequency: Annually

City of Torrance Underground Storage Tank

Underground storage tank sites located in the city of Torrance.

Date of Government Version: 04/19/2010
Date Data Arrived at EDR: 04/21/2010
Date Made Active in Reports: 05/18/2010
Number of Days to Update: 27

Source: City of Torrance Fire Department
Telephone: 310-618-2973
Last EDR Contact: 04/19/2010
Next Scheduled EDR Contact: 08/02/2010
Data Release Frequency: Semi-Annually

MARIN COUNTY:

Underground Storage Tank Sites

Currently permitted USTs in Marin County.

Date of Government Version: 04/19/2010
Date Data Arrived at EDR: 04/30/2010
Date Made Active in Reports: 05/18/2010
Number of Days to Update: 18

Source: Public Works Department Waste Management
Telephone: 415-499-6647
Last EDR Contact: 04/12/2010
Next Scheduled EDR Contact: 07/26/2010
Data Release Frequency: Semi-Annually

NAPA COUNTY:

Sites With Reported Contamination

A listing of leaking underground storage tank sites located in Napa county.

Date of Government Version: 07/09/2008
Date Data Arrived at EDR: 07/09/2008
Date Made Active in Reports: 07/31/2008
Number of Days to Update: 22

Source: Napa County Department of Environmental Management
Telephone: 707-253-4269
Last EDR Contact: 06/07/2010
Next Scheduled EDR Contact: 09/20/2010
Data Release Frequency: No Update Planned

Closed and Operating Underground Storage Tank Sites

Underground storage tank sites located in Napa county.

Date of Government Version: 01/15/2008
Date Data Arrived at EDR: 01/16/2008
Date Made Active in Reports: 02/08/2008
Number of Days to Update: 23

Source: Napa County Department of Environmental Management
Telephone: 707-253-4269
Last EDR Contact: 06/07/2010
Next Scheduled EDR Contact: 09/20/2010
Data Release Frequency: No Update Planned

ORANGE COUNTY:

List of Industrial Site Cleanups

Petroleum and non-petroleum spills.

Date of Government Version: 12/02/2009
Date Data Arrived at EDR: 02/16/2010
Date Made Active in Reports: 03/04/2010
Number of Days to Update: 16

Source: Health Care Agency
Telephone: 714-834-3446
Last EDR Contact: 05/18/2010
Next Scheduled EDR Contact: 08/30/2010
Data Release Frequency: Annually

List of Underground Storage Tank Cleanups

Orange County Underground Storage Tank Cleanups (LUST).

Date of Government Version: 02/03/2010
Date Data Arrived at EDR: 02/16/2010
Date Made Active in Reports: 03/04/2010
Number of Days to Update: 16

Source: Health Care Agency
Telephone: 714-834-3446
Last EDR Contact: 05/18/2010
Next Scheduled EDR Contact: 08/30/2010
Data Release Frequency: Quarterly

List of Underground Storage Tank Facilities

Orange County Underground Storage Tank Facilities (UST).

Date of Government Version: 02/03/2010
Date Data Arrived at EDR: 02/12/2010
Date Made Active in Reports: 02/23/2010
Number of Days to Update: 11

Source: Health Care Agency
Telephone: 714-834-3446
Last EDR Contact: 05/28/2010
Next Scheduled EDR Contact: 08/30/2010
Data Release Frequency: Quarterly

PLACER COUNTY:

Master List of Facilities

List includes aboveground tanks, underground tanks and cleanup sites.

Date of Government Version: 03/16/2010
Date Data Arrived at EDR: 03/17/2010
Date Made Active in Reports: 04/09/2010
Number of Days to Update: 23

Source: Placer County Health and Human Services
Telephone: 530-889-7312
Last EDR Contact: 06/14/2010
Next Scheduled EDR Contact: 09/27/2010
Data Release Frequency: Semi-Annually

RIVERSIDE COUNTY:

Listing of Underground Tank Cleanup Sites

Riverside County Underground Storage Tank Cleanup Sites (LUST).

Date of Government Version: 04/19/2010
Date Data Arrived at EDR: 04/19/2010
Date Made Active in Reports: 05/18/2010
Number of Days to Update: 29

Source: Department of Public Health
Telephone: 951-358-5055
Last EDR Contact: 03/29/2010
Next Scheduled EDR Contact: 07/12/2010
Data Release Frequency: Quarterly

Underground Storage Tank Tank List
Underground storage tank sites located in Riverside county.

Date of Government Version: 04/19/2010
Date Data Arrived at EDR: 04/19/2010
Date Made Active in Reports: 05/18/2010
Number of Days to Update: 29

Source: Health Services Agency
Telephone: 951-358-5055
Last EDR Contact: 03/29/2010
Next Scheduled EDR Contact: 07/12/2010
Data Release Frequency: Quarterly

SACRAMENTO COUNTY:

Toxic Site Clean-Up List
List of sites where unauthorized releases of potentially hazardous materials have occurred.

Date of Government Version: 04/01/2010
Date Data Arrived at EDR: 04/15/2010
Date Made Active in Reports: 05/18/2010
Number of Days to Update: 33

Source: Sacramento County Environmental Management
Telephone: 916-875-8406
Last EDR Contact: 04/12/2010
Next Scheduled EDR Contact: 07/26/2010
Data Release Frequency: Quarterly

Master Hazardous Materials Facility List
Any business that has hazardous materials on site - hazardous material storage sites, underground storage tanks, waste generators.

Date of Government Version: 03/03/2010
Date Data Arrived at EDR: 04/16/2010
Date Made Active in Reports: 05/18/2010
Number of Days to Update: 32

Source: Sacramento County Environmental Management
Telephone: 916-875-8406
Last EDR Contact: 04/12/2010
Next Scheduled EDR Contact: 07/26/2010
Data Release Frequency: Quarterly

SAN BERNARDINO COUNTY:

Hazardous Material Permits
This listing includes underground storage tanks, medical waste handlers/generators, hazardous materials handlers, hazardous waste generators, and waste oil generators/handlers.

Date of Government Version: 03/16/2010
Date Data Arrived at EDR: 03/17/2010
Date Made Active in Reports: 04/09/2010
Number of Days to Update: 23

Source: San Bernardino County Fire Department Hazardous Materials Division
Telephone: 909-387-3041
Last EDR Contact: 05/17/2010
Next Scheduled EDR Contact: 08/30/2010
Data Release Frequency: Quarterly

SAN DIEGO COUNTY:

Hazardous Materials Management Division Database
The database includes: HE58 - This report contains the business name, site address, business phone number, establishment 'H' permit number, type of permit, and the business status. HE17 - In addition to providing the same information provided in the HE58 listing, HE17 provides inspection dates, violations received by the establishment, hazardous waste generated, the quantity, method of storage, treatment/disposal of waste and the hauler, and information on underground storage tanks. Unauthorized Release List - Includes a summary of environmental contamination cases in San Diego County (underground tank cases, non-tank cases, groundwater contamination, and soil contamination are included.)

Date of Government Version: 07/16/2008
Date Data Arrived at EDR: 10/29/2008
Date Made Active in Reports: 11/26/2008
Number of Days to Update: 28

Source: Hazardous Materials Management Division
Telephone: 619-338-2268
Last EDR Contact: 03/31/2010
Next Scheduled EDR Contact: 06/28/2010
Data Release Frequency: Quarterly

Solid Waste Facilities
San Diego County Solid Waste Facilities.

Date of Government Version: 10/01/2009
Date Data Arrived at EDR: 12/04/2009
Date Made Active in Reports: 01/18/2010
Number of Days to Update: 45

Source: Department of Health Services
Telephone: 619-338-2209
Last EDR Contact: 05/03/2010
Next Scheduled EDR Contact: 08/16/2010
Data Release Frequency: Varies

Environmental Case Listing
The listing contains all underground tank release cases and projects pertaining to properties contaminated with hazardous substances that are actively under review by the Site Assessment and Mitigation Program.

Date of Government Version: 09/23/2009
Date Data Arrived at EDR: 12/15/2009
Date Made Active in Reports: 01/18/2010
Number of Days to Update: 34

Source: San Diego County Department of Environmental Health
Telephone: 619-338-2371
Last EDR Contact: 06/15/2010
Next Scheduled EDR Contact: 09/27/2010
Data Release Frequency: Varies

SAN FRANCISCO COUNTY:

Local Oversite Facilities
A listing of leaking underground storage tank sites located in San Francisco county.

Date of Government Version: 09/19/2008
Date Data Arrived at EDR: 09/19/2008
Date Made Active in Reports: 09/29/2008
Number of Days to Update: 10

Source: Department Of Public Health San Francisco County
Telephone: 415-252-3920
Last EDR Contact: 05/17/2010
Next Scheduled EDR Contact: 08/30/2010
Data Release Frequency: Quarterly

Underground Storage Tank Information
Underground storage tank sites located in San Francisco county.

Date of Government Version: 03/26/2010
Date Data Arrived at EDR: 04/30/2010
Date Made Active in Reports: 05/10/2010
Number of Days to Update: 10

Source: Department of Public Health
Telephone: 415-252-3920
Last EDR Contact: 05/17/2010
Next Scheduled EDR Contact: 08/30/2010
Data Release Frequency: Quarterly

SAN JOAQUIN COUNTY:

San Joaquin Co. UST
A listing of underground storage tank locations in San Joaquin county.

Date of Government Version: 10/14/2009
Date Data Arrived at EDR: 10/15/2009
Date Made Active in Reports: 11/02/2009
Number of Days to Update: 18

Source: Environmental Health Department
Telephone: N/A
Last EDR Contact: 03/29/2010
Next Scheduled EDR Contact: 07/12/2010
Data Release Frequency: Semi-Annually

SAN MATEO COUNTY:

Business Inventory
List includes Hazardous Materials Business Plan, hazardous waste generators, and underground storage tanks.

Date of Government Version: 04/20/2010
Date Data Arrived at EDR: 04/21/2010
Date Made Active in Reports: 05/18/2010
Number of Days to Update: 27

Source: San Mateo County Environmental Health Services Division
Telephone: 650-363-1921
Last EDR Contact: 06/21/2010
Next Scheduled EDR Contact: 10/04/2010
Data Release Frequency: Annually

Fuel Leak List
A listing of leaking underground storage tank sites located in San Mateo county.

Date of Government Version: 03/22/2010
Date Data Arrived at EDR: 03/23/2010
Date Made Active in Reports: 04/09/2010
Number of Days to Update: 17

Source: San Mateo County Environmental Health Services Division
Telephone: 650-363-1921
Last EDR Contact: 06/21/2010
Next Scheduled EDR Contact: 10/04/2010
Data Release Frequency: Semi-Annually

SANTA CLARA COUNTY:

HIST LUST - Fuel Leak Site Activity Report
A listing of open and closed leaking underground storage tanks. This listing is no longer updated by the county. Leaking underground storage tanks are now handled by the Department of Environmental Health.

Date of Government Version: 03/29/2005
Date Data Arrived at EDR: 03/30/2005
Date Made Active in Reports: 04/21/2005
Number of Days to Update: 22

Source: Santa Clara Valley Water District
Telephone: 408-265-2600
Last EDR Contact: 03/23/2009
Next Scheduled EDR Contact: 06/22/2009
Data Release Frequency: No Update Planned

LOP Listing
A listing of leaking underground storage tanks located in Santa Clara county.

Date of Government Version: 05/29/2009
Date Data Arrived at EDR: 06/01/2009
Date Made Active in Reports: 06/15/2009
Number of Days to Update: 14

Source: Department of Environmental Health
Telephone: 408-918-3417
Last EDR Contact: 06/21/2010
Next Scheduled EDR Contact: 09/20/2010
Data Release Frequency: Annually

Hazardous Material Facilities
Hazardous material facilities, including underground storage tank sites.

Date of Government Version: 08/31/2009
Date Data Arrived at EDR: 08/31/2009
Date Made Active in Reports: 09/18/2009
Number of Days to Update: 18

Source: City of San Jose Fire Department
Telephone: 408-535-7694
Last EDR Contact: 06/14/2010
Next Scheduled EDR Contact: 08/30/2010
Data Release Frequency: Annually

SOLANO COUNTY:

Leaking Underground Storage Tanks
A listing of leaking underground storage tank sites located in Solano county.

Date of Government Version: 03/11/2010
Date Data Arrived at EDR: 03/16/2010
Date Made Active in Reports: 04/09/2010
Number of Days to Update: 24

Source: Solano County Department of Environmental Management
Telephone: 707-784-6770
Last EDR Contact: 06/07/2010
Next Scheduled EDR Contact: 09/20/2010
Data Release Frequency: Quarterly

Underground Storage Tanks
Underground storage tank sites located in Solano county.

Date of Government Version: 03/11/2010
Date Data Arrived at EDR: 03/16/2010
Date Made Active in Reports: 04/14/2010
Number of Days to Update: 29

Source: Solano County Department of Environmental Management
Telephone: 707-784-6770
Last EDR Contact: 03/08/2010
Next Scheduled EDR Contact: 09/20/2010
Data Release Frequency: Quarterly

SONOMA COUNTY:

Leaking Underground Storage Tank Sites
A listing of leaking underground storage tank sites located in Sonoma county.

Date of Government Version: 04/06/2010
Date Data Arrived at EDR: 04/07/2010
Date Made Active in Reports: 05/18/2010
Number of Days to Update: 41

Source: Department of Health Services
Telephone: 707-565-6565
Last EDR Contact: 04/05/2010
Next Scheduled EDR Contact: 07/19/2010
Data Release Frequency: Quarterly

SUTTER COUNTY:

Underground Storage Tanks
Underground storage tank sites located in Sutter county.

Date of Government Version: 04/01/2009
Date Data Arrived at EDR: 04/02/2009
Date Made Active in Reports: 04/09/2009
Number of Days to Update: 7

Source: Sutter County Department of Agriculture
Telephone: 530-822-7500
Last EDR Contact: 06/21/2010
Next Scheduled EDR Contact: 09/27/2010
Data Release Frequency: Semi-Annually

VENTURA COUNTY:

Business Plan, Hazardous Waste Producers, and Operating Underground Tanks
The BWT list indicates by site address whether the Environmental Health Division has Business Plan (B), Waste Producer (W), and/or Underground Tank (T) information.

Date of Government Version: 01/28/2010
Date Data Arrived at EDR: 02/25/2010
Date Made Active in Reports: 03/04/2010
Number of Days to Update: 7

Source: Ventura County Environmental Health Division
Telephone: 805-654-2813
Last EDR Contact: 02/23/2010
Next Scheduled EDR Contact: 09/06/2010
Data Release Frequency: Quarterly

Inventory of Illegal Abandoned and Inactive Sites
Ventura County Inventory of Closed, Illegal Abandoned, and Inactive Sites.

Date of Government Version: 08/01/2009
Date Data Arrived at EDR: 10/05/2009
Date Made Active in Reports: 10/13/2009
Number of Days to Update: 8

Source: Environmental Health Division
Telephone: 805-654-2813
Last EDR Contact: 05/03/2010
Next Scheduled EDR Contact: 08/16/2010
Data Release Frequency: Annually

Listing of Underground Tank Cleanup Sites
Ventura County Underground Storage Tank Cleanup Sites (LUST).

Date of Government Version: 05/29/2008
Date Data Arrived at EDR: 06/24/2008
Date Made Active in Reports: 07/31/2008
Number of Days to Update: 37

Source: Environmental Health Division
Telephone: 805-654-2813
Last EDR Contact: 05/24/2010
Next Scheduled EDR Contact: 09/06/2010
Data Release Frequency: Quarterly

Underground Tank Closed Sites List
Ventura County Operating Underground Storage Tank Sites (UST)/Underground Tank Closed Sites List.

Date of Government Version: 03/05/2010
Date Data Arrived at EDR: 03/24/2010
Date Made Active in Reports: 04/14/2010
Number of Days to Update: 21

Source: Environmental Health Division
Telephone: 805-654-2813
Last EDR Contact: 03/24/2010
Next Scheduled EDR Contact: 07/05/2010
Data Release Frequency: Quarterly

YOLO COUNTY:

Underground Storage Tank Comprehensive Facility Report
Underground storage tank sites located in Yolo county

Date of Government Version: 04/07/2010	Source: Yolo County Department of Health
Date Data Arrived at EDR: 04/13/2010	Telephone: 530-666-8646
Date Made Active in Reports: 05/18/2010	Last EDR Contact: 03/29/2010
Number of Days to Update: 35	Next Scheduled EDR Contact: 07/12/2010
	Data Release Frequency: Annually

OTHER DATABASE(S)

Depending on the geographic area covered by this report, the data provided in these specialty databases may or may not be complete. For example, the existence of wetlands information data in a specific report does not mean that all wetlands in the area covered by the report are included. Moreover, the absence of any reported wetlands information does not necessarily mean that wetlands do not exist in the area covered by the report.

CT MANIFEST: Hazardous Waste Manifest Data
Facility and manifest data. Manifest is a document that lists and tracks hazardous waste from the generator through transporters to a tsd facility.

Date of Government Version: 12/31/2007	Source: Department of Environmental Protection
Date Data Arrived at EDR: 08/26/2009	Telephone: 860-424-3375
Date Made Active in Reports: 09/11/2009	Last EDR Contact: 06/04/2010
Number of Days to Update: 16	Next Scheduled EDR Contact: 09/06/2010
	Data Release Frequency: Annually

NJ MANIFEST: Manifest Information
Hazardous waste manifest information.

Date of Government Version: 12/31/2009	Source: Department of Environmental Protection
Date Data Arrived at EDR: 01/20/2010	Telephone: N/A
Date Made Active in Reports: 02/05/2010	Last EDR Contact: 04/23/2010
Number of Days to Update: 16	Next Scheduled EDR Contact: 08/02/2010
	Data Release Frequency: Annually

NY MANIFEST: Facility and Manifest Data
Manifest is a document that lists and tracks hazardous waste from the generator through transporters to a TSD facility.

Date of Government Version: 04/30/2010	Source: Department of Environmental Conservation
Date Data Arrived at EDR: 05/13/2010	Telephone: 518-402-8651
Date Made Active in Reports: 06/21/2010	Last EDR Contact: 05/13/2010
Number of Days to Update: 39	Next Scheduled EDR Contact: 08/23/2010
	Data Release Frequency: Annually

PA MANIFEST: Manifest Information
Hazardous waste manifest information.

Date of Government Version: 12/31/2008	Source: Department of Environmental Protection
Date Data Arrived at EDR: 12/01/2009	Telephone: 717-783-8990
Date Made Active in Reports: 12/14/2009	Last EDR Contact: 05/24/2010
Number of Days to Update: 13	Next Scheduled EDR Contact: 09/06/2010
	Data Release Frequency: Annually

RI MANIFEST: Manifest Information
Hazardous waste manifest information

Date of Government Version: 11/03/2009	Source: Department of Environmental Management
Date Data Arrived at EDR: 02/12/2010	Telephone: 401-222-2797
Date Made Active in Reports: 02/22/2010	Last EDR Contact: 08/01/2010
Number of Days to Update: 10	Next Scheduled EDR Contact: 09/13/2010
	Data Release Frequency: Annually

WI MANIFEST: Manifest Information
Hazardous waste manifest information.

Date of Government Version: 12/31/2008	Source: Department of Natural Resources
Date Data Arrived at EDR: 07/17/2009	Telephone: N/A
Date Made Active in Reports: 08/10/2009	Last EDR Contact: 06/21/2010
Number of Days to Update: 24	Next Scheduled EDR Contact: 10/04/2010
	Data Release Frequency: Annually

Oil/Gas Pipelines: This data was obtained by EDR from the USGS in 1994. It is referred to by USGS as GeoData Digital Line Graphs from 1:100,000-Scale Maps. It was extracted from the transportation category including some oil, but primarily gas pipelines.

Electric Power Transmission Line Data
Source: Rextag Strategies Corp.
Telephone: (281) 769-2247
U.S. Electric Transmission and Power Plants Systems Digital GIS Data

Sensitive Receptors: There are individuals deemed sensitive receptors due to their fragile immune systems and special sensitivity to environmental discharges. These sensitive receptors typically include the elderly, the sick, and children. While the location of all sensitive receptors cannot be determined, EDR indicates those buildings and facilities - schools, daycares, hospitals, medical centers, and nursing homes - where individuals who are sensitive receptors are likely to be located.

AHA Hospitals:
Source: American Hospital Association, Inc.
Telephone: 312-280-5991
The database includes a listing of hospitals based on the American Hospital Association's annual survey of hospitals.

Medical Centers: Provider of Services Listing
Source: Centers for Medicare & Medicaid Services
Telephone: 410-786-3000
A listing of hospitals with Medicare provider number, produced by Centers of Medicare & Medicaid Services, a federal agency within the U.S. Department of Health and Human Services.

Nursing Homes
Source: National Institutes of Health
Telephone: 301-594-6248
Information on Medicare and Medicaid certified nursing homes in the United States.

Public Schools
Source: National Center for Education Statistics
Telephone: 202-502-7300
The National Center for Education Statistics' primary database on elementary and secondary public education in the United States. It is a comprehensive, annual, national statistical database of all public elementary and secondary schools and school districts, which contains data that are comparable across all states.

Private Schools
Source: National Center for Education Statistics
Telephone: 202-502-7300
The National Center for Education Statistics' primary database on private school locations in the United States.

Daycare Centers: Licensed Facilities
Source: Department of Social Services
Telephone: 916-657-4041

Flood Zone Data: This data, available in select counties across the country, was obtained by EDR in 2003 & 2009 from the Federal Emergency Management Agency (FEMA). Data depicts 100-year and 500-year flood zones as defined by FEMA.

NWI: National Wetlands Inventory. This data, available in select counties across the country, was obtained by EDR in 2002 and 2005 from the U.S. Fish and Wildlife Service.

Scanned Digital USGS 7.5' Topographic Map (DRG)
Source: United States Geologic Survey
A digital raster graphic (DRG) is a scanned image of a U.S. Geological Survey topographic map. The map images are made by scanning published paper maps on high-resolution scanners. The raster image is georeferenced and fit to the Universal Transverse Mercator (UTM) projection.

STREET AND ADDRESS INFORMATION

ENCLOSURE "D"

REVIEWED AERIAL PHOTOGRAPHS

UCR Glen Mor 2
UCR Glen Mor 2
Riverside, CA 92507

Inquiry Number: 2788149.5
June 10, 2010

The EDR Aerial Photo Decade Package

EDR® Environmental Data Resources Inc

440 Wheelers Farms Road
Milford, CT 06461
800.352.0050
www.edrnet.com

EDR Aerial Photo Decade Package

Environmental Data Resources, Inc. (EDR) Aerial Photo Decade Package is a screening tool designed to assist environmental professionals in evaluating potential liability on a target property resulting from past activities. EDR's professional researchers provide digitally reproduced historical aerial photographs, and when available, provide one photo per decade.

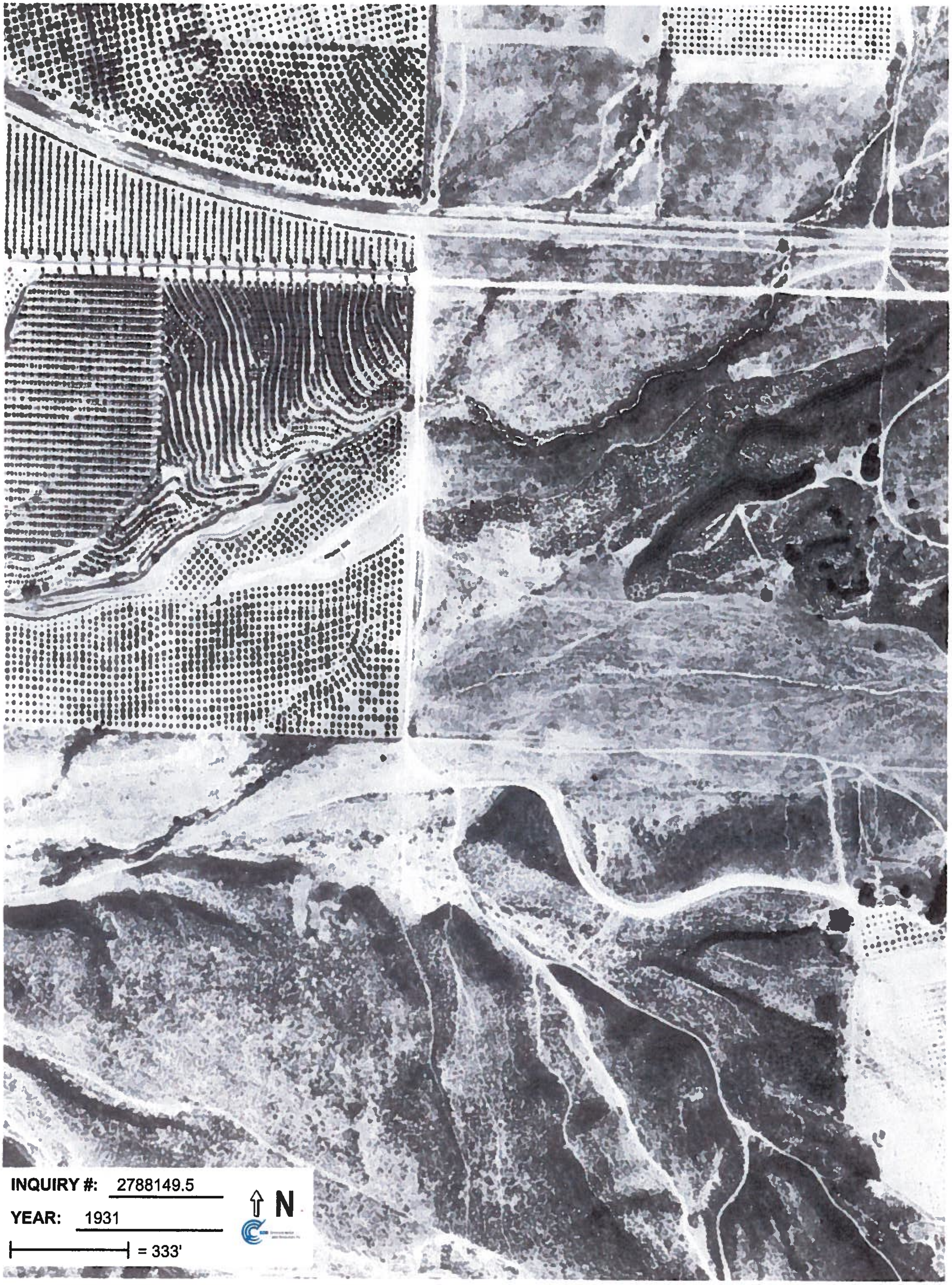
When delivered electronically by EDR, the aerial photo images included with this report are for ONE TIME USE ONLY. Further reproduction of these aerial photo images is prohibited without permission from EDR. For more information contact your EDR Account Executive.

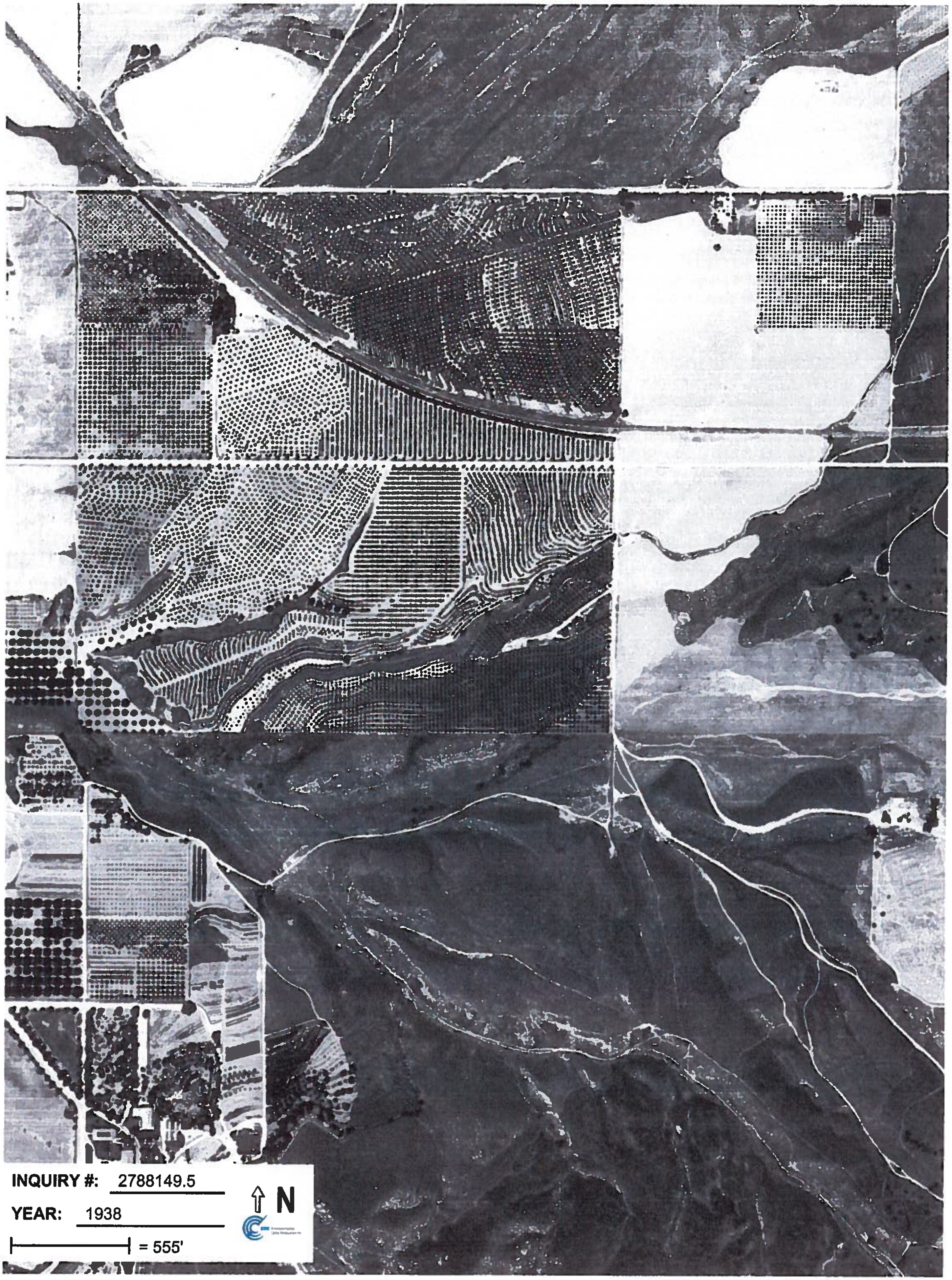
Thank you for your business.
Please contact EDR at 1-800-352-0050
with any questions or comments.

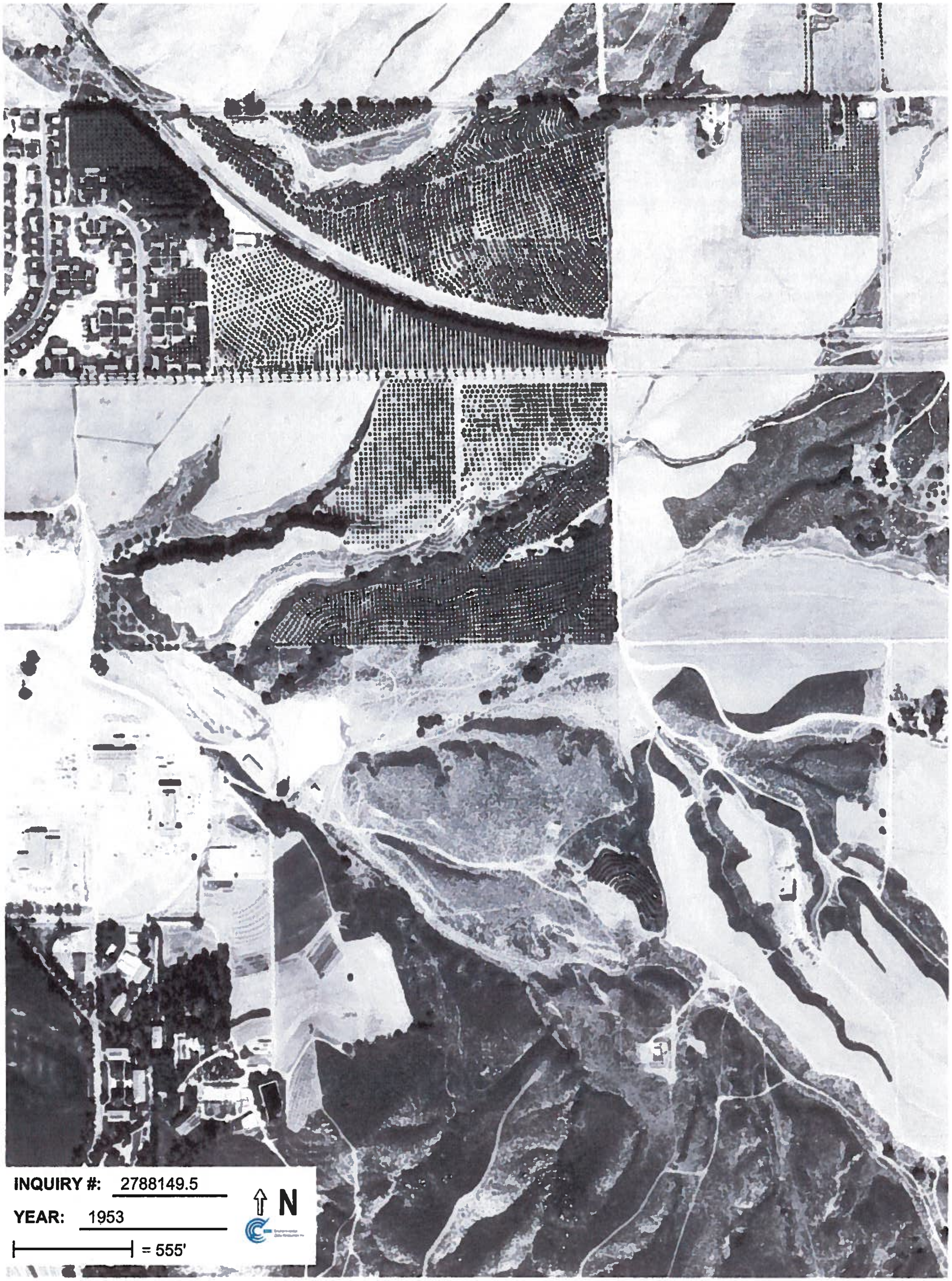
Date EDR Searched Historical Sources:
Aerial Photography June 10, 2010

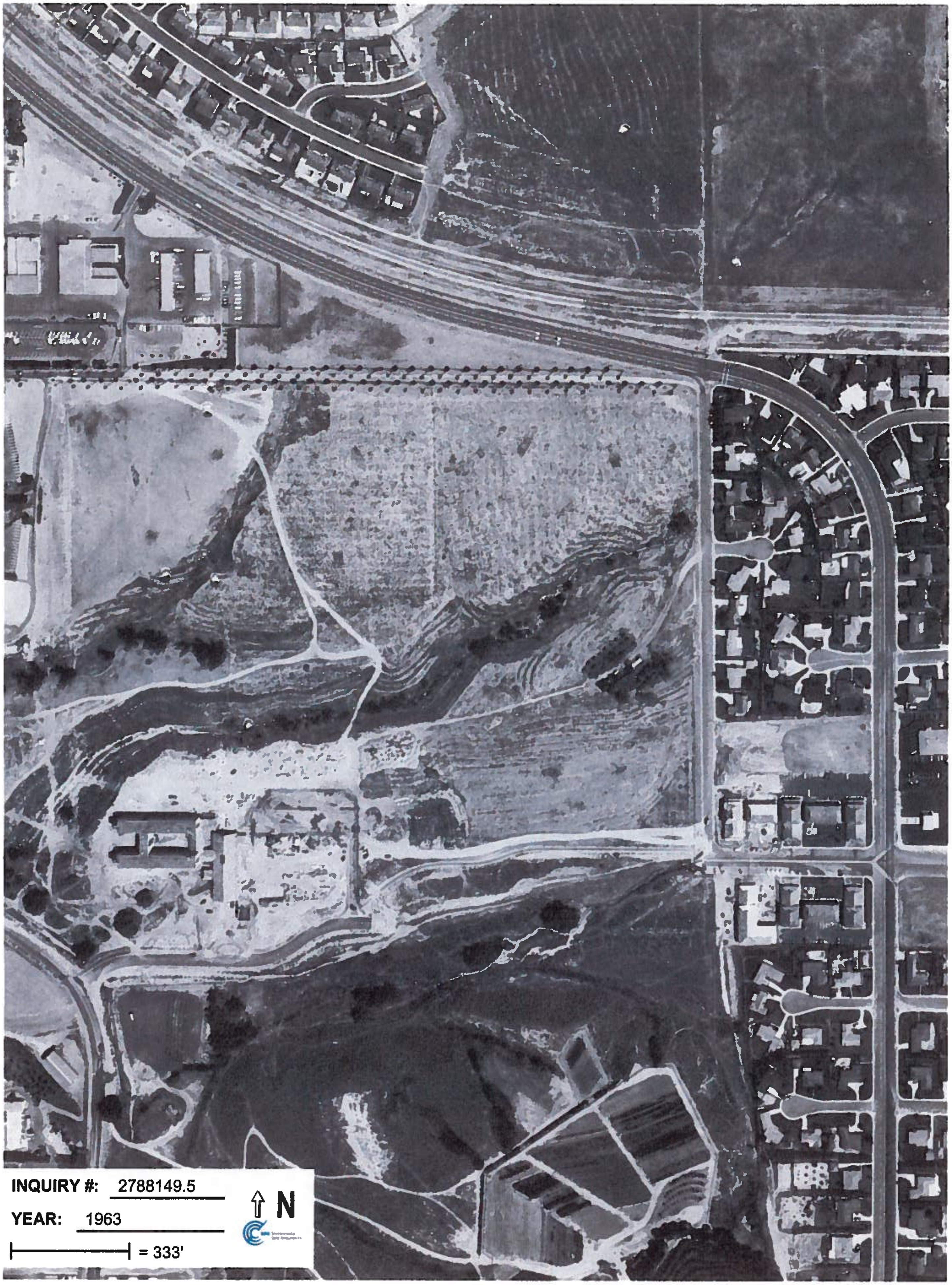
Target Property:
UCR Glen Mor 2
Riverside, CA 92507

Year	***Scale***	***Details***	***Source***
1931	Aerial Photograph. Scale: 1"=333'	Flight Year: 1931	Fairchild
1938	Aerial Photograph. Scale: 1"=555'	Flight Year: 1938	Laval
1953	Aerial Photograph. Scale: 1"=555'	Flight Year: 1953	Pacific Air
1963	Aerial Photograph. Scale: 1"=333'	Flight Year: 1963	Mark Hurd
1977	Aerial Photograph. Scale: 1"=666'	Flight Year: 1977	Teledyne
1989	Aerial Photograph. Scale: 1"=666'	Flight Year: 1989	USGS
1994	Aerial Photograph. Scale: 1"=666'	Flight Year: 1994	USGS
2002	Aerial Photograph. Scale: 1"=666'	Flight Year: 2002	USGS
2005	Aerial Photograph. Scale: 1"=604'	Flight Year: 2005	EDR


INQUIRY #: 2788149.5
YEAR: 1931
N
= 333'

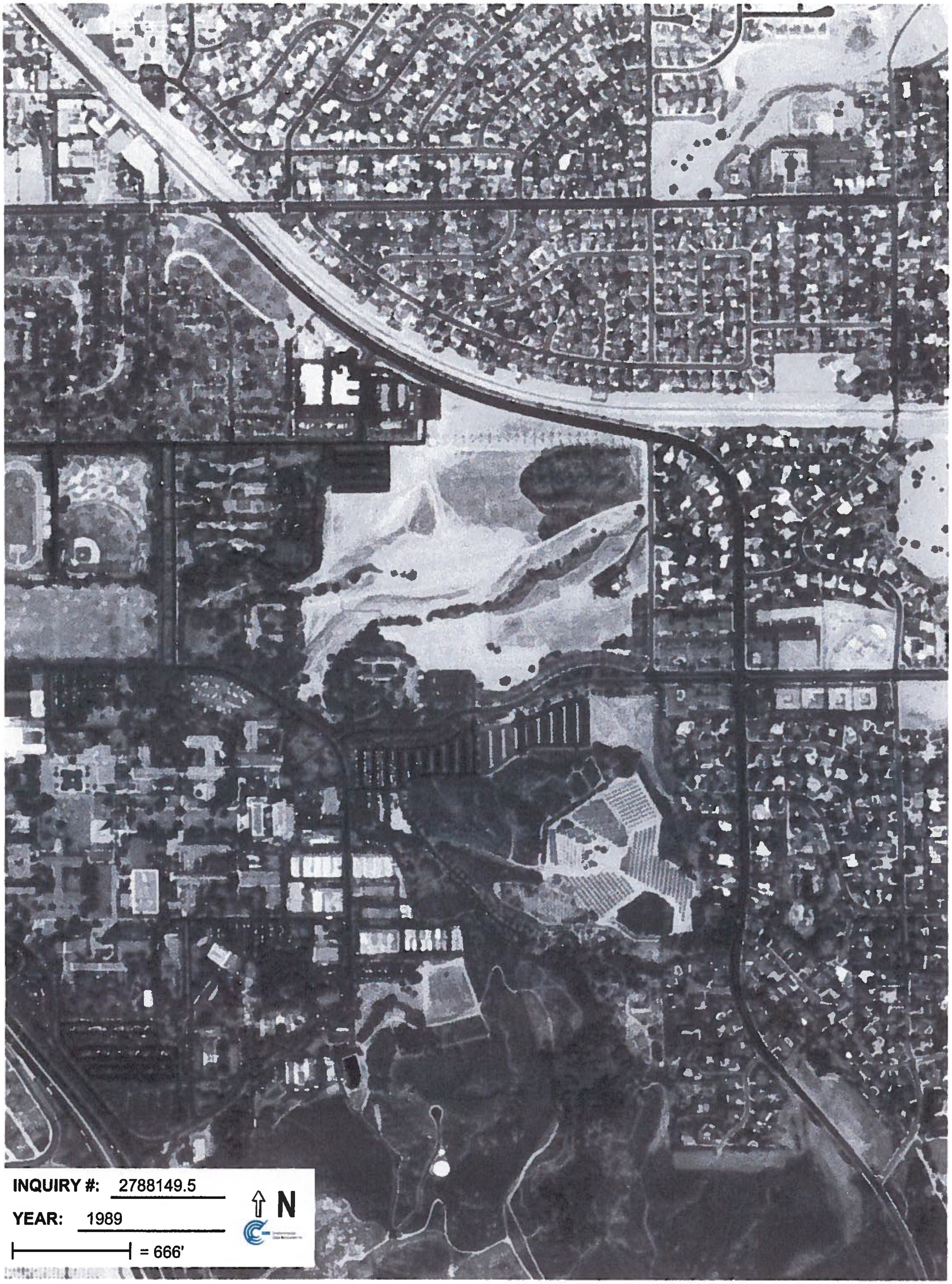

INQUIRY #: 2788149.5
YEAR: 1938
= 555'
N

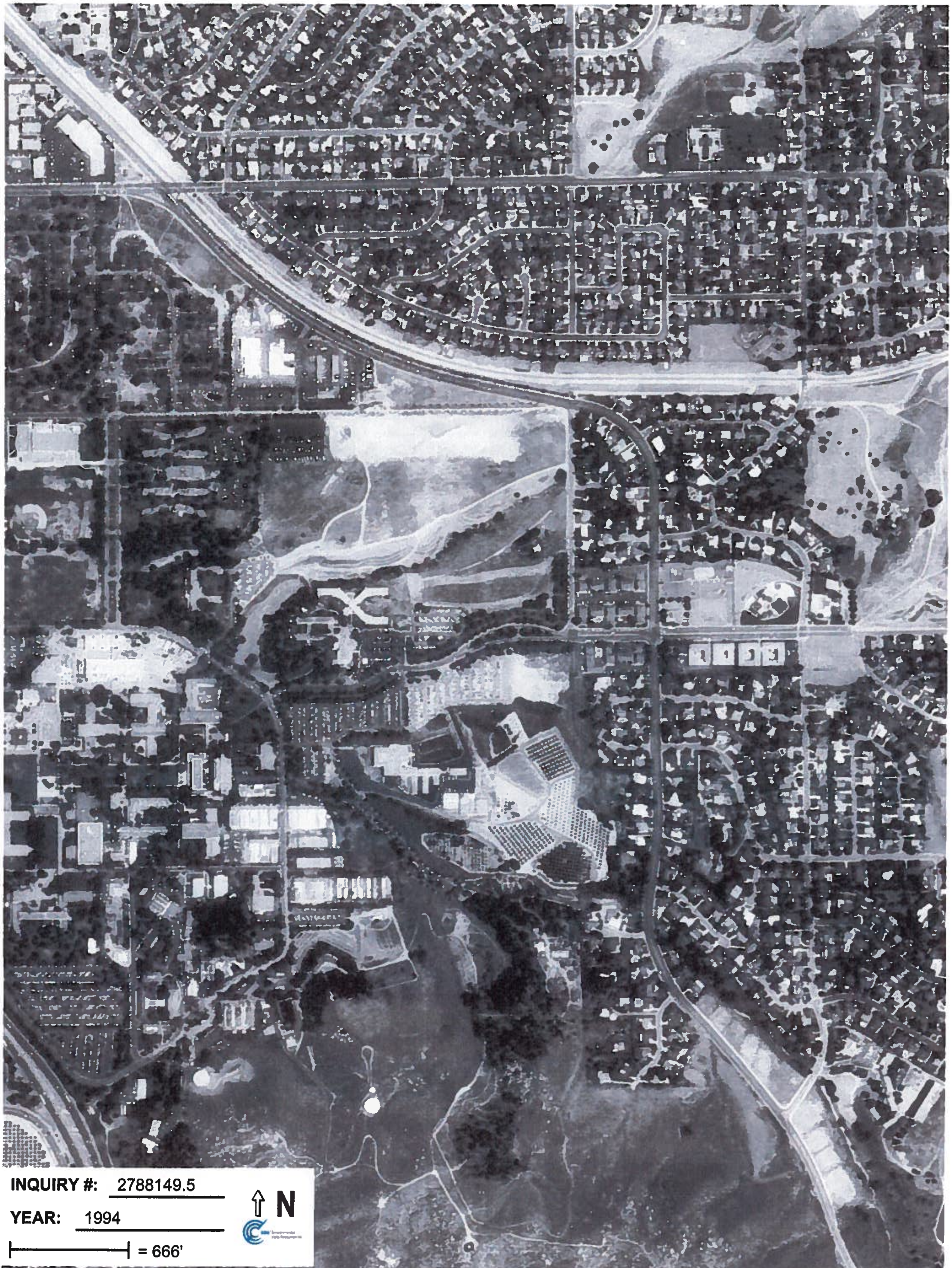

INQUIRY #: 2788149.5
YEAR: 1953
= 555'
N



INQUIRY #: 2788149.5
YEAR: 1963
= 333'
N


INQUIRY #: 2788149.5
YEAR: 1977
N
= 666'


INQUIRY #: 2788149.5
YEAR: 1989
= 666'
N



INQUIRY #: 2788149.5
YEAR: 1994
= 666'
N


INQUIRY #: 2788149.5
YEAR: 2002
= 666'
N

INQUIRY #: 2788149.5

YEAR: 2005

= 604'

N

ENCLOSURE "E"

ANALYTICAL RESULTS AND CHAIN-OF-CUSTODY DOCUMENTATION

Microbac Laboratories, Inc.
SOUTHERN CALIFORNIA DIVISION
1401 RESEARCH PARK DRIVE, SUITE 100
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FDA#	2030513
LA City#	10159
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CASE NARRATIVE

Authorized Signature Name / Title (print)	Robert R. Clark, PhD, Division Manager
Signature / Date	Robert R. Clark, PhD, Division Manager 06/29/2010 11:28:18
Laboratory Job No. (Certificate of Analysis No.)	1006-00367
Project Name / No.	UCR GLENMOR 2 10326-9
Dates Sampled (from/to)	06/24/10 To 06/24/10
Dates Received (from/to)	06/24/10 To 06/24/10
Dates Reported (from/to)	06/29/10 To 6/29/2010
Chains of Custody Received	Yes

Comments:

Subcontracting
Organic Analyses
No analyses sub-contracted

Sample Condition(s)
All samples intact

Positive Results (Organic Compounds)

Sample	Analyte	Result	Qual	Units	RL	Sample	Analyte	Result	Qual	Units	RL
S-1 8"	4,4'-DDE	0.0032		mg/Kg	0.0020	S-5 8"	Dieldrin	0.0048		mg/Kg	0.0020
S-6 8"	4,4'-DDE	0.0092		mg/Kg	0.0020	S-6 8"	4,4'-DDT	0.0051		mg/Kg	0.0020
S-7 8"	4,4'-DDE	0.0046		mg/Kg	0.0020	S-7 8"	4,4'-DDT	0.0035		mg/Kg	0.0020
S-8 8"	Dieldrin	0.0091		mg/Kg	0.0020						

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CERTIFICATE OF ANALYSIS

1006-00367

CHJ, INC.
ANN LAUDERMILK
P.O. BOX 231
COLTON, CA 92324-0231

Date Reported	06/29/10
Date Received	06/24/10
Invoice No.	60102
Cust #	1091
Permit Number	
Customer P.O.	10326-9

Project: UCR GLENMOR 2

Analysis	Result	Qual	Units	Method	DF	RL	Date	Tech
Sample: 001 **S-1 8"**				Date & Time Sampled:			06/24/10 @	8:15
[Pesticides]								
Ultrasonic Extraction	Complete			EPA 3550	1		06/25/10	AMJ
Aldrin	<0.0010		mg/Kg	EPA 8081A	1	0.0010	06/28/10	CEO
alpha-BHC	<0.0010		mg/Kg	EPA 8081A	1	0.0010	06/28/10	CEO
beta-BHC	<0.0010		mg/Kg	EPA 8081A	1	0.0010	06/28/10	CEO
delta-BHC	<0.0010		mg/Kg	EPA 8081A	1	0.0010	06/28/10	CEO
gamma-BHC	<0.0010		mg/Kg	EPA 8081A	1	0.0010	06/28/10	CEO
Chlordane	<0.010		mg/Kg	EPA 8081A	1	0.010	06/28/10	CEO
4,4'-DDD	<0.0020		mg/Kg	EPA 8081A	1	0.0020	06/28/10	CEO
4,4'-DDE	**0.0032**		mg/Kg	EPA 8081A	1	0.0020	06/28/10	CEO
4,4'-DDT	<0.0020		mg/Kg	EPA 8081A	1	0.0020	06/28/10	CEO
Dieldrin	<0.0020		mg/Kg	EPA 8081A	1	0.0020	06/28/10	CEO
Endosulfan I	<0.0010		mg/Kg	EPA 8081A	1	0.0010	06/28/10	CEO
Endosulfan II	<0.0020		mg/Kg	EPA 8081A	1	0.0020	06/28/10	CEO
Endosulfan Sulfate	<0.0020		mg/Kg	EPA 8081A	1	0.0020	06/28/10	CEO
Endrin	<0.0020		mg/Kg	EPA 8081A	1	0.0020	06/28/10	CEO
Endrin Aldehyde	<0.0020		mg/Kg	EPA 8081A	1	0.0020	06/28/10	CEO
Endrin ketone	<0.10		mg/Kg	EPA 8081A	1	0.10	06/28/10	CEO
Heptachlor	<0.0010		mg/Kg	EPA 8081A	1	0.0010	06/28/10	CEO
Heptachlor Epoxide	<0.0010		mg/Kg	EPA 8081A	1	0.0010	06/28/10	CEO
Methoxychlor	<0.010		mg/Kg	EPA 8081A	1	0.010	06/28/10	CEO
Toxaphene	<0.020		mg/Kg	EPA 8081A	1	0.020	06/28/10	CEO
[Surrogates]								
Tetrachloro-m-xylene	75		%REC	EPA 8081A/8082		50-150	06/28/10	CEO
Decachlorobiphenyl	120		%REC	EPA 8081A/8082		50-150	06/28/10	CEO
Sample: 002 **S-1 30"**				Date & Time Sampled:			06/24/10 @	8:15
Sample: 003 **S-2 8"**				Date & Time Sampled:			06/24/10 @	8:35
[Pesticides]								
Ultrasonic Extraction	Complete			EPA 3550	1		06/25/10	AMJ
Aldrin	<0.0010		mg/Kg	EPA 8081A	1	0.0010	06/28/10	CEO

Microbac Laboratories, Inc.
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CERTIFICATE OF ANALYSIS

1006-00367

CHJ, INC.
ANN LAUDERMILK
P.O. BOX 231
COLTON, CA 92324-0231

Date Reported	06/29/10
Date Received	06/24/10
Invoice No.	60102
Cust #	1091
Permit Number	
Customer P.O.	10326-9

Project: UCR GLENMOR 2

Analysis	Result	Qual	Units	Method	DF	RL	Date	Tech
Sample: 003 S-2 8"				Date & Time Sampled:			06/24/10 @	8:35
.....continued								
alpha-BHC	<0.0010		mg/Kg	EPA 8081A	1	0.0010	06/28/10	CEO
beta-BHC	<0.0010		mg/Kg	EPA 8081A	1	0.0010	06/28/10	CEO
delta-BHC	<0.0010		mg/Kg	EPA 8081A	1	0.0010	06/28/10	CEO
gamma-BHC	<0.0010		mg/Kg	EPA 8081A	1	0.0010	06/28/10	CEO
Chlordane	<0.010		mg/Kg	EPA 8081A	1	0.010	06/28/10	CEO
4,4'-DDD	<0.0020		mg/Kg	EPA 8081A	1	0.0020	06/28/10	CEO
4,4'-DDE	<0.0020		mg/Kg	EPA 8081A	1	0.0020	06/28/10	CEO
4,4'-DDT	<0.0020		mg/Kg	EPA 8081A	1	0.0020	06/28/10	CEO
Dieldrin	<0.0020		mg/Kg	EPA 8081A	1	0.0020	06/28/10	CEO
Endosulfan I	<0.0010		mg/Kg	EPA 8081A	1	0.0010	06/28/10	CEO
Endosulfan II	<0.0020		mg/Kg	EPA 8081A	1	0.0020	06/28/10	CEO
Endosulfan Sulfate	<0.0020		mg/Kg	EPA 8081A	1	0.0020	06/28/10	CEO
Endrin	<0.0020		mg/Kg	EPA 8081A	1	0.0020	06/28/10	CEO
Endrin Aldehyde	<0.0020		mg/Kg	EPA 8081A	1	0.0020	06/28/10	CEO
Endrin ketone	<0.10		mg/Kg	EPA 8081A	1	0.10	06/28/10	CEO
Heptachlor	<0.0010		mg/Kg	EPA 8081A	1	0.0010	06/28/10	CEO
Heptachlor Epoxide	<0.0010		mg/Kg	EPA 8081A	1	0.0010	06/28/10	CEO
Methoxychlor	<0.010		mg/Kg	EPA 8081A	1	0.010	06/28/10	CEO
Toxaphene	<0.020		mg/Kg	EPA 8081A	1	0.020	06/28/10	CEO
[Surrogates]								
Tetrachloro-m-xylene	86		%REC	EPA 8081A/8082		50-150	06/28/10	CEO
Decachlorobiphenyl	127		%REC	EPA 8081A/8082		50-150	06/28/10	CEO
Sample: 004 S-2 30"				Date & Time Sampled:			06/24/10 @	8:35
Sample: 005 S-3 8"				Date & Time Sampled:			06/24/10 @	9:00
[Pesticides]								
Ultrasonic Extraction	Complete			EPA 3550	1		06/25/10	AMJ
Aldrin	<0.0010		mg/Kg	EPA 8081A	1	0.0010	06/28/10	CEO
alpha-BHC	<0.0010		mg/Kg	EPA 8081A	1	0.0010	06/28/10	CEO
beta-BHC	<0.0010		mg/Kg	EPA 8081A	1	0.0010	06/28/10	CEO

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1006-00367

CHJ, INC.
ANN LAUDERMILK
P.O. BOX 231
COLTON, CA 92324-0231

Date Reported	06/29/10
Date Received	06/24/10
Invoice No.	60102
Cust #	1091
Permit Number	
Customer P.O.	10326-9

Project: UCR GLENMOR 2

Analysis	Result	Qual	Units	Method	DF	RL	Date	Tech
Sample: 005 **S-3 8"**				Date & Time Sampled:			06/24/10 @	9:00
.....continued								
delta-BHC	<0.0010		mg/Kg	EPA 8081A	1	0.0010	06/28/10	CEO
gamma-BHC	<0.0010		mg/Kg	EPA 8081A	1	0.0010	06/28/10	CEO
Chlordane	<0.010		mg/Kg	EPA 8081A	1	0.010	06/28/10	CEO
4,4'-DDD	<0.0020		mg/Kg	EPA 8081A	1	0.0020	06/28/10	CEO
4,4'-DDE	<0.0020		mg/Kg	EPA 8081A	1	0.0020	06/28/10	CEO
4,4'-DDT	<0.0020		mg/Kg	EPA 8081A	1	0.0020	06/28/10	CEO
Dieldrin	<0.0020		mg/Kg	EPA 8081A	1	0.0020	06/28/10	CEO
Endosulfan I	<0.0010		mg/Kg	EPA 8081A	1	0.0010	06/28/10	CEO
Endosulfan II	<0.0020		mg/Kg	EPA 8081A	1	0.0020	06/28/10	CEO
Endosulfan Sulfate	<0.0020		mg/Kg	EPA 8081A	1	0.0020	06/28/10	CEO
Endrin	<0.0020		mg/Kg	EPA 8081A	1	0.0020	06/28/10	CEO
Endrin Aldehyde	<0.0020		mg/Kg	EPA 8081A	1	0.0020	06/28/10	CEO
Endrin ketone	<0.10		mg/Kg	EPA 8081A	1	0.10	06/28/10	CEO
Heptachlor	<0.0010		mg/Kg	EPA 8081A	1	0.0010	06/28/10	CEO
Heptachlor Epoxide	<0.0010		mg/Kg	EPA 8081A	1	0.0010	06/28/10	CEO
Methoxychlor	<0.010		mg/Kg	EPA 8081A	1	0.010	06/28/10	CEO
Toxaphene	<0.020		mg/Kg	EPA 8081A	1	0.020	06/28/10	CEO
[Surrogates]								
Tetrachloro-m-xylene	74		%REC	EPA 8081A/8082		50-150	06/28/10	CEO
Decachlorobiphenyl	114		%REC	EPA 8081A/8082		50-150	06/28/10	CEO
Sample: 006 **S-3 30"**				Date & Time Sampled:			06/24/10 @	9:00
Sample: 007 **S-4 8"**				Date & Time Sampled:			06/24/10 @	9:25
[Pesticides]								
Ultrasonic Extraction	Complete			EPA 3550	1		06/25/10	AMJ
Aldrin	<0.0010		mg/Kg	EPA 8081A	1	0.0010	06/28/10	CEO
alpha-BHC	<0.0010		mg/Kg	EPA 8081A	1	0.0010	06/28/10	CEO
beta-BHC	<0.0010		mg/Kg	EPA 8081A	1	0.0010	06/28/10	CEO
delta-BHC	<0.0010		mg/Kg	EPA 8081A	1	0.0010	06/28/10	CEO
gamma-BHC	<0.0010		mg/Kg	EPA 8081A	1	0.0010	06/28/10	CEO

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COLTON, CA 92324-0231

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Date Received	06/24/10
Invoice No.	60102
Cust #	1091
Permit Number	
Customer P.O.	10326-9

Project: UCR GLENMOR 2

Analysis	Result	Qual	Units	Method	DF	RL	Date	Tech
Sample: 007 S-4 8"				Date & Time Sampled:			06/24/10 @	9:25
.....continued								
Chlordane	<0.010		mg/Kg	EPA 8081A	1	0.010	06/28/10	CEO
4,4'-DDD	<0.0020		mg/Kg	EPA 8081A	1	0.0020	06/28/10	CEO
4,4'-DDE	<0.0020		mg/Kg	EPA 8081A	1	0.0020	06/28/10	CEO
4,4'-DDT	<0.0020		mg/Kg	EPA 8081A	1	0.0020	06/28/10	CEO
Dieldrin	<0.0020		mg/Kg	EPA 8081A	1	0.0020	06/28/10	CEO
Endosulfan I	<0.0010		mg/Kg	EPA 8081A	1	0.0010	06/28/10	CEO
Endosulfan II	<0.0020		mg/Kg	EPA 8081A	1	0.0020	06/28/10	CEO
Endosulfan Sulfate	<0.0020		mg/Kg	EPA 8081A	1	0.0020	06/28/10	CEO
Endrin	<0.0020		mg/Kg	EPA 8081A	1	0.0020	06/28/10	CEO
Endrin Aldehyde	<0.0020		mg/Kg	EPA 8081A	1	0.0020	06/28/10	CEO
Endrin ketone	<0.10		mg/Kg	EPA 8081A	1	0.10	06/28/10	CEO
Heptachlor	<0.0010		mg/Kg	EPA 8081A	1	0.0010	06/28/10	CEO
Heptachlor Epoxide	<0.0010		mg/Kg	EPA 8081A	1	0.0010	06/28/10	CEO
Methoxychlor	<0.010		mg/Kg	EPA 8081A	1	0.010	06/28/10	CEO
Toxaphene	<0.020		mg/Kg	EPA 8081A	1	0.020	06/28/10	CEO
[Surrogates]								
Tetrachloro-m-xylene	74		%REC	EPA 8081A/8082		50-150	06/28/10	CEO
Decachlorobiphenyl	117		%REC	EPA 8081A/8082		50-150	06/28/10	CEO
Sample: 008 S-4 30"				Date & Time Sampled:			06/24/10 @	9:25
Sample: 009 S-5 8"				Date & Time Sampled:			06/24/10 @	10:00
[Pesticides]								
Ultrasonic Extraction	Complete			EPA 3550	1		06/25/10	AMJ
Aldrin	<0.0010		mg/Kg	EPA 8081A	1	0.0010	06/28/10	CEO
alpha-BHC	<0.0010		mg/Kg	EPA 8081A	1	0.0010	06/28/10	CEO
beta-BHC	<0.0010		mg/Kg	EPA 8081A	1	0.0010	06/28/10	CEO
delta-BHC	<0.0010		mg/Kg	EPA 8081A	1	0.0010	06/28/10	CEO
gamma-BHC	<0.0010		mg/Kg	EPA 8081A	1	0.0010	06/28/10	CEO
Chlordane	<0.010		mg/Kg	EPA 8081A	1	0.010	06/28/10	CEO
4,4'-DDD	<0.0020		mg/Kg	EPA 8081A	1	0.0020	06/28/10	CEO

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FDA#	2030513
LA City#	10159
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	2750
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CERTIFICATE OF ANALYSIS

1006-00367

CHJ, INC.
ANN LAUDERMILK
P.O. BOX 231
COLTON, CA 92324-0231

Date Reported	06/29/10
Date Received	06/24/10
Invoice No.	60102
Cust #	1091
Permit Number	
Customer P.O.	10326-9

Project: UCR GLENMOR 2

Analysis	Result	Qual	Units	Method	DF	RL	Date	Tech
Sample: 009 **S-5 8"**				Date & Time Sampled:			06/24/10 @	10:00
.....continued								
4,4'-DDE	<0.0020		mg/Kg	EPA 8081A	1	0.0020	06/28/10	CEO
4,4'-DDT	<0.0020		mg/Kg	EPA 8081A	1	0.0020	06/28/10	CEO
Dieldrin	**0.0048**		mg/Kg	EPA 8081A	1	0.0020	06/28/10	CEO
Endosulfan I	<0.0010		mg/Kg	EPA 8081A	1	0.0010	06/28/10	CEO
Endosulfan II	<0.0020		mg/Kg	EPA 8081A	1	0.0020	06/28/10	CEO
Endosulfan Sulfate	<0.0020		mg/Kg	EPA 8081A	1	0.0020	06/28/10	CEO
Endrin	<0.0020		mg/Kg	EPA 8081A	1	0.0020	06/28/10	CEO
Endrin Aldehyde	<0.0020		mg/Kg	EPA 8081A	1	0.0020	06/28/10	CEO
Endrin ketone	<0.10		mg/Kg	EPA 8081A	1	0.10	06/28/10	CEO
Heptachlor	<0.0010		mg/Kg	EPA 8081A	1	0.0010	06/28/10	CEO
Heptachlor Epoxide	<0.0010		mg/Kg	EPA 8081A	1	0.0010	06/28/10	CEO
Methoxychlor	<0.010		mg/Kg	EPA 8081A	1	0.010	06/28/10	CEO
Toxaphene	<0.020		mg/Kg	EPA 8081A	1	0.020	06/28/10	CEO
[Surrogates]								
Tetrachloro-m-xylene	78		%REC	EPA 8081A/8082		50-150	06/28/10	CEO
Decachlorobiphenyl	111		%REC	EPA 8081A/8082		50-150	06/28/10	CEO
Sample: 010 **S-5 30"**				Date & Time Sampled:			06/24/10 @	10:00
Sample: 011 **S-6 8"**				Date & Time Sampled:			06/24/10 @	10:30
[Pesticides]								
Ultrasonic Extraction	Complete			EPA 3550	1		06/25/10	AMJ
Aldrin	<0.0010		mg/Kg	EPA 8081A	1	0.0010	06/28/10	CEO
alpha-BHC	<0.0010		mg/Kg	EPA 8081A	1	0.0010	06/28/10	CEO
beta-BHC	<0.0010		mg/Kg	EPA 8081A	1	0.0010	06/28/10	CEO
delta-BHC	<0.0010		mg/Kg	EPA 8081A	1	0.0010	06/28/10	CEO
gamma-BHC	<0.0010		mg/Kg	EPA 8081A	1	0.0010	06/28/10	CEO
Chlordane	<0.010		mg/Kg	EPA 8081A	1	0.010	06/28/10	CEO
4,4'-DDD	<0.0020		mg/Kg	EPA 8081A	1	0.0020	06/28/10	CEO
4,4'-DDE	**0.0092**		mg/Kg	EPA 8081A	1	0.0020	06/28/10	CEO
4,4'-DDT	**0.0051**		mg/Kg	EPA 8081A	1	0.0020	06/28/10	CEO

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CERTIFICATE OF ANALYSIS

1006-00367

CHJ, INC.
ANN LAUDERMILK
P.O. BOX 231
COLTON, CA 92324-0231

Date Reported	06/29/10
Date Received	06/24/10
Invoice No.	60102
Cust #	1091
Permit Number	
Customer P.O.	10326-9

Project: UCR GLENMOR 2

Analysis	Result	Qual	Units	Method	DF	RL	Date	Tech
Sample: 011 **S-6 8"**				Date & Time Sampled:			06/24/10	@ 10:30
.....continued								
Dieldrin	<0.0020		mg/Kg	EPA 8081A	1	0.0020	06/28/10	CEO
Endosulfan I	<0.0010		mg/Kg	EPA 8081A	1	0.0010	06/28/10	CEO
Endosulfan II	<0.0020		mg/Kg	EPA 8081A	1	0.0020	06/28/10	CEO
Endosulfan Sulfate	<0.0020		mg/Kg	EPA 8081A	1	0.0020	06/28/10	CEO
Endrin	<0.0020		mg/Kg	EPA 8081A	1	0.0020	06/28/10	CEO
Endrin Aldehyde	<0.0020		mg/Kg	EPA 8081A	1	0.0020	06/28/10	CEO
Endrin ketone	<0.10		mg/Kg	EPA 8081A	1	0.10	06/28/10	CEO
Heptachlor	<0.0010		mg/Kg	EPA 8081A	1	0.0010	06/28/10	CEO
Heptachlor Epoxide	<0.0010		mg/Kg	EPA 8081A	1	0.0010	06/28/10	CEO
Methoxychlor	<0.010		mg/Kg	EPA 8081A	1	0.010	06/28/10	CEO
Toxaphene	<0.020		mg/Kg	EPA 8081A	1	0.020	06/28/10	CEO
[Surrogates]								
Tetrachloro-m-xylene	88		%REC	EPA 8081A/8082		50-150	06/28/10	CEO
Decachlorobiphenyl	127		%REC	EPA 8081A/8082		50-150	06/28/10	CEO
Sample: 012 **S-6 30"**				Date & Time Sampled:			06/24/10	@ 10:30
Sample: 013 **S-7 8"**				Date & Time Sampled:			06/24/10	@ 11:00
[Pesticides]								
Ultrasonic Extraction	Complete			EPA 3550	1		06/25/10	AMJ
Aldrin	<0.0010		mg/Kg	EPA 8081A	1	0.0010	06/28/10	CEO
alpha-BHC	<0.0010		mg/Kg	EPA 8081A	1	0.0010	06/28/10	CEO
beta-BHC	<0.0010		mg/Kg	EPA 8081A	1	0.0010	06/28/10	CEO
delta-BHC	<0.0010		mg/Kg	EPA 8081A	1	0.0010	06/28/10	CEO
gamma-BHC	<0.0010		mg/Kg	EPA 8081A	1	0.0010	06/28/10	CEO
Chlordane	<0.010		mg/Kg	EPA 8081A	1	0.010	06/28/10	CEO
4,4'-DDD	<0.0020		mg/Kg	EPA 8081A	1	0.0020	06/28/10	CEO
4,4'-DDE	**0.0046**		mg/Kg	EPA 8081A	1	0.0020	06/28/10	CEO
4,4'-DDT	**0.0035**		mg/Kg	EPA 8081A	1	0.0020	06/28/10	CEO
Dieldrin	<0.0020		mg/Kg	EPA 8081A	1	0.0020	06/28/10	CEO
Endosulfan I	<0.0010		mg/Kg	EPA 8081A	1	0.0010	06/28/10	CEO

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CERTIFICATE OF ANALYSIS

1006-00367

CHJ, INC.
ANN LAUDERMILK
P.O. BOX 231
COLTON, CA 92324-0231

Date Reported	06/29/10
Date Received	06/24/10
Invoice No.	60102
Cust #	1091
Permit Number	
Customer P.O.	10326-9

Project: UCR GLENMOR 2

Analysis	Result	Qual	Units	Method	DF	RL	Date	Tech
Sample: 013 **S-7 8"**				Date & Time Sampled:			06/24/10 @	11:00
.....continued								
Endosulfan II	<0.0020		mg/Kg	EPA 8081A	1	0.0020	06/28/10	CEO
Endosulfan Sulfate	<0.0020		mg/Kg	EPA 8081A	1	0.0020	06/28/10	CEO
Endrin	<0.0020		mg/Kg	EPA 8081A	1	0.0020	06/28/10	CEO
Endrin Aldehyde	<0.0020		mg/Kg	EPA 8081A	1	0.0020	06/28/10	CEO
Endrin ketone	<0.10		mg/Kg	EPA 8081A	1	0.10	06/28/10	CEO
Heptachlor	<0.0010		mg/Kg	EPA 8081A	1	0.0010	06/28/10	CEO
Heptachlor Epoxide	<0.0010		mg/Kg	EPA 8081A	1	0.0010	06/28/10	CEO
Methoxychlor	<0.010		mg/Kg	EPA 8081A	1	0.010	06/28/10	CEO
Toxaphene	<0.020		mg/Kg	EPA 8081A	1	0.020	06/28/10	CEO
[Surrogates]								
Tetrachloro-m-xylene	76		%REC	EPA 8081A/8082		50-150	06/28/10	CEO
Decachlorobiphenyl	114		%REC	EPA 8081A/8082		50-150	06/28/10	CEO
Sample: 014 **S-7 30"**				Date & Time Sampled:			06/24/10 @	11:00
Sample: 015 **S-8 8"**				Date & Time Sampled:			06/24/10 @	11:45
[Pesticides]								
Ultrasonic Extraction	Complete			EPA 3550	1		06/25/10	AMJ
Aldrin	<0.0010		mg/Kg	EPA 8081A	1	0.0010	06/28/10	CEO
alpha-BHC	<0.0010		mg/Kg	EPA 8081A	1	0.0010	06/28/10	CEO
beta-BHC	<0.0010		mg/Kg	EPA 8081A	1	0.0010	06/28/10	CEO
delta-BHC	<0.0010		mg/Kg	EPA 8081A	1	0.0010	06/28/10	CEO
gamma-BHC	<0.0010		mg/Kg	EPA 8081A	1	0.0010	06/28/10	CEO
Chlordane	<0.010		mg/Kg	EPA 8081A	1	0.010	06/28/10	CEO
4,4'-DDD	<0.0020		mg/Kg	EPA 8081A	1	0.0020	06/28/10	CEO
4,4'-DDE	<0.0020		mg/Kg	EPA 8081A	1	0.0020	06/28/10	CEO
4,4'-DDT	<0.0020		mg/Kg	EPA 8081A	1	0.0020	06/28/10	CEO
Dieldrin	**0.0091**		mg/Kg	EPA 8081A	1	0.0020	06/28/10	CEO
Endosulfan I	<0.0010		mg/Kg	EPA 8081A	1	0.0010	06/28/10	CEO
Endosulfan II	<0.0020		mg/Kg	EPA 8081A	1	0.0020	06/28/10	CEO
Endosulfan Sulfate	<0.0020		mg/Kg	EPA 8081A	1	0.0020	06/28/10	CEO

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CERTIFICATE OF ANALYSIS

1006-00367

CHJ, INC.
ANN LAUDERMILK
P.O. BOX 231
COLTON, CA 92324-0231

Date Reported	06/29/10
Date Received	06/24/10
Invoice No.	60102
Cust #	1091
Permit Number	
Customer P.O.	10326-9

Project: UCR GLENMOR 2

Analysis	Result	Qual	Units	Method	DF	RL	Date	Tech
Sample: 015 **S-8 8"**					Date & Time Sampled:		06/24/10 @ 11:45	
.....continued								
Endrin	<0.0020		mg/Kg	EPA 8081A	1	0.0020	06/28/10	CEO
Endrin Aldehyde	<0.0020		mg/Kg	EPA 8081A	1	0.0020	06/28/10	CEO
Endrin ketone	<0.10		mg/Kg	EPA 8081A	1	0.10	06/28/10	CEO
Heptachlor	<0.0010		mg/Kg	EPA 8081A	1	0.0010	06/28/10	CEO
Heptachlor Epoxide	<0.0010		mg/Kg	EPA 8081A	1	0.0010	06/28/10	CEO
Methoxychlor	<0.010		mg/Kg	EPA 8081A	1	0.010	06/28/10	CEO
Toxaphene	<0.020		mg/Kg	EPA 8081A	1	0.020	06/28/10	CEO
[Surrogates]								
Tetrachloro-m-xylene	81		%REC	EPA 8081A/8082		50-150	06/28/10	CEO
Decachlorobiphenyl	117		%REC	EPA 8081A/8082		50-150	06/28/10	CEO
Sample: 016 **S-8 30"**					Date & Time Sampled:		06/24/10 @ 11:45	

Respectfully Submitted:

Robert R. Clark, PhD - Division Manager

QUALIFIERS

B = Detected in the associated Method Blank at a concentration above the routine RL.
B1 = BOD dilution water is over specifications . The reported result may be biased high.
D = Surrogate recoveries are not calculated due to sample dilution.
E = Estimated value; Value exceeds calibration level of instrument.
H = Analyte was prepared and/or analyzed outside of the analytical method holding time
I = Matrix Interference.
J = Analyte concentration detected between RL and MDL.
Q = One or more quality control criteria did not meet specifications. See Comments for further explanation.
S = Customer provided specification limit exceeded.

ABBREVIATIONS

DF = Dilution Factor
RL = Reporting Limit, Adjusted by DF
MDL = Method Detection Limit, Adjusted by DF
Qual = Qualifier
Tech = Technician

As regulatory limits change frequently, Microbac advises the recipient of this report to confirm such limits with the appropriate federal, state, or local authorities before acting in reliance on the regulatory limits provided.

For any feedback concerning our services, please contact Robert Clark, the Division Manager at 951.779.0310. You may also contact both Trevor Boyce, President and Robert Morgan, Chief Operating Officer at president@microbac.com.

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QUALITY CONTROL DATA REPORT

1006-00367

CHJ, INC.
COLTON, CA 92324-0231

Date Reported	06/29/2010
Date Received	06/24/2010
Date Sampled	06/24/2010
Invoice No.	60102
Customer #	1091
Customer P.O.	10326-9

Project: UCR GLENMOR 2

Method # EPA 8081A
QC Reference # 23093 **Date Analyzed:** 6/28/2010 **Technician:** CEO
Samples 001 003 005 007 009 011 013 015

Results / **Control Ranges**

	LCS %REC	LCS %DUP	LCS %RPD	Control Range LCS %REC	Control Range LCS %RPD
4,4'-DDT	108	109	1	70 - 130	0 - 25
Aldrin	79	86	8	70 - 130	0 - 25
Dieldrin	104	106	2	70 - 130	0 - 25
Endrin	113	112	1	70 - 130	0 - 25
gamma-BHC	108	112	3	70 - 130	0 - 25
Heptachlor	108	111	3	70 - 130	0 - 25

Method # EPA 8081A/8082
QC Reference # 23093 **Date Analyzed:** 6/28/2010 **Technician:** CEO
Samples 001 003 005 007 009 011 013 015

Results / **Control Ranges**

	BLKSRR%REC	Control Range BLKSRR%REC
Decachlorobiphenyl	130	50 - 150
Tetrachloro-m-xylene	88	50 - 150

No method blank results were above reporting limit

Respectfully Submitted:

Robert R. Clark, PhD - Division Manager

For any feedback concerning our services, please contact Robert Clark, the Division Manager at 951.779.0310. You may also contact both Trevor Boyce, President and Robert Morgan, Chief Operating Officer at president@microbac.com.

Microbac®

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RUSH

Chain of Custody Record

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Microbac WO# 1006-003607

Page 1 of 2

Project No: 10326-9
Project Name: UCR GlenMor 2
Project Manager: Ann Laudermilk
Phone: 9098247210 Fax: 9098247209
Customer Name: (Report and Billing) CofJ
Address: (Report and Billing) P.O. Box 231 Colton 92324
Email: alaudermilk@chjinc.com

Turn Around
- 24hr RUSH*
- ☒ 48hr RUSH*
- Normal
- Other ____

*PRIOR approval, additional fee, work received after 4 pm will be processed next work day.

Analyses Requested (circle appropriate)

Lab # (Lab use only)	Sample ID (As it should appear on report)	Grab/ Comp	Date sampled	Time sampled	Sample matrix	Container # & Type	Preserved	Micro: Plate Cnt., Coliform, E.Coli	Chem: BOD, TSS, TDS, pH	Chem: Cyanide, Ammonia, TKN, Oil & Grease	IC: Br, SO4, PO4, NO3, Cl	Metals: Title 22(CAM) or RCRA	LUFT Gas or 8015 GRO or C4-C12	LUFT Diesel or 8015 DRO or C13-C40	VOCs by GCMS: 8260 or 624	VOCs by GCMS: BTEX, OXYs	SVOCs: 8270 or 625	Pest. &/or PCBs: 608 or 8081/8082					Special Instructions
1	S-1 8"		6/24/10	0815	soil	4 oz glass												X					
2	S-1 30"		↓	↓	↓	↓																	hold
3	S-2 8"			0835														X					
4	S-2 30"			↓																			hold
5	S-3 8"			0900														X					
6	S-3 30"			↓																			hold
7	S-4 8"			0925														X					
8	S-4 30"			↓																			hold
9	S-5 8"			1000														X					
10	S-5 30"		↓	↓	↓	↓																	hold

1) Relinquished by: (Sampler's Signature) [signature]	Date: 6-24	Time: 1200	3) Relinquished by:	Date:	Time:	5) Relinquished by:	Date:	Time:
2) Received by:	Date:	Time:	4) Received by:	Date:	Time:	6) Received for Laboratory by: [signature]	Date: 6/24/10	Time: 1200

Disposal
- Return
- ☒ Lab Disposal

Unless other arrangements are made samples will be disposed of 60 days after reciept.

This Section is to be completed by Laboratory personnel:

Samples Chilled: ○ Yes ○ No ☒ From Field
Custody Seals: ○ Yes ☒ No
Samples Intact: ☒ Yes ○ No
Temp C:
Delivery: ○ Courier ☒ Walk In ○ UPS/Fed Ex

Report Delivery Formats
- ☐ Paper ☒ EMAIL ☐ XLS
- ☐ EDD, Type ______
- ☐ EDF, EPA Site ID ______

Laboratory Notes:

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The delivery of samples and the signature on this chain of custody form constitutes authorization to perform the analyses specified above under the Terms and Conditions set forth on the back hereof.

White Copy - Original (Accompanies Samples) Yellow Copy - Microbac Files Pink Copy - Client Copy

Microbac

Southern California Division
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Chain of Custody Record

RUSH

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Microbac WO# 1006-003367

Page 2 of 2

Project No: 10326-9
Project Name: UCR Glen Mar 2
Project Manager: Ann Laudermilk
Phone:
Fax:
Customer Name: (Report and Billing) CHJ
Address: (Report and Billing)
Email:

Turn Around: ○ 24hr RUSH* ⊗ 48hr RUSH* ○ Normal ○ Other ____

*PRIOR approval, additional fee, work received after 4 pm will be processed next work day.

Analyses Requested (circle appropriate)

Lab # (Lab use only)	Sample ID (As it should appear on report)	Grab/ Comp	Date sampled	Time sampled	Sample matrix	Container # & Type	Preserved	Micro: Plate Cnt., Coliform, E.Coli	Chem: BOD, TSS, TDS, pH	Chem: Cyanide, Ammonia, TKN, Oil & Grease	IC: Br, SO4, PO4, NO3, Cl	Metals: Title 22(CAM) or RCRA	LUFT Gas or 8015 GRO or C4-C12	LUFT Diesel or 8015 DRO or C13-C40	VOCs by GCMS: 8260 or 624	VOCs by GCMS: BTEX, OXYs	SVOCs: 8270 or 625	Pest. &/or PCBs: 608 or 8081 8082					Special Instructions
11	S-6 8"		6/24/10	1030	soil	4 oz glass												X					
12	S-6 30"		↓	↓	↓	8 oz glass																	hold
13	S-7 8"		↓	1100	↓	↓												X					
14	S-7 30"		↓	↓	↓	↓																	hold
15	S-8 8"		↓	1145	↓	↓												X					
16	S-8 30"		↓	↓	↓	↓																	hold

1) Relinquished by: (Sampler's Signature) [signature]	Date: 6-24	Time: 1200	3) Relinquished by:	Date:	Time:	5) Relinquished by:	Date:	Time:
2) Received by:	Date:	Time:	4) Received by:	Date:	Time:	6) Received for Laboratory by: [signature]	Date: 6/24/10	Time: 1200

Disposal: ○ Return ⊗ Lab Disposal

Unless other arrangements are made samples will be disposed of 60 days after reciept.

This Section is to be completed by Laboratory personnel:

Samples Chilled: ○ Yes ○ No ⊗ From Field
Custody Seals: ○ Yes ⊗ No
Samples Intact: ⊗ Yes ○ No
Temp C:
Delivery: ○ Courier ⊗ Walk In ○ UPS/Fed Ex

Report Delivery Formats: ☐ Paper ☒ EMAIL ☐ XLS ☐ EDD, Type ____ ☐ EDF, EPA Site ID ____

Laboratory Notes:

CHEMISTRY · MICROBIOLOGY · FOOD SAFETY · CONSUMER PRODUCTS · MOBILE LABORATORIES · PHARMACEUTICALS · NUTRACEUTICALS · COSMETICS

The delivery of samples and the signature on this chain of custody form constitutes authorization to perform the analyses specified above under the Terms and Conditions set forth on the back hereof.

White Copy - Original (Accompanies Samples) Yellow Copy - Microbac Files Pink Copy - Client Copy

ENCLOSURE "F"

REFERENCES

REFERENCES

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Appendix N

Asbestos Containing Building Material (ACBM) and Lead Based Paint (LBP) Survey

CONFIDENTIAL AND PRIVILEGED
ASBESTOS AND LEAD
SURVEY
FOR
THE PROPERTY LOCATED AT:

Valencia Hill House
University of California, Riverside
Riverside, California

UCR PROJECT #: 956334
GLEN MOR 2 Student Apartments

Prepared for:

University of California, Riverside
Office of Design and Construction
3637 Canyon Crest Drive
Riverside, California 92507
Attn: Mr. Tim Brown
Project Manager

Prepared by:
Ambient Environment, Inc.
1464 Sixth Street
Norco, California 92860

December 7, 2010

Ambient Environmental Inc. Project #10-2037

Todd Hill
CAC #09-4544
CDPH#

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1.0 EXECUTIVE SUMMARY

Ambient Environmental Inc. was retained by the University of California, Office of Design and Construction to conduct a comprehensive Asbestos Containing Material (ACM) and Lead Based Paint (LBP) Survey for the Valencia Hill House located on the University of California, Riverside Campus.

Mr. Todd Hill, a Certified Asbestos Consultant and a United States Environmental Protection Agency (USEPA) certified building inspector for Asbestos Containing Building Materials (ACBM) and a CDPH Certified Lead Inspector/Assessor conducted the survey on December 3, 2010.

The purpose of the asbestos and lead based paint survey was to locate and identify accessible friable and non-friable suspect ACM and the presence of LBP. Once a visual inspection was performed, representative asbestos bulk samples were obtained from each homogenous building material. Lead samples were obtained from each homogenous paint color utilizing an X-Ray Fluorescence (XRF) lead-containing paint analyzer. The sample location, material type, friability, condition of material, and quantity were also documented.

Asbestos bulk sampling was obtained in accordance with the USEPA established guidelines document, "Guidance for Controlling Asbestos Containing Materials in Buildings" (USEPA 560/5-85-024, 1985) and USEPA 40 CFR Part 763 "Asbestos Containing Materials in Schools, Final Rule" (AHERA). Each bulk sample was analyzed for asbestos content by Polarized Light Microscopy (PLM). Forensic Analytical is the accredited laboratory that performed the analysis for asbestos. A total of 22 asbestos bulk samples were obtained during the survey.

Lead based paint readings were collected in accordance with Chapter 7 of the HUD Guidelines for Evaluation and Control of Lead-Based Paint Hazards in Housing and U.S. Environmental Protection Agency (EPA) 40 CFR part 745 and Title X of the 1992 Housing and Community Development Act. A total of 124 XRF readings were obtained during the survey.

All areas of the interior and exterior of the building were visually inspected. Asbestos containing building materials and lead based paint not identified in this report may be present within hidden and/or concealed areas of the building.

Locations, amounts, and conditions of each building material and lead based paint assessed and sampled can be found in the inventory (Tables).

2.0 SURVEY PROCEDURES

Ambient Environmental Inc. conducted asbestos containing material and lead based paint survey for the interior and exterior of the Valencia Hill House located on the University of California, Riverside Campus. All areas of the building interior and exterior were surveyed for asbestos and lead based paint. Asbestos containing materials or lead based paint not identified in this report may be present within hidden or concealed areas of the buildings.

Asbestos containing material identification was performed by entering each functional space, assessing all structural/mechanical components and architectural finishes. The physical conditions, friability, accessibility, activity and damage of suspect asbestos containing building materials was also assessed and documented.

Lead based paint was identified by entering each functional space and assessing all structural/mechanical compounds and architectural finishes. The physical conditions, accessibility, activity and damage of suspect lead containing paint was also assessed and documented.

For reporting purposes, space designations were assigned each functional space within the facilities using the pre-existing designation on doors or as indicated on the floor plans. Where neither was available, the space was labeled by the inspector as indicated in the report. The following procedures were performed:

1. A visual assessment to identify the location, type and quantity of lead based paint and friable and non-friable asbestos building materials.

2. Obtain representative bulk samples of from suspect asbestos containing building materials.

3. Obtain representative XRF reading from suspect paints.

4. Asbestos samples were analyzed by an independent accredited laboratory for the presence of asbestos by PLM.

5. Present all survey results in a written report including recommendation, locations, quantities, and laboratory results.

All findings, recommendations, and analytical data presented in this report are based on the information (assessment and sampling data) obtained by our inspector during the survey.

3.0 BULK SAMPLING PROCEDURES FOR ASBESTOS

Each suspect ACM identified was sampled in accordance with sampling guidelines established by the USEPA. The following summarizes the sampling procedures utilized:

1. Building materials were categorized into homogeneous materials. A homogeneous material is defined as being uniform in texture, color, and date of application.

2. A sampling scheme was developed based upon the location and quantities of the various homogeneous materials.

3. Bulk samples were collected by extracting a representative section of the selected material, placing it in a sampling container and assigning a unique sample number. The samples were placed into a sealed shipping container for delivery to an accredited laboratory for analysis by PLM.

4. The personnel performed proper decontamination procedures to prevent the spread of secondary contamination.

5. Each bulk sample was recorded on a bulk sample log and possession of the samples was tracked by a chain of custody record.

The reported laboratory results in this report are a visual estimate by area of Asbestos concentration. Results for heterogeneous samples examined by component are reported as a composite. The lower limit of reliable detection for this method is 1%. Samples that contain more than 1% of Asbestos are reported in 5% ranges. Samples which contain Asbestos in a concentration lower than the limit of reliable detection (<1%) are considered "Trace."

All bulk samples were analyzed by PLM in accordance with the "Interim Method for the Determination of Asbestos in Bulk Insulation Samples EPA - 600/M4-82-020" dated December 1982 and adopted by the National Voluntary Laboratory Accreditation Program (NVLAP) Title 15, part 7 of the Code of Federal Register as affiliated with the National Institute for Standards and Testing (NIST).

Twenty two bulk samples were obtained from the subject property and analyzed for asbestos content by Forensic Analytical: 2959 Pacific Commerce Drive Rancho Dominguez, California (310) 763-2374. Forensic Analytical is accredited by the American Industrial Hygiene Association (AIHA), National Voluntary Laboratory Accreditation Program (NVLAP #101459-0), National Institute of Standards and Testing (NIST), and is a successful participant in the Proficiency Analytical Testing Program (PAT).

4.0 X-RAY FLUORESCENCE SAMPLING PROCEDURES FOR LEAD-BASED PAINT

Sampling was accomplished by entering each room equivalent. A room equivalent is an identifiable part of a building such as a room, office, hallway, staircase, foyer and exterior. X-Ray Fluorescence (XRF) lead-containing paint analyzer readings were collected of each testing combination in each room equivalent. A testing combination is a unique combination of room equivalent building component type, and substrate. Visible color may not be an accurate predictor of painting history and is not included in the definition of a testing combination. The sample locations and condition of the paint were documented.

Lead based paint readings were collected in accordance with Chapter 7 of the HUD Guidelines for Evaluation and Control of Lead-Based Paint Hazards in Housing and U.S. Environmental Protection Agency (EPA) 40 CFR part 745 and Title X of the 1992 Housing and Community Development Act. A total of 124 XRF readings were obtained during the survey.

LA County Department of Health Services standard for definition of LBP is .7 mg/cm^2 or 600 parts per million (ppm), however **OSHA requires that all workers be properly protected when working with materials containing any level of lead in accordance with Title 8 CCR Section 1532.1.**

5.0 POSITIVE ASBESTOS SAMPLE RESULTS AND LOCATIONS

Material	Asbestos Content	Location of Material	Square Footage	Friable	Damage
Floor Tile	3% Chrysotile	Sun Room (Under Carpet)	200	No	No
Multi Layer Flooring	Trace Chrysotile	Kitchen/Dining Room (Above Sub Floor)	400	No	No
Multi Layer Flooring	70% Chrysotile	Kitchen/Dining Room (Below Sub Floor)	400	Yes	No
Duct Wrap	55% Chrysotile	Heater Vents	60	Yes	Yes
Sheet Flooring	70% Chrysotile	Basement (Under Tile)	100	Yes	Yes
Pipe Insulation	70% Chrysotile	Basement	200	Yes	No
Silver Roof Paint	2% Chrysotile	Roof	900	No	No
Roof Felt	75% Chrysotile	Roof	900	No	No
Roof Mastic	3% Chrysotile	Roof	200	No	No

Square footages are approximations only and should not be used for bidding or notification purposes.

6.0 NEGATIVE ASBESTOS SAMPLE RESULTS AND LOCATIONS

Material	Asbestos Content	Location of Material	Square Footage	Friable	Damage
Interior Plaster	Non Detected	Throughout House	NA	NA	NA
Drywall/Joint Compound	Non Detected	Kitchen	NA	NA	NA
Insulation	Non Detected	Attic	NA	NA	NA
Exterior Stucco	Non Detected	Exterior Walls	NA	NA	NA
Window Putty	Non Detected	Exterior Windows	NA	NA	NA

7.0 HAZARD ASSESSMENTS OF (ACM) MATERIALS

Material	Location of Material	Hazard
Floor Tile	Sun Room	Good
Multi Layer Flooring	Kitchen	Good
Multi Layer Flooring	Kitchen	Good
Duct Wrap	Throughout	Moderate
Sheet Flooring	Basement	Moderate
Pipe Insulation	Basement	Good
Silver Roof Paint	Roof	Good
Roof Felt	Roof	Good
Roof Mastic	Roof	Good

Good - Material shows little or no damage and requires no remedial action.
Moderate - Material is somewhat damaged and is in need of minor repairs.
Significantly Damaged - Material is in need of immediate remedial action.

8.0 LEAD-BASED PAINT SAMPLE RESULTS AND LOCATIONS

Sample Number	Side	Component	Location	Substrate	Condition	Pbl mg/cm^2
1		Calibration	---	---	---	1.0
2		Calibration	---	---	---	1.0
3		Calibration	---	---	---	1.1
4	A	Wall	Living Room	Plaster	Good	0.02
5	B	Wall	Living Room	Plaster	Good	0.00
6	C	Wall	Living Room	Plaster	Good	0.00
7	**C**	**Fire Place**	**Living Room**	**Ceramic**	**Good**	**24.3**
8	D	Wall	Living Room	Plaster	Good	0.00
9	D	Window	Living Room	Wood	Good	0.02
10	A	Jamb	Living Room	Wood	Good	0.02
11	A	Door	Living Room	Wood	Good	0.00
12	A	Wall	Formal Dine	Plaster	Good	0.00
13	B	Wall	Formal Dine	Plaster	Good	0.00
14	C	Wall	Formal Dine	Plaster	Good	0.00
15	D	Wall	Formal Dine	Plaster	Good	0.00
16	D	Ceiling	Formal Dine	Plaster	Good	0.00
17	D	Baseboard	Formal Dine	Wood	Good	0.00
18	B	Window	Formal Dine	Wood	Good	0.00
19	B	Jamb	Formal Dine	Wood	Good	0.00
20	B	Door	Formal Dine	Wood	Good	0.00
21	A	Wall	Bed 1	Plaster	Good	0.00
22	B	Wall	Bed 1	Plaster	Good	0.04
23	C	Wall	Bed 1	Plaster	Good	0.02
24	D	Wall	Bed 1	Plaster	Good	0.00
25	A	Jamb	Bed 1	Wood	Good	0.00
26	A	Door	Bed 1	Wood	Good	0.05
27	A	Ceiling	Bed 1	Plaster	Good	0.02
28	**C**	**Window**	**Bed 1**	**Wood**	**Good**	**1.0**
29	A	Wall	Bath 1	Plaster	Good	0.00
30	B	Wall	Bath 1	Plaster	Good	0.02
31	**B**	**Wall**	**Bath 1**	**Ceramic**	**Good**	**5.9**
32	C	Wall	Bath 1	Plaster	Good	0.02
33	D	Wall	Bath 1	Plaster	Good	0.00
34	D	Floor	Bath 1	Ceramic	Good	0.02
35	A	Jamb	Bath 1	Wood	Good	0.30
36	A	Door	Bath 1	Wood	Good	0.20
37	**C**	**Window**	**Bath 1**	**Wood**	**Good**	**1.0**
38	**C**	**Counter**	**Bath 1**	**Ceramic**	**Good**	**2.5**
39	A	Wall	Hall	Plaster	Good	0.02
40	B	Wall	Hall	Plaster	Good	0.02
41	C	Wall	Hall	Plaster	Good	0.00
42	D	Wall	Hall	Plaster	Good	0.03
42	D	Ceiling	Hall	Plaster	Good	0.01
43	B	Jamb	Hall	Wood	Good	0.05
44	B	Door	Hall	Wood	Good	0.04
45	B	Baseboard	Hall	Wood	Good	0.30
46	C	Phone Shelf	Hall	Wood	Good	0.03
47	A	Wall	Bed 2	Plaster	Good	0.00
48	B	Wall	Bed 2	Plaster	Good	0.00
49	C	Wall	Bed 2	Plaster	Good	0.00
50	D	Wall	Bed 2	Plaster	Good	0.00
51	A	Jamb	Bed 2	Wood	Good	0.02
52	A	Door	Bed 2	Wood	Good	0.04
53	A	Baseboard	Bed 2	Wood	Good	0.02
54	B	Floor	Bed 2	Wood	Good	0.02
55	B	Ceiling	Bed 2	Plaster	Good	0.00
56	A	Wall	Sitting Room	Plaster	Good	0.02

57	B	Wall	Sitting Room	Plaster	Good	0.00
58	C	Wall	Sitting Room	Plaster	Good	0.00
59	D	Wall	Sitting Room	Plaster	Good	0.01
60	D	Ceiling	Sitting Room	Plaster	Good	0.00
61	**B**	**Window**	**Sitting Room**	**Wood**	**Good**	**2.49**
62	**D**	**Jamb**	**Sitting Room**	**Wood**	**Good**	**1.2**
63	**D**	**Door**	**Sitting Room**	**Wood**	**Good**	**1.6**
64	A	Wall	Sun Porch	Plaster	Good	0.00
65	B	Wall	Sun Porch	Plaster	Good	0.00
66	C	Wall	Sun Porch	Plaster	Good	0.00
67	D	Wall	Sun Porch	Plaster	Good	0.00
68	**B**	**Window**	**Sun Porch**	**Wood**	**Good**	**2.3**
69	**D**	**Window**	**Sun Porch**	**Wood**	**Good**	**1.5**
70	A	Wall	Bed 3	Plaster	Good	0.00
71	B	Wall	Bed 3	Plaster	Good	0.00
72	C	Wall	Bed 3	Plaster	Good	0.00
73	D	Wall	Bed 3	Plaster	Good	0.00
74	**A**	**Jamb**	**Bed 3**	**Wood**	**Good**	**1.2**
74	A	Door	Bed 3	Wood	Good	0.90
75	**A**	**Window**	**Bed 3**	**Wood**	**Good**	**1.2**
76	A	Baseboard	Bed 3	Wood	Good	0.05
77	A	Floor	Bed 3	Wood	Good	0.00
78	B	Ceiling	Bed 3	Plaster	Good	0.00
79	A	Wall	Dining Room	Plaster	Good	0.00
80	B	Wall	Dining Room	Plaster	Good	0.00
81	C	Wall	Dining Room	Plaster	Good	0.00
82	D	Wall	Dining Room	Plaster	Good	0.00
83	**A**	**Jamb**	**Dining Room**	**Wood**	**Good**	**1.60**
84	A	Door	Dining Room	Wood	Good	0.02
85	**B**	**Window**	**Dining Room**	**Wood**	**Good**	**1.0**
86	B	Ceiling	Dining Room	Plaster	Good	0.02
87	A	Wall	Kitchen	Drywall	Good	0.00
88	B	Wall	Kitchen	Drywall	Good	0.00
89	C	Wall	Kitchen	Drywall	Good	0.00
90	D	Wall	Kitchen	Drywall	Good	0.00
91	**C**	**Window**	**Kitchen**	**Wood**	**Good**	**1.3**
92	C	Cabinet	Kitchen	Wood	Good	0.02
93	C	Counter	Kitchen	Formica	Good	0.02
94	A	Wall	Basement	Plaster	Good	0.00
95	B	Wall	Basement	Plaster	Good	0.00
96	C	Wall	Basement	Plaster	Good	0.00
97	D	Wall	Basement	Plaster	Good	0.00
98	C	Wall	Basement	Drywall	Good	0.00
99	A	Jamb	Basement	Wood	Good	0.00
100	A	Door	Basement	Wood	Good	0.00
101	A	Wall	Bath 2	Drywall	Good	0.00
102	B	Wall	Bath 2	Drywall	Good	0.00
103	C	Wall	Bath 2	Drywall	Good	0.00
104	D	Wall	Bath 2	Drywall	Good	0.00
105	A	Floor	Bath 2	Ceramic	Good	23.0
106	B	Wall	Exterior	Stucco	Fair	0.03
107	**B**	**Jamb**	**Exterior**	**Wood**	**Poor**	**2.3**
108	**B**	**Door**	**Exterior**	**Wood**	**Poor**	**1.0**
109	**B**	**Window**	**Exterior**	**Wood**	**Poor**	**3.2**
110	C	Wall	Exterior	Stucco	Fair	0.01
111	C	Window	Exterior	Wood	Poor	0.90
112	A	Wall	Exterior	Stucco	Fair	0.02
113	A	Jamb	Exterior	Wood	Fair	0.60
114	A	Door	Exterior	Wood	Good	0.00
115	**A**	**Window**	**Exterior**	**Wood**	**Poor**	**6.2**
116	B	Wall	Exterior	Stucco	Good	0.20
117	**B**	**Window**	**Exterior**	**Wood**	**Poor**	**1.0**
118	B	Jamb	Exterior	Wood	Fair	0.04

119	B	Door	Exterior	Wood	Fair	0.01
120	B	Garage Door	Exterior	Metal	Good	0.00
121	B	Garage Jamb	Exterior	Wood	Fair	0.60
122	---	---	---	Calibrate	---	1.0
123	---	---	---	Calibrate	---	1.0
124	---	---	---	Calibrate	---	1.0

Detection Limit Guidelines for the Housing and Urban Development (HUD) is 1.0 mg/cm^2. As per the OSHA Guidelines the concentration is .7mg/cm^2. **OSHA requires that all workers be properly protected when working with materials containing any level of lead in accordance with Title 8 CCR Section 1532.1.**

9.0 HAZARDOUS ASSESSMENT PROCEDURES

During the comprehensive asbestos and lead based paint survey, Ambient also conduct a visual hazardous assessment to identify the presence of any hazardous waste such as (PCB's, Freon, waste drums, sink traps, storage areas, lights ballasts, fume hoods, radioactive contamination, thermostats, fluorescent lamps, etc.). During the assessment Ambient observed the following:

- No visible radioactive contamination
- No waste drums
- No Freon
- All sink traps were clean and working
- No visible contamination in storage areas
- **Mercury Thermostats**
- Light Ballast had no PCB's

10.0 RECOMMENDATIONS

Current federal and state regulations require that repair, renovation, or demolition of any ACM or LBP must be conducted only by workers and contractors who have been properly trained in the correct handling of ACM and LBP. All asbestos work should proceed under the guidance or direction of an independent State Certified Asbestos Consultant with oversight performed by a State Certified Site Surveillance Technician.

Ambient Environmental Services Inc.'s professional recommendation that only a certified hazardous materials removal contractor removes the materials identified in this survey as containing asbestos and lead based paint.

The ACM identified during this survey are in good to moderate condition. All asbestos containing materials must be removed prior to demolition.

The exterior LBP is in fair to poor condition. Loose and flaking LBP should be scrapped and stabilized. Once the paint is stabilized the adjacent soil should be cleared of any paint chips and soil samples be obtained.

Ambient Environmental Services, Inc. warrants that our services are performed within the limits prescribed by our client with the usual thoroughness and competence of the engineering profession.

The recommendations in this report are professional opinions solely based on visual observations and analytical analyses, as described in this report. Therefore, the scope of services was limited to accessible ACM and lead based paints and destructive, intrusive investigative techniques were not contracted. However, it is possible that unrecognized ACM and LBP may exist in the facilities.

Opinions and recommendations presented herein apply to site conditions existing at the time of our investigation and those reasonably foreseeable, cannot necessarily apply to site changes of which this office is not aware and has not had the opportunity to evaluate.

APPENDIX A

ASBESTOS CHAIN OF CUSTODY AND BULK SAMPLE LOG

AMBIENT ENVIRONMENTAL, INC.

Asbestos / Lead Field Services
Indoor Air Quality Services
Phase I Site Assessments
Lab Services

1464 6TH STREET
NORCO, CALIFORNIA 92860
* TEL: (951) 272-4730
* FAX: (951) 272-4731

ASBESTOS BULK SAMPLE LOG

Page ____ of ____

Client Name: UCR ODTC

Project Location: Valencia Hill House Riverside

Date: 12-2-10 Field Technician: T. Hill

Project Number: 10-2037 Priority: ASAP ✓ 24 HR ____ 3-5 Days ____

SAMPLE NUMBER	SAMPLE LOCATION	MATERIAL DESCRIPTION	SQUARE FOOTAGE
1	Living Room	Plaster	
2	Bed Room 1	Plaster	
3	Hall	Plaster	
4	Kitchen	Drywall / JC	
5	Kitchen	Drywall / JC	
6	Kitchen	Drywall / JC	
7	Sun Room	Floor Tile / Mastic under carpet	200
8	Kitchen / Dining	Multi layer flooring above sub floor	400
9	Kitchen	Multi layer flooring above sub floor	400
10	Kitchen	Flooring below subflooring	400

Chain of Custody Analytical Method: PLM: ✓ TEM: ____ Other: ____

Sampled By		Date 12-2-10	Time
Relinquished By		Date	Time
Received By	[signature]	Date 12-6-10	Time 7:20 am
Relinquished By		Date	Time
Received By		Date	Time

AMBIENT ENVIRONMENTAL, INC.

Asbestos / Lead Field Services
Indoor Air Quality Services
Phase I Site Assessments
Lab Services

1464 6TH STREET
NORCO, CALIFORNIA 92860
* TEL: (951) 272-4730
* FAX: (951) 272-4731

ASBESTOS BULK SAMPLE LOG

Page____ of ____

Client Name: UCR ODFC

Project Location: VALENCIA HILL HOUSE RIVERSIDE

Date: 12-2-10 Field Technician: T. HILL

Project Number: 10-2037 Priority: ASAP ✓ 24 HR ____ 3-5 Days ____

SAMPLE NUMBER	SAMPLE LOCATION	MATERIAL DESCRIPTION	SQUARE FOOTAGE
11	KITCHEN / DINING	FLOORING BELOW SUB FLOORING	400
12	LIVING ROOM	VENT INSULATION	60
13	ATTIC	INSULATION	900
14	BASEMENT	MULT LAYER SHEET FLOORING	100
15	BASEMENT	PIPE INSULATION	200
16	E. WALL	STUCCO	
17	S. WALL	STUCCO	
18	W. WALL	STUCCO	
19	E. WALL	WINDOW PUTTY	200
20	ROOF	FELT	900

Chain of Custody

Analytical Method: PLM: ✓ TEM: ____ Other: ____

Sampled By	[signature]	Date 12-2-10	Time
Relinquished By		Date	Time
Received By	[signature] 8/0	Date 12-6-10	Time 7:20 AM
Relinquished By		Date	Time
Received By		Date	Time

AMBIENT ENVIRONMENTAL, INC.

Asbestos / Lead Field Services
Indoor Air Quality Services
Phase I Site Assessments
Lab Services

1464 6TH STREET
NORCO, CALIFORNIA 92860
* TEL: (951) 272-4730
* FAX: (951) 272-4731

ASBESTOS BULK SAMPLE LOG

Page____ of ____

Client Name: UCR OD+C

Project Location: VALENCIA HILL HOUSE RIVERSIDE

Date: 12-2-10 Field Technician: T. Hill

Project Number: 10-2037 Priority: ASAP ✓ 24 HR ____ 3-5 Days ____

SAMPLE NUMBER	SAMPLE LOCATION	MATERIAL DESCRIPTION	SQUARE FOOTAGE
21	ROOF	UNDER LAYMENT	900
22	ROOF	MASTIC	300

Chain of Custody Analytical Method: PLM: ✓ TEM: ____ Other: ________

Sampled By	[signature]	Date	12-2-10	Time	
Relinquished By		Date		Time	
Received By	[signature]	Date	12-6-10	Time	7:20 am
Relinquished By		Date		Time	
Received By		Date		Time	

APPENDIX B

ASBESTOS LABORATORY CERTIFICATES OF ANALYSIS

Forensic Analytical Laboratories

Final Report

Bulk Asbestos Analysis

(EPA Method 600/R-93-116, Visual Area Estimation)

Ambient Environmental Inc
J.Payne/J.Lumpkin
1464 6th Street

Norco, CA 92860

Client ID:	5697
Report Number:	B142710
Date Received:	12/06/10
Date Analyzed:	12/06/10
Date Printed:	12/06/10
First Reported:	12/06/10

Job ID/Site: 10-2037; Valencia Hill House, Riverside

FALI Job ID: 5697

Date(s) Collected: 12/02/2010

Total Samples Submitted: 22

Total Samples Analyzed: 22

Sample ID	Lab Number	Asbestos Type	Percent in Layer	Asbestos Type	Percent in Layer	Asbestos Type	Percent in Layer
1	50615870						
Layer: Beige Plaster			**ND**				
Layer: White Plaster			**ND**				
Layer: Paint			**ND**				
Total Composite Values of Fibrous Components:		**Asbestos (ND)**					
Cellulose (Trace)							
2	50615871						
Layer: Beige Plaster			**ND**				
Layer: White Plaster			**ND**				
Layer: Paint			**ND**				
Total Composite Values of Fibrous Components:		**Asbestos (ND)**					
Cellulose (Trace)							
3	50615872						
Layer: Beige Plaster			**ND**				
Layer: White Plaster			**ND**				
Layer: Paint			**ND**				
Total Composite Values of Fibrous Components:		**Asbestos (ND)**					
Cellulose (Trace)							
4	50615873						
Layer: White Drywall			**ND**				
Layer: White Skimcoat/Joint Compound			**ND**				
Layer: Paint			**ND**				
Total Composite Values of Fibrous Components:		**Asbestos (ND)**					
Cellulose (20 %)							
5	50615874						
Layer: White Drywall			**ND**				
Layer: White Skimcoat/Joint Compound			**ND**				
Layer: Paint			**ND**				
Total Composite Values of Fibrous Components:		**Asbestos (ND)**					
Cellulose (20 %)							

Sample ID	Lab Number	Asbestos Type	Percent in Layer	Asbestos Type	Percent in Layer	Asbestos Type	Percent in Layer
6	50615875						
Layer: White Drywall			**ND**				
Layer: White Skimcoat/Joint Compound			**ND**				
Layer: Paint			**ND**				
Total Composite Values of Fibrous Components:		**Asbestos (ND)**					
Cellulose (20 %)							
7	50615876						
Layer: Brown Tile		Chrysotile	**3 %**				
Layer: Black Mastic			**ND**				
Total Composite Values of Fibrous Components:		**Asbestos (3%)**					
Cellulose (Trace)							
8	50615877						
Layer: Light Green Sheet Flooring			**ND**				
Layer: Fibrous Backing/Beige Mastic			**ND**				
Layer: Beige Tile		Chrysotile	**Trace**				
Layer: Tan Mastic			**ND**				
Layer: Wood			**ND**				
Total Composite Values of Fibrous Components:		**Asbestos (Trace)**					
Cellulose (40 %) Fibrous Glass (Trace)	Synthetic (Trace)						
9	50615878						
Layer: Light Green Sheet Flooring			**ND**				
Layer: Fibrous Backing/Beige Mastic			**ND**				
Layer: Beige Tile		Chrysotile	**Trace**				
Layer: Tan Mastic			**ND**				
Layer: Wood			**ND**				
Total Composite Values of Fibrous Components:		**Asbestos (Trace)**					
Cellulose (40 %) Fibrous Glass (Trace)	Synthetic (Trace)						
10	50615879						
Layer: Tan Sheet Flooring			**ND**				
Layer: Fibrous Backing			**ND**				
Layer: Brown Mastic			**ND**				
Total Composite Values of Fibrous Components:		**Asbestos (ND)**					
Cellulose (80 %) Synthetic (5 %)							
11	50615880						
Layer: Tan Sheet Flooring			**ND**				
Layer: Fibrous Backing/Tan Mastic		Chrysotile	**70 %**				
Layer: Black/Off-White Tile			**ND**				
Layer: Tan Mastic			**ND**				
Total Composite Values of Fibrous Components:		**Asbestos (25%)**					
Cellulose (2 %)							
12	50615881						
Layer: Beige Fibrous Material		Chrysotile	**55 %**				
Layer: Tan Plaster			**ND**				
Total Composite Values of Fibrous Components:		**Asbestos (52%)**					
Cellulose (40 %)							

2959 Pacific Commerce Drive, Rancho Dominguez, CA 90221 / Telephone: (310) 763-2374 (888) 813-9417 / Fax: (310) 763-8684

Client Name: Ambient Environmental Inc

Report Number: B142710
Date Printed: 12/06/10

Sample ID	Lab Number	Asbestos Type	Percent in Layer	Asbestos Type	Percent in Layer	Asbestos Type	Percent in Layer
13	50615882						
Layer: White Fibrous Material			ND				
Total Composite Values of Fibrous Components:		Asbestos (ND)					
Cellulose (Trace) Fibrous Glass (99 %)							
14	50615883						
Layer: Tan Sheet Flooring			ND				
Layer: Fibrous Backing/Tan Mastic		Chrysotile	70 %				
Layer: Black/Off-White Tile			ND				
Layer: Tan Mastic			ND				
Total Composite Values of Fibrous Components:		Asbestos (25%)					
Cellulose (2 %)							
15	50615884						
Layer: Beige Fibrous Material		Chrysotile	70 %				
Total Composite Values of Fibrous Components:		Asbestos (70%)					
Cellulose (5 %)							
16	50615885						
Layer: Grey Cementitious Material			ND				
Layer: Beige Cementitious Material			ND				
Layer: Paint			ND				
Total Composite Values of Fibrous Components:		Asbestos (ND)					
Cellulose (Trace)							
17	50615886						
Layer: Grey Cementitious Material			ND				
Layer: Beige Cementitious Material			ND				
Layer: Paint			ND				
Total Composite Values of Fibrous Components:		Asbestos (ND)					
Cellulose (Trace)							
18	50615887						
Layer: Grey Cementitious Material			ND				
Layer: Beige Cementitious Material			ND				
Layer: Paint			ND				
Total Composite Values of Fibrous Components:		Asbestos (ND)					
Cellulose (Trace)							
19	50615888						
Layer: Tan Putty			ND				
Layer: Paint			ND				
Total Composite Values of Fibrous Components:		Asbestos (ND)					
Cellulose (Trace)							

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Client Name: Ambient Environmental Inc

Report Number: B142710
Date Printed: 12/06/10

Sample ID	Lab Number	Asbestos Type	Percent in Layer	Asbestos Type	Percent in Layer	Asbestos Type	Percent in Layer
20	50615889						
Layer: Stones			ND				
Layer: Black Tars			ND				
Layer: Black Felt			ND				
Layer: Silver Paint		Chrysotile	2 %				
Total Composite Values of Fibrous Components:		**Asbestos (Trace)**					
Cellulose (65 %)							
21	50615890						
Layer: Silver Paint		Chrysotile	2 %				
Layer: Black Tar			ND				
Layer: Black Felt		Chrysotile	75 %				
Total Composite Values of Fibrous Components:		**Asbestos (68%)**					
Cellulose (2 %)							
22	50615891						
Layer: Black Semi-Fibrous Tar		Chrysotile	3 %				
Total Composite Values of Fibrous Components:		**Asbestos (3%)**					
Cellulose (Trace)							

Steven Takahashi, Laboratory Supervisor, Rancho Dominguez Laboratory

Note: Limit of Quantification ('LOQ') = 1%. 'Trace' denotes the presence of asbestos below the LOQ. 'ND' = 'None Detected'.

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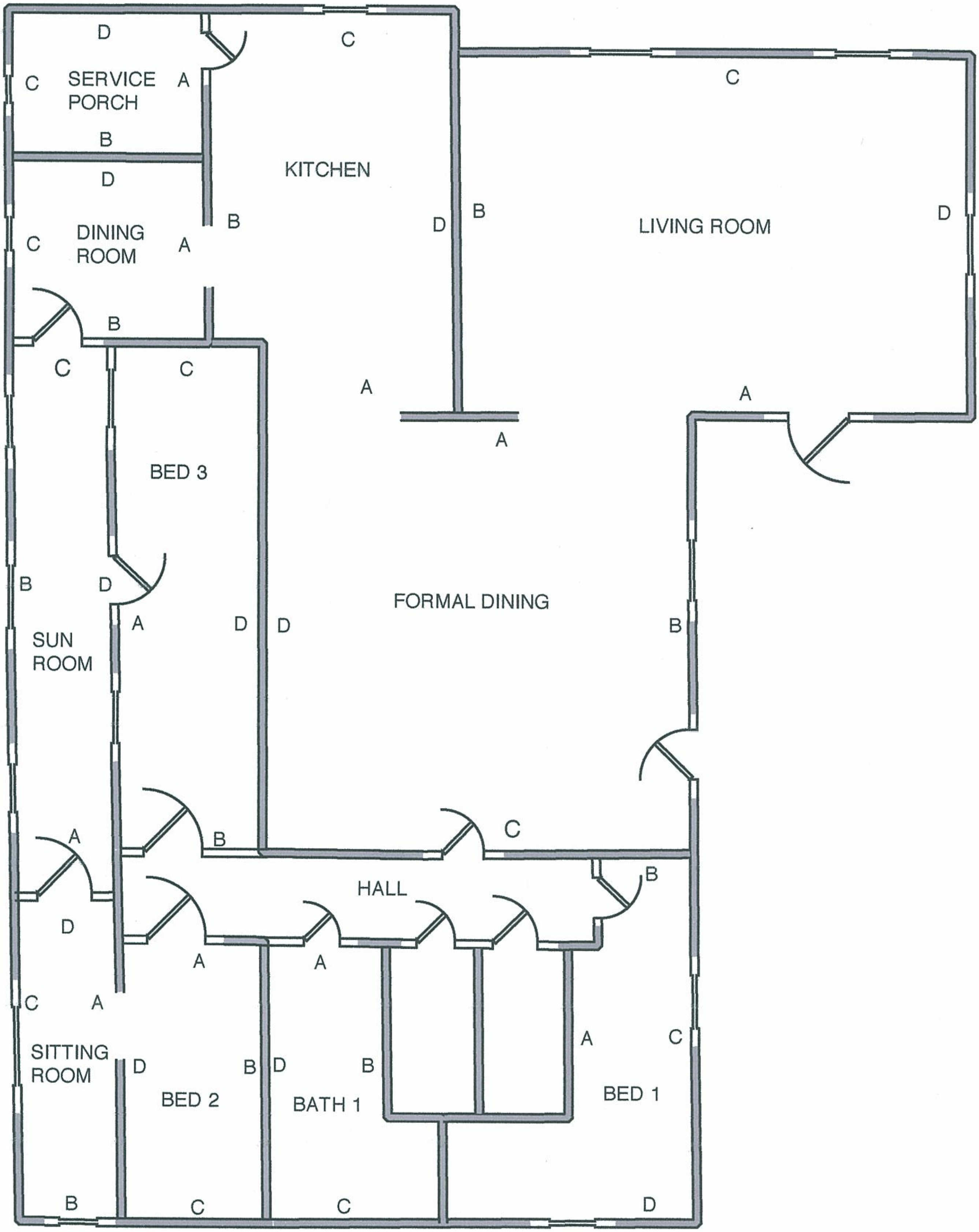
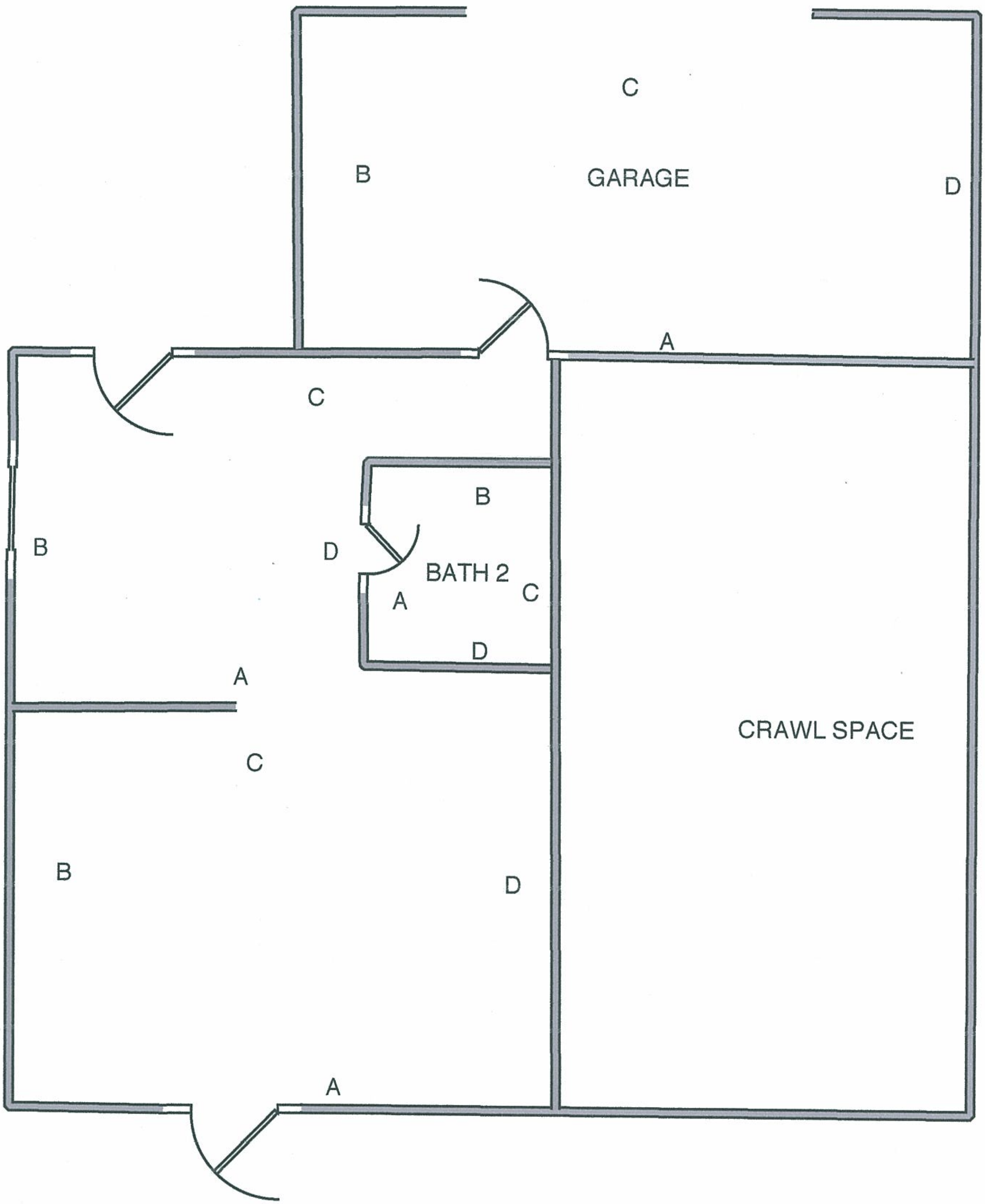
PHOTOS



AMBIENT ENVIRONMENTAL INC.
1464 SIXTH STREET
NORCO CA
10-2010

UCR
VALENCIA HILL HOUSE
1ST FLOOR
NOT TO SCALE



AMBIENT ENVIRONMENTAL INC.
1464 SIXTH STREET
NORCO CA
10-2010

UCR
VALENCIA HILL HOUSE
BASEMENT
NOT TO SCALE

Appendix O

Preliminary Hydrology and Drainage Basin Calculations

Preliminary Hydrology and Drainage Basin Calculations

for

Grading & Improvements

at

UC Riverside Glen Mor 2 Housing
900 University Ave
Riverside, CA 92521

PREPARED FOR:

Sasaki Associates Inc.
77 Geary Street 4th Floor
San Francisco, California 94108

PREPARED BY:

FLC FLORES LUND CONSULTANTS

7220 TRADE STREET, SUITE 120
SAN DIEGO, CALIFORNIA 92121-2325
(858) 566-0626 **FAX:** (858) 566-0627

FLC# C0841
February, 2011

Table of Contents

1.0 GENERAL PROJECT INFORMATION

A. Project Site Information

Project Name: UC Riverside Glen Mor 2 Housing
Area of Construction: 15.40 Acres
Hydrology Area: 23.67Acres
Project Address: 900 University Ave, Riverside, Riverside County, California, 92521
Latitude/Longitude: N33 58 36v, W117 19 09

Flood Plain Status: According to Federal Emergency Management Agency (FEMA) Map FM06065C0727G dated August 28, 2008, the site is outside the limits of the 100 year Flood Zone.
"The 1% annual flood (100-year flood), also known as the base flood, is the flood that has 1% chance of being equaled or exceeded in any given year. The Special Flood hazard Area is the area subject to flooding by 1% annual chance flood. Areas of Special flood Hazard include Zones A, AE, AH, AO, AR, A99, V, and VE. The Base Flood Elevation is the water-surface elevation of the 1% annual chance flood."

B. Project Description

The UC Riverside Glen Mor 2 Housing project site is located within the City of Riverside, in the western Riverside County, California. The project currently contains the existing asphalt parking lot 14 that is dedicated to student-resident permit holders. Access to the parking lot is provided from West Big Springs Road. An existing unoccupied residential structure is located north of the parking lot 14 at the top of the slope. An existing asphalt access road connects the existing building to Valencia Hill Drive. The project site is also characterized by sloping grades of unimproved landscape.
The site is bordered by an existing natural arroyo and Glen Mor 1 housing to the north, Valencia Hill Drive to the east, West Big Springs Road to the south and the existing Lothian Residence Hall & Dining Center to the west.

The average annual rainfall for this project site is about 10 inches.

C. Existing Conditions

The UC Riverside Glen Mor 2 Housing project site is located within the existing UC Riverside University complex located in the city of Riverside. Based upon a search of available records at the City of Riverside and UC Riverside, it has been determined that storm drain facilities exist within the project perimeter.

An 18" storm drain exist within Valencia Drive and connects two opposed curb inlets located just north of the intersection to Big Springs Road. This 18" storm drain ties into a 72" storm drain that exists within Big Springs Road. The 72" storm drain follows the general alignment of West Big Springs Road and discharges into the Gage Detention Basin located north of University Avenue at Canyon Crest Drive.

Runoff from northeast of the project site sheet flows to the southeast to the existing curb inlet located on the west side of Valencia Hill Drive. This curb inlet also captures runoff that travels from the north to the south along curb and gutter from Valencia Hill Drive.

Stormwater from the north of the project site sheet flows towards the existing parking lot and continues to sheet flow to the south towards West Big Springs Road and into the existing 72" storm drain.

The existing pervious area for the 15.40 acres project is approximately 68%; the existing impervious area is approximately 32%. Site topography consists of approximately 55 feet of vertical difference from north to south over a distance of 730 feet (average of 7.5% slope). The pinnacle of the hill is roughly 40 feet above the existing Parking Lot 14. Much of the undeveloped area of the site has grades in excess of 10% slope, with the steepest portions in excess of 20% slope. The existing parking lot 14 is gentle sloping to the south.

D. Proposed Conditions

The proposed UC Riverside Glen Mor 2 Housing project includes the construction of multiple student housing buildings, a multi-story parking structure, underground utilities, landscaping and hardscape. The project will provide additional 800 single occupant student beds in apartment-style units. Two pedestrian bridges connecting the community to Glen Mor 1 housing will also be part of this project. The existing unoccupied building with the access road will be demolished. The existing parking lot 14 will also be demolished prior to construction of the UC Riverside Glen Mor 2 housing project.

The proposed new onsite underground storm drain system consists of two systems. The first storm drain system captures storm water from the northern portion of the project site, directs the storm water into a modular wetland system which then outlets into the arroyo.

The second storm drain system captures storm water from the southern portion of the project site, directs the storm water into the existing 72" storm drain system at West Big Springs road which is treated via the existing Gage Detention Basin.

The proposed pervious area for the 15.40 acres project is approximately 50%; the proposed impervious area is approximately 50%.

E. Project Site Soils

The following site soils information has been provided according to the "Geotechnical Investigation – Proposed Glen Mor 2 Student Apartments, prepared by C.H.J. Incorporated, dated 25th June, 2010.

"The site is located on the Perris Block, a portion of the Peninsular ranges Geomorphic Province. The Perris Block is a fault-bounded region of relative tectonic stability composed of crystalline bedrock of the Southern California Batholith that is thinly and discontinuously mantled by sedimentary material."

"Several geomorphic surfaces are well developed on the Perris Block that represent former, local, erosional/depositional base levels. The site lies in the northern portion of the Perris Block in an area of relatively low-lying Pleistocene-age and Holocene-age alluvium surrounded by elevated erosion surfaces. A Geologic Index Map is presented as Enclosure "A-3"."

"The project area is situated in an area of 'very old alluvial-fan deposits' dissected and bounded by the historic 'University arroyo' on the south and a smaller tributary arroyo on the north. As mapped by Morton and Cox (2001), the native geologic materials underlying the majority of the site consist of very old alluvial-fan deposits (Qvoa). Localized areas of young axial-channel deposits (QYA) mantle Qvoa along existing and historic arroyo bottoms within the site. Fill was encountered within Exploratory Boring Nos. 6, 17, 23, 24, 25, and 27 to typical depths ranging from 2 to 7 below the ground surface (bgs). The fill consists primarily of silty sand, locally includes gravel, and is interpreted to be derived from local native materials. Deeper fill was encountered in Boring No. 18 to a depth of approximately 15 feet bgs. Based on review of aerial photographs dated 1931, it appears that the southeast corner of the proposed parking structure is located within the former margin of the University arroyo and is underlain by fill mantling native sediments."

"The materials within unit Qoa are generally dense to very dense."

"Bedrock was not encountered in our exploratory borings to the maximum depth attained (63-1/2 feet)."

"Refusal to further advancement of the drilling augers was not experienced."

"The on-site soils encountered during this investigation are generally granular and considered non-critically expansive."

"Consolidation testing and field dry density tests on relatively undisturbed samples indicated negligible to moderate potential for hydroconsolidation (water-induced collapse) and a potential for moderate settlement for the upper younger alluvial soils when loaded."

"Groundwater was not encountered within the maximum 63-1/2 foot depth of the current borings.

The results of the corrosivity testing are discussed in the "Chemical/Corrosivity Testing" section of this report."

"Slight caving of the borings was experienced upon removal of the augers.

"The site is located in Sections 20 to 29 of Township 2 South, Range 4 West, in the Riverside-Arlington Subbasin of the Upper Santa Ana Valley groundwater basin. Depth-to-groundwater data in the vicinity of the site is available from the Western

Municipal Water District, Cooperative Well Program (2009). These data are summarized in the following table."

State Well No.	Date Measured	Depth to Water (feet)	Approximate Water Elevation (feet)	Location of Well
02S/04W-29M001S	11-19-08	65.93	986	½ mile SW
	05-23-95	63.50	989	

"Based on published groundwater contour mapping by Carson and Matti (1985), the minimum depth to groundwater in the area of the site was approximately 150 feet bgs for the time period from 1973 to 1979. Based on the available data, a historic high groundwater of 60 feet bgs was utilized in our analyses."

"The onsite soils encountered are generally granular and considered non-critically expansive. SPT data from exploratory borings indicates soils in loose to medium dense states and are thus considered to be of moderate hydroconsolidation potential."

The Antecedent Moisture Condition (AMC) for this project will be AMC II. The Riverside County Hydrology Manual describes AMC II as having "moderate runoff potential, an intermediate condition" (C-4). Given the soil type and the AMC index, the infiltration rate of the soil can be obtained from Plates E-6.1 and E-6.2; the resultant infiltration rate of the site rates between 0.398 and 0.118 inches/hour.

2.0 DESIGN CRITERIA

Since the project site (including the offsite area) is roughly 300 acres, the Rational Method will be used to calculate the runoff rate for pipe sizing purposes, as indicated in the Riverside County Hydrology Manual.

The Rational Method

Rational Method equation:

$$Q = CIA$$

Where:

Q = Peak Discharge, cfs
C = Coefficient of Runoff
I = Rainfall Intensity, inches/hour, corresponding with the Time of Concentration
A = Area of Basin, acres

Coefficient of Runoff:

The weighted value of the runoff coefficient "C" accounts for many factors which influence the peak flow rate. To account for the difference between actual and effective impervious area, it is assumed that the maximum runoff rate which can occur from impervious surfaces is 90-percent of the rainfall rate. The runoff from pervious surfaces is further reduced by infiltration. The weighted "C" value can be determined for each basin with the following equation:

$$C = 0.9\left[A_i + \frac{I - F_p}{I} A_p\right]$$

Where:

C = Coefficient of Runoff
I = Rainfall Intensity, inches/hour
F_p = Infiltration Rate for Pervious Areas, inches/hour
A_i = Actual Impervious Area, decimal percent
A_p = Actual Pervious Area, decimal percent
and A_p = 1.00 - A_i

From this equation, the weighted C can be calculated for each drainage basin within the site.

The Time of Concentration is the time is takes the rate of runoff from an impervious surface to reach a maximum rate, which would be equivalent to the rate of rainfall. The Time of Concentration can be determined using the nomograph on Plate D-3 in the Riverside County Hydrology Manual. For the purposes of this report, Time of Concentration was calculated using the following equation:

Time of Concentration equation:

The Time of Concentration is the time is takes the rate of runoff from an impervious surface to reach a maximum rate, which would be equivalent to the rate of rainfall. The Time of Concentration can be determined using the nomograph on Plate D-3 in the Riverside County Hydrology Manual. For the purposes of this report, Time of Concentration was calculated using the following equation:

The Time of Concentration in the storm drain pipes can be calculated via the following equation:

$$T_{Cpipe} = \frac{L}{V} \bullet \frac{1}{60\,\text{sec/min}}$$

Where:

T_{Cpipe}=Time of Concentration in the pipe, min
L=Length of pipe, feet
V= Velocity in pipe, ft/sec

Based upon the cumulative time of concentration, which includes time of concentration for the pipes, calculated for each drainage basin, and the city the project site is located in, intensities can be obtained in the Riverside County Flood Control Manual, Plate D-4.1, for both 10-year and 100-year storms. For Time of Concentration values falling between the whole numbers, interpolation can be used to get the appropriate intensity values.

Storm drain sizing is important on a site as well. Depending upon the site's location and whether it is subject to flooding, a design storm is chosen. For the UC Riverside Glen Mor 2 Housing project site, a 10-year-1hour design storm will be used to size the storm drain pipes on this site.

For flow in pipes, Manning's Equation is typically used. With Manning's Equation, the pipe's Full Flow Capacity, Full Flow Velocity, and Pipe Diameter can be determined.

<u>Manning's Equation:</u>

Solving for Velocity:

$$V = \frac{1.486}{\eta} R^{2/3} S^{1/2}$$

Where:

V= Velocity the water flowing through the pipe, ft/sec
η= Manning's Roughness Coefficient (as determined by from a table based upon pipe material)
R=A/P=D/4= Hydraulic Radius, ft
S= Slope of the pipe, ft/ft

Solving for Flow:

$$Q = \frac{1.486}{\eta} \bullet AR^{2/3} S^{1/2}$$

Where:

Q= flow (cubic feet/second)
η= Manning's Roughness Coefficient
A= Area
P=Wetted Perimeter (feet)
R= A/P=Hydraulic Radius (feet)
S= Pipe Slope (feet/feet)

In order to determine the depth of flow in a pipe, Manning's Equation is rearranged to solve for $AR^{2/3}$ as follows:

$$AR^{2/3} = \frac{Q \bullet \eta}{1.486 \bullet S^{1/2}}$$

Next, solve for $d_0^{8/3}$, where d_0=proposed pipe diameter (ft).

Using Table 10.1 Geometric Elements for Circular Section from Hydrology and Hydraulic Systems by Ram S. Gupta:

TABLE 10.1 GEOMETRIC ELEMENTS FOR CIRCULAR SECTION

$\frac{y}{d_0}$	$\frac{A}{d_0^2}$	$\frac{P}{d_0}$	$\frac{R}{d_0}$	$\frac{T}{d_0}$	$\frac{D}{d_0}$	$\frac{A\sqrt{D}}{d_0^{5/2}}$	$\frac{AR^{2/3}}{d_0^{8/3}}$
0.01	0.0013	0.2003	0.0066	0.1990	0.0066	0.0001	0.0000
0.05	0.0147	0.4510	0.0326	0.4359	0.0336	0.0027	0.0015
0.10	0.0409	0.6435	0.0635	0.6000	0.0682	0.0107	0.0065
0.15	0.0739	0.7954	0.0929	0.7141	0.1034	0.0238	0.0152
0.20	0.1118	0.9273	0.1206	0.8000	0.1398	0.0418	0.0273
0.25	0.1535	1.0472	0.1466	0.8660	0.1774	0.0646	0.0427
0.30	0.1982	1.1593	0.1709	0.9165	0.2162	0.0921	0.0610
0.35	0.2450	1.2661	0.1935	0.9539	0.2568	0.1241	0.0820
0.40	0.2934	1.3694	0.2142	0.9798	0.2994	0.1603	0.1050
0.45	0.3428	1.4706	0.2331	0.9950	0.3446	0.2011	0.1298
0.50	0.3927	1.5708	0.2500	1.0000	0.3928	0.2459	0.1558
0.55	0.4426	1.6710	0.2649	0.9950	0.4448	0.2949	0.1825
0.60	0.4920	1.7722	0.2776	0.9798	0.5022	0.3438	0.2092
0.65	0.5404	1.8755	0.2881	0.9539	0.5666	0.4066	0.2358
0.70	0.5872	1.9823	0.2962	0.9165	0.6408	0.4694	0.2608
0.75	0.6318	2.0944	0.3017	0.8660	0.7296	0.5392	0.2840
0.80	0.6736	2.2143	0.3042	0.8000	0.8420	0.6177	0.3045
0.85	0.7115	2.3462	0.3033	0.7141	0.9964	0.7098	0.3212
0.90	0.7445	2.4981	0.2980	0.6000	1.2408	0.8285	0.3324
0.94*	0.7662	2.6467	0.2896	0.4750	1.6130	0.9725	0.3353
0.95	0.7707	2.6909	0.2864	0.4359	1.7682	1.0242	0.3349
1.00	0.7854	3.1413	0.2500	0.0000	∞	∞	0.3117

*Maximum Flow occurs at 0.94 full depth

Calculating the following ratio will provide a number in the above table.

<u>Example</u>: Depth of Flow Calculation for a 6" Storm Drain Line with 0.79% slope and flow of Q=0.11 cfs

Manning's Equation:

$$AR^{2/3} = \frac{Q \bullet \eta}{1.486 \bullet S^{1/2}} = \frac{0.11 \bullet 0.013}{1.486 \bullet 0.0079^{1/2}} = 0.01083$$

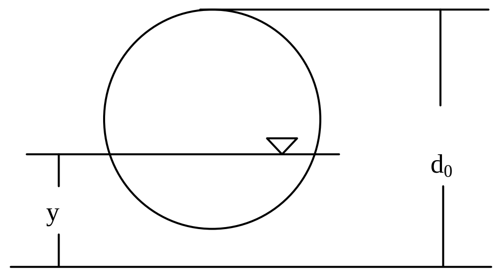
Where:

Q=0.11 cfs
η=0.013
$AR^{2/3}$=?
S=0.0079 ft/ft
d_0=0.5 ft

Using Table 10.1 above:

$$d_0^{8/3} = 0.5^{8/3} = 0.15749$$

Using Table 10.1, solve for $AR^{2/3}/d_0^{8/3}$:



$$\frac{AR^{2/3}}{d_0^{8/3}} = \frac{0.01083}{0.15479} = 0.0687$$

Interpolate to determine the ratio of y/d_0:

$$\frac{y}{d_0} = 0.3183`$$

Solving for y, also known as the depth of flow:

$$y = 0.3183 \bullet 0.5\, feet = 0.16\, feet$$

Synthetic Unit Hydrograph Method

Per the Riverside County Hydrology Manual, a flood hydrograph is needed to evaluate retention basins for an extremely small drainage area (less than 100 to 200 acres) with lag times less than 7 to 8 minutes. For these small sites, the Short Cut Synthetic Hydrograph Method may be used.

For projects that are located in localized depressions, or sag condition, the retention shall be designed for a 100-year storm event.

Short Cut Synthetic Hydrograph Method:

Assumptions:

- Small watershed
- High percentage of impervious area
- Response time to effective rainfall is short
- Runoff rates for a given period of time are directly proportional to effective rain

<u>Determine Lag Time:</u>

$$Lag(hours) = 24 \bullet \eta_{ave} \left[\frac{L \bullet L_{ca}}{S^{1/2}} \right]^{0.38}$$

Where:

L= length of longest water course, miles
L_{ca}= length along the longest watercourse, measured upstream to a point opposite the centroid of the area, miles
S= Overall slope of longest watercourse between headwaters and concentration point, feet/mile (S=H/L)
H= Difference in elevation between the concentration point and the most remote point of the basin, feet
η_{ave}= The visually estimated mean of the Manning's Roughness Coefficient values for all collection streams and channels within the watershed.

Plate E-3 of the Riverside County Hydrology Manual may also be used to determine Lag Time.

Selection of Unit Time:

Per the Riverside County Hydrology Manual, a suitable unit time is equal to 100 to 200 percent of the lag time. Normally, 5-10 minutes for 3 and 6-hour storms, and 15 minutes for 24 hours storms is adequate.

With Plate E-2.2, the Short Cut Hydrograph Method Worksheet, the effective rain can be calculated. As stated in the assumptions, the effective rain is directly proportional to the runoff rates for a given period of time.

Effective Rain:

$$EffectiveRain(in/hr) = \sum ColumnE23 \bullet UnitTime(hours)$$

Where:
Column E23= Effective Rain, inches/hour
Unit Time=as determined above, hours

Flood Volume:

The flood volume calculated would be the amount of water that must be retained on site as a result of the project improvements.

$$FloodVolume(acre \bullet ft) = EffectiveRain \bullet \frac{1ft}{12in} \bullet ProjectArea$$

Where:
Flood Volume=Volume of Water to be Retained on Site, acre-ft
Effective Rain= Depth of rain generated by the storm, inches
Project Area=Area of the Site, acres

3.0 EXAMPLE HYDROLOGY CALCULATIONS

SAMPLE AREA PEAK FLOW CALCULATION

(SEE SPREADSHEETS FOR ALL CALCULATIONS UNDER TAB B)

10Year -1hour Storm Event:

Existing Drainage Area A:

Total Drainage Area = 2.03 acres
T_c = 22.0 min per Plate D-3
C = 0.9*(A_i+((I-F_p)/I)*A_p)
C=0.9*(0.187+((2.00-0.398)/2.00)*0.813)=0.75
Hydraulic Length (L) = 843 feet
Change in Elevation (ΔH) = 38.3 feet
$I_{10\text{-YR-1h}}$ = Per Plate D-4.7 = 2.00 inches/hour

Peak Flow, Q, cfs = C*I*A = (0.75*2.00 in/hr*2.03 acres) =3.06 cfs

4.0 Conclusions

The UC Riverside Glen Mor 2 Housing project consists of the demolition of the existing parking lots and the construction of multiple student housing buildings, a multi-story parking structure, underground utilities, landscaping and hardscape.

Per the Rational Method the total peak flow "Q_{10}" for pre-developed conditions was calculated to be 23.50cfs for the 10year-1hour storm event. Per the Rational Method the total peak flow "Q_{10}" for post-developed conditions was calculated to be 31.49cfs for the 10year-1hour storm event. The total difference between pre- and post- conditions is 7.99cfs. This calculation can be found under Tab B of this report.

Per the Rational Method the total peak flow "Q_{100}" pre-developed conditions was calculated to be 32.92cfs for the 100year-1hour storm event. Per the Rational Method the total peak flow "Q_{100}" for post-developed conditions was calculated to be 47.97cfs for the 100year-1hour storm event. The total difference between pre- and post- conditions is 15.05cfs. This calculation can be found under Tab B of this report.

The increase in runoff results in the increase of imperviousness from 68% for existing conditions to 50% for proposed conditions.

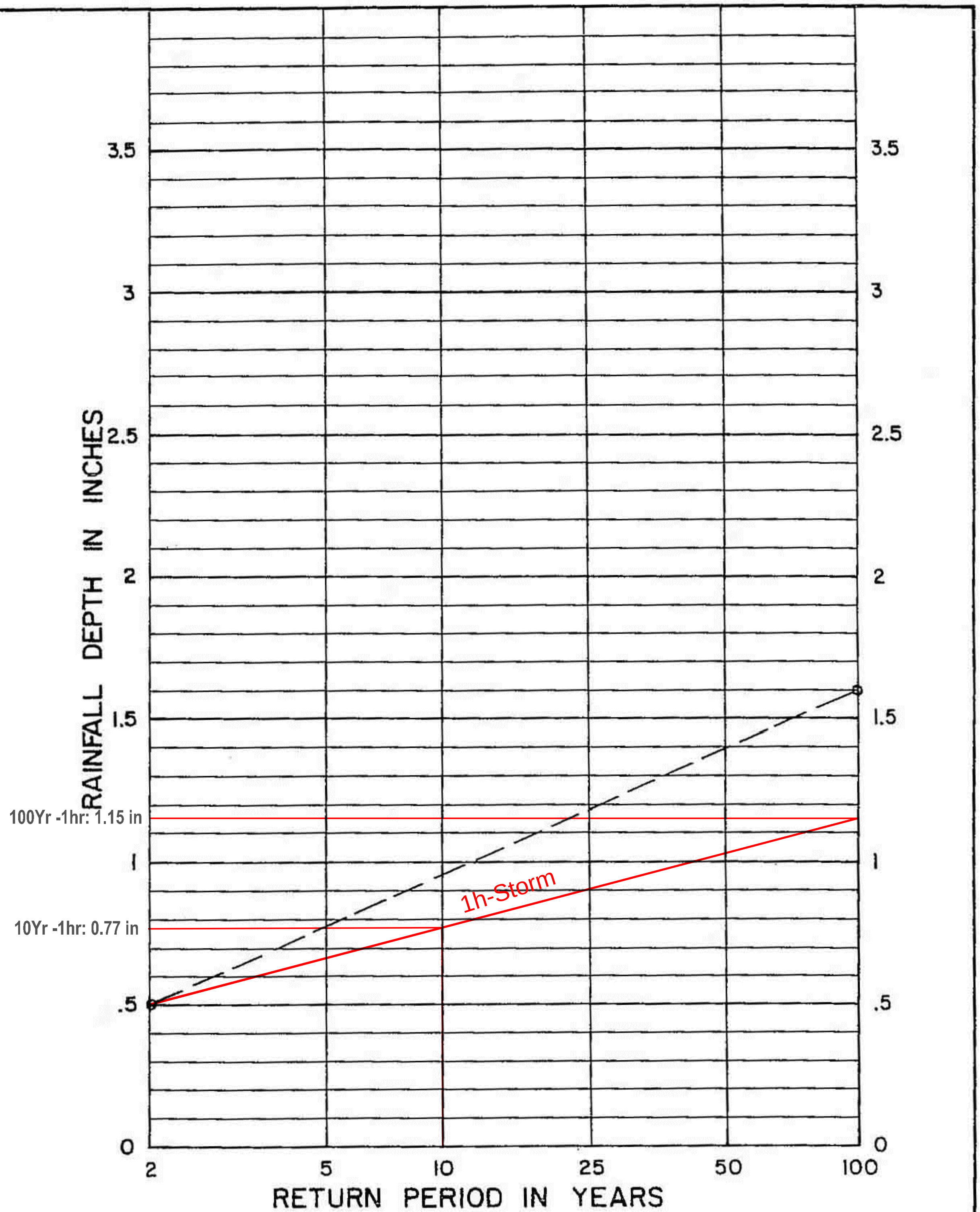
References

1. Gupta, Ram S., *Hydrology and Hydraulic Systems*, Waveland Press, Inc., Illinois, 1989.

2. Riverside County Flood Control and Water District, *Hydrology Manual*, 1978.

3. Riverside County Water Management Plan For Urban Runoff, July 24, 2006

4. Riverside County Stormwater Quality Best Management Practice Design Handbook, July 21, 2006.



NOTE:

1. For intermediate return periods plot 2-year and 100-year one hour values from maps, then connect points and read value for desired return period. For example given 2-year one hour = .50" and 100-year one hour = 1.60", 25-year one hour = 1.18"

Reference: NOAA Atlas 2, Volume XI-California, 1973.

RCFC & WCD

HYDROLOGY MANUAL

RAINFALL DEPTH VERSUS RETURN PERIOD FOR PARTIAL DURATION SERIES

C0841 UC Riverside Glen Mor

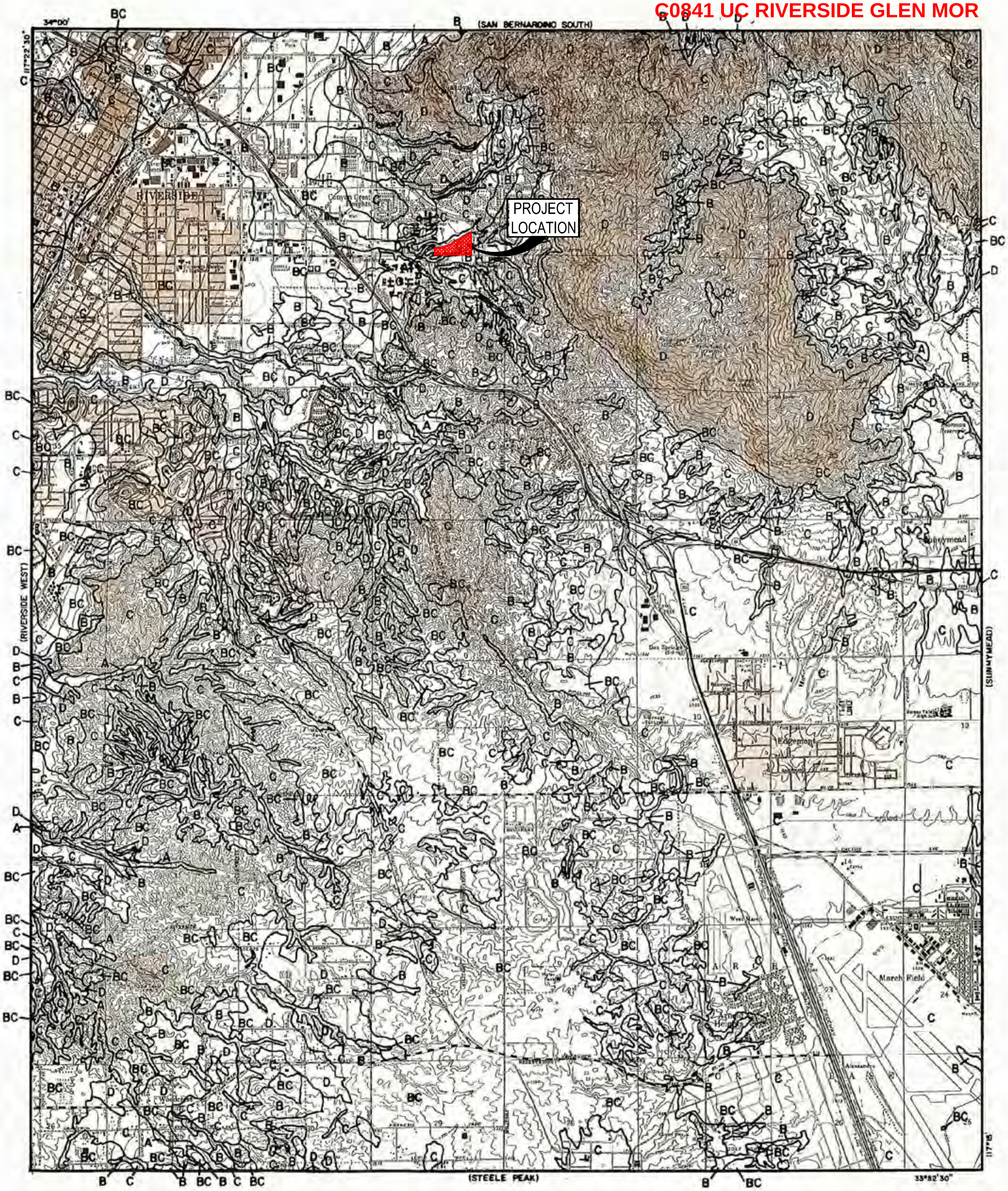
RUNOFF INDEX NUMBERS OF HYDROLOGIC SOIL-COVER COMPLEXES FOR PERVIOUS AREAS-AMC II

Cover Type (3)	Quality of Cover (2)	Soil Group A	B	C	D
NATURAL COVERS -					
Barren (Rockland, eroded and graded land)		78	86	$\boxed{91}$	93
Chaparrel, Broadleaf (Manzonita, ceanothus and scrub oak)	Poor	53	70	80	85
	Fair	40	63	75	81
	Good	31	57	71	78
Chaparrel, Narrowleaf (Chamise and redshank)	Poor	71	82	88	91
	Fair	55	72	81	86
Grass, Annual or Perennial	Poor	67	78	86	89
	Fair	50	69	79	84
	Good	38	61	74	80
Meadows or Cienegas (Areas with seasonally high water table, principal vegetation is sod forming grass)	Poor	63	77	85	88
	Fair	51	70	80	84
	Good	30	58	72	78
Open Brush (Soft wood shrubs - buckwheat, sage, etc.)	Poor	62	76	84	88
	Fair	46	66	77	83
	Good	41	63	75	81
Woodland (Coniferous or broadleaf trees predominate. Canopy density is at least 50 percent)	Poor	45	66	77	83
	Fair	36	60	73	79
	Good	28	55	70	77
Woodland, Grass (Coniferous or broadleaf trees with canopy density from 20 to 50 percent)	Poor	57	73	82	86
	Fair	44	65	77	82
	Good	33	58	72	79
URBAN COVERS -					
Residential or Commercial Landscaping (Lawn, shrubs, etc.)	Good	32	56	$\boxed{69}$	75
Turf (Irrigated and mowed grass)	Poor	58	74	83	87
	Fair	44	65	77	82
	Good	33	58	72	79
AGRICULTURAL COVERS -					
Fallow (Land plowed but not tilled or seeded)		76	85	90	92

RCFC & WCD
HYDROLOGY MANUAL

RUNOFF INDEX NUMBERS FOR PERVIOUS AREA

C0841 UC RIVERSIDE GLEN MOR



LEGEND

—— SOILS GROUP BOUNDARY

A SOILS GROUP DESIGNATION

RCFC & WCD

HYDROLOGY MANUAL

N

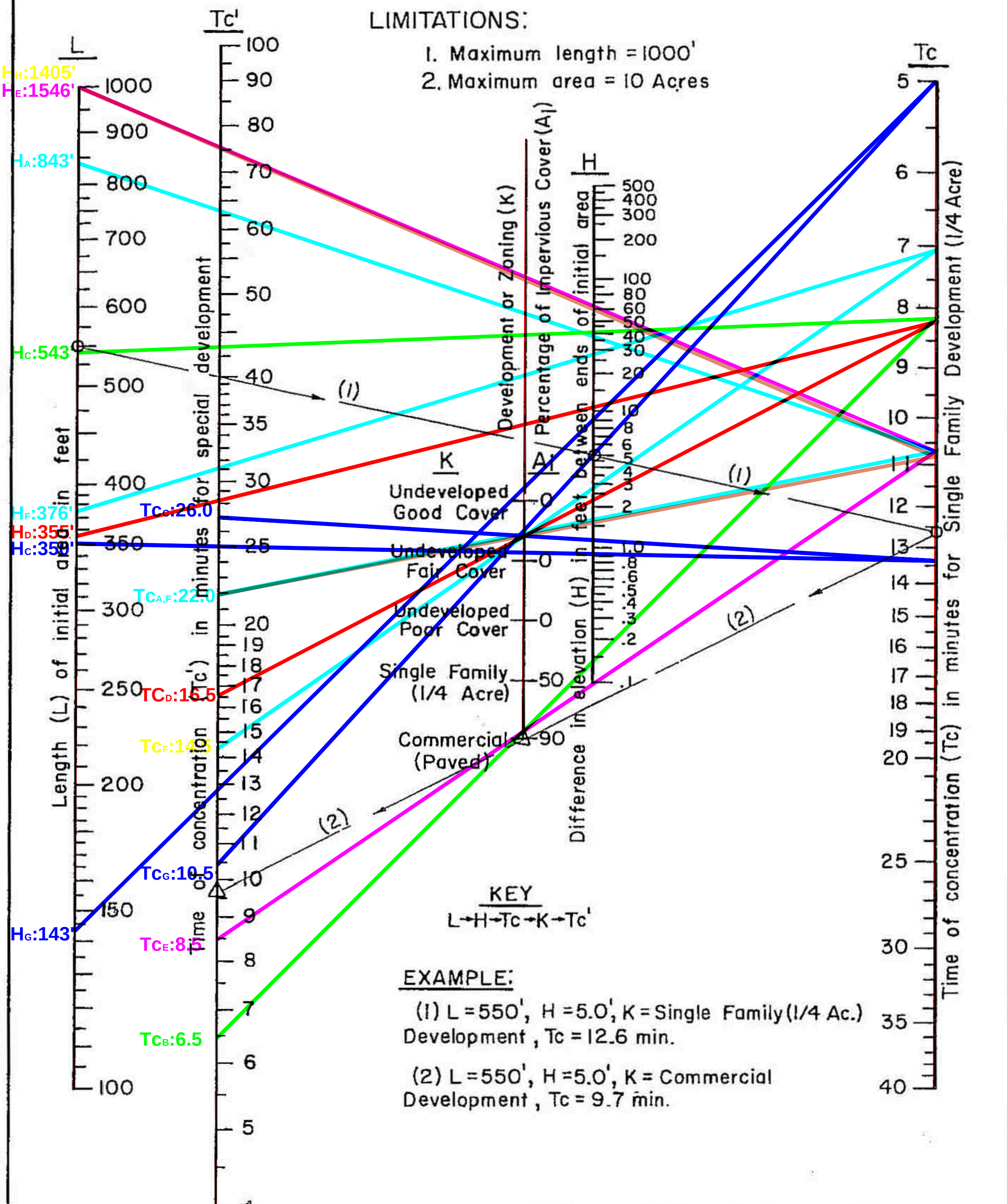
0 FEET 5000

HYDROLOGIC SOILS GROUP MAP FOR RIVERSIDE-EAST

SOIL TYPE: C

PLATE C-1.16

C0841 UC RIVERSIDE GLEN MOR
EXISTING CONDITIONS



Reference: Bibliography item No. 35.

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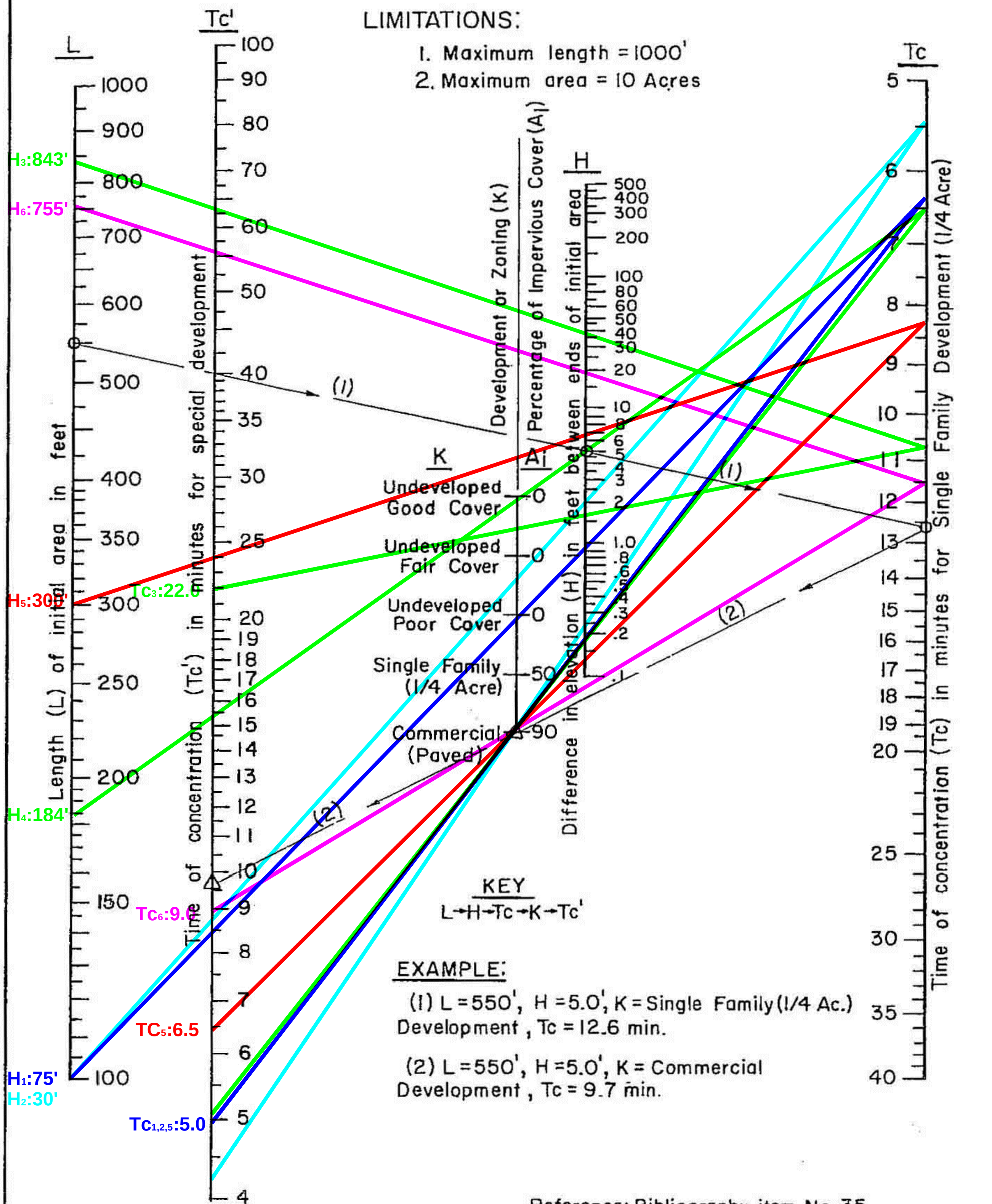
HYDROLOGY MANUAL

TIME OF CONCENTRATION FOR INITIAL SUBAREA

PLATE D-3

Existing Conditions AREA A: 22.0 mins
Existing Conditions AREA B: 6.5 mins
Existing Conditions AREA C: 26.0 mins
Existing Conditions AREA D: 16.5 mins
Existing Conditions AREA E: 8.5 mins
Existing Conditions AREA F: 14.5 mins
Existing Conditions AREA G: 10.5 mins

C0841 UC RIVERSIDE GLEN MOR
PROPOSED CONDITIONS

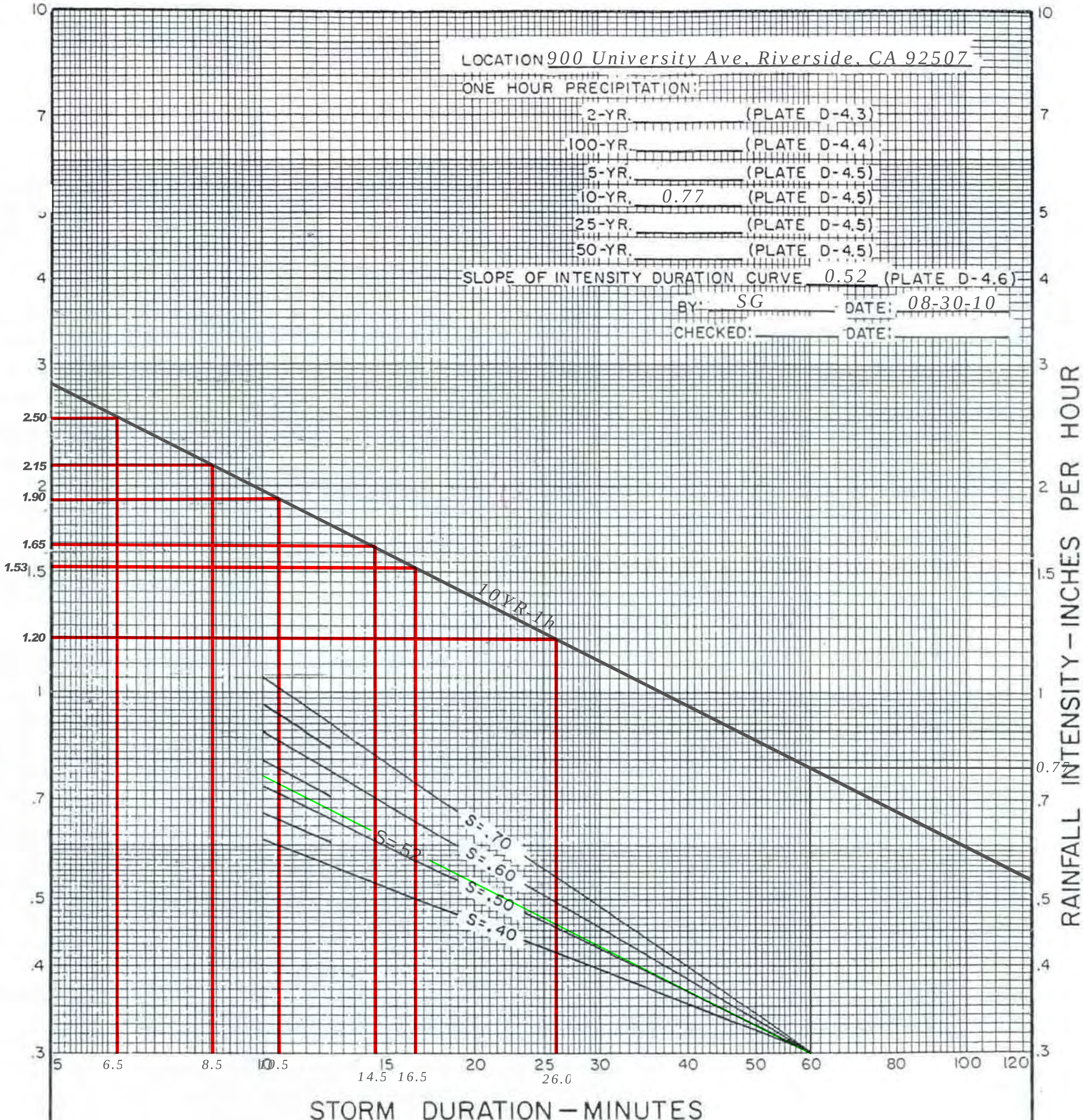


RCFC & WCD
HYDROLOGY MANUAL

TIME OF CONCENTRATION FOR INITIAL SUBAREA

Proposed Conditions AREA 1,2,4: 5.0 mins
Proposed Conditions AREAS 3: 22.0 mins
Proposed Conditions AREA 5: 6.5 mins
Proposed Conditions AREA 6: 9.0 mins

PLATE D-3



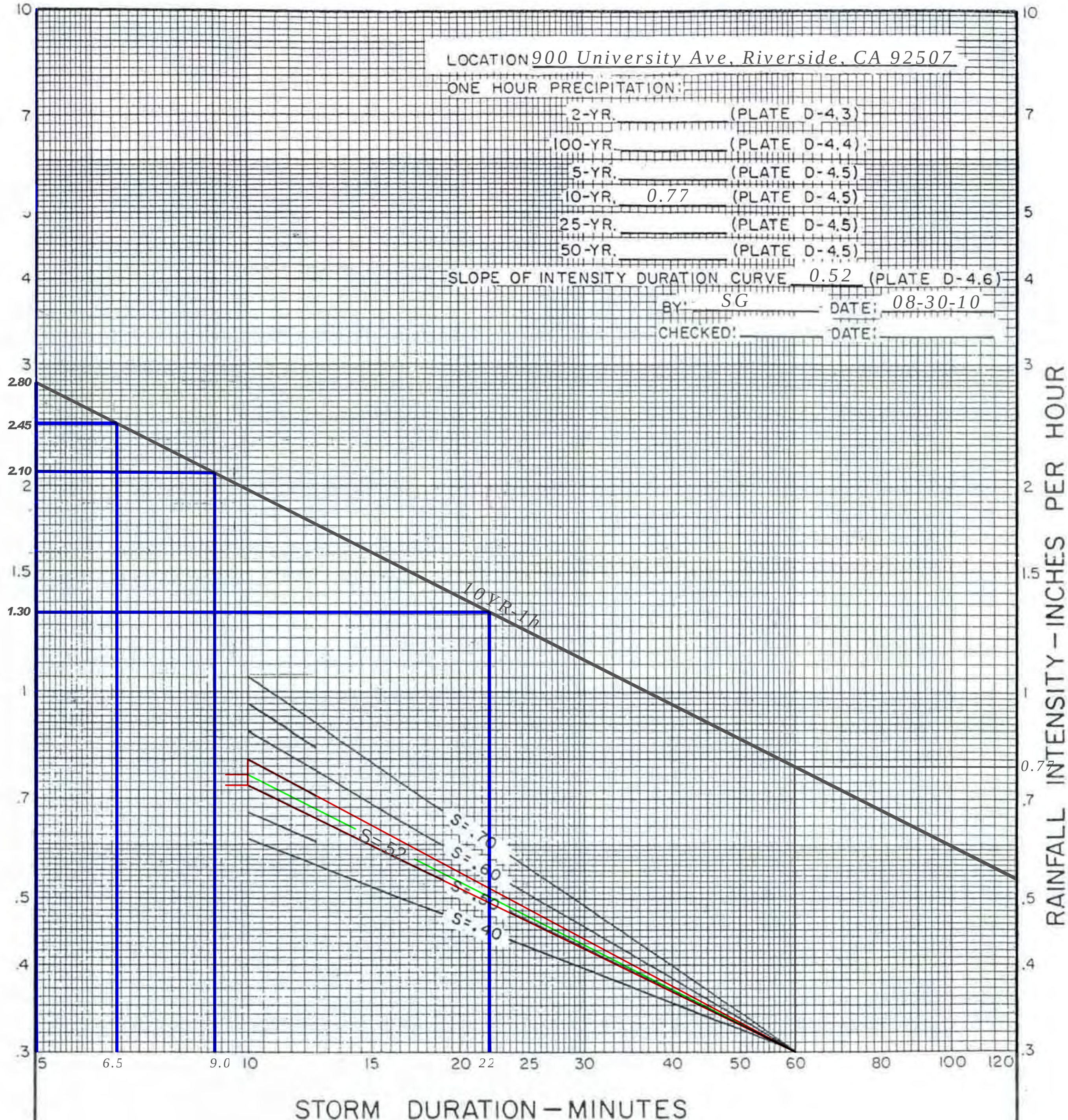
10Yr-1hr: Existing Conditions AREA A: 22.0 mins, Intenstity: 1.35 in/hr
10Yr-1hr: Existing Conditions AREA B: 6.5 mins, Intenstity: 2.50 in/hr
10Yr-1hr: Existing Conditions AREA C: 26.0 mins, Intenstity: 1.20 in/hr
10Yr-1hr: Existing Conditions AREA D: 16.5 mins, Intenstity: 1.53 in/hr
10Yr-1hr: Existing Conditions AREA E: 8.5 mins, Intenstity: 2.15 in/hr
10Yr-1hr: Existing Conditions AREA F: 14.5 mins, Intenstity: 1.65 in/hr
10Yr-1hr: Existing Conditions AREA G: 10.5 mins, Intenstity: 1.90 in/hr

RCFC & WCD

HYDROLOGY MANUAL

INTENSITY-DURATION
CURVES
CALCULATION SHEET

C0841 UC RIVERSIDE GLEN-MOR



10Yr-1hr: Proposed Conditions AREA 1,2,4: 5.0 mins, Intenstity: 2.80 in/hr
10Yr-1hr: Proposed Conditions AREAS 3: 22.0 mins, Intenstity: 1.27 in/hr
10Yr-1hr: Proposed Conditions AREAS 5: 6.5 mins, Intenstity: 2.45 in/hr
10Yr-1hr: Proposed Conditions AREAS 6: 9.0 mins, Intenstity: 2.10 in/hr

RCFC & WCD
HYDROLOGY MANUAL

INTENSITY—DURATION
CURVES
CALCULATION SHEET

C0841 UC RIVERSIDE GLEN MOR
10Yr-1h Rational Method
Existing Drainage Basin Hydrology

Reference: Riverside County Hydrology Manual dated April 1978, 10-Year Storm 1-Hour Rainfall (inch)=0.77; Slope=0.52

Drainage Basin #	Total Area (acres)	Pervious Area (acres)	Pervious Area (%)	Impervious Area (acres)	Impervious Area (%)	Hydrolength (ft)	Elevation (ft)	Soil Type (Plate C-1.16)	Tc (Plate D-3) (min.)	I (in/hr) (Plate D-4.7)	RI (Plate D-5.5)	Fp (Plate E-6.2) (in/h)	Runoff Coefficient C	Flow, Q_{10} (cfs)
A	2.03	1.65	81.3	0.38	18.7	843	38.3	C	22.0	1.35	69	0.398	0.68	1.88
B	1.84	1.07	58.2	0.77	41.8	543	40.7	C	6.5	2.50	69	0.398	0.82	3.76
C	1.06	0.76	71.7	0.30	28.3	350	9.2	C	26.0	1.20	69	0.398	0.69	0.87
D	1.06	0.94	88.7	0.12	11.3	355	11.3	C	16.5	1.53	69	0.398	0.69	1.12
E	6.96	3.6	52.3	3.32	47.7	1546	64.7	C	8.5	2.15	69	0.398	0.81	12.16
F	1.03	1.0	100.0	0.00	0.0	376	27.1	C	14.5	1.65	91	0.118	0.84	1.42
G	1.42	1.3	93.0	0.10	7.0	143	15.6	C	10.5	1.90	91	0.118	0.85	2.29
total	**15.40**	**10.41**	**67.6**	**4.99**	**32.4**								**Q Total=**	**23.50**

APPLICABLE EQUATIONS:

Soil Type: C = Plate C-1.16

Time of Concentration (min): Tc = Plate D-3 [Minimum allowable Tc= 5.0 minutes]

Intensity (in/h): Plate D-4.7

Expected Coefficent Runoff: C = 0.9*(Ai+((I-Fp)/I)*Ap)

Expected Runoff/Flow from Drainage Basin (cfs): Q=C*I*A

C0841 UC RIVERSIDE GLEN MOR
10Yr-1h Rational Method
Proposed Drainage Basin Hydrology

Reference: Riverside County Hydrology Manual dated April 1978, 10-Year Storm 1-Hour Rainfall (inch)=0.77; Slope=0.52

Drainage Basin #	Total Area (acres)	Pervious Area (acres)	Pervious Area (%)	Impervious Area (acres)	Impervious Area (%)	Hydrolength (ft)	Elevation (ft)	Soil Type (Plate C-1.16)	Tc (Plate D-3) (min.)	I (in/hr) (Plate D-4.7)	RI (Plate D-5.5)	Fp (Plate E-6.2) (in/h)	Runoff Coefficient C	Flow, Q_{10} (cfs)
1	2.48	1.33	53.6	1.15	46.4	75.0	1.0	C	5.0	2.80	69	0.398	0.83	5.77
2	7.48	3.03	40.5	4.45	59.5	30.0	2.0	C	5.0	2.80	69	0.398	0.85	17.76
3	1.78	1.40	78.7	0.38	21.3	843.0	38.3	C	22.0	1.30	69	0.398	0.68	1.58
4	0.64	0.29	45.3	0.35	54.7	184.0	5.0	C	5.0	2.80	69	0.398	0.84	1.51
5	0.70	0.53	75.7	0.17	24.3	300.0	6.7	C	6.5	2.45	69	0.398	0.79	1.35
6	2.04	0.98	48.0	1.06	52.0	755.0	19.0	C	9.0	2.10	69	0.398	0.82	3.50
total	**15.12**	**7.56**	**50.0**	**7.56**	**50.0**								**Q Total=**	**31.49**

APPLICABLE EQUATIONS:

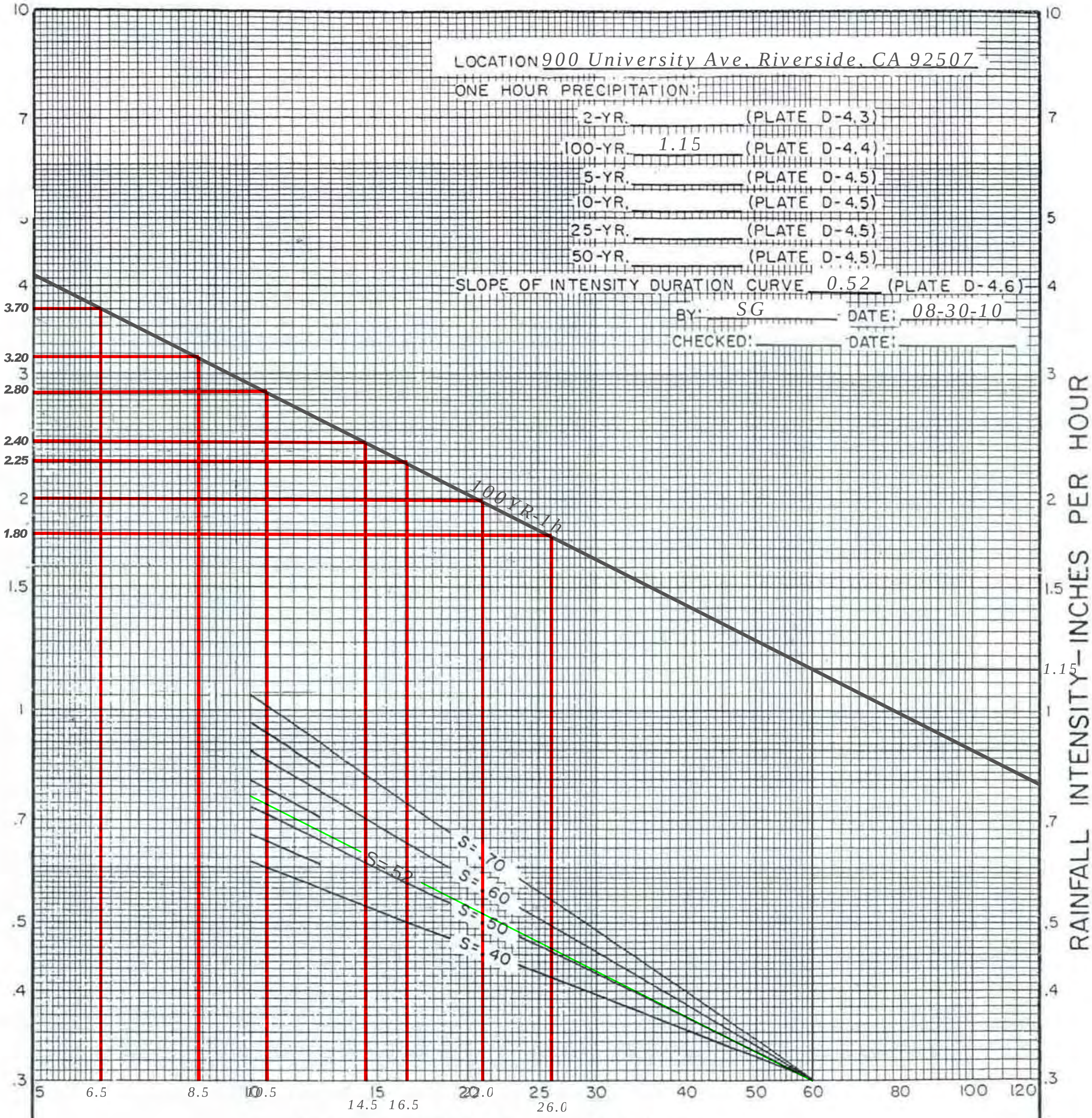
Soil Type: C = Plate C-1.16

Time of Concentration (min): Tc = Plate D-3 [Minimum allowable Tc= 5.0 minutes]

Intensity (in/h): Plate D-4.7

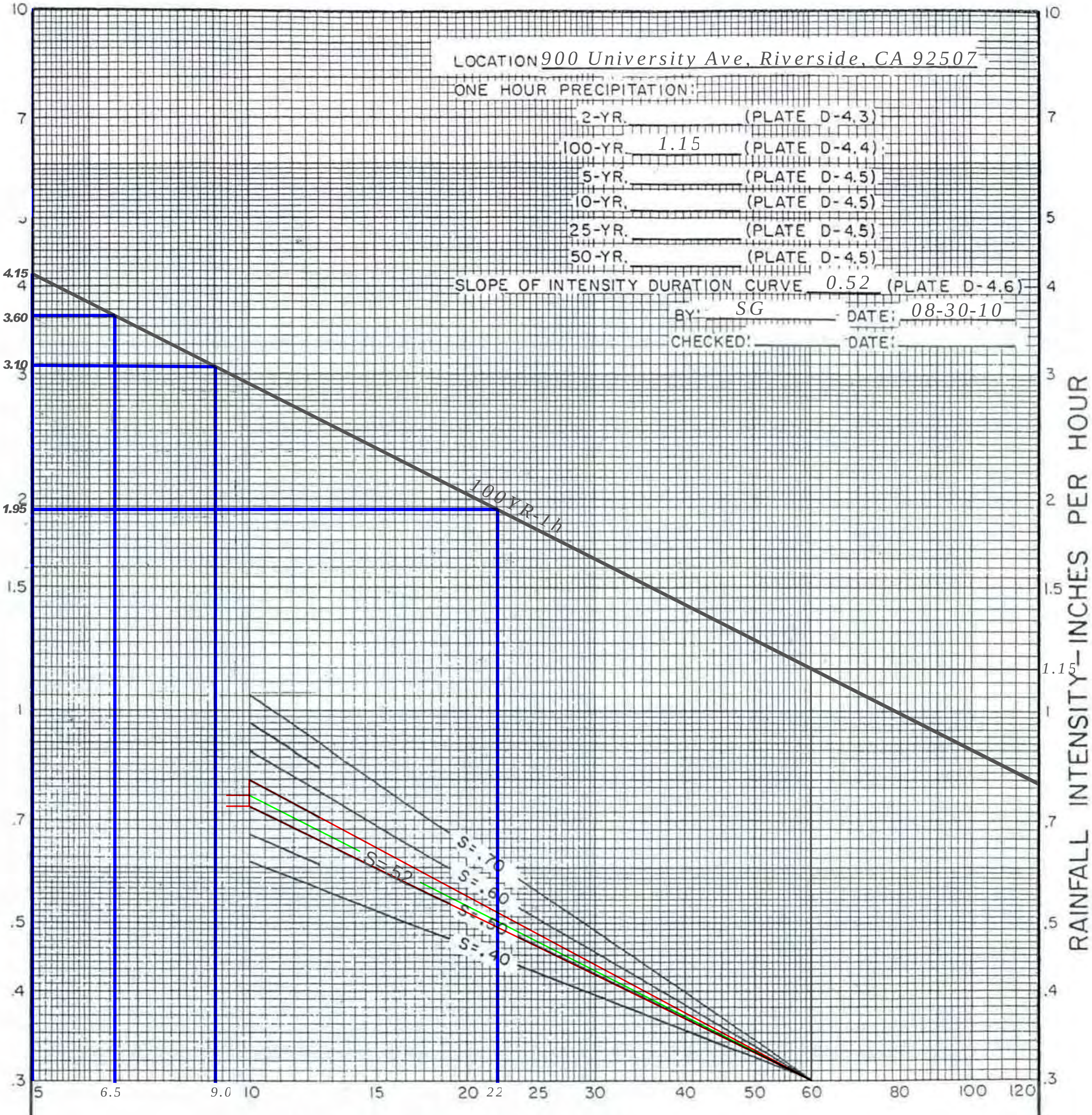
Expected Coefficent Runoff: C = 0.9*(Ai+((I-Fp)/I)*Ap)

Expected Runoff/Flow from Drainage Basin (cfs): Q=C*I*A



100Yr-1hr: Existing Conditions AREA A: 22.0 mins, Intenstity: 2.00 in/hr
100Yr-1hr: Existing Conditions AREA B: 6.5 mins, Intenstity: 3.70 in/hr
100Yr-1hr: Existing Conditions AREA C: 26.0 mins, Intenstity: 1.80 in/hr
100Yr-1hr: Existing Conditions AREA D: 16.5 mins, Intenstity: 2.25 in/hr
100Yr-1hr: Existing Conditions AREA E: 8.5 mins, Intenstity: 3.20 in/hr
100Yr-1hr: Existing Conditions AREA F: 14.5 mins, Intenstity: 2.40 in/hr
100Yr-1hr: Existing Conditions AREA G: 10.5 mins, Intenstity: 2.80 in/hr

RCFC & WCD HYDROLOGY MANUAL	INTENSITY–DURATION CURVES CALCULATION SHEET



100Yr-1hr: Proposed Conditions AREA 1,2,4: 23.0 mins, Intenstity: 4.15 in/hr
100Yr-1hr: Proposed Conditions AREAS 3: 22.0 mins, Intenstity: 1.95 in/hr
100Yr-1hr: Proposed Conditions AREAS 5: 6.5 mins, Intenstity: 3.60 in/hr
100Yr-1hr: Proposed Conditions AREAS 6: 9.0 mins, Intenstity: 3.10 in/hr

RCFC & WCD
HYDROLOGY MANUAL

INTENSITY—DURATION CURVES CALCULATION SHEET

PLATE D-4.7

C0841 UC RIVERSIDE GLEN MOR
100Yr-1h Rational Method
Existing Drainage Basin Hydrology

Reference: Riverside County Hydrology Manual dated April 1978, 100-Year Storm 1-Hour Rainfall (inch)=1.15; Slope=0.52

Drainage Basin #	Total Area (acres)	Pervious Area (acres)	Pervious Area (%)	Impervious Area (acres)	Impervious Area (%)	Hydrolength (ft)	Elevation (ft)	Soil Type (Plate C-1.16)	Tc (Plate D-3) (min.)	I (in/hr) (Plate D-4.7)	RI (Plate D-5.5)	Fp (Plate E-6.2) (in/h)	Runoff Coefficient C	Flow, Q_{100} (cfs)
A	2.03	1.65	81.3	0.38	18.7	843	38.3	C	22.0	2.00	69	0.398	0.75	3.06
B	1.84	1.07	58.2	0.77	41.8	543	40.7	C	6.5	3.70	69	0.398	0.84	5.74
C	1.06	0.76	71.7	0.30	28.3	350	9.2	C	26.0	1.80	69	0.398	0.76	1.44
D	1.06	0.94	88.7	0.12	11.3	355	11.3	C	16.5	2.25	69	0.398	0.76	1.81
E	6.96	3.6	52.3	3.32	47.7	1546	64.7	C	8.5	3.20	69	0.398	0.84	18.74
F	1.03	1.0	100.0	0.00	0.0	376	27.1	C	14.5	2.40	91	0.118	0.86	2.12
G	1.42	1.3	93.0	0.10	7.0	143	15.6	C	10.5	2.80	91	0.118	0.86	3.44
total	**15.40**	**9.09**	**68.2**	**4.89**	**31.8**								**Q Total=**	**32.92**

APPLICABLE EQUATIONS:

Soil Type: C = Plate C-1.16

Time of Concentration (min): Tc = Plate D-3 [Minimum allowable Tc= 5.0 minutes]

Intensity (in/h): Plate D-4.7

Expected Coefficent Runoff: C = 0.9*(Ai+((I-Fp)/I)*Ap)

Expected Runoff/Flow from Drainage Basin (cfs): Q=C*I*A

C0841 UC RIVERSIDE GLEN MOR
100Yr-1h Rational Method
Existing Drainage Basin Hydrology

Reference: Riverside County Hydrology Manual dated April 1978, 100-Year Storm 1-Hour Rainfall (inch)=1.15; Slope=0.52

Drainage Basin #	Total Area (acres)	Pervious Area (acres)	Pervious Area (%)	Impervious Area (acres)	Impervious Area (%)	Hydrolength (ft)	Elevation (ft)	Soil Type (Plate C-1.16)	Tc (Plate D-3) (min.)	I (in/hr) (Plate D-4.7)	RI (Plate D-5.5)	Fp (Plate E-6.2) (in/h)	Runoff Coefficient C	Flow, Q_{100} (cfs)
1	2.48	1.33	53.6	1.15	46.4	75.0	1.0	C	5.0	4.15	69	0.398	0.85	8.79
2	7.48	3.03	40.5	4.45	59.5	30.0	2.0	C	5.0	4.15	69	0.398	0.87	26.85
3	1.78	1.40	78.7	0.38	21.3	843.0	38.3	C	22.0	1.95	69	0.398	0.76	2.62
4	0.64	0.29	45.3	0.35	54.7	184.0	5.0	C	5.0	4.15	69	0.398	0.86	2.29
5	0.70	0.53	75.7	0.17	24.3	300.0	6.7	C	6.5	3.60	69	0.398	0.82	2.08
6	2.04	0.98	48.0	1.06	52.0	755.0	19.0	C	9.0	3.10	69	0.398	0.84	5.34
total	**15.12**	**7.56**	**50.0**	**7.56**	**50.0**								**Q Total=**	**47.97**

APPLICABLE EQUATIONS:

Soil Type: C = Plate C-1.16

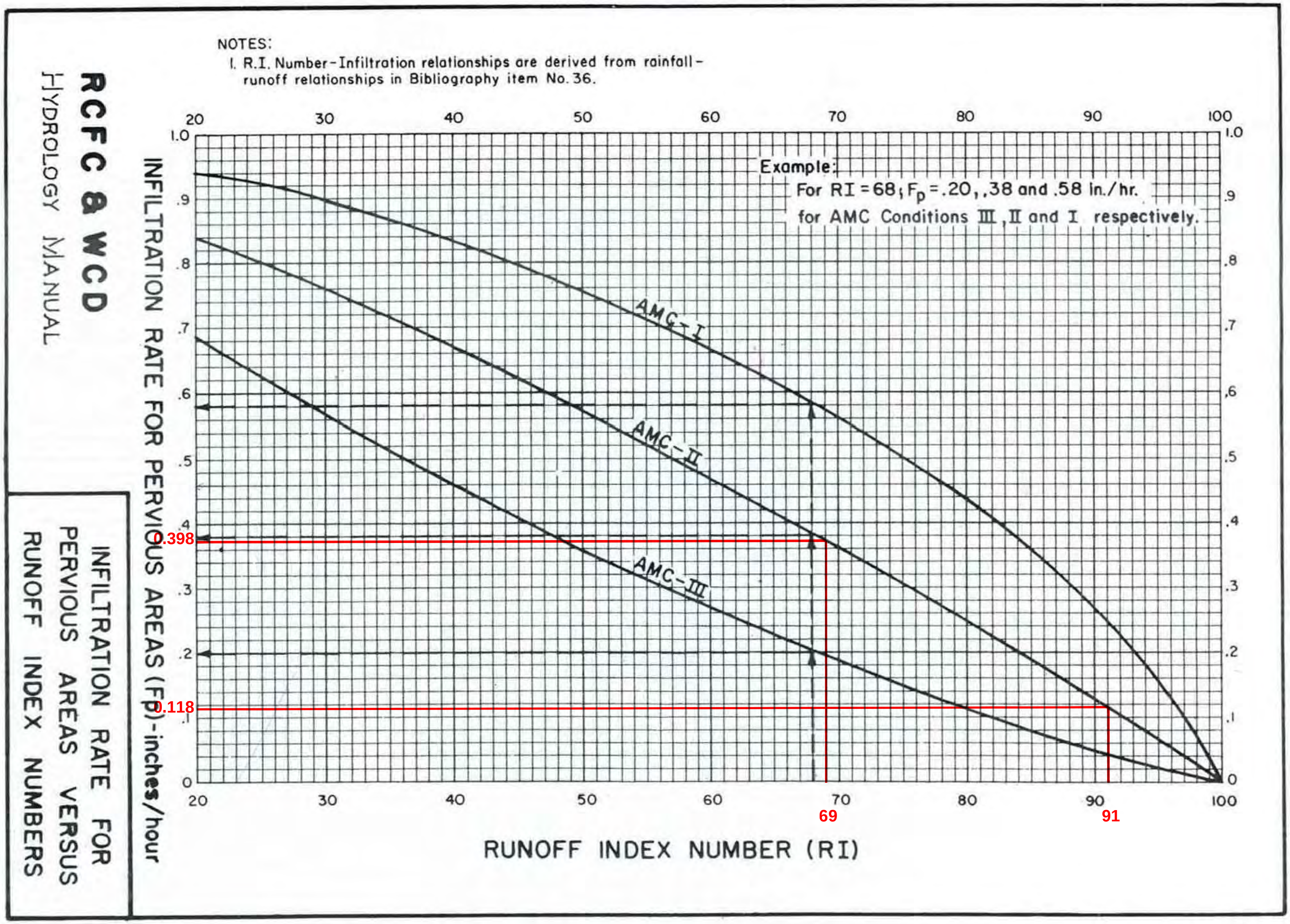
Time of Concentration (min): Tc = Plate D-3 [Minimum allowable Tc= 5.0 minutes]

Intensity (in/h): Plate D-4.7

Expected Coefficent Runoff: C = 0.9*(Ai+((I-Fp)/I)*Ap)

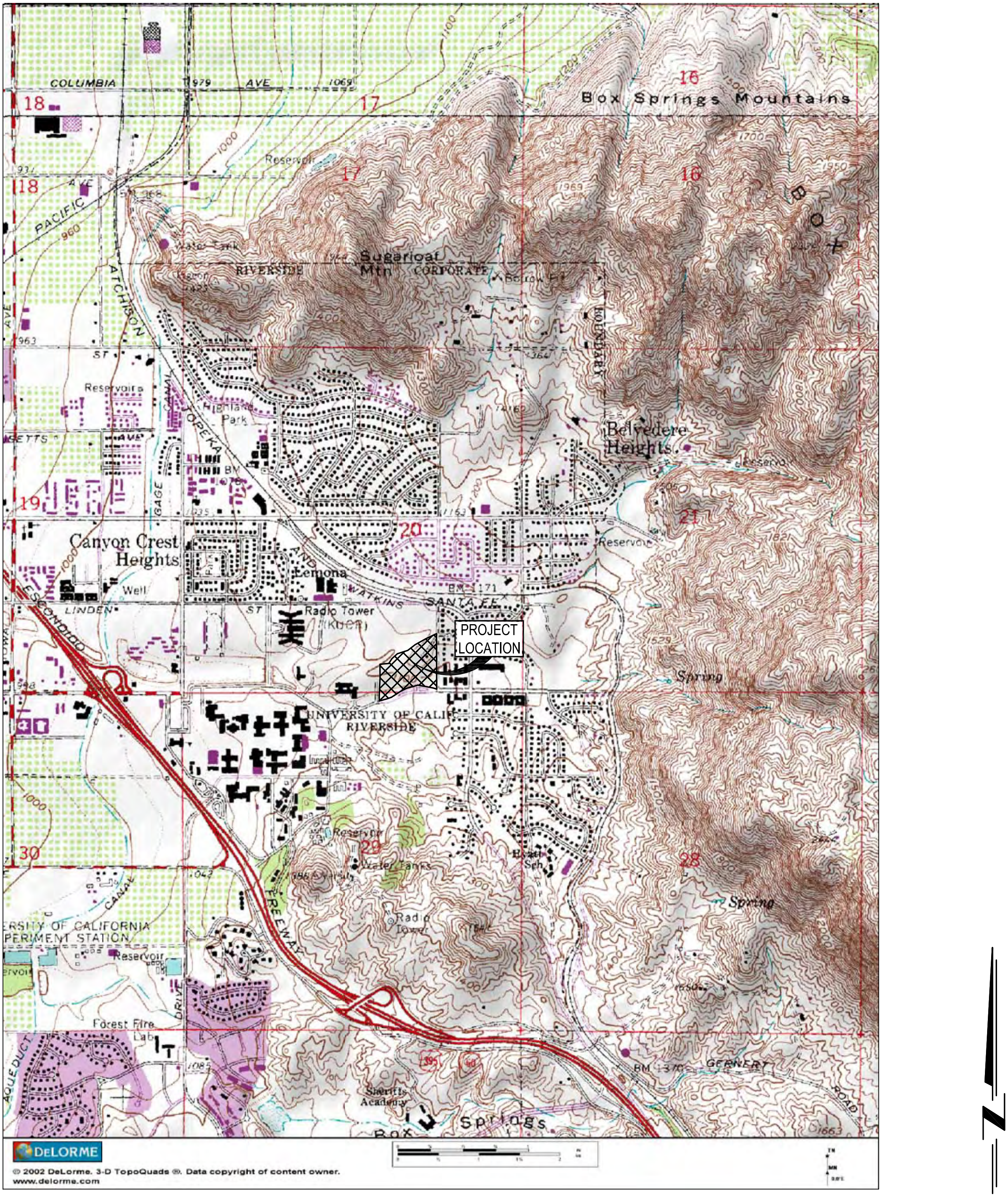
Expected Runoff/Flow from Drainage Basin (cfs): Q=C*I*A

C0841 UC Riverside Glen-Mor



AREA A,B,C,D,E: RI =69 -> Fp = 0.398in/h

AREA F: RI =91 -> Fp = 0.118in/h



FLC FLORES LUND CONSULTANTS
PROFESSIONAL ENGINEERS

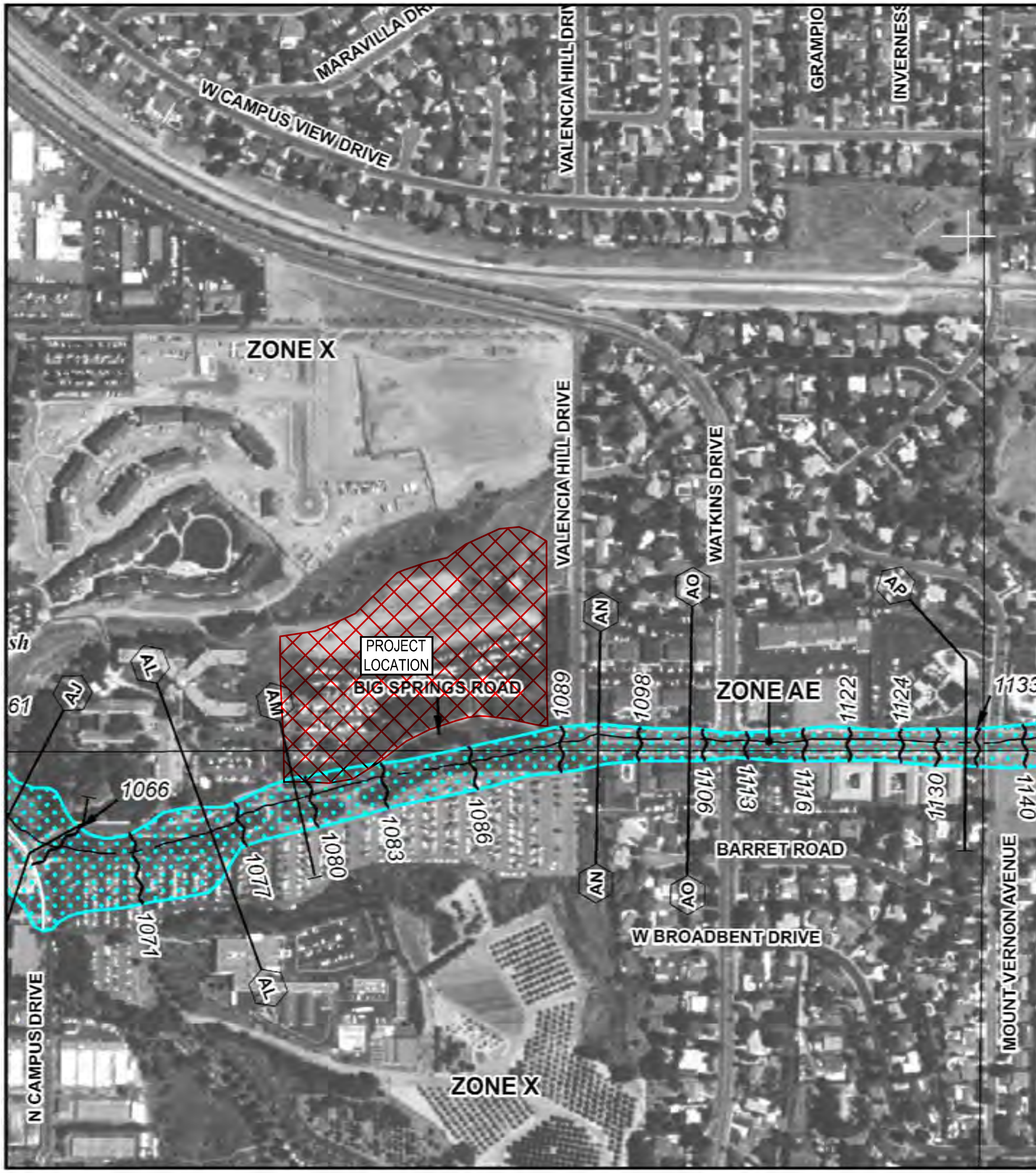
7220 TRADE STREET, SUITE 120. SAN DIEGO, CALIFORNIA 92121
(858) 566-0626 FAX (858) 566-0627

VICINITY MAP

UC RIVERSIDE – GLEN MOR HOUSING
900 UNIVERSITY AVENUE
RIVERSIDE, CALIFORNIA 92507

SG		PLOT NO: 1	DATE: April, 2010	PROJECT NUMBER: C0841	FIG 1

C0841 UC RIVERSIDE GLEN MOR



MAP SCALE 1" = 500'

250 0 500 1000 FEET

METERS

NFIP

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0727G

FIRM

FLOOD INSURANCE RATE MAP

RIVERSIDE COUNTY, CALIFORNIA
AND INCORPORATED AREAS

PANEL 727 OF 3805

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
RIVERSIDE COUNTY	060245	0727	G
RIVERSIDE, CITY OF	060260	0727	G

Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

MAP NUMBER
06065C0727G

EFFECTIVE DATE
AUGUST 28, 2008

Federal Emergency Management Agency

This is an official copy of a portion of the above referenced flood map. It was extracted using F-MIT On-Line. This map does not reflect changes or amendments which may have been made subsequent to the date on the title block. For the latest product information about National Flood Insurance Program flood maps check the FEMA Flood Map Store at www.msc.fema.gov

NOTES TO USERS

This map is for use in administering the National Flood Insurance Program. It does not necessarily identify all areas subject to flooding, particularly from local drainage sources of small size. The **community map repository** should be consulted for possible updated or additional flood hazard information.

To obtain more detailed information in areas where **Base Flood Elevations** (BFEs) and/or **floodways** have been determined, users are encouraged to consult the Flood Profiles and Floodway Data and/or Summary of Stillwater Elevations tables contained within the Flood Insurance Study (FIS) report that accompanies this FIRM. Users should be aware that BFEs shown on the FIRM represent rounded whole-foot elevations. These BFEs are intended for flood insurance rating purposes only and should not be used as the sole source of flood elevation information. Accordingly, flood elevation data presented in the FIS report should be utilized in conjunction with the FIRM for purposes of construction and/or floodplain management.

Coastal Base Flood Elevations shown on this map apply only landward of 0.0' North American Vertical Datum of 1988 (NAVD 88). Users of this FIRM should be aware that coastal flood elevations are also provided in the Summary of Stillwater Elevations tables in the Flood Insurance Study report for this jurisdiction. Elevations shown in the Summary of Stillwater Elevations tables should be used for construction and/or floodplain management purposes when they are higher than the elevations shown on this FIRM.

Boundaries of the **floodways** were computed at cross sections and interpolated between cross sections. The floodways were based on hydraulic considerations with regard to requirements of the National Flood Insurance Program. Floodway widths and other pertinent floodway data are provided in the Flood Insurance Study report for this jurisdiction.

Certain areas not in Special Flood Hazard Areas may be protected by **flood control structures**. Refer to Section 2.4 "Flood Protection Measures" of the Flood Insurance Study report for information on flood control structures for this jurisdiction.

The **projection** used in the preparation of this map was Universal Transverse Mercator (UTM) zone 11. The **horizontal datum** was NAD 83, GRS80 spheroid. Differences in datum, spheroid, projection or UTM zones used in the production of FIRMs for adjacent jurisdictions may result in slight positional differences in map features across jurisdiction boundaries. These differences do not affect the accuracy of this FIRM.

Flood elevations on this map are referenced to the North American Vertical Datum of 1988. These flood elevations must be compared to structure and ground

MAP SCALE 1" = 500'

250 0 500 1000 FEET

METER

NFIP

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0727G

FIRM

FLOOD INSURANCE RATE MAP

RIVERSIDE COUNTY, CALIFORNIA
AND INCORPORATED AREAS

PANEL 727 OF 3805

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
RIVERSIDE COUNTY	060245	0727	G
RIVERSIDE, CITY OF	060260	0727	G

Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

MAP NUMBER
06065C0727G

EFFECTIVE DATE
AUGUST 28, 2008

Federal Emergency Management Agency

Flood elevations on this map are referenced to the North American Vertical Datum of 1988. These flood elevations must be compared to structure and ground elevations referenced to the same **vertical datum**. For information regarding conversion between the National Geodetic Vertical Datum of 1929 and the North American Vertical Datum of 1988, visit the National Geodetic Survey website at http://www.ngs.noaa.gov or contact the National Geodetic Survey at the following address:

NGS Information Services
NOAA, N/NGS12
National Geodetic Survey
SSMC-3, #9202
1315 East-West Highway
Silver Spring, Maryland 20910-3282
(301) 713-3242

To obtain current elevation, description, and/or location information for **bench marks** shown on this map, please contact the Information Services Branch of the National Geodetic Survey at **(301) 713-3242**, or visit its website at http://www.ngs.noaa.gov.

Base map information shown on this FIRM was derived from U.S. Geological Survey Digital Orthophoto Quadrangles produced at a scale of 1:12,000 from photography dated 1994 or later.

This map may reflect more detailed and up-to-date **stream channel configurations** than those shown on the previous FIRM for this jurisdiction. The floodplains and floodways that were transferred from the previous FIRM may have been adjusted to conform to these new stream channel configurations. As a result, the Flood Profiles and Floodway Data in the Flood Insurance Study Report (which contains authoritative hydraulic data) may reflect stream channel distances that differ from what is shown on this map.

Corporate limits shown on this map are based on the best data available at the time of publication. Because changes due to annexations or de-annexations may have occurred after this map was published, map users should contact appropriate community officials to verify current corporate limit locations.

Please refer to the separately printed **Map Index** for an overview map of the county showing the layout of map panels; community map repository addresses; and a Listing of Communities table containing National Flood Insurance Program dates for each community as well as a listing of the panels on which each community is located.

Contact the **FEMA Map Service Center** at 1-800-358-9616 for information on available products associated with this FIRM. Available products may include previously issued Letters of Map Change, a Flood Insurance Study report, and/or

N

MAP SCALE 1" = 500'

250 0 500 1000 FEET

METER

NFIP

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0727G

FIRM

FLOOD INSURANCE RATE MAP

RIVERSIDE COUNTY, CALIFORNIA
AND INCORPORATED AREAS

PANEL 727 OF 3805

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
RIVERSIDE COUNTY	060245	0727	G
RIVERSIDE, CITY OF	060260	0727	G

Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

MAP NUMBER
06065C0727G

EFFECTIVE DATE
AUGUST 28, 2008

Federal Emergency Management Agency

This is an official copy of a portion of the above referenced flood map. It was extracted using F-MIT On-Line. This map does not reflect changes or amendments which may have been made subsequent to the date on the title block. For the latest product information about National Flood Insurance Program flood maps check the FEMA Flood Map Store at www.msc.fema.gov

NGS Information Services
NOAA, N/NGS12
National Geodetic Survey
SSMC-3, #9202
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Contact the **FEMA Map Service Center** at 1-800-358-9616 for information on available products associated with this FIRM. Available products may include previously issued Letters of Map Change, a Flood Insurance Study report, and/or digital versions of this map. The FEMA Map Service Center may also be reached by Fax at 1-800-358-9620 and its website at http://msc.fema.gov.

If you have **questions about this map** or questions concerning the National Flood Insurance Program in general, please call **1-877-FEMA MAP** (1-877-336-2627) or visit the FEMA website at http://www.fema.gov.

MAP SCALE 1" = 500'

250 0 500 1000 FEET

METER

NFIP

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OTHER FLOOD AREAS

ZONE X Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.

OTHER AREAS

ZONE X Areas determined to be outside the 0.2% annual chance floodplain.

ZONE D Areas in which flood hazards are undetermined, but possible.

COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS

OTHERWISE PROTECTED AREAS (OPAs)

CBRS areas and OPAs are normally located within or adjacent to Special Flood Hazard Areas.

1% annual chance floodplain boundary

0.2% annual chance floodplain boundary

Floodway boundary

Zone D boundary

CBRS and OPA boundary

Boundary dividing Special Flood Hazard Area Zones and boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths or flood velocities.

513 Base Flood Elevation line and value; elevation in feet*

(EL 987) Base Flood Elevation value where uniform within zone; elevation in feet*

* Referenced to the North American Vertical Datum of 1988

A A Cross section line

23 23 Transect line

87°07'45", 32°22'30" Geographic coordinates referenced to the North American Datum of 1983 (NAD 83), Western Hemisphere

$^{24}76^{000m}$N 1000-meter Universal Transverse Mercator grid values, zone 11N

600000 FT 5000-foot grid ticks: California State Plane coordinate system, zone VI (FIPSZONE 0406), Lambert Conformal Conic projection

DX5510 × Bench mark (see explanation in Notes to Users section of this FIRM panel)

● M1.5 River Mile

MAP SCALE 1" = 500'

250 0 500 1000 FEET

METER

NFIP

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PANEL 727 OF 3805

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Federal Emergency Management Agency

LEGEND

SPECIAL FLOOD HAZARD AREAS SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD

The 1% annual flood (100-year flood), also known as the base flood, is the flood that has a 1% chance of being equaled or exceeded in any given year. The Special Flood Hazard Area is the area subject to flooding by the 1% annual chance flood. Areas of Special Flood Hazard include Zones A, AE, AH, AO, AR, A99, V, and VE. The Base Flood Elevation is the water-surface elevation of the 1% annual chance flood.

ZONE A	No Base Flood Elevations determined.
ZONE AE	Base Flood Elevations determined.
ZONE AH	Flood depths of 1 to 3 feet (usually areas of ponding); Base Flood Elevations determined.
ZONE AO	Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.
ZONE AR	Special Flood Hazard Area formerly protected from the 1% annual chance flood by a flood control system that was subsequently decertified. Zone AR indicates that the former flood control system is being restored to provide protection from the 1% annual chance or greater flood.
ZONE A99	Area to be protected from 1% annual chance flood by a Federal flood protection system under construction; no Base Flood Elevations determined.
ZONE V	Coastal flood zone with velocity hazard (wave action); no Base Flood Elevations determined.
ZONE VE	Coastal flood zone with velocity hazard (wave action); Base Flood Elevations determined.

FLOODWAY AREAS IN ZONE AE

The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.

OTHER FLOOD AREAS

ZONE X Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.

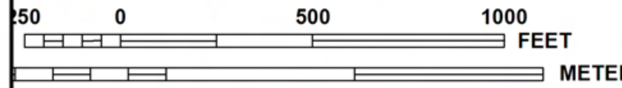
OTHER AREAS

ZONE X Areas determined to be outside the 0.2% annual chance floodplain.

ZONE D Areas in which flood hazards are undetermined, but possible.

N

MAP SCALE 1" = 500'



NATIONAL FLOOD INSURANCE PROGRAM

NFIP

PANEL 0727G

FIRM
FLOOD INSURANCE RATE MAP

RIVERSIDE COUNTY, CALIFORNIA
AND INCORPORATED AREAS

PANEL 727 OF 3805

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EFFECTIVE DATE
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	Flood Elevations, flood depths or flood velocities.
513	Base Flood Elevation line and value; elevation in feet*
(EL 987)	Base Flood Elevation value where uniform within zone; elevation in feet*

* Referenced to the North American Vertical Datum of 1988

A — A	Cross section line
23 - - - - - - 23	Transect line
87°07'45", 32°22'30"	Geographic coordinates referenced to the North American Datum of 1983 (NAD 83), Western Hemisphere
$^{24}76^{000m}$N	1000-meter Universal Transverse Mercator grid values, zone 11N
600000 FT	5000-foot grid ticks: California State Plane coordinate system, zone VI (FIPSZONE 0406), Lambert Conformal Conic projection
DX5510 ×	Bench mark (see explanation in Notes to Users section of this FIRM panel)
● M1.5	River Mile

MAP REPOSITORY
Refer to listing of Map Repositories on Map Index

EFFECTIVE DATE OF COUNTYWIDE
FLOOD INSURANCE RATE MAP
August 28, 2008

EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL

For community map revision history prior to countywide mapping, refer to the Community Map History table located in the Flood Insurance Study report for this jurisdiction.

To determine if flood insurance is available in this community, contact your Insurance agent or call the National Flood Insurance Program at 1-800-638-6620.

N

MAP SCALE 1" = 500'

250 0 500 1000 FEET

METERS

150 0 150 300

N

MAP SCALE 1" = 500'

250 0 500 1000 FEET

METERS

NFIP

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0727G

FIRM

FLOOD INSURANCE RATE MAP

RIVERSIDE COUNTY, CALIFORNIA
AND INCORPORATED AREAS

PANEL 727 OF 3805

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

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RIVERSIDE, CITY OF	060260	0727	G

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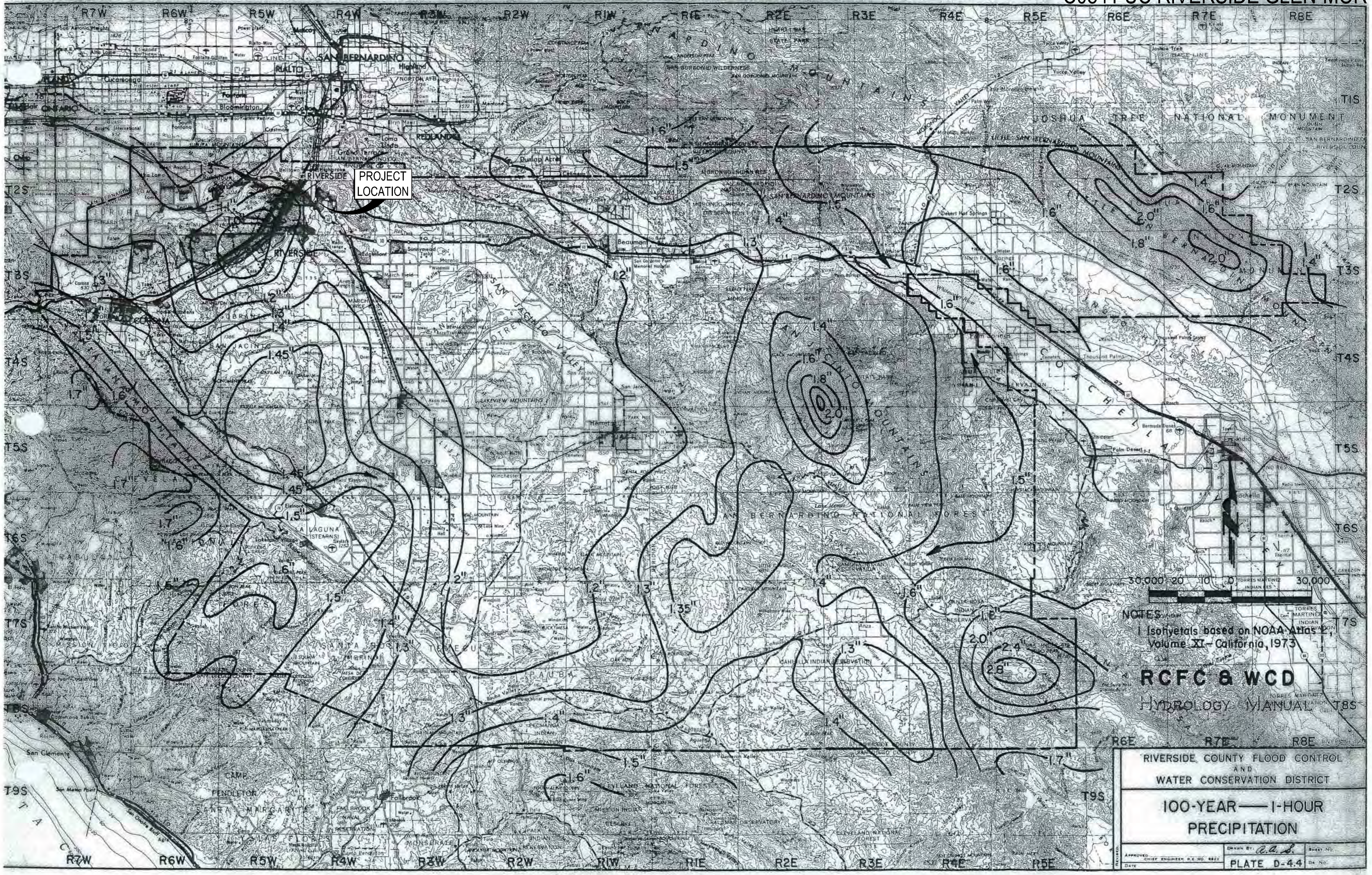
U.S. DEPARTMENT OF HOMELAND SECURITY

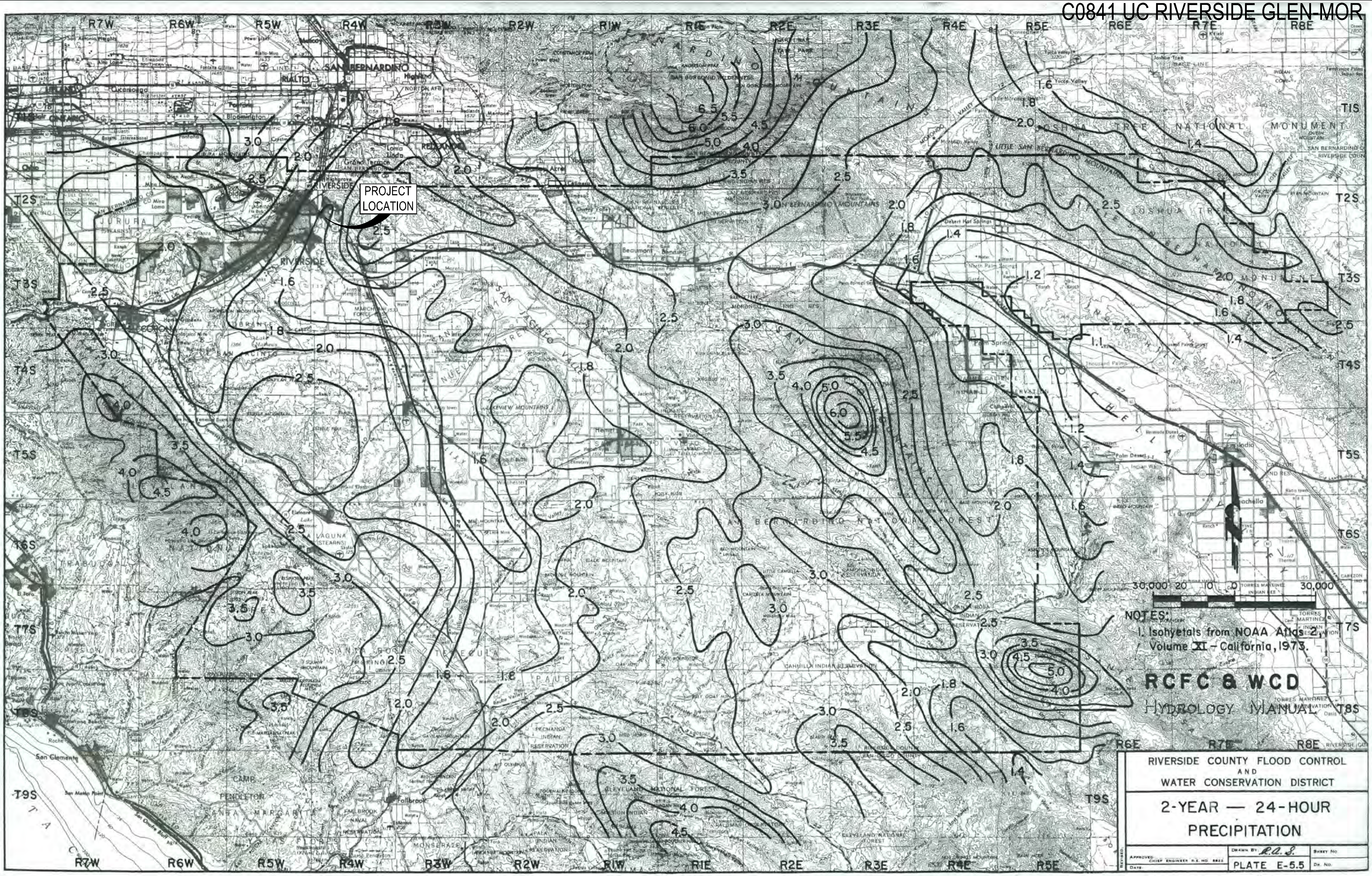
MAP NUMBER
06065C0727G

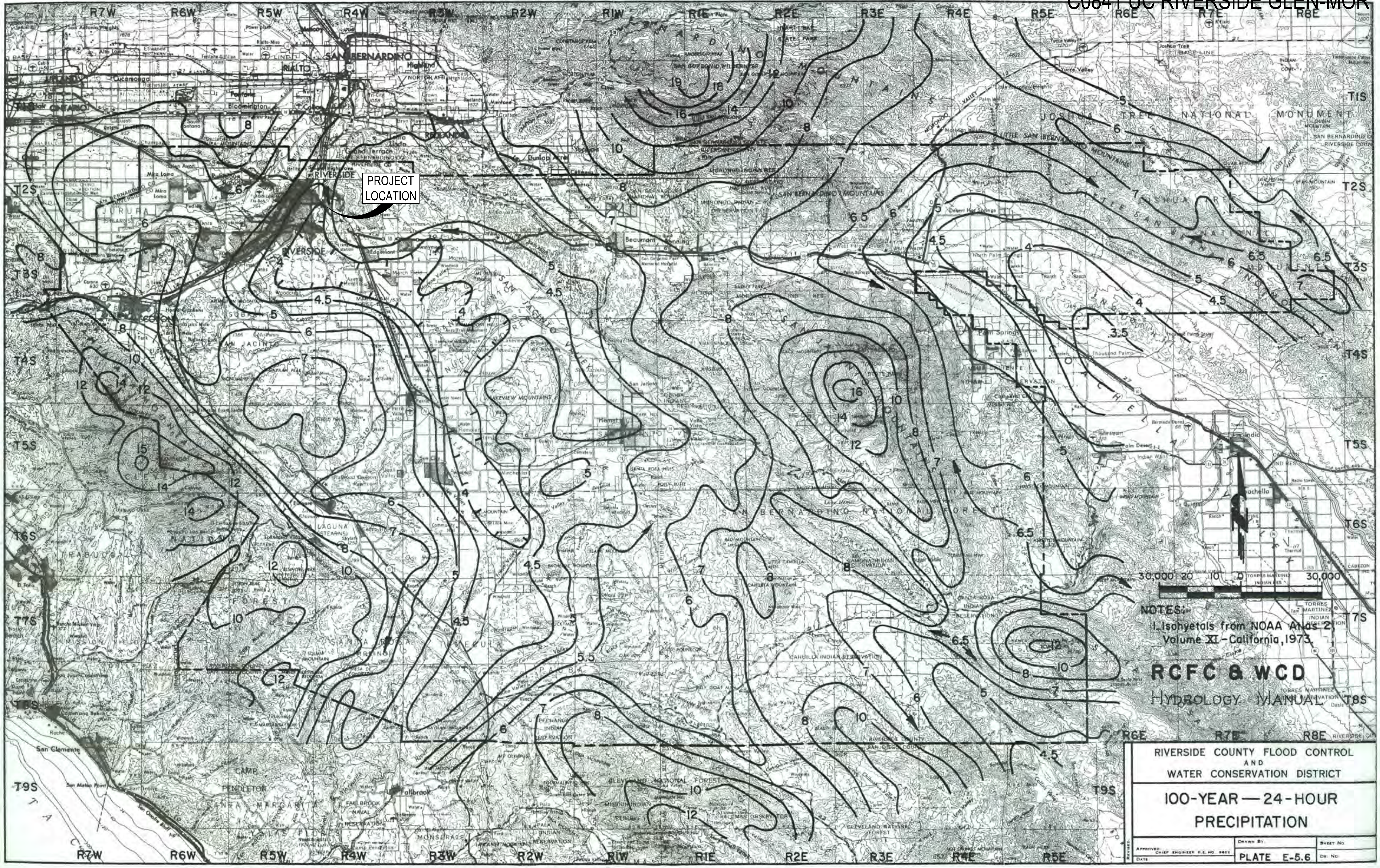
EFFECTIVE DATE
AUGUST 28, 2008

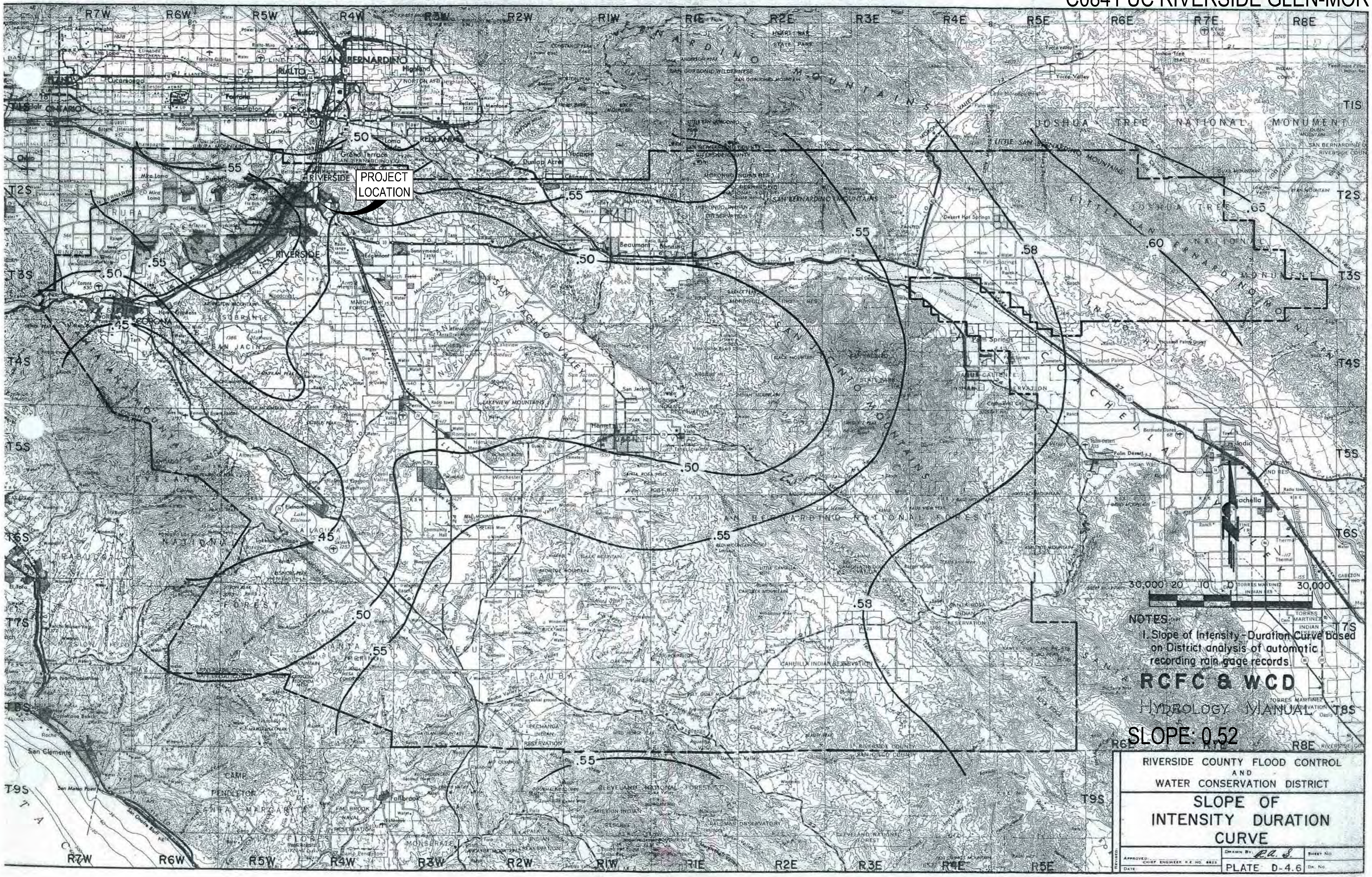
Federal Emergency Management Agency

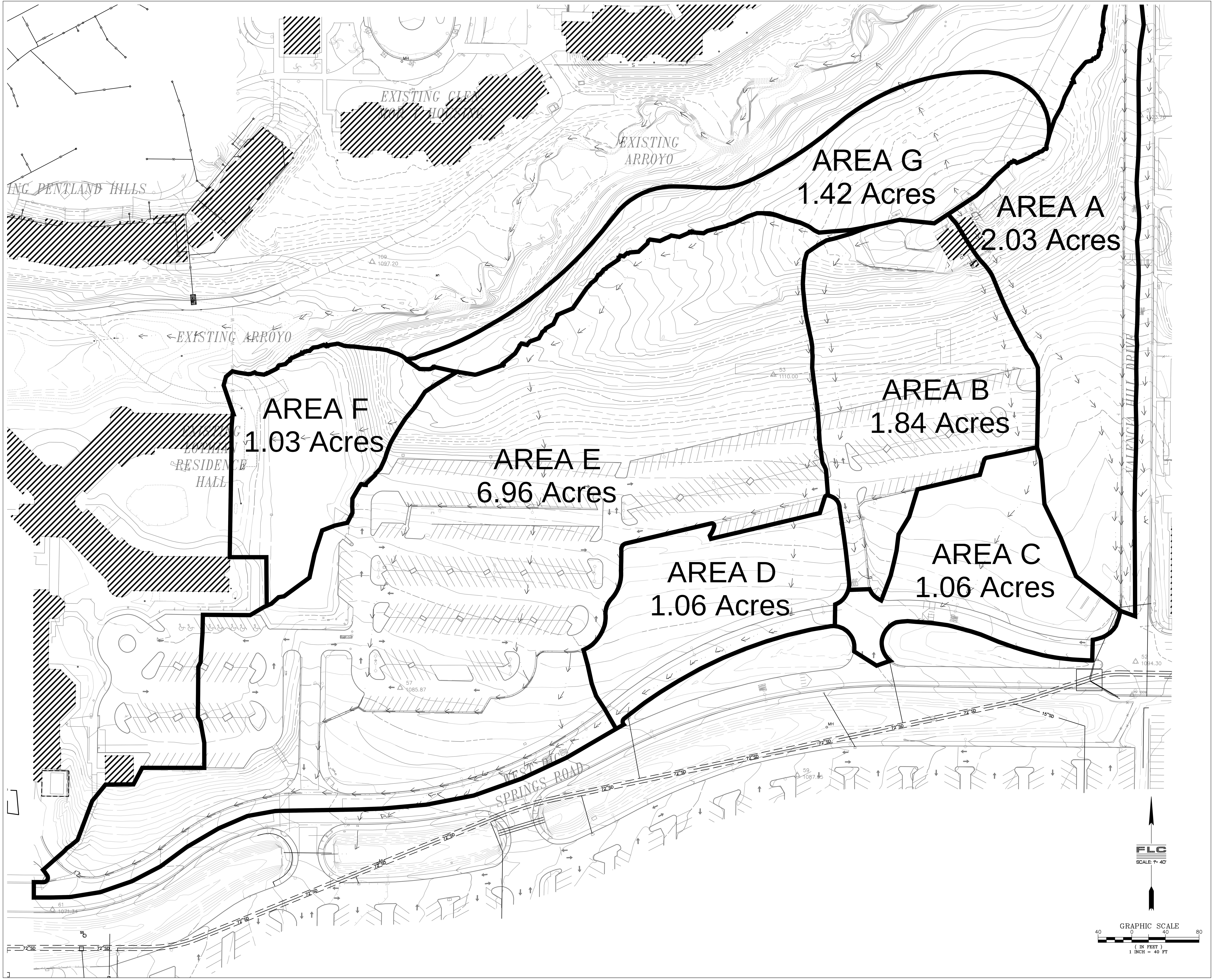

PROJECT LOCATION
RIVERSIDE
SAN BERNARDINO
JOSHUA TREE NATIONAL MONUMENT
SAN BERNARDINO NATIONAL FOREST
CLEVELAND NATIONAL FOREST
R7W
R6W
R5W
R4W
R3W
R2W
R1W
R1E
R2E
R3E
R4E
R5E
R6E
R7E
R8E
T1S
T2S
T3S
T4S
T5S
T6S
T7S
T8S
T9S
.5"
.55"
.45"
.6"
.65"
.7"
.8"
.9"
NOTES:
1. Isohyetals based on NOAA Atlas 2, Volume XI - California, 1973
RCFC & WCD
HYDROLOGY MANUAL
RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT
2-YEAR — 1-HOUR PRECIPITATION
PLATE D-4.3


PROJECT LOCATION
RIVERSIDE
SAN BERNARDINO
JOSHUA TREE NATIONAL MONUMENT
SAN JACINTO MOUNTAINS
NOTES
1 Isohyetals based on NOAA Atlas 2, Volume XI - California, 1973
RCFC & WCD
HYDROLOGY MANUAL
RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT
100-YEAR — 1-HOUR PRECIPITATION
PLATE D-4.4


PROJECT LOCATION
NOTES:
1. Isohyetals from NOAA Atlas 2, Volume XI - California, 1973.
RCFC & WCD
HYDROLOGY MANUAL
RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT
2-YEAR — 24-HOUR PRECIPITATION
PLATE E-5.5
30,000 20 10 0 30,000
SAN BERNARDINO
RIVERSIDE
R7W
R6W
R5W
R4W
R3W
R2W
R1W
R1E
R2E
R3E
R4E
R5E
R6E
R7E
R8E
T1S
T2S
T3S
T4S
T5S
T6S
T7S
T8S
T9S


PROJECT LOCATION
NOTES:
1. Isohyetals from NOAA Atlas 2 Volume XI - California, 1973.
RCFC & WCD
HYDROLOGY MANUAL
RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT
100-YEAR — 24-HOUR PRECIPITATION
PLATE E-5.6
R7W
R6W
R5W
R4W
R3W
R2W
R1W
R1E
R2E
R3E
R4E
R5E
R6E
R7E
R8E
T1S
T2S
T3S
T4S
T5S
T6S
T7S
T8S
T9S
SAN BERNARDINO
RIVERSIDE
JOSHUA TREE NATIONAL MONUMENT
SAN BERNARDINO NATIONAL FOREST
CLEVELAND NATIONAL FOREST
CAMP PENDLETON
30,000
20
10
0
30,000


PROJECT LOCATION
RIVERSIDE
SAN BERNARDINO
REDLANDS
CORONA
SAN JACINTO MOUNTAINS
JOSHUA TREE NATIONAL MONUMENT
SAN BERNARDINO NATIONAL FOREST
CLEVELAND NATIONAL FOREST
.45
.50
.55
.58
.60
.65
NOTES:
1. Slope of Intensity - Duration Curve based on District analysis of automatic recording rain gage records.
RCFC & WCD
HYDROLOGY MANUAL
SLOPE: 0.52
RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT
SLOPE OF INTENSITY DURATION CURVE
PLATE D-4.6



SASAKI
77 GEARY STREET, FOURTH FLOOR, SAN FRANCISCO, CA 94108 USA
t 415 776 7272 f 415 202 8970 w www.sasaki.com

PRELIMINARY-NOT FOR CONSTRUCTION

FLC FLORES LUND CONSULTANTS
7220 TRADE STREET, SUITE 120
SAN DIEGO, CALIFORNIA 92121-2325
TEL (858) 566-0626
FAX (858) 566-0627

Key Plan

DSA Stamp

SFM Stamp

No.	Description	Date
	95% SCHEMATIC DESIGN	24 JUN 2010

DWG ISSUE & REVISION HISTORY

Stamp

Project Title: UNIVERSITY OF CALIFORNIA

UC RIVERSIDE GLEN MOR 2
STUDENT HOUSING

PROJECT STATUS

Drawing Title:

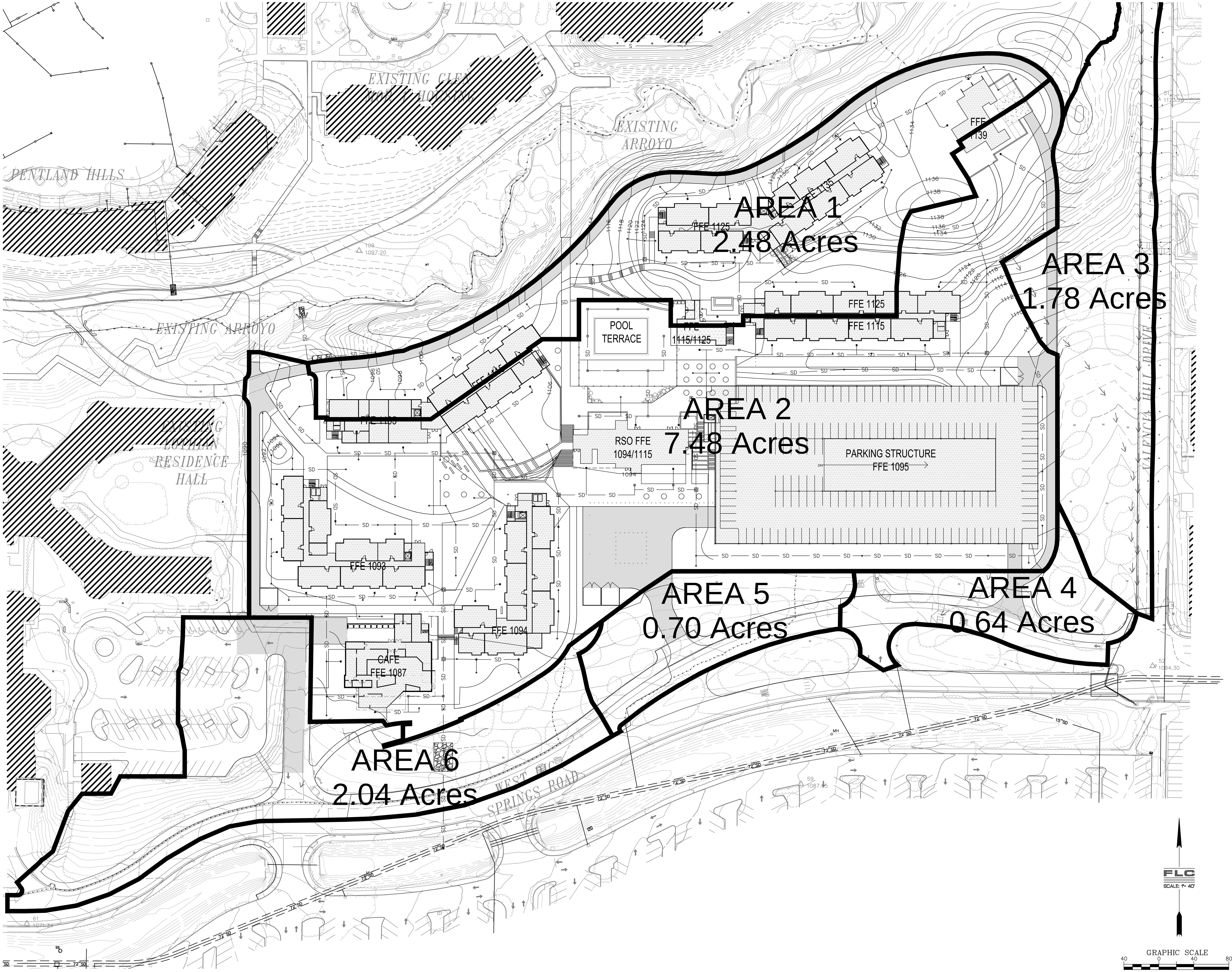
EXISTING DRAINAGE CONDITIONS

Project No.	06031.00	Drawn By:	Author
Scale:	1" = 40'	Checked By:	Checker
Date:	04/20/10	Approved By:	Approver

Drawing No.

C1.0

Project Directory: 5/13/2010 11:06:33 AM



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t 415 776 7272 f 415 202 8970 w www.sasaki.com

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Key Plan

DSA Stamp

SFM Stamp

No.	Description	Date
	95% SCHEMATIC DESIGN	24 JUN 2010

DWG ISSUE & REVISION HISTORY

Stamp

JEFF R. CROSS NO. 67530 Expires 6/30/2011 CIVIL STATE OF CALIFORNIA

Project Title: UNIVERSITY OF CALIFORNIA

UC RIVERSIDE GLEN MOR 2 STUDENT HOUSING

PROJECT STATUS

Drawing Title:

PROPOSED DRAINAGE CONDITIONS

Project No.	06031.00	Drawn By:	Author
Scale:	1" = 40'	Checked By:	Checker
Date:	04/20/10	Approved By:	Approver

Drawing No.

C2.0

Project Directory: 5/13/2010 11:06:33 AM

Appendix P

Summary of Arroyo Hydraulic Analyses

Date: September 23, 2010

Preliminary UCR Glen Mor 2 - Summary of Arroyo Hydraulic Analyses

Introduction

An existing minor drainageway traverses east to west through the proposed University of California at Riverside (UCR) Glen Mor 2 project. This drainageway is not mapped by FEMA but does confluence with the FEMA-mapped University Arroyo immediately downstream of the project limits. The limits of this study are not impacted by the backwater of the University Arroyo. This memorandum summarizes results of hydraulic analyses that were performed for the drainageway from Valencia Hill Drive to immediately downstream of Lothian Residence Hall (approximately 2100 feet). Hydrologic analyses previously prepared by Philip Williams & Associates (PWA) were reviewed and adopted for input into the hydraulic models. The results of these hydraulic analyses were then used to define 100-year floodplain limits for the drainageway. These results will be used to help define limits for proposed improvements tied to the Glen Mor 2 Housing Development project.

Hydrologic Summary

Hydrologic analyses (HEC-1) prepared by PWA were reviewed and adopted for hydraulic analyses performed as part of this study. These analyses are summarized in the report entitled, "University Arroyo Flood Control and Enhancement Plan: Summary Report of Hydrologic and Hydrodynamic Conditions and Evaluation of Alternatives" dated October 9, 2001. This report was prepared to assist the University in developing a flood control management plan for the University Arroyo traversing the campus. These analyses were also used as part of a Letter of Map Revision prepared by RBF Consultants in September 2009. PWA referenced this study's drainageway as Trib (2) in their study and this identification will be used throughout this study. See Attachment A for excerpts from PWA study.

Trib (2) is comprised of sub-basins BigUP and BIGDS based on the PWA study. These sub-basins define the entire contributing watershed for Trib (2) prior to its confluence with the major arroyo. PWA prepared HEC-1 models for the 100-year 3-, 6-, and 24-hour storm events as part of their study. The 100-year, 3-hour peak discharge was used for this study's hydraulic analyses because it resulted in the highest peak discharge. A summary of drainage areas and 100-year peak flows are summarized in Table 1 below.

Table 1: Hydrology Summary

LOCATION	AREA (acres)	100-Year, 3-hr (cfs)
BigUP	57.06	60
BIGDS	30.44	36
Total	**87.50**	**96**

The total contributing watershed for the drainageway is approximately 87.5 acres which results in a total 100-year, 3-hour peak discharge of 96 cfs. The RBF HEC-RAS model prepared for the University Arrroyo only showed an increase of 83.7 cfs to represent the contribution from Trib (2). This probably accounts for attenuation and timing of peaks between Trib (2) and the University Arroyo

The 100-year peak discharge of 96 cfs was used for this study's hydraulic analyses. See Attachment B for HEC-1 output files.

Hydraulic Analyses

A site visit of Trib (2) and its contributing watershed was performed on September 11, 2010 to document channel roughness coefficients and hydraulic parameters for incorporation into the hydraulic model. The sub-basin limits defined in the PWA Study appear to accurately define the contributing watershed for Trib (2). The low-flow channel is comprised of mostly grasses through the entire study reach. There are clumps of trees in several areas within the drainageway, however, these trees are spaced apart with minimal undergrowth. Mannings roughness coefficients for the channel banks and overbanks were assumed as 0.03 and 0.04, respectively.

There are two existing culvert crossings (12- and 54-inch) within the study reach. The 12-inch culvert does not have any conveyance capacity because it is completely filled in with sediment. It was assumed that the 12-inch culvert would remain blocked and the top of road was modeled at this location. The 54-inch culvert has about 2 feet of sediment deposition within the pipe reach. This culvert was modeled assuming that the 2 feet of deposition would remain (i.e. no maintenance of culvert). Cross section data for the HEC-RAS hydraulic model was extracted from topography and field survey shots provided by TMAD (dated 2010). The 100-year peak discharge listed in Table 1 above was also input into the hydraulic model.

Results show that 100-year water depths range from approximately 0.5 to 2.5 feet. The only exception is immediately upstream of the 54-inch culvert crossing. Depths are approximately 3-4 feet in this location due to sediment deposition within the culvert which causes 100-year flows to overtop the crossing. **(Note: Topography and field survey shots still need to be verified for this area of the study.)**

ATTACHMENT A

PWA Study

PWA

PHILIP WILLIAMS & ASSOCIATES

CONSULTANTS IN HYDROLOGY

770 Tamalpais Drive, Suite 401, Corte Madera, CA 94925
TEL 415.945.0600 FAX 415.945.0606
e-mail sfo@pwa-ltd.com

University Arroyo Flood Control and Enhancement Plan: Summary Report of Hydrologic and Hydrodynamic Conditions and Evaluation of Alternatives.

Prepared for

University of California at Riverside

Prepared by

Philip Williams & Associates, Ltd.

October 9, 2001

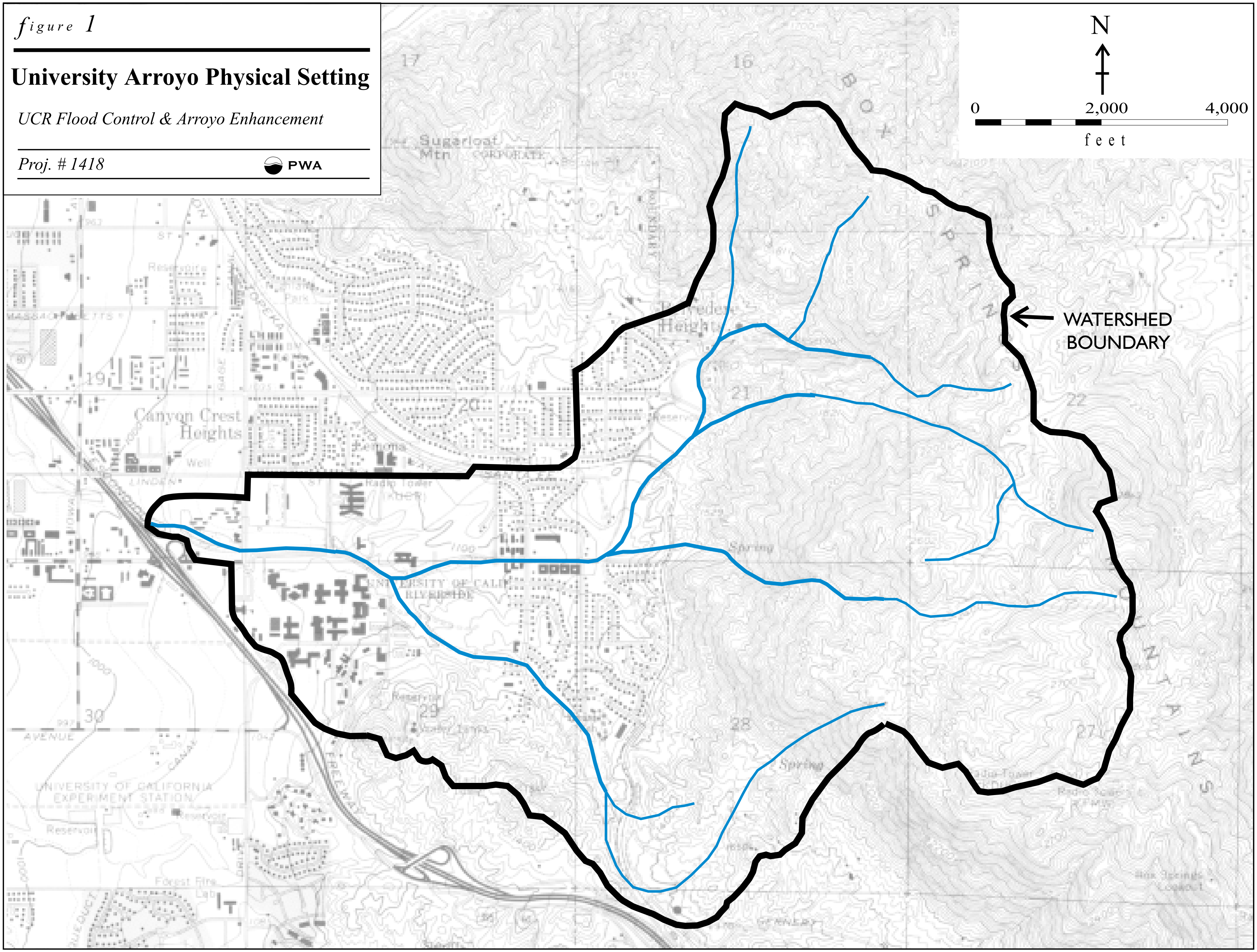
PWA Ref. # 1418

figure 1

University Arroyo Physical Setting

UCR Flood Control & Arroyo Enhancement

Proj. # 1418 PWA



1418\ watershed.cdr

figure 2

Existing Drainage Conditions

UCR Flood Control & Arroyo Enhancement

Proj. # 1418

PWA

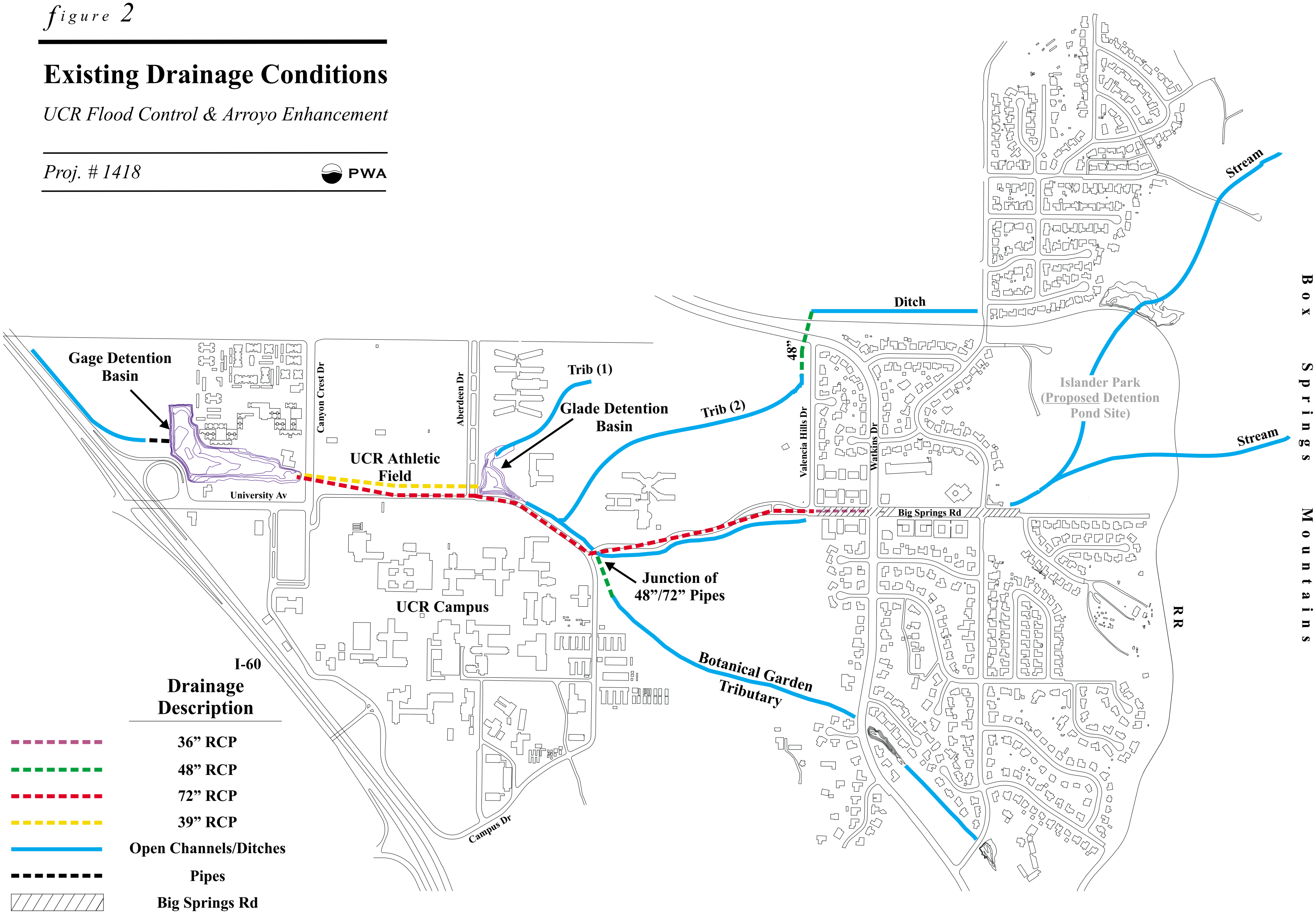
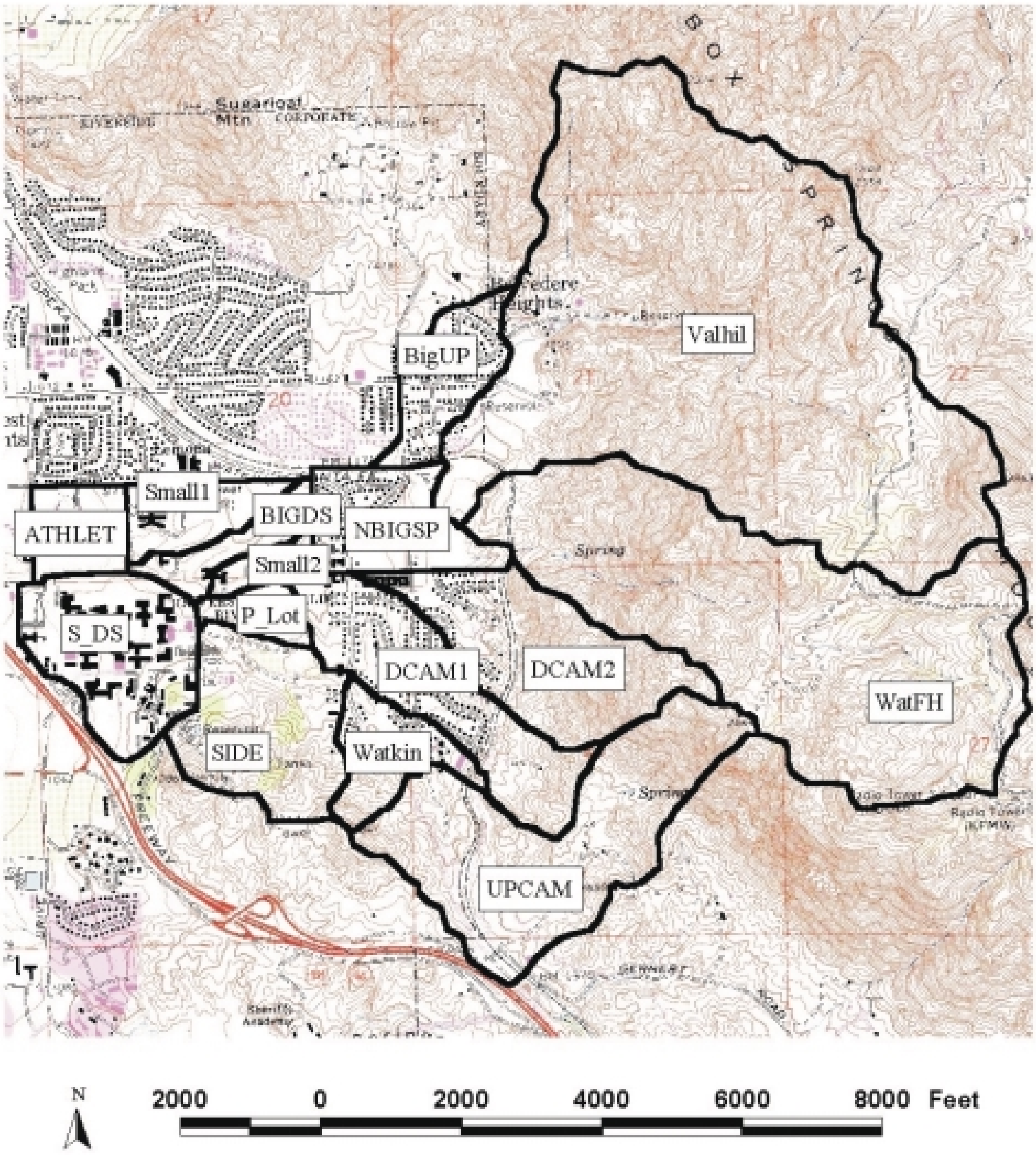


figure 5

Sub-basin delineation of University Arroyo watershed used for hydrologic modeling

UCR Flood Control & Arroyo Enhancement

Proj. # 1418 PWA



1418 sub-basins.cdr

Table 1: Summary of Geometric and Hydrologic Characteristics, University Arroyo Watershed

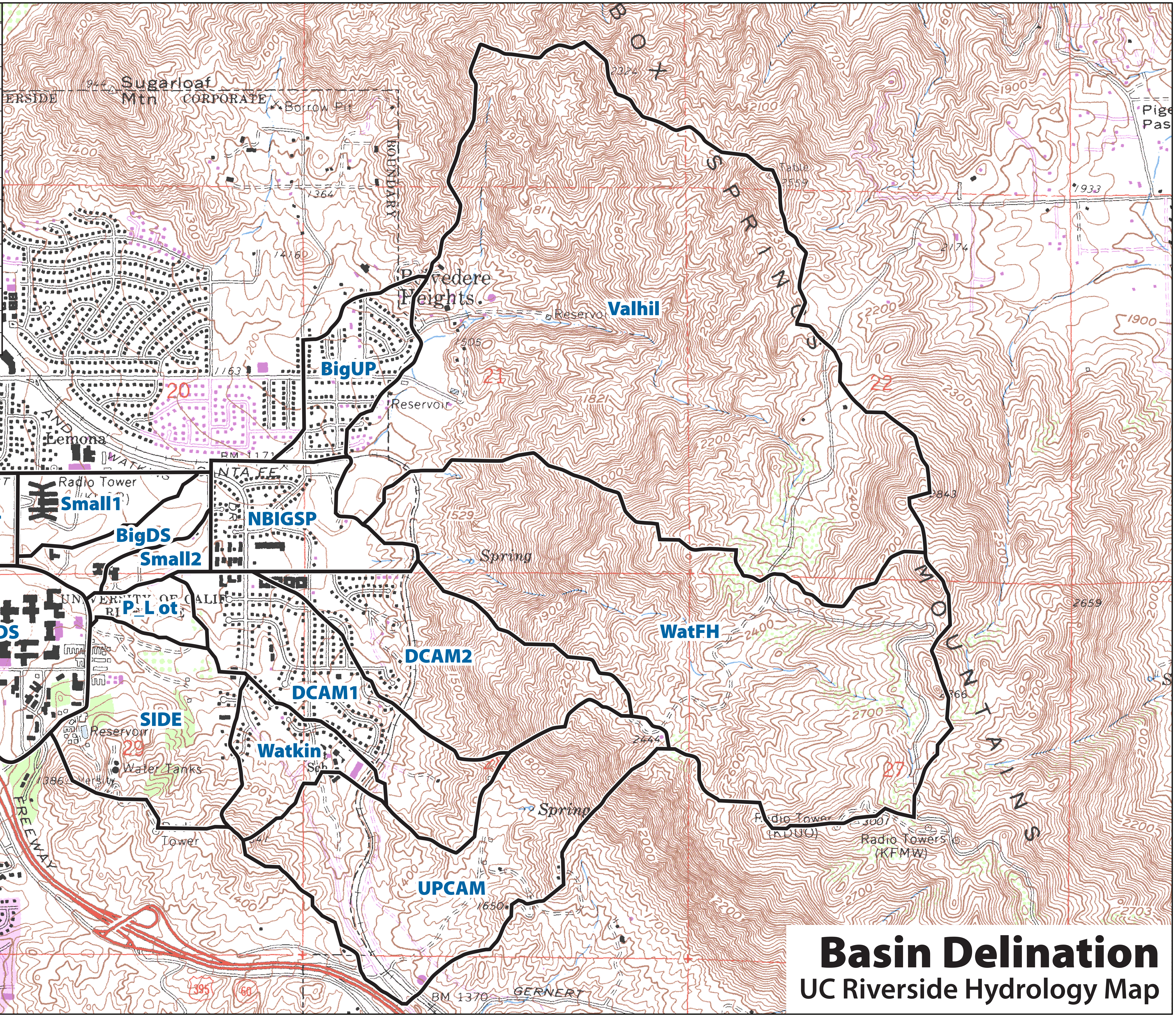
Basin ID	Basin Description	Area (acres)	Longest Reach (feet)	Lengh to Centroid (feet)	Δ Elevation (feet)	Percentage of Hydrologic Soil Group					Sub Basin 'n' Values	Runoff Index	% Impervious	S-Hydrograph	Low Loss Rate
						A	B	BC	C	D					
ATHLET	Athletic field area & surrounding campus area	39.34	2730	1272	50	0%	29%	47%	20%	3%	0.05	62.4	75%	Valley	0.3
BIGDS	Sub basin entering ditch opposite Campus Dr. & Big Springs Rd	30.44	3882	1603	101	6%	1%	0%	52%	41%	0.04	73.7	32%	Valley	0.64
BIGUP	Sub basin North of Campus View Dr & train tracks	57.06	8630	6945	261	0%	35%	0%	56%	9%	0.025	77.9	42%	Valley	0.57
DCAM1	Sub basin south of Broadbent Rd	126.02	8619	3371	604	0%	10%	0%	54%	35%	0.035	79.3	29%	Valley	0.67
DCAM2	Sub basin north of Broadbent Rd	142.85	9231	2961	1315	0%	12%	0%	15%	73%	0.035	79.2	16%	Foothills	0.77
NBIGSP	Sub basin north of Big Springs Rd	77.94	2998	1652	163	0%	27%	0%	38%	35%	0.025	82.4	41%	Valley	0.57
PLOT	Sub basin surrounding parking lot	21.77	2519	907	100	0%	41%	0%	33%	26%	0.02	67.9	40%	Valley	0.58
SDS	Main campus drains sub basin	112.58	7249	1480	128	0%	20%	16%	56%	7%	0.025	65.5	75%	Valley	0.3
SIDE	Sub basin between 48" pipe inlet & Watkins Rd	120.81	8866	6656	429	0%	10%	4%	63%	23%	0.035	72.9	32%	Valley	0.64
SMALL1	Sub basin west of Aberdeen Rd	42.77	3684	1726	98	0%	4%	23%	58%	15%	0.04	71.5	40%	Valley	0.58
SMALL2	Sub basin north of Big Springs Rd	17.92	2579	1265	68	0%	9%	0%	77%	14%	0.04	70.9	50%	Valley	0.5
UPCAM	Sub basin upstream of Hyatt School	220.37	7460	3899	1253	0%	4%	1%	57%	39%	0.04	77	3%	Foothills	0.87
VALHIL	Valencia Hills sub basin	767.16	12002	5970	1727	0%	6%	3%	4%	86%	0.045	80	2%	Foothills	0.88
WATFH	Watkins Foothills sub basin	465.97	14553	4849	1850	0%	0%	8%	4%	88%	0.05	80.3	0%	Foothills	0.9
WATKIN	Sub basin between Watkins Rd & Hyatt School	51.47	6654	4109	397	0%	0%	0%	69%	31%	0.035	78.4	32%	Valley	0.64
TOTAL WATERSHED	Entire UCR Watershed	2294.47	-	-	??	0%	8%	5%	25%	62%	0.041	77.86	15%	-	0.775

\projects\1418_UCR_IV\report\tables\1418_Tb_ 1_Geom&Hydroparameters.xls

ATTACHMENT B

HEC-1 Output

Basin ID	Basin Description	Drainage Area (ac)	Longest Reach (ft)	Δ Elevation (feet)
ATHLET	Athletic field area & surrounding campus area	39	2730	50
BIGDS	Sub basin entering ditch opposite Campus Dr. & Big Springs Rd	30	3882	101
BIGUP	Sub basin North of Campus View Dr & train tracks	57	8630	261
DCAM1	Sub basin south of Broadbent Rd	126	8619	604
DCAM2	Sub basin north of Broadbent Rd	143	9231	1315
NBIGSP	Sub basin north of Big Springs Rd	78	2998	163
PLOT	Sub basin surrounding parking lot	22	2519	100
SDS	Main campus drains sub basin	113	7249	128
SIDE	Sub basin between 48" pipe inlet & Watkins Rd	121	8866	429
SMALL1	Sub basin west of Aberdeen Rd	43	3684	98
SMALL2	Sub basin north of Big Springs Rd	18	2579	68
UPCAM	Sub basin upstream of Hyatt School	220	7460	1253
VALHIL	Valencia Hills sub basin	767	12002	1727
WATFH	Watkins Foothills sub basin	466	14553	1850
WATKIN	Sub basin between Watkins Rd & Hyatt School	51	6654	397



Basin Delination

UC Riverside Hydrology Map

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1*****************************************                                                   ***************************************
 *                                        *                                                  *                                     *
 *   FLOOD HYDROGRAPH PACKAGE  (HEC-1)    *                                                  *   U.S. ARMY CORPS OF ENGINEERS      *
 *             JUN   1998                 *                                                  *   HYDROLOGIC ENGINEERING CENTER     *
 *          VERSION 4.1                   *                                                  *         609 SECOND STREET           *
 *                                        *                                                  *      DAVIS, CALIFORNIA 95616        *
 *  RUN DATE   17JUN09  TIME  16:08:13    *                                                  *         (916) 756-1104              *
 *                                        *                                                  *                                     *
 *****************************************                                                   ***************************************


                                                         X     X  XXXXXXX   XXXXX          X
                                                         X     X  X        X     X        XX
                                                         X     X  X        X               X
                                                         XXXXXXX  XXXX     X        XXXXX  X
                                                         X     X  X        X               X
                                                         X     X  X        X     X         X
                                                         X     X  XXXXXXX   XXXXX         XXX


           THIS PROGRAM REPLACES ALL PREVIOUS VERSIONS OF HEC-1 KNOWN AS HEC1 (JAN 73), HEC1GS, HEC1DB, AND HEC1KW.

           THE DEFINITIONS OF VARIABLES -RTIMP- AND -RTIOR- HAVE CHANGED FROM THOSE USED WITH THE 1973-STYLE INPUT STRUCTURE.
           THE DEFINITION OF -AMSKK- ON RM-CARD WAS CHANGED WITH REVISIONS DATED 28 SEP 81. THIS IS THE FORTRAN77 VERSION
           NEW OPTIONS: DAMBREAK OUTFLOW SUBMERGENCE , SINGLE EVENT DAMAGE CALCULATION, DSS:WRITE STAGE FREQUENCY,
           DSS:READ TIME SERIES AT DESIRED CALCULATION INTERVAL   LOSS RATE:GREEN AND AMPT INFILTRATION
           KINEMATIC WAVE: NEW FINITE DIFFERENCE ALGORITHM


1                                                           HEC-1 INPUT                                              PAGE  1

          LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

            1           ID       UNIVERSITY OF CALIFORNIA RIVERSIDE
            2           ID       UCR ARROYO LOMR HYDROLOGY
            3           ID       SUB-WATERSHED BIGUP
            4           ID       100-YEAR; 3-HOUR;  5 MINUTE INTERVAL ANALYSIS
            5           ID       JN 10-106309 MD    06/17/2009
                        *DIAGRAM
            6           IT       5       0       0     200
            7           IO       0

            8           KK          SUB-WATERSHED BIGUP
            9           KM       HYDROGRAPH DEVELOPMENT - VALLEY S-GRAPH
           10           BA    0.09
           11           PB    1.31
           12           PI    0.72    0.72    0.44    0.99    0.99    1.41    0.99    1.41    1.41    0.99
           13           PI    1.13    1.41    1.96    1.96    1.96    1.68    2.51    2.65    2.24    2.65
           14           PI    3.48    3.21    2.93    3.07    3.21    4.73    5.84    3.76    8.33    9.02
           15           PI   10.26    7.08    1.68    1.41    1.41    0.36    0.00    0.00    0.00    0.00
           16           LU       0       0       0
           17           KM   UHG FROM VALLEY S-GRAPH
           18           UI    40.2    83.2   131.9   127.4    72.6    45.3    33.3    25.5    19.7    16.1
           19           UI    13.3    11.7    10.2     8.8     7.3     7.0     5.8     5.6     4.9     3.7
           20           UI     3.7     3.7     2.7     1.8     1.8     1.8     1.8     1.8     1.8     1.8
           21           UI      .0
           22           ZZ
1
               SCHEMATIC DIAGRAM OF STREAM NETWORK
 INPUT
  LINE      (V) ROUTING          (--->) DIVERSION OR PUMP FLOW

   NO.      (.) CONNECTOR        (<---) RETURN OF DIVERTED OR PUMPED FLOW

     8

 (***) RUNOFF ALSO COMPUTED AT THIS LOCATION
```

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1*****************************************                                                   ***************************************
 *                                        *                                                  *                                     *
 *   FLOOD HYDROGRAPH PACKAGE  (HEC-1)    *                                                  *   U.S. ARMY CORPS OF ENGINEERS      *
 *             JUN   1998                 *                                                  *   HYDROLOGIC ENGINEERING CENTER     *
 *          VERSION 4.1                   *                                                  *         609 SECOND STREET           *
 *                                        *                                                  *      DAVIS, CALIFORNIA 95616        *
 *  RUN DATE   17JUN09  TIME  16:08:13    *                                                  *         (916) 756-1104              *
 *                                        *                                                  *                                     *
 *****************************************                                                   ***************************************
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                                   UNIVERSITY OF CALIFORNIA RIVERSIDE
                                   UCR ARROYO LOMR HYDROLOGY
                                   SUB-WATERSHED BIGUP
                                   100-YEAR; 3-HOUR;  5 MINUTE INTERVAL ANALYSIS
                                   JN 10-106309 MD    06/17/2009

    7 IO         OUTPUT CONTROL VARIABLES
                       IPRNT          0  PRINT CONTROL
                       IPLOT          0  PLOT CONTROL
                       QSCAL         0.  HYDROGRAPH PLOT SCALE

      IT         HYDROGRAPH TIME DATA
                        NMIN          5  MINUTES IN COMPUTATION INTERVAL
                       IDATE      1   0  STARTING DATE
                       ITIME       0000  STARTING TIME
                          NQ        200  NUMBER OF HYDROGRAPH ORDINATES
                      NDDATE      1   0  ENDING DATE
                      NDTIME       1635  ENDING TIME
                       ICENT         19  CENTURY MARK
```

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                COMPUTATION INTERVAL     .08 HOURS
                     TOTAL TIME BASE   16.58 HOURS

       ENGLISH UNITS
            DRAINAGE AREA          SQUARE MILES
            PRECIPITATION DEPTH    INCHES
            LENGTH, ELEVATION      FEET
            FLOW                   CUBIC FEET PER SECOND
            STORAGE VOLUME         ACRE-FEET
            SURFACE AREA           ACRES
            TEMPERATURE            DEGREES FAHRENHEIT


*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** 


          **************
          *            *
   8 KK   *            *       SUB-WATERSHED BIGUP
          *            *
          **************

                             HYDROGRAPH DEVELOPMENT - VALLEY S-GRAPH
                        UHG FROM VALLEY S-GRAPH

            SUBBASIN RUNOFF DATA

  10 BA       SUBBASIN CHARACTERISTICS
                    TAREA        .09  SUBBASIN AREA

              PRECIPITATION DATA

  11 PB             STORM       1.31  BASIN TOTAL PRECIPITATION

  12 PI         INCREMENTAL PRECIPITATION PATTERN
                    .72       .72       .44       .99       .99      1.41       .99      1.41      1.41       .99
                   1.13      1.41      1.96      1.96      1.96      1.68      2.51      2.65      2.24      2.65
                   3.48      3.21      2.93      3.07      3.21      4.73      5.84      3.76      8.33      9.02
                  10.26      7.08      1.68      1.41      1.41       .36

  16 LU       UNIFORM LOSS RATE
                    STRTL        .00  INITIAL LOSS
                    CNSTL        .00  UNIFORM LOSS RATE
                    RTIMP        .00  PERCENT IMPERVIOUS AREA

  16 UI       INPUT UNITGRAPH,  30 ORDINATES,  VOLUME = 1.00
                   40.2      83.2     131.9     127.4      72.6      45.3      33.3      25.5      19.7      16.1
                   13.3      11.7      10.2       8.8       7.3       7.0       5.8       5.6       4.9       3.7
                    3.7       3.7       2.7       1.8       1.8       1.8       1.8       1.8       1.8       1.8

                                                                  ***

***************************************************************************************************************************************

                                                            HYDROGRAPH AT STATION

***************************************************************************************************************************************
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DA	MON	HRMN	ORD	RAIN	LOSS	EXCESS	COMP Q	*	DA	MON	HRMN	ORD	RAIN	LOSS	EXCESS	COMP Q
1		0000	1	.00	.00	.00	0.	*	1		0820	101	.00	.00	.00	0.
1		0005	2	.01	.00	.01	0.	*	1		0825	102	.00	.00	.00	0.
1		0010	3	.01	.00	.01	1.	*	1		0830	103	.00	.00	.00	0.
1		0015	4	.01	.00	.01	2.	*	1		0835	104	.00	.00	.00	0.
1		0020	5	.01	.00	.01	3.	*	1		0840	105	.00	.00	.00	0.
1		0025	6	.01	.00	.01	4.	*	1		0845	106	.00	.00	.00	0.
1		0030	7	.02	.00	.02	5.	*	1		0850	107	.00	.00	.00	0.
1		0035	8	.01	.00	.01	7.	*	1		0855	108	.00	.00	.00	0.
1		0040	9	.02	.00	.02	8.	*	1		0900	109	.00	.00	.00	0.
1		0045	10	.02	.00	.02	8.	*	1		0905	110	.00	.00	.00	0.
1		0050	11	.01	.00	.01	9.	*	1		0910	111	.00	.00	.00	0.
1		0055	12	.01	.00	.01	9.	*	1		0915	112	.00	.00	.00	0.
1		0100	13	.02	.00	.02	9.	*	1		0920	113	.00	.00	.00	0.
1		0105	14	.03	.00	.03	10.	*	1		0925	114	.00	.00	.00	0.
1		0110	15	.03	.00	.03	11.	*	1		0930	115	.00	.00	.00	0.
1		0115	16	.03	.00	.03	13.	*	1		0935	116	.00	.00	.00	0.
1		0120	17	.02	.00	.02	14.	*	1		0940	117	.00	.00	.00	0.
1		0125	18	.03	.00	.03	15.	*	1		0945	118	.00	.00	.00	0.
1		0130	19	.03	.00	.03	16.	*	1		0950	119	.00	.00	.00	0.
1		0135	20	.03	.00	.03	17.	*	1		0955	120	.00	.00	.00	0.
1		0140	21	.03	.00	.03	19.	*	1		1000	121	.00	.00	.00	0.
1		0145	22	.05	.00	.05	20.	*	1		1005	122	.00	.00	.00	0.
1		0150	23	.04	.00	.04	21.	*	1		1010	123	.00	.00	.00	0.
1		0155	24	.04	.00	.04	23.	*	1		1015	124	.00	.00	.00	0.
1		0200	25	.04	.00	.04	24.	*	1		1020	125	.00	.00	.00	0.
1		0205	26	.04	.00	.04	25.	*	1		1025	126	.00	.00	.00	0.
1		0210	27	.06	.00	.06	26.	*	1		1030	127	.00	.00	.00	0.
1		0215	28	.08	.00	.08	29.	*	1		1035	128	.00	.00	.00	0.
1		0220	29	.05	.00	.05	32.	*	1		1040	129	.00	.00	.00	0.
1		0225	30	.11	.00	.11	38.	*	1		1045	130	.00	.00	.00	0.
1		0230	31	.12	.00	.12	43.	*	1		1050	131	.00	.00	.00	0.
1		0235	32	.13	.00	.13	51.	*	1		1055	132	.00	.00	.00	0.
1		0240	33	.09	.00	.09	59.	*	1		1100	133	.00	.00	.00	0.
1		0245	34	.02	.00	.02	60.	*	1		1105	134	.00	.00	.00	0.
1		0250	35	.02	.00	.02	54.	*	1		1110	135	.00	.00	.00	0.
1		0255	36	.02	.00	.02	43.	*	1		1115	136	.00	.00	.00	0.
1		0300	37	.00	.00	.00	33.	*	1		1120	137	.00	.00	.00	0.
1		0305	38	.00	.00	.00	26.	*	1		1125	138	.00	.00	.00	0.
1		0310	39	.00	.00	.00	20.	*	1		1130	139	.00	.00	.00	0.
1		0315	40	.00	.00	.00	16.	*	1		1135	140	.00	.00	.00	0.
1		0320	41	.00	.00	.00	13.	*	1		1140	141	.00	.00	.00	0.
1		0325	42	.00	.00	.00	10.	*	1		1145	142	.00	.00	.00	0.
1		0330	43	.00	.00	.00	9.	*	1		1150	143	.00	.00	.00	0.
1		0335	44	.00	.00	.00	8.	*	1		1155	144	.00	.00	.00	0.
1		0340	45	.00	.00	.00	7.	*	1		1200	145	.00	.00	.00	0.
1		0345	46	.00	.00	.00	6.	*	1		1205	146	.00	.00	.00	0.

1	0350	47	.00	.00	.00	5.	*	1	1210	147	.00	.00	.00	0.
1	0355	48	.00	.00	.00	4.	*	1	1215	148	.00	.00	.00	0.
1	0400	49	.00	.00	.00	4.	*	1	1220	149	.00	.00	.00	0.
1	0405	50	.00	.00	.00	3.	*	1	1225	150	.00	.00	.00	0.
1	0410	51	.00	.00	.00	3.	*	1	1230	151	.00	.00	.00	0.
1	0415	52	.00	.00	.00	3.	*	1	1235	152	.00	.00	.00	0.
1	0420	53	.00	.00	.00	2.	*	1	1240	153	.00	.00	.00	0.
1	0425	54	.00	.00	.00	2.	*	1	1245	154	.00	.00	.00	0.
1	0430	55	.00	.00	.00	2.	*	1	1250	155	.00	.00	.00	0.
1	0435	56	.00	.00	.00	1.	*	1	1255	156	.00	.00	.00	0.
1	0440	57	.00	.00	.00	1.	*	1	1300	157	.00	.00	.00	0.
1	0445	58	.00	.00	.00	1.	*	1	1305	158	.00	.00	.00	0.
1	0450	59	.00	.00	.00	1.	*	1	1310	159	.00	.00	.00	0.
1	0455	60	.00	.00	.00	1.	*	1	1315	160	.00	.00	.00	0.
1	0500	61	.00	.00	.00	1.	*	1	1320	161	.00	.00	.00	0.
1	0505	62	.00	.00	.00	0.	*	1	1325	162	.00	.00	.00	0.
1	0510	63	.00	.00	.00	0.	*	1	1330	163	.00	.00	.00	0.
1	0515	64	.00	.00	.00	0.	*	1	1335	164	.00	.00	.00	0.
1	0520	65	.00	.00	.00	0.	*	1	1340	165	.00	.00	.00	0.
1	0525	66	.00	.00	.00	0.	*	1	1345	166	.00	.00	.00	0.
1	0530	67	.00	.00	.00	0.	*	1	1350	167	.00	.00	.00	0.
1	0535	68	.00	.00	.00	0.	*	1	1355	168	.00	.00	.00	0.
1	0540	69	.00	.00	.00	0.	*	1	1400	169	.00	.00	.00	0.
1	0545	70	.00	.00	.00	0.	*	1	1405	170	.00	.00	.00	0.
1	0550	71	.00	.00	.00	0.	*	1	1410	171	.00	.00	.00	0.
1	0555	72	.00	.00	.00	0.	*	1	1415	172	.00	.00	.00	0.
1	0600	73	.00	.00	.00	0.	*	1	1420	173	.00	.00	.00	0.
1	0605	74	.00	.00	.00	0.	*	1	1425	174	.00	.00	.00	0.
1	0610	75	.00	.00	.00	0.	*	1	1430	175	.00	.00	.00	0.
1	0615	76	.00	.00	.00	0.	*	1	1435	176	.00	.00	.00	0.
1	0620	77	.00	.00	.00	0.	*	1	1440	177	.00	.00	.00	0.
1	0625	78	.00	.00	.00	0.	*	1	1445	178	.00	.00	.00	0.
1	0630	79	.00	.00	.00	0.	*	1	1450	179	.00	.00	.00	0.
1	0635	80	.00	.00	.00	0.	*	1	1455	180	.00	.00	.00	0.
1	0640	81	.00	.00	.00	0.	*	1	1500	181	.00	.00	.00	0.
1	0645	82	.00	.00	.00	0.	*	1	1505	182	.00	.00	.00	0.
1	0650	83	.00	.00	.00	0.	*	1	1510	183	.00	.00	.00	0.
1	0655	84	.00	.00	.00	0.	*	1	1515	184	.00	.00	.00	0.
1	0700	85	.00	.00	.00	0.	*	1	1520	185	.00	.00	.00	0.
1	0705	86	.00	.00	.00	0.	*	1	1525	186	.00	.00	.00	0.
1	0710	87	.00	.00	.00	0.	*	1	1530	187	.00	.00	.00	0.
1	0715	88	.00	.00	.00	0.	*	1	1535	188	.00	.00	.00	0.
1	0720	89	.00	.00	.00	0.	*	1	1540	189	.00	.00	.00	0.
1	0725	90	.00	.00	.00	0.	*	1	1545	190	.00	.00	.00	0.
1	0730	91	.00	.00	.00	0.	*	1	1550	191	.00	.00	.00	0.
1	0735	92	.00	.00	.00	0.	*	1	1555	192	.00	.00	.00	0.
1	0740	93	.00	.00	.00	0.	*	1	1600	193	.00	.00	.00	0.
1	0745	94	.00	.00	.00	0.	*	1	1605	194	.00	.00	.00	0.
1	0750	95	.00	.00	.00	0.	*	1	1610	195	.00	.00	.00	0.
1	0755	96	.00	.00	.00	0.	*	1	1615	196	.00	.00	.00	0.
1	0800	97	.00	.00	.00	0.	*	1	1620	197	.00	.00	.00	0.
1	0805	98	.00	.00	.00	0.	*	1	1625	198	.00	.00	.00	0.
1	0810	99	.00	.00	.00	0.	*	1	1630	199	.00	.00	.00	0.
1	0815	100	.00	.00	.00	0.	*	1	1635	200	.00	.00	.00	0.

```
                                                                *
*******************************************************************************************************************************

    TOTAL RAINFALL =    1.31, TOTAL LOSS =     .00, TOTAL EXCESS =    1.31

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                        6-HR       24-HR       72-HR     16.58-HR
+   (CFS)       (HR)
                          (CFS)
+      60.      2.75                     13.          5.          5.           5.
                       (INCHES)        1.309       1.309       1.309        1.309
                        (AC-FT)           6.          6.          6.           6.

                        CUMULATIVE AREA =     .09 SQ MI
```

```
1
                                                   RUNOFF SUMMARY
                                            FLOW IN CUBIC FEET PER SECOND
                                         TIME IN HOURS,  AREA IN SQUARE MILES

                                               PEAK    TIME OF     AVERAGE FLOW FOR MAXIMUM PERIOD        BASIN     MAXIMUM     TIME OF
          OPERATION       STATION              FLOW     PEAK                                               AREA      STAGE     MAX STAGE
+                                                                   6-HOUR      24-HOUR      72-HOUR

          HYDROGRAPH AT
+                                                60.    2.75          13.          5.           5.          .09
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*** NORMAL END OF HEC-1 ***

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1*****************************************                                                            ***************************************
 *                                       *                                                            *                                     *
 *   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *                                                            *   U.S. ARMY CORPS OF ENGINEERS      *
 *              JUN   1998               *                                                            *   HYDROLOGIC ENGINEERING CENTER     *
 *           VERSION 4.1                 *                                                            *         609 SECOND STREET           *
 *                                       *                                                            *      DAVIS, CALIFORNIA 95616        *
 *  RUN DATE   17JUN09  TIME  16:08:07   *                                                            *         (916) 756-1104              *
 *                                       *                                                            *                                     *
 *****************************************                                                            ***************************************



                                                          X     X  XXXXXXX   XXXXX         X
                                                          X     X  X        X     X       XX
                                                          X     X  X        X              X
                                                          XXXXXXX  XXXX     X       XXXXX  X
                                                          X     X  X        X              X
                                                          X     X  X        X     X        X
                                                          X     X  XXXXXXX   XXXXX        XXX


            THIS PROGRAM REPLACES ALL PREVIOUS VERSIONS OF HEC-1 KNOWN AS HEC1 (JAN 73), HEC1GS, HEC1DB, AND HEC1KW.

            THE DEFINITIONS OF VARIABLES -RTIMP- AND -RTIOR- HAVE CHANGED FROM THOSE USED WITH THE 1973-STYLE INPUT STRUCTURE.
            THE DEFINITION OF -AMSKK- ON RM-CARD WAS CHANGED WITH REVISIONS DATED 28 SEP 81. THIS IS THE FORTRAN77 VERSION
            NEW OPTIONS: DAMBREAK OUTFLOW SUBMERGENCE , SINGLE EVENT DAMAGE CALCULATION, DSS:WRITE STAGE FREQUENCY,
            DSS:READ TIME SERIES AT DESIRED CALCULATION INTERVAL   LOSS RATE:GREEN AND AMPT INFILTRATION
            KINEMATIC WAVE: NEW FINITE DIFFERENCE ALGORITHM


1                                                    HEC-1 INPUT                                                    PAGE  1

          LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

            1           ID       UNIVERSITY OF CALIFORNIA RIVERSIDE
            2           ID       UCR ARROYO LOMR HYDROLOGY
            3           ID       SUB-WATERSHED BIGDS
            4           ID       100-YEAR; 3-HOUR;  5 MINUTE INTERVAL ANALYSIS
            5           ID       JN 10-106309 MD    06/17/2009
                        *DIAGRAM
            6           IT       5       0       0     200
            7           IO       0

            8           KK          SUB-WATERSHED BIGDS
            9           KM       HYDROGRAPH DEVELOPMENT - VALLEY S-GRAPH
           10           BA    0.05
           11           PB    1.14
           12           PI    0.40    0.40    0.08    0.72    0.72    1.19    0.72    1.19    1.19    0.72
           13           PI    0.88    1.19    1.83    1.83    1.83    1.51    2.47    2.62    2.15    2.62
           14           PI    3.58    3.26    2.94    3.10    3.26    5.01    6.28    3.90    9.15    9.94
           15           PI   11.37    7.71    1.51    1.19    1.19    0.34    0.00    0.00    0.00    0.00
           16           LU       0       0       0
           17           KM   UHG FROM VALLEY S-GRAPH
           18           UI    39.0    93.6    95.9    44.6    26.6    18.5    13.2    10.2     8.5     6.8
           19           UI     5.6     4.7     4.4     2.9     2.9     2.3     1.5     1.5     1.5     1.5
           20           UI     1.3
           21           ZZ
1
               SCHEMATIC DIAGRAM OF STREAM NETWORK
 INPUT
  LINE     (V) ROUTING         (--->) DIVERSION OR PUMP FLOW

   NO.     (.) CONNECTOR       (<---) RETURN OF DIVERTED OR PUMPED FLOW

    8

 (***) RUNOFF ALSO COMPUTED AT THIS LOCATION
```

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1*****************************************                                                            ***************************************
 *                                       *                                                            *                                     *
 *   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *                                                            *   U.S. ARMY CORPS OF ENGINEERS      *
 *              JUN   1998               *                                                            *   HYDROLOGIC ENGINEERING CENTER     *
 *           VERSION 4.1                 *                                                            *         609 SECOND STREET           *
 *                                       *                                                            *      DAVIS, CALIFORNIA 95616        *
 *  RUN DATE   17JUN09  TIME  16:08:07   *                                                            *         (916) 756-1104              *
 *                                       *                                                            *                                     *
 *****************************************                                                            ***************************************
```

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                              UNIVERSITY OF CALIFORNIA RIVERSIDE
                              UCR ARROYO LOMR HYDROLOGY
                              SUB-WATERSHED BIGDS
                              100-YEAR; 3-HOUR;  5 MINUTE INTERVAL ANALYSIS
                              JN 10-106309 MD    06/17/2009

   7 IO         OUTPUT CONTROL VARIABLES
                      IPRNT          0  PRINT CONTROL
                      IPLOT          0  PLOT CONTROL
                      QSCAL         0.  HYDROGRAPH PLOT SCALE

     IT         HYDROGRAPH TIME DATA
                       NMIN          5  MINUTES IN COMPUTATION INTERVAL
                      IDATE      1   0  STARTING DATE
                      ITIME       0000  STARTING TIME
                         NQ        200  NUMBER OF HYDROGRAPH ORDINATES
                     NDDATE      1   0  ENDING DATE
                     NDTIME       1635  ENDING TIME
                      ICENT         19  CENTURY MARK

                  COMPUTATION INTERVAL     .08 HOURS
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                  TOTAL TIME BASE   16.58 HOURS

          ENGLISH UNITS
               DRAINAGE AREA          SQUARE MILES
               PRECIPITATION DEPTH    INCHES
               LENGTH, ELEVATION      FEET
               FLOW                   CUBIC FEET PER SECOND
               STORAGE VOLUME         ACRE-FEET
               SURFACE AREA           ACRES
               TEMPERATURE            DEGREES FAHRENHEIT


*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***


            **************
            *            *
   8 KK     *            *        SUB-WATERSHED BIGDS
            *            *
            **************
                                HYDROGRAPH DEVELOPMENT - VALLEY S-GRAPH
                           UHG FROM VALLEY S-GRAPH

               SUBBASIN RUNOFF DATA

  10 BA          SUBBASIN CHARACTERISTICS
                       TAREA         .05  SUBBASIN AREA

                 PRECIPITATION DATA

  11 PB                STORM        1.14  BASIN TOTAL PRECIPITATION

  12 PI            INCREMENTAL PRECIPITATION PATTERN
                      .40       .40       .08       .72       .72      1.19       .72      1.19      1.19       .72
                      .88      1.19      1.83      1.83      1.83      1.51      2.47      2.62      2.15      2.62
                     3.58      3.26      2.94      3.10      3.26      5.01      6.28      3.90      9.15      9.94
                    11.37      7.71      1.51      1.19      1.19       .34

  16 LU          UNIFORM LOSS RATE
                       STRTL         .00  INITIAL LOSS
                       CNSTL         .00  UNIFORM LOSS RATE
                       RTIMP         .00  PERCENT IMPERVIOUS AREA

  16 UI          INPUT UNITGRAPH,  21 ORDINATES,  VOLUME = 1.00
                     39.0      93.6      95.9      44.6      26.6      18.5      13.2      10.2       8.5       6.8
                      5.6       4.7       4.4       2.9       2.9       2.3       1.5       1.5       1.5       1.5
                      1.3

                                                                ***

*****************************************************************************************************************************************

                                                          HYDROGRAPH AT STATION

*****************************************************************************************************************************************
```

DA	MON HRMN	ORD	RAIN	LOSS	EXCESS	COMP Q	*	DA	MON HRMN	ORD	RAIN	LOSS	EXCESS	COMP Q
1	0000	1	.00	.00	.00	0.	*	1	0820	101	.00	.00	.00	0.
1	0005	2	.00	.00	.00	0.	*	1	0825	102	.00	.00	.00	0.
1	0010	3	.00	.00	.00	1.	*	1	0830	103	.00	.00	.00	0.
1	0015	4	.00	.00	.00	1.	*	1	0835	104	.00	.00	.00	0.
1	0020	5	.01	.00	.01	1.	*	1	0840	105	.00	.00	.00	0.
1	0025	6	.01	.00	.01	2.	*	1	0845	106	.00	.00	.00	0.
1	0030	7	.01	.00	.01	2.	*	1	0850	107	.00	.00	.00	0.
1	0035	8	.01	.00	.01	3.	*	1	0855	108	.00	.00	.00	0.
1	0040	9	.01	.00	.01	3.	*	1	0900	109	.00	.00	.00	0.
1	0045	10	.01	.00	.01	4.	*	1	0905	110	.00	.00	.00	0.
1	0050	11	.01	.00	.01	4.	*	1	0910	111	.00	.00	.00	0.
1	0055	12	.01	.00	.01	4.	*	1	0915	112	.00	.00	.00	0.
1	0100	13	.01	.00	.01	4.	*	1	0920	113	.00	.00	.00	0.
1	0105	14	.02	.00	.02	4.	*	1	0925	114	.00	.00	.00	0.
1	0110	15	.02	.00	.02	6.	*	1	0930	115	.00	.00	.00	0.
1	0115	16	.02	.00	.02	6.	*	1	0935	116	.00	.00	.00	0.
1	0120	17	.02	.00	.02	7.	*	1	0940	117	.00	.00	.00	0.
1	0125	18	.03	.00	.03	7.	*	1	0945	118	.00	.00	.00	0.
1	0130	19	.03	.00	.03	8.	*	1	0950	119	.00	.00	.00	0.
1	0135	20	.02	.00	.02	9.	*	1	0955	120	.00	.00	.00	0.
1	0140	21	.03	.00	.03	9.	*	1	1000	121	.00	.00	.00	0.
1	0145	22	.04	.00	.04	10.	*	1	1005	122	.00	.00	.00	0.
1	0150	23	.04	.00	.04	12.	*	1	1010	123	.00	.00	.00	0.
1	0155	24	.03	.00	.03	12.	*	1	1015	124	.00	.00	.00	0.
1	0200	25	.04	.00	.04	13.	*	1	1020	125	.00	.00	.00	0.
1	0205	26	.04	.00	.04	13.	*	1	1025	126	.00	.00	.00	0.
1	0210	27	.06	.00	.06	14.	*	1	1030	127	.00	.00	.00	0.
1	0215	28	.07	.00	.07	17.	*	1	1035	128	.00	.00	.00	0.
1	0220	29	.04	.00	.04	19.	*	1	1040	129	.00	.00	.00	0.
1	0225	30	.10	.00	.10	21.	*	1	1045	130	.00	.00	.00	0.
1	0230	31	.11	.00	.11	26.	*	1	1050	131	.00	.00	.00	0.
1	0235	32	.13	.00	.13	33.	*	1	1055	132	.00	.00	.00	0.
1	0240	33	.09	.00	.09	36.	*	1	1100	133	.00	.00	.00	0.
1	0245	34	.02	.00	.02	33.	*	1	1105	134	.00	.00	.00	0.
1	0250	35	.01	.00	.01	24.	*	1	1110	135	.00	.00	.00	0.
1	0255	36	.01	.00	.01	17.	*	1	1115	136	.00	.00	.00	0.
1	0300	37	.00	.00	.00	13.	*	1	1120	137	.00	.00	.00	0.
1	0305	38	.00	.00	.00	10.	*	1	1125	138	.00	.00	.00	0.
1	0310	39	.00	.00	.00	7.	*	1	1130	139	.00	.00	.00	0.
1	0315	40	.00	.00	.00	5.	*	1	1135	140	.00	.00	.00	0.
1	0320	41	.00	.00	.00	4.	*	1	1140	141	.00	.00	.00	0.
1	0325	42	.00	.00	.00	4.	*	1	1145	142	.00	.00	.00	0.
1	0330	43	.00	.00	.00	3.	*	1	1150	143	.00	.00	.00	0.
1	0335	44	.00	.00	.00	2.	*	1	1155	144	.00	.00	.00	0.
1	0340	45	.00	.00	.00	2.	*	1	1200	145	.00	.00	.00	0.
1	0345	46	.00	.00	.00	2.	*	1	1205	146	.00	.00	.00	0.
1	0350	47	.00	.00	.00	1.	*	1	1210	147	.00	.00	.00	0.

1	0355	48	.00	.00	.00	1.	*	1	1215	148	.00	.00	.00	0.
1	0400	49	.00	.00	.00	1.	*	1	1220	149	.00	.00	.00	0.
1	0405	50	.00	.00	.00	1.	*	1	1225	150	.00	.00	.00	0.
1	0410	51	.00	.00	.00	1.	*	1	1230	151	.00	.00	.00	0.
1	0415	52	.00	.00	.00	0.	*	1	1235	152	.00	.00	.00	0.
1	0420	53	.00	.00	.00	0.	*	1	1240	153	.00	.00	.00	0.
1	0425	54	.00	.00	.00	0.	*	1	1245	154	.00	.00	.00	0.
1	0430	55	.00	.00	.00	0.	*	1	1250	155	.00	.00	.00	0.
1	0435	56	.00	.00	.00	0.	*	1	1255	156	.00	.00	.00	0.
1	0440	57	.00	.00	.00	0.	*	1	1300	157	.00	.00	.00	0.
1	0445	58	.00	.00	.00	0.	*	1	1305	158	.00	.00	.00	0.
1	0450	59	.00	.00	.00	0.	*	1	1310	159	.00	.00	.00	0.
1	0455	60	.00	.00	.00	0.	*	1	1315	160	.00	.00	.00	0.
1	0500	61	.00	.00	.00	0.	*	1	1320	161	.00	.00	.00	0.
1	0505	62	.00	.00	.00	0.	*	1	1325	162	.00	.00	.00	0.
1	0510	63	.00	.00	.00	0.	*	1	1330	163	.00	.00	.00	0.
1	0515	64	.00	.00	.00	0.	*	1	1335	164	.00	.00	.00	0.
1	0520	65	.00	.00	.00	0.	*	1	1340	165	.00	.00	.00	0.
1	0525	66	.00	.00	.00	0.	*	1	1345	166	.00	.00	.00	0.
1	0530	67	.00	.00	.00	0.	*	1	1350	167	.00	.00	.00	0.
1	0535	68	.00	.00	.00	0.	*	1	1355	168	.00	.00	.00	0.
1	0540	69	.00	.00	.00	0.	*	1	1400	169	.00	.00	.00	0.
1	0545	70	.00	.00	.00	0.	*	1	1405	170	.00	.00	.00	0.
1	0550	71	.00	.00	.00	0.	*	1	1410	171	.00	.00	.00	0.
1	0555	72	.00	.00	.00	0.	*	1	1415	172	.00	.00	.00	0.
1	0600	73	.00	.00	.00	0.	*	1	1420	173	.00	.00	.00	0.
1	0605	74	.00	.00	.00	0.	*	1	1425	174	.00	.00	.00	0.
1	0610	75	.00	.00	.00	0.	*	1	1430	175	.00	.00	.00	0.
1	0615	76	.00	.00	.00	0.	*	1	1435	176	.00	.00	.00	0.
1	0620	77	.00	.00	.00	0.	*	1	1440	177	.00	.00	.00	0.
1	0625	78	.00	.00	.00	0.	*	1	1445	178	.00	.00	.00	0.
1	0630	79	.00	.00	.00	0.	*	1	1450	179	.00	.00	.00	0.
1	0635	80	.00	.00	.00	0.	*	1	1455	180	.00	.00	.00	0.
1	0640	81	.00	.00	.00	0.	*	1	1500	181	.00	.00	.00	0.
1	0645	82	.00	.00	.00	0.	*	1	1505	182	.00	.00	.00	0.
1	0650	83	.00	.00	.00	0.	*	1	1510	183	.00	.00	.00	0.
1	0655	84	.00	.00	.00	0.	*	1	1515	184	.00	.00	.00	0.
1	0700	85	.00	.00	.00	0.	*	1	1520	185	.00	.00	.00	0.
1	0705	86	.00	.00	.00	0.	*	1	1525	186	.00	.00	.00	0.
1	0710	87	.00	.00	.00	0.	*	1	1530	187	.00	.00	.00	0.
1	0715	88	.00	.00	.00	0.	*	1	1535	188	.00	.00	.00	0.
1	0720	89	.00	.00	.00	0.	*	1	1540	189	.00	.00	.00	0.
1	0725	90	.00	.00	.00	0.	*	1	1545	190	.00	.00	.00	0.
1	0730	91	.00	.00	.00	0.	*	1	1550	191	.00	.00	.00	0.
1	0735	92	.00	.00	.00	0.	*	1	1555	192	.00	.00	.00	0.
1	0740	93	.00	.00	.00	0.	*	1	1600	193	.00	.00	.00	0.
1	0745	94	.00	.00	.00	0.	*	1	1605	194	.00	.00	.00	0.
1	0750	95	.00	.00	.00	0.	*	1	1610	195	.00	.00	.00	0.
1	0755	96	.00	.00	.00	0.	*	1	1615	196	.00	.00	.00	0.
1	0800	97	.00	.00	.00	0.	*	1	1620	197	.00	.00	.00	0.
1	0805	98	.00	.00	.00	0.	*	1	1625	198	.00	.00	.00	0.
1	0810	99	.00	.00	.00	0.	*	1	1630	199	.00	.00	.00	0.
1	0815	100	.00	.00	.00	0.	*	1	1635	200	.00	.00	.00	0.
							*							

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*******************************************************************************************************************************

    TOTAL RAINFALL =    1.14, TOTAL LOSS =     .00, TOTAL EXCESS =    1.14

  PEAK FLOW     TIME                             MAXIMUM AVERAGE FLOW
                                      6-HR       24-HR       72-HR      16.58-HR
+   (CFS)       (HR)
                           (CFS)
+     36.       2.67                   6.          2.          2.           2.
                        (INCHES)     1.139       1.139       1.139        1.139
                         (AC-FT)       3.          3.          3.           3.

                         CUMULATIVE AREA =     .05 SQ MI

1
                                                               RUNOFF SUMMARY
                                                       FLOW IN CUBIC FEET PER SECOND
                                                    TIME IN HOURS,  AREA IN SQUARE MILES

                                            PEAK    TIME OF     AVERAGE FLOW FOR MAXIMUM PERIOD       BASIN      MAXIMUM     TIME OF
         OPERATION       STATION            FLOW     PEAK                                              AREA       STAGE     MAX STAGE
+                                                               6-HOUR      24-HOUR      72-HOUR

         HYDROGRAPH AT
+                                             36.    2.67          6.          2.           2.        .05

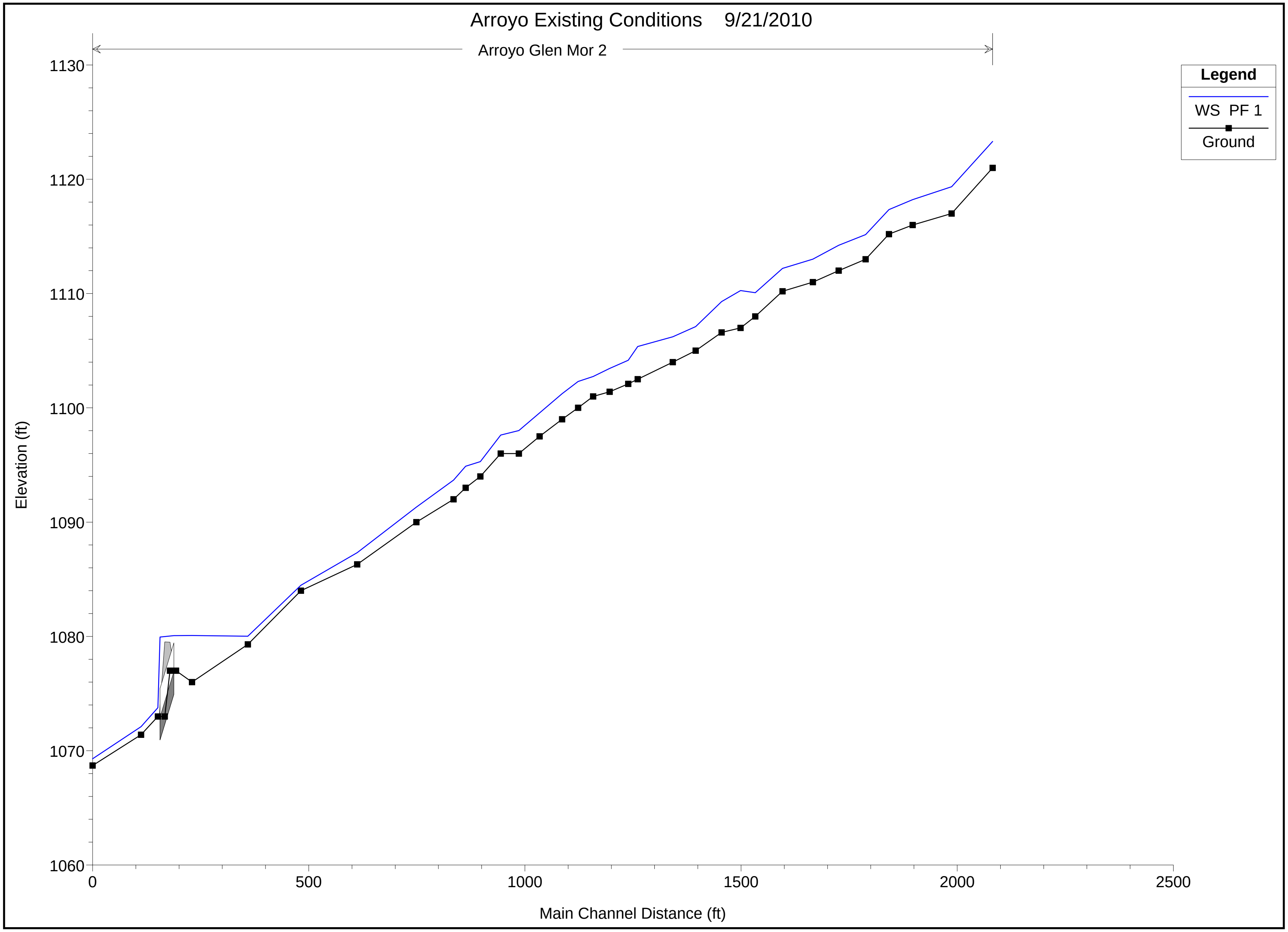

 *** NORMAL END OF HEC-1 ***
```

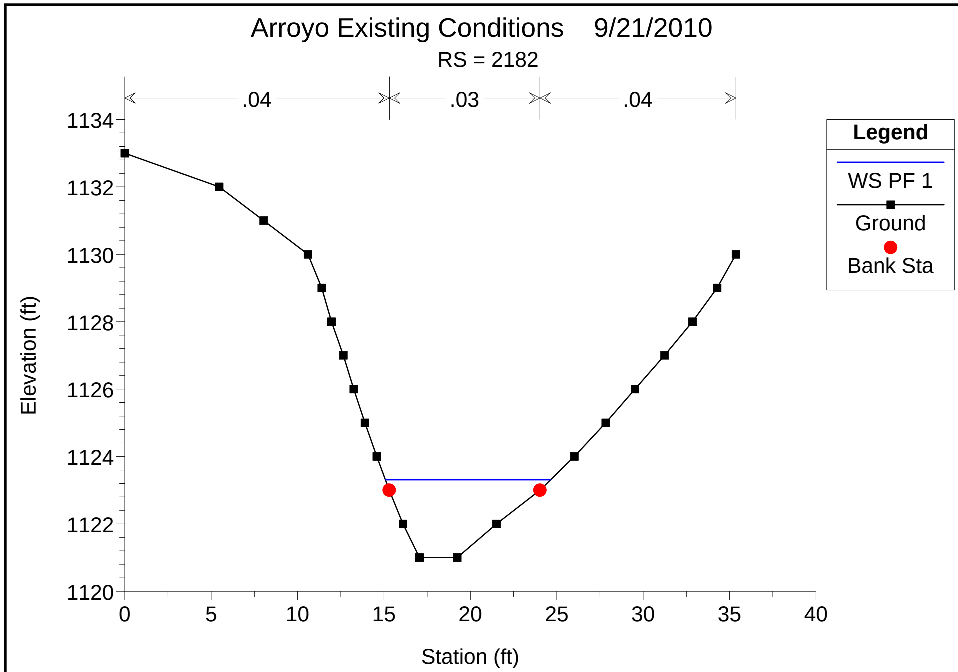
ATTACHMENT C

HEC-RAS Output

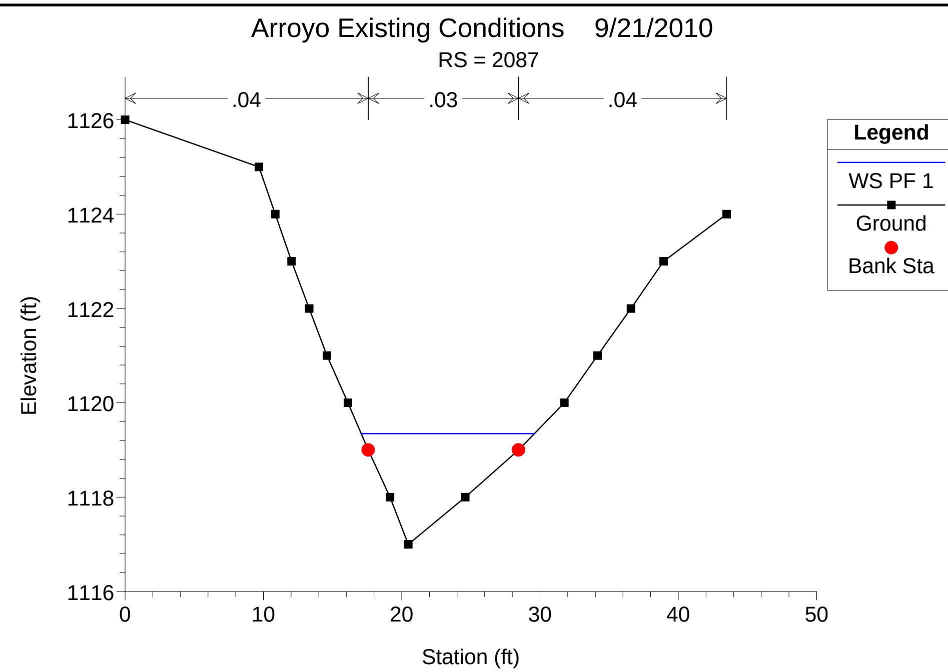
HEC-RAS Plan: exist River: Arroyo Reach: Glen Mor 2 Profile: PF 1

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Glen Mor 2	100	PF 1	96.00	1068.70	1069.29	1069.28	1069.49	0.015009	3.53	28.25	71.29	0.93
Glen Mor 2	212	PF 1	96.00	1071.40	1072.11	1072.11	1072.31	0.018118	3.66	26.34	66.59	1.01
Glen Mor 2	251	PF 1	96.00	1073.00	1073.76	1073.76	1074.11	0.015019	4.78	20.09	28.47	1.00
Glen Mor 2	272		Culvert									
Glen Mor 2	293	PF 1	96.00	1077.00	1080.07	1077.53	1080.08	0.000028	0.53	206.32	97.08	0.05
Glen Mor 2	330	PF 1	96.00	1076.00	1080.08		1080.08	0.000006	0.29	358.52	111.35	0.03
Glen Mor 2	459	PF 1	96.00	1079.30	1080.02		1080.11	0.004850	2.42	39.65	67.46	0.56
Glen Mor 2	582	PF 1	96.00	1084.00	1084.48	1084.48	1084.69	0.008514	3.69	25.98	61.00	1.00
Glen Mor 2	712	PF 1	96.00	1086.30	1087.33	1087.33	1087.63	0.015998	4.43	21.67	36.37	1.01
Glen Mor 2	849	PF 1	96.00	1090.00	1091.31	1091.31	1091.73	0.012830	5.19	19.28	26.80	0.96
Glen Mor 2	935	PF 1	96.00	1092.00	1093.68	1093.68	1094.14	0.010129	5.85	20.21	23.67	0.89
Glen Mor 2	963	PF 1	96.00	1093.00	1094.89	1094.89	1095.34	0.007911	5.93	22.61	28.74	0.78
Glen Mor 2	997	PF 1	96.00	1094.00	1095.30	1095.30	1095.80	0.012916	5.69	17.07	17.99	0.99
Glen Mor 2	1044	PF 1	96.00	1096.00	1097.62	1097.62	1097.95	0.006976	5.07	28.22	52.22	0.75
Glen Mor 2	1086	PF 1	96.00	1096.00	1098.01	1098.01	1098.49	0.009051	6.39	22.83	30.17	0.86
Glen Mor 2	1134	PF 1	96.00	1097.50	1099.56	1099.56	1099.81	0.005207	4.67	34.65	65.79	0.64
Glen Mor 2	1186	PF 1	96.00	1099.00	1101.24	1101.24	1101.57	0.005818	4.86	27.09	55.04	0.67
Glen Mor 2	1223	PF 1	96.00	1100.00	1102.31	1102.31	1102.63	0.006871	4.95	27.23	47.98	0.70
Glen Mor 2	1258	PF 1	96.00	1101.00	1102.74	1102.74	1103.53	0.012530	7.14	13.81	9.48	0.99
Glen Mor 2	1296	PF 1	96.00	1101.40	1103.45	1103.21	1103.92	0.007473	5.52	17.70	12.77	0.78
Glen Mor 2	1339	PF 1	96.00	1102.10	1104.16	1104.16	1104.89	0.013734	6.85	14.04	10.13	1.01
Glen Mor 2	1361	PF 1	96.00	1102.50	1105.37	1105.37	1106.03	0.009707	6.62	16.48	19.69	0.80
Glen Mor 2	1442	PF 1	96.00	1104.00	1106.22		1106.31	0.001298	2.36	40.78	26.74	0.33
Glen Mor 2	1495	PF 1	96.00	1105.00	1107.11	1107.11	1107.73	0.014397	6.34	15.16	12.69	1.01
Glen Mor 2	1555	PF 1	96.00	1106.60	1109.29	1109.29	1110.19	0.014435	7.62	12.79	8.22	0.98
Glen Mor 2	1599	PF 1	96.00	1107.00	1110.26		1110.36	0.000770	2.57	38.50	15.49	0.27
Glen Mor 2	1633	PF 1	96.00	1108.00	1110.08	1110.08	1110.66	0.008504	6.54	18.29	16.54	0.84
Glen Mor 2	1696	PF 1	96.00	1110.20	1112.20	1112.20	1112.86	0.013104	6.48	14.92	12.61	1.00
Glen Mor 2	1766	PF 1	96.00	1111.00	1113.02		1113.12	0.001297	2.64	39.05	26.96	0.34
Glen Mor 2	1826	PF 1	96.00	1112.00	1114.23	1114.23	1115.03	0.010441	7.43	14.66	10.36	0.92
Glen Mor 2	1888	PF 1	96.00	1113.00	1115.16		1115.41	0.003057	4.05	25.23	15.91	0.52
Glen Mor 2	1942	PF 1	96.00	1115.20	1117.35	1117.35	1118.07	0.012895	6.80	14.26	10.70	0.99
Glen Mor 2	1997	PF 1	96.00	1116.00	1118.22		1118.61	0.006916	5.00	19.25	14.36	0.74
Glen Mor 2	2087	PF 1	96.00	1117.00	1119.35	1119.35	1120.01	0.012920	6.53	14.94	12.53	0.99
Glen Mor 2	2182	PF 1	96.00	1121.00	1123.31	1123.31	1124.08	0.013643	7.07	13.69	9.56	1.00

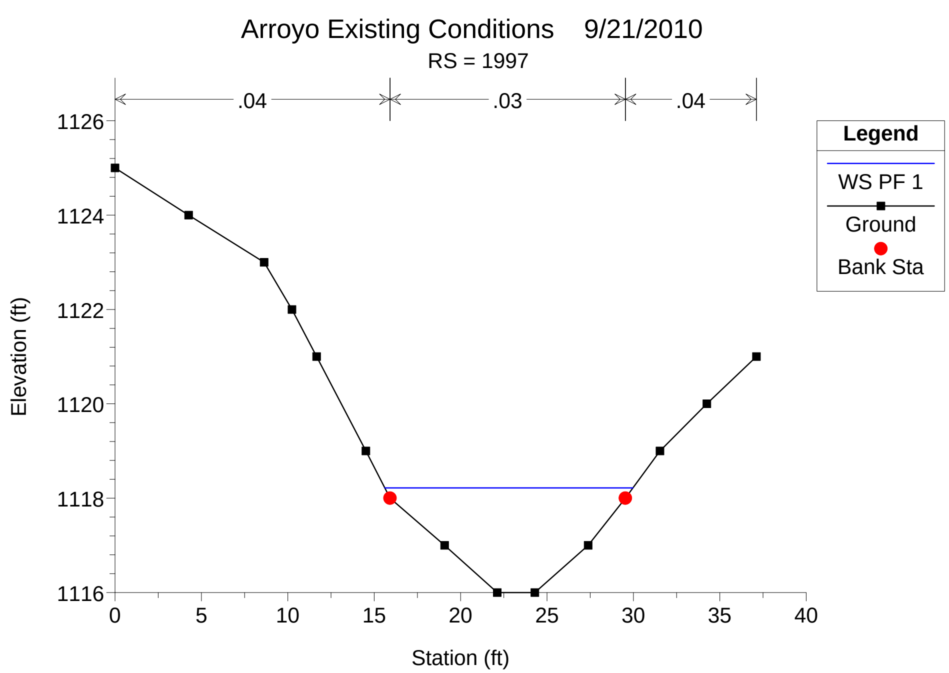

Arroyo Existing Conditions 9/21/2010
Arroyo Glen Mor 2
Legend
WS PF 1
Ground
Elevation (ft)
1130
1120
1110
1100
1090
1080
1070
1060
0
500
1000
1500
2000
2500
Main Channel Distance (ft)



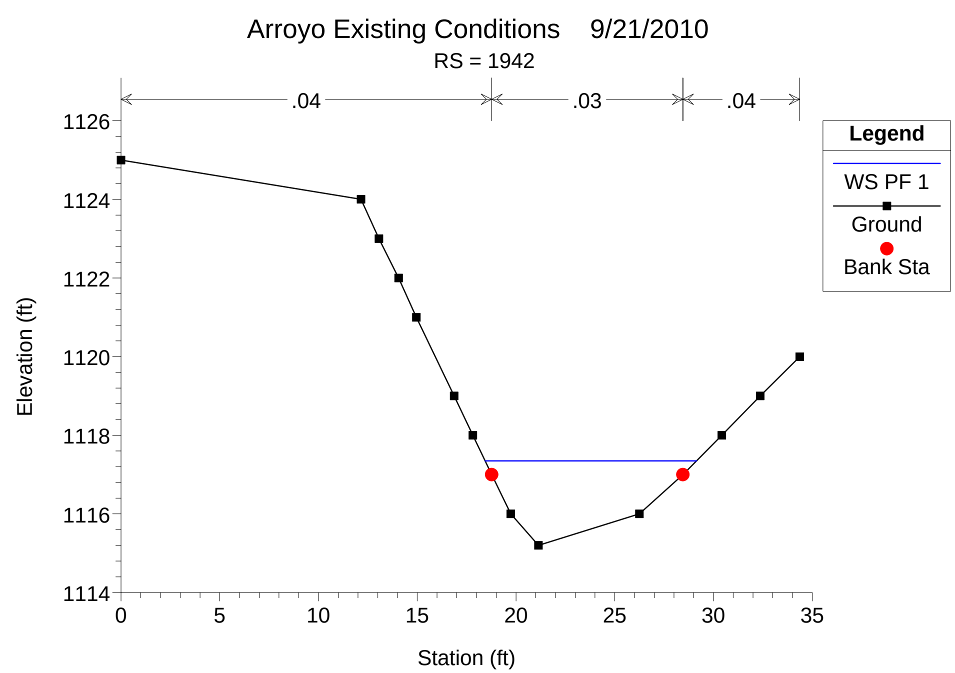
Arroyo Existing Conditions 9/21/2010
RS = 2182
.04
.03
.04
Legend
WS PF 1
Ground
Bank Sta
Elevation (ft)
1120
1122
1124
1126
1128
1130
1132
1134
Station (ft)
0
5
10
15
20
25
30
35
40



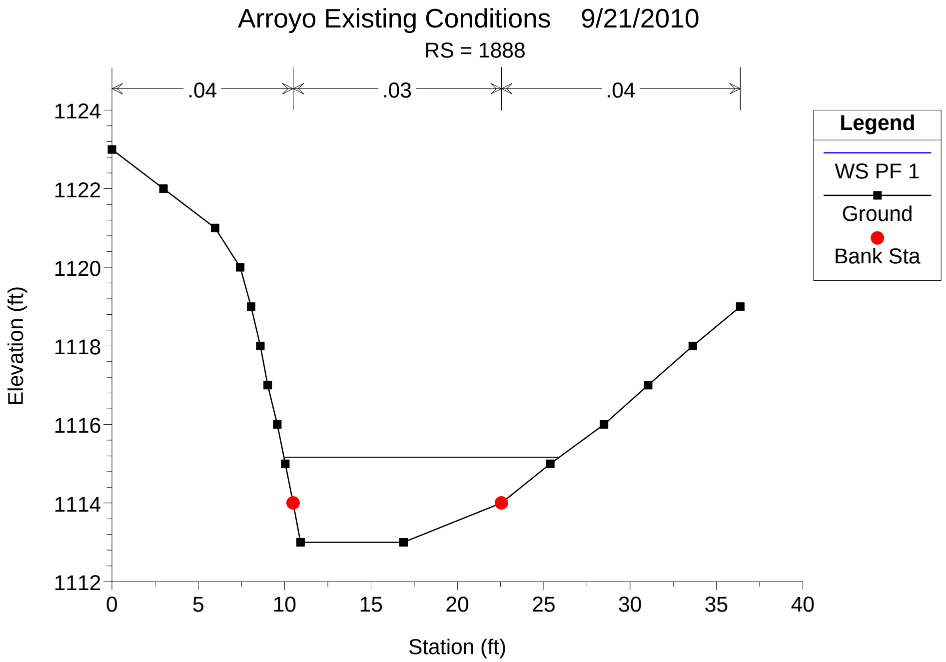
Arroyo Existing Conditions 9/21/2010
RS = 2087
.04
.03
.04
Legend
WS PF 1
Ground
Bank Sta
Elevation (ft)
1116
1118
1120
1122
1124
1126
Station (ft)
0
10
20
30
40
50



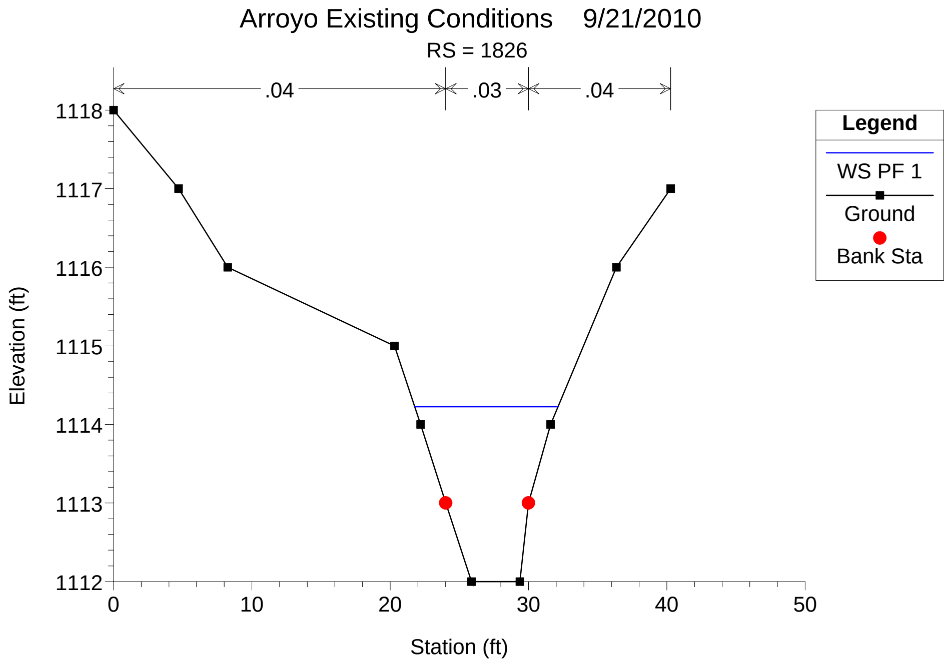
Arroyo Existing Conditions 9/21/2010
RS = 1997
.04
.03
.04
Legend
WS PF 1
Ground
Bank Sta
Elevation (ft)
1116
1118
1120
1122
1124
1126
Station (ft)
0
5
10
15
20
25
30
35
40



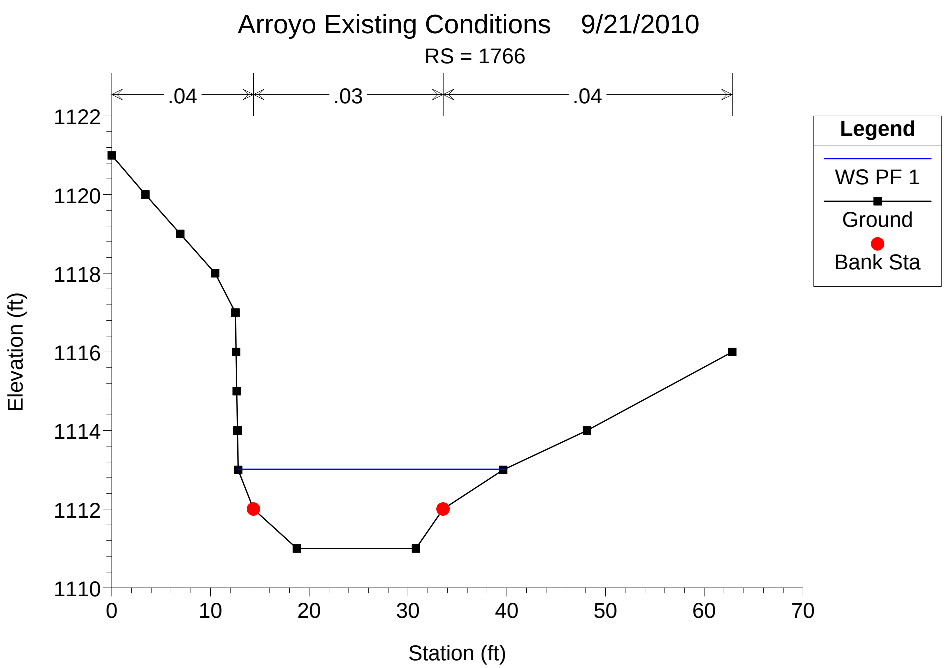
Arroyo Existing Conditions 9/21/2010
RS = 1942
.04
.03
.04
Legend
WS PF 1
Ground
Bank Sta
Elevation (ft)
1114
1116
1118
1120
1122
1124
1126
Station (ft)
0
5
10
15
20
25
30
35



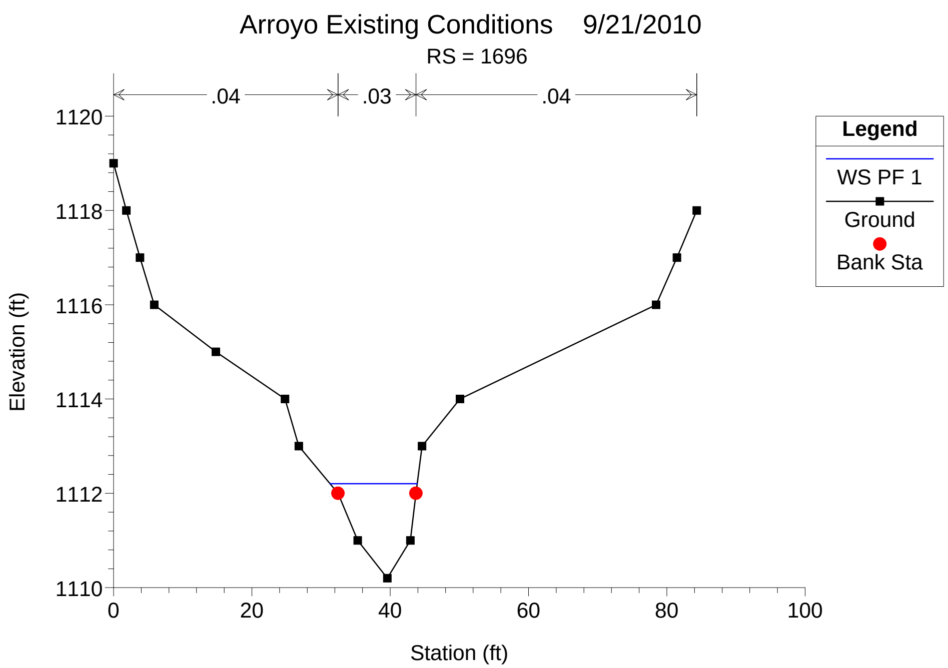
Arroyo Existing Conditions 9/21/2010
RS = 1888
.04
.03
.04
Legend
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
1112
1114
1116
1118
1120
1122
1124
0
5
10
15
20
25
30
35
40



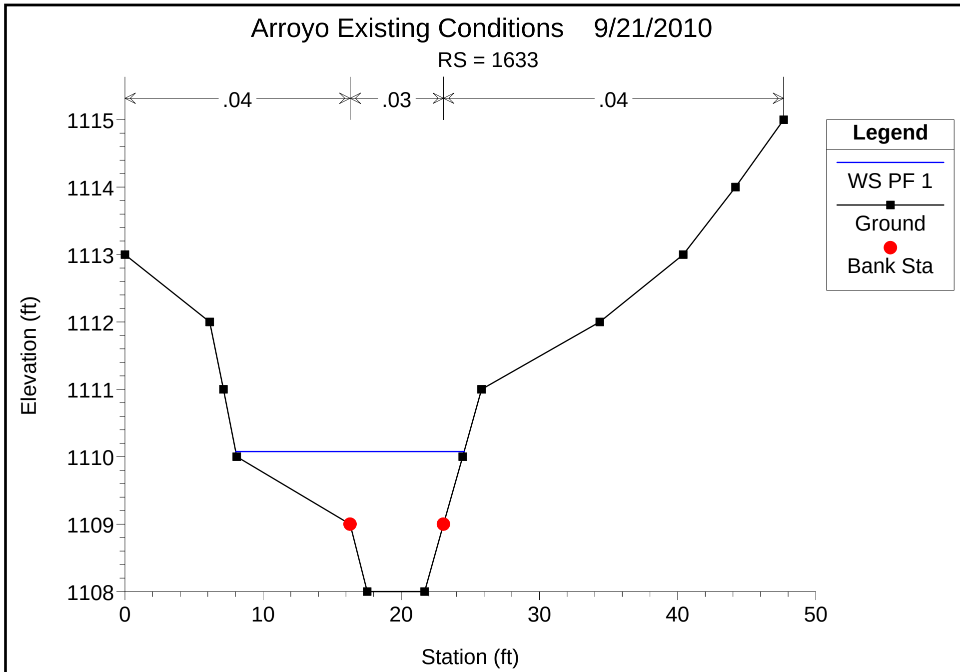
Arroyo Existing Conditions 9/21/2010
RS = 1826
.04
.03
.04
Legend
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
1112
1113
1114
1115
1116
1117
1118
0
10
20
30
40
50

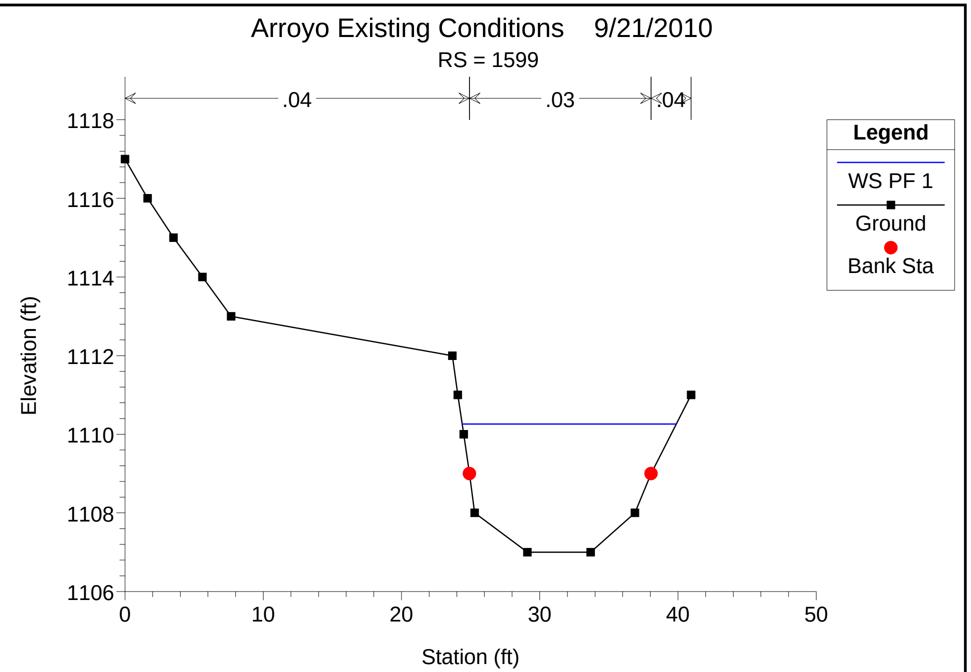


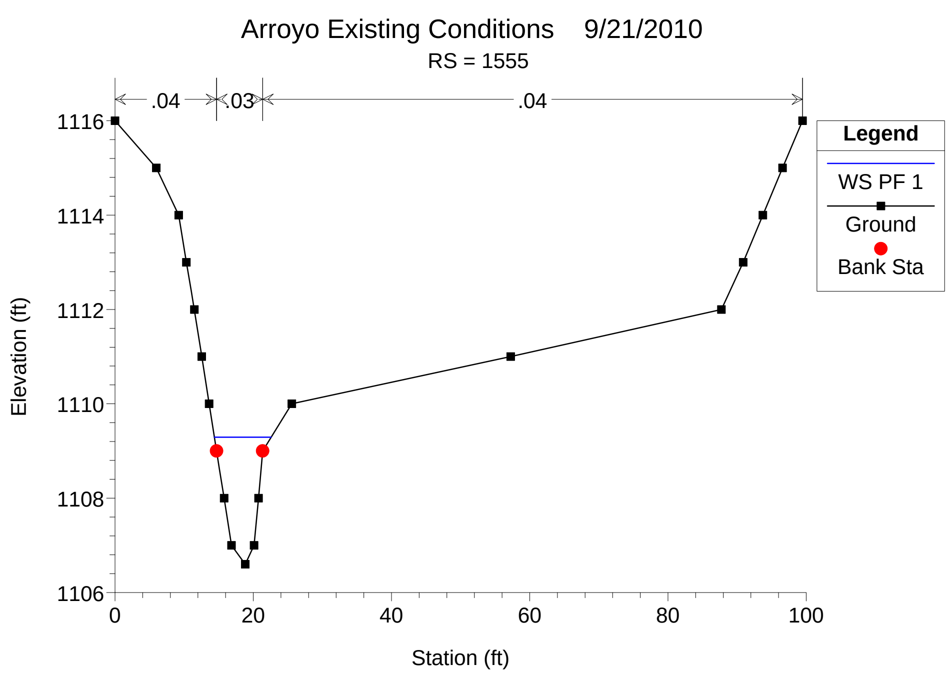
Arroyo Existing Conditions 9/21/2010
RS = 1766
.04
.03
.04
Legend
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
1110
1112
1114
1116
1118
1120
1122
0
10
20
30
40
50
60
70

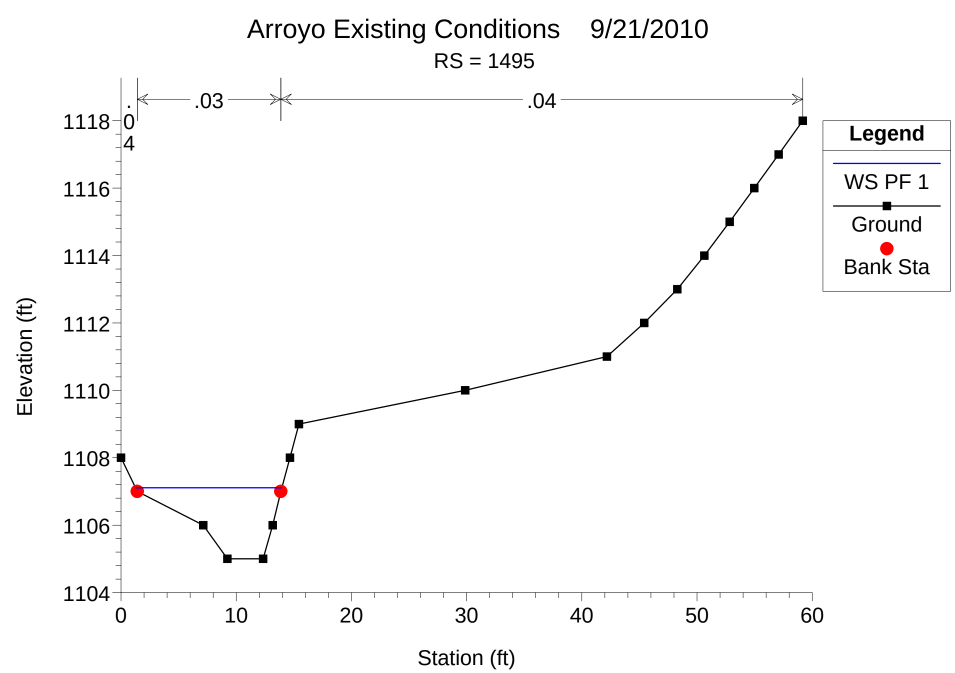


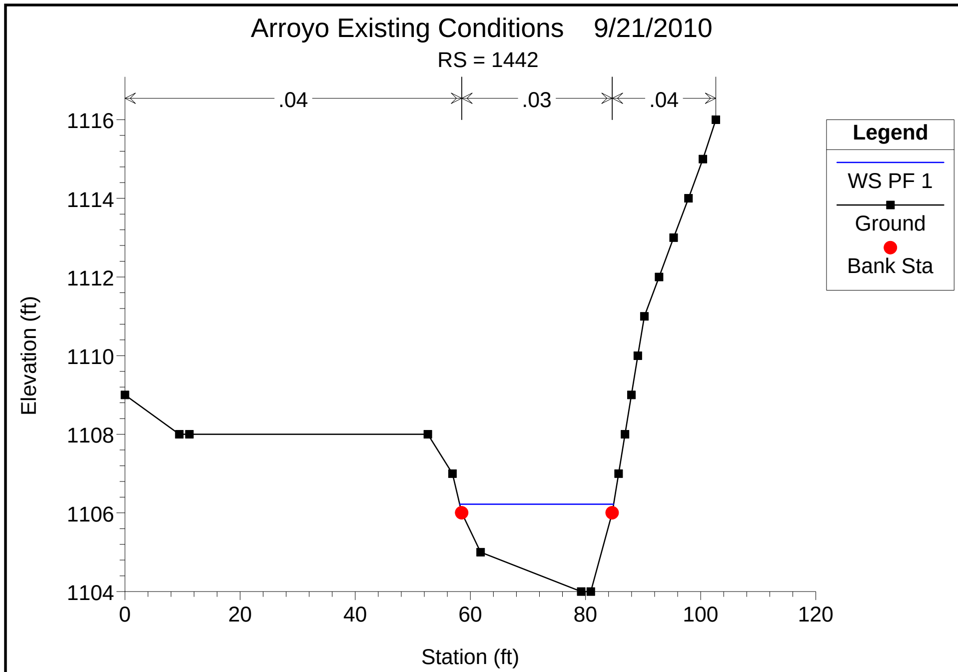
Arroyo Existing Conditions 9/21/2010
RS = 1696
.04
.03
.04
Legend
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
1110
1112
1114
1116
1118
1120
0
20
40
60
80
100

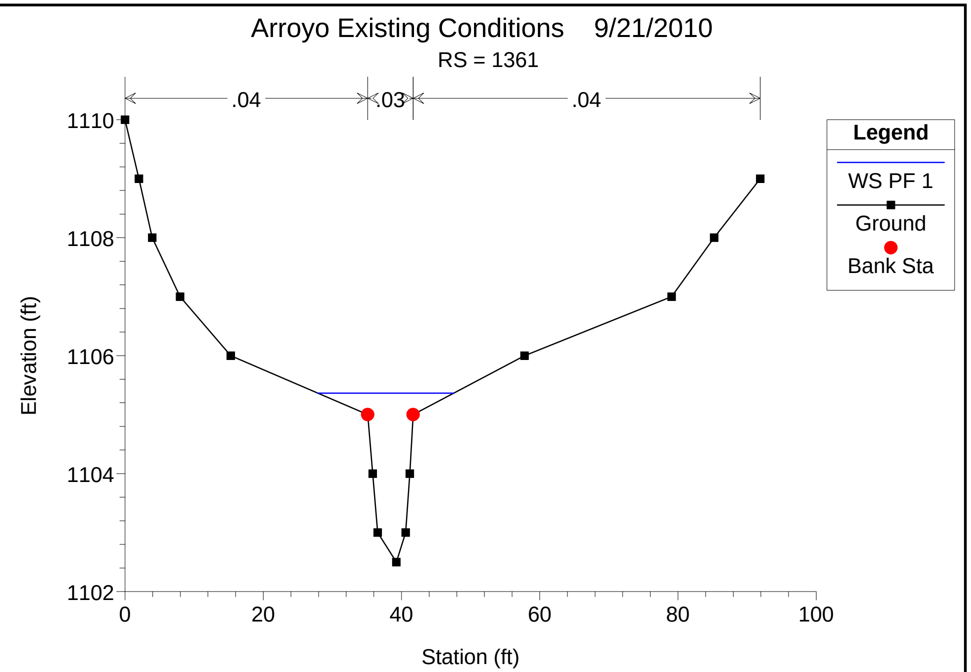

Arroyo Existing Conditions 9/21/2010
RS = 1633
.04
.03
.04
Elevation (ft)
1108
1109
1110
1111
1112
1113
1114
1115
Station (ft)
0
10
20
30
40
50
Legend
WS PF 1
Ground
Bank Sta

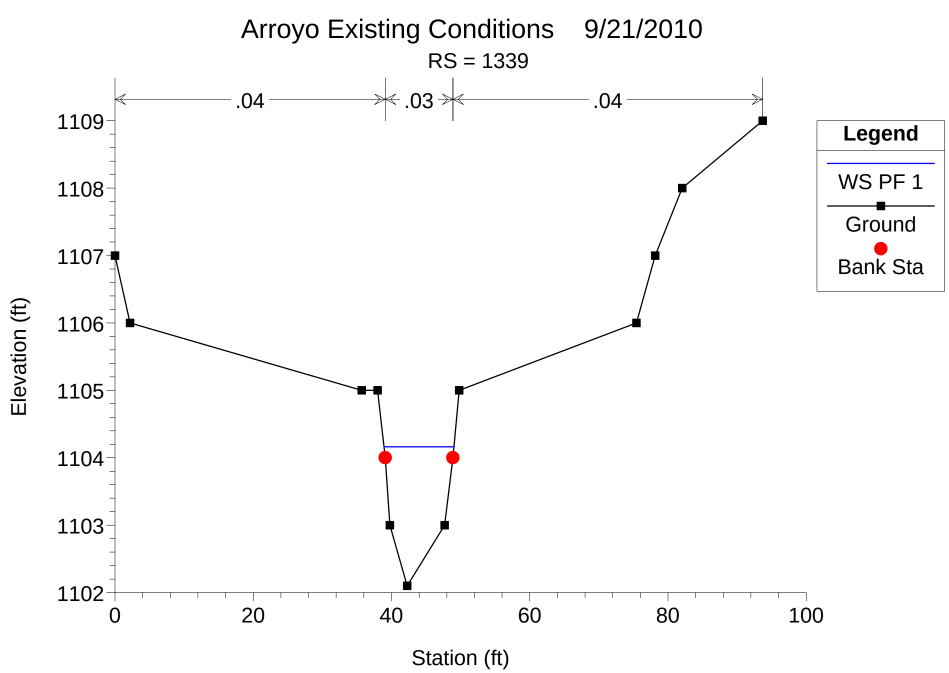

Arroyo Existing Conditions 9/21/2010
RS = 1599
.04
.03
.04
Elevation (ft)
1106
1108
1110
1112
1114
1116
1118
Station (ft)
0
10
20
30
40
50
Legend
WS PF 1
Ground
Bank Sta

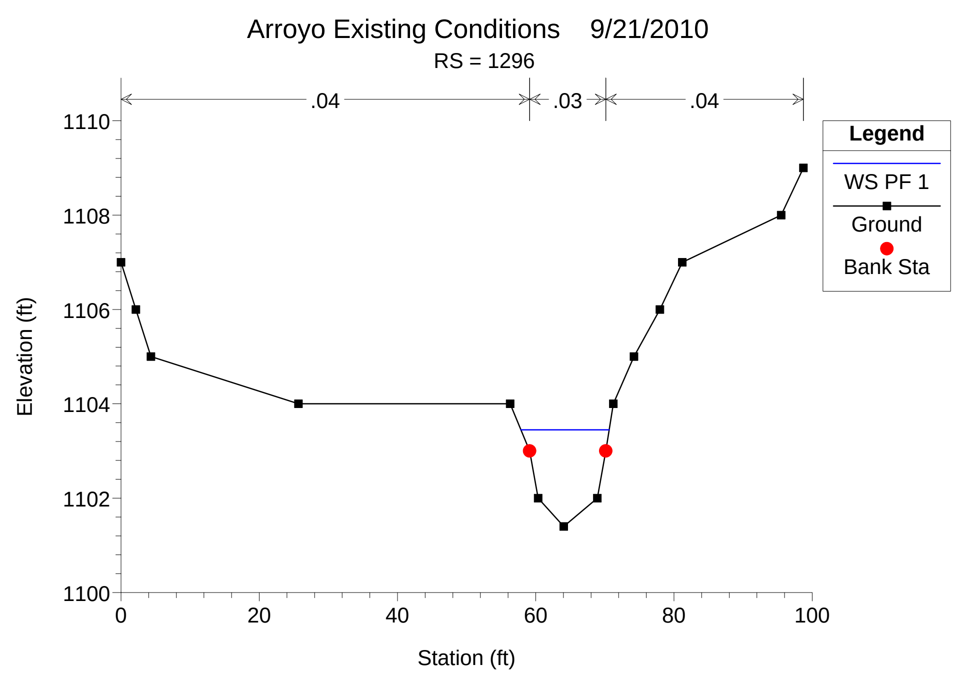

Arroyo Existing Conditions 9/21/2010
RS = 1555
.04
.03
.04
Elevation (ft)
1106
1108
1110
1112
1114
1116
Station (ft)
0
20
40
60
80
100
Legend
WS PF 1
Ground
Bank Sta

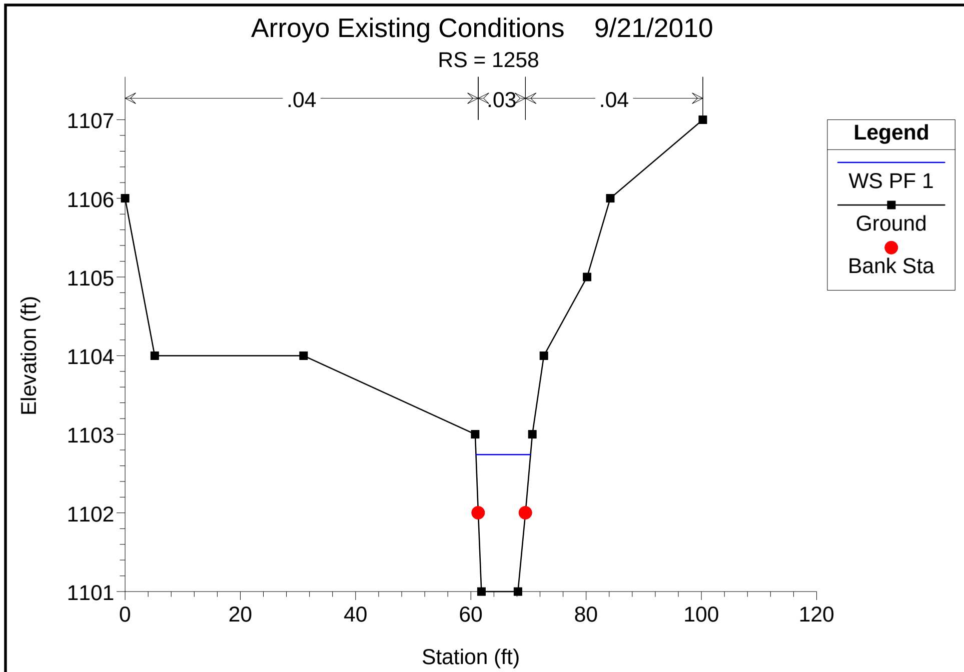

Arroyo Existing Conditions 9/21/2010
RS = 1495
.04
.03
.04
Elevation (ft)
1104
1106
1108
1110
1112
1114
1116
1118
Station (ft)
0
10
20
30
40
50
60
Legend
WS PF 1
Ground
Bank Sta

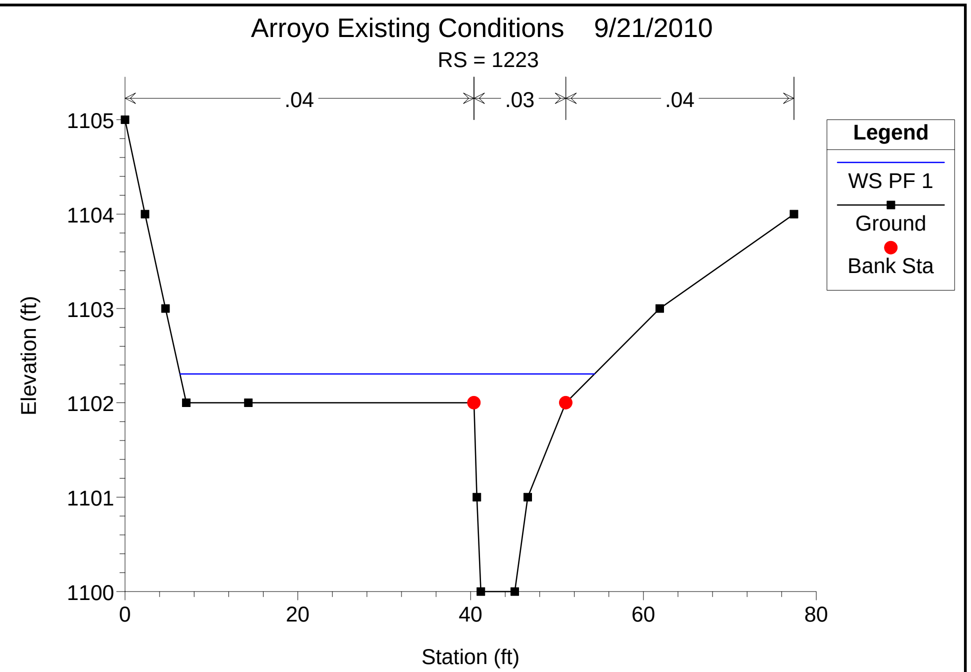

Arroyo Existing Conditions 9/21/2010
RS = 1442
.04
.03
.04
Legend
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
1104
1106
1108
1110
1112
1114
1116
0
20
40
60
80
100
120

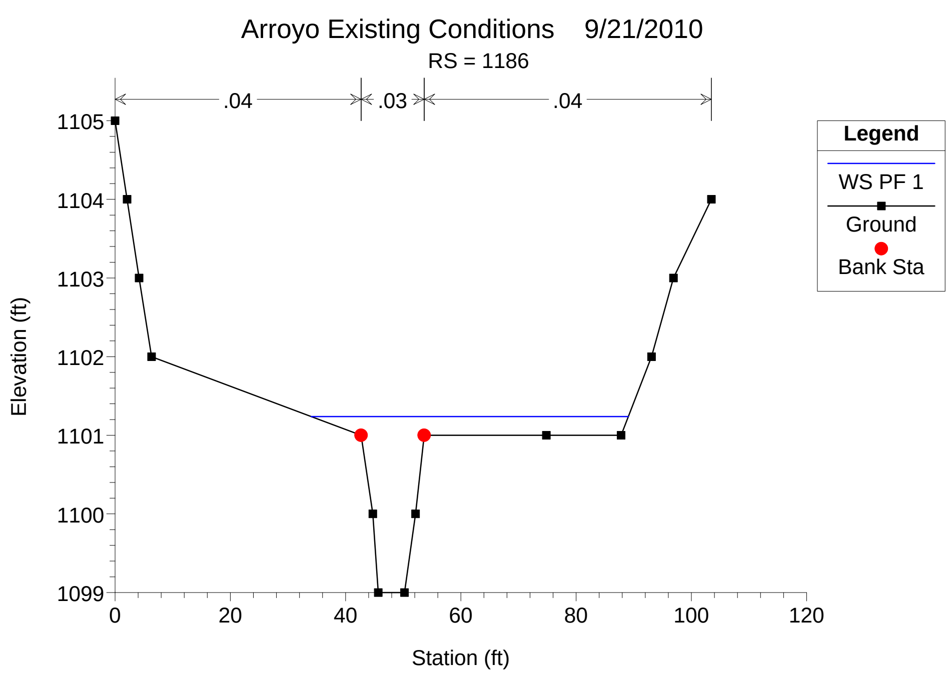

Arroyo Existing Conditions 9/21/2010
RS = 1361
.04
.03
.04
Legend
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
1102
1104
1106
1108
1110
0
20
40
60
80
100

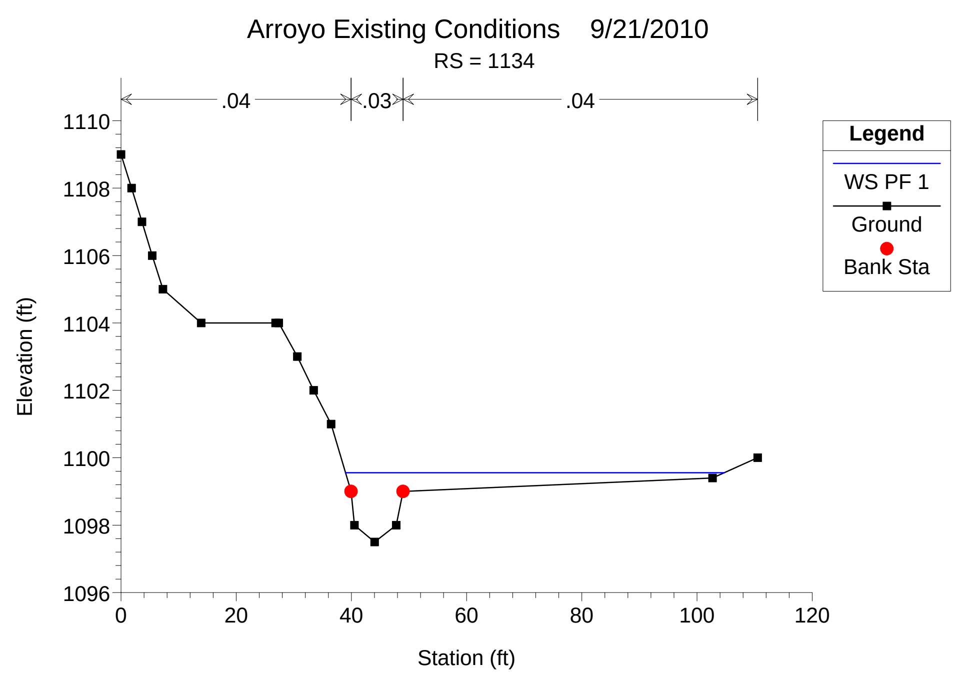

Arroyo Existing Conditions 9/21/2010
RS = 1339
.04
.03
.04
Legend
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
1102
1103
1104
1105
1106
1107
1108
1109
0
20
40
60
80
100

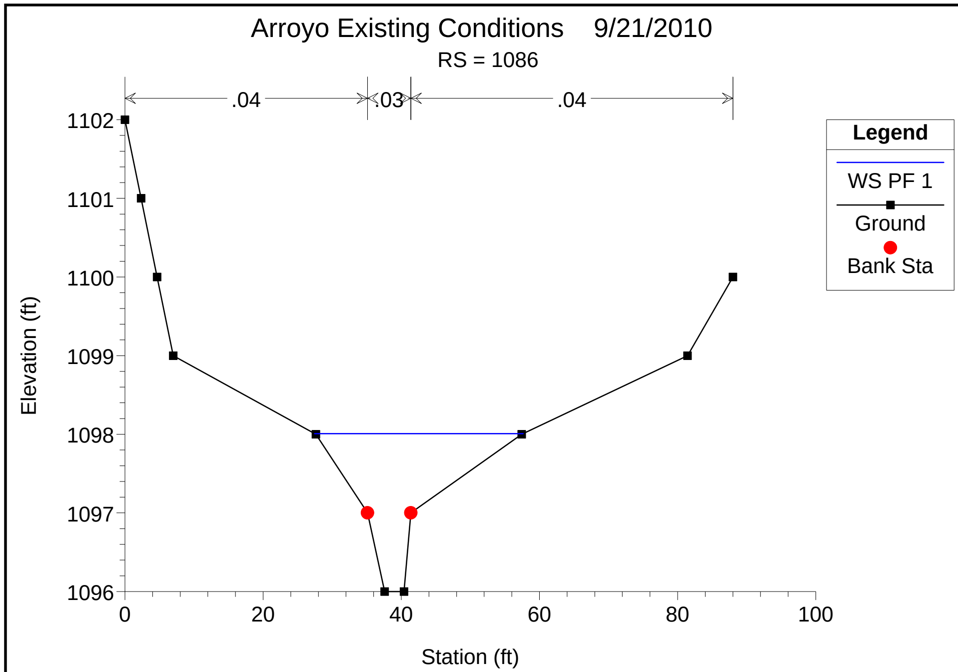

Arroyo Existing Conditions 9/21/2010
RS = 1296
.04
.03
.04
Legend
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
1100
1102
1104
1106
1108
1110
0
20
40
60
80
100

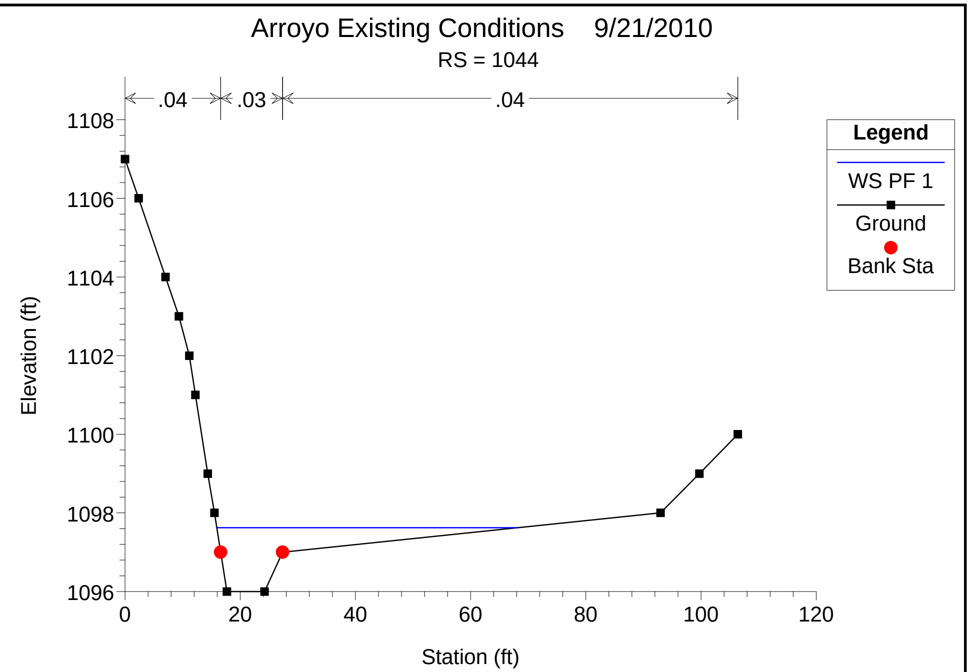

Arroyo Existing Conditions 9/21/2010
RS = 1258
.04
.03
.04
Legend
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)

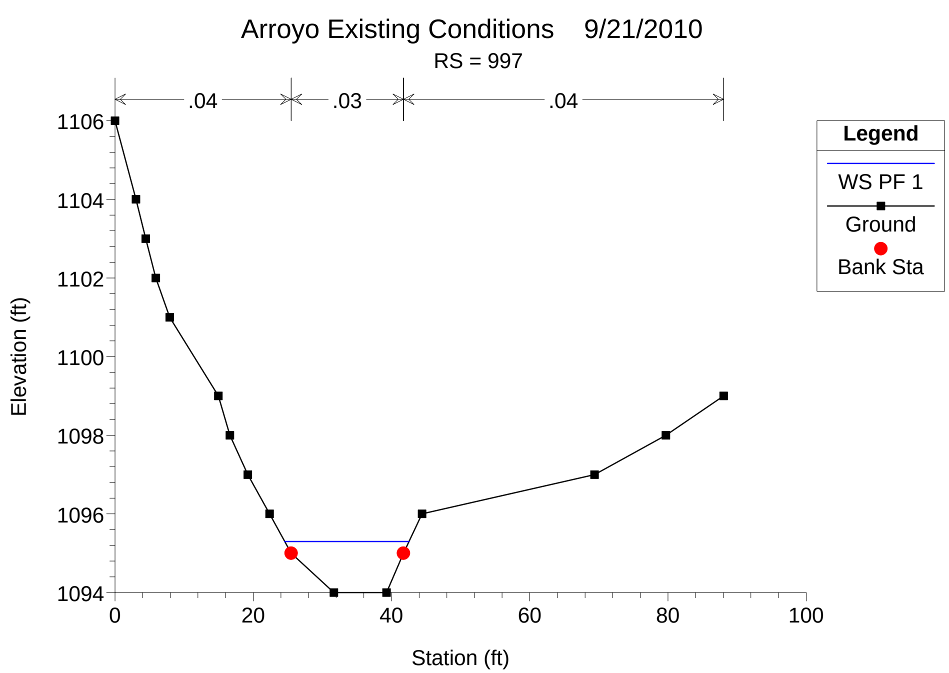

Arroyo Existing Conditions 9/21/2010
RS = 1223
.04
.03
.04
Legend
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)

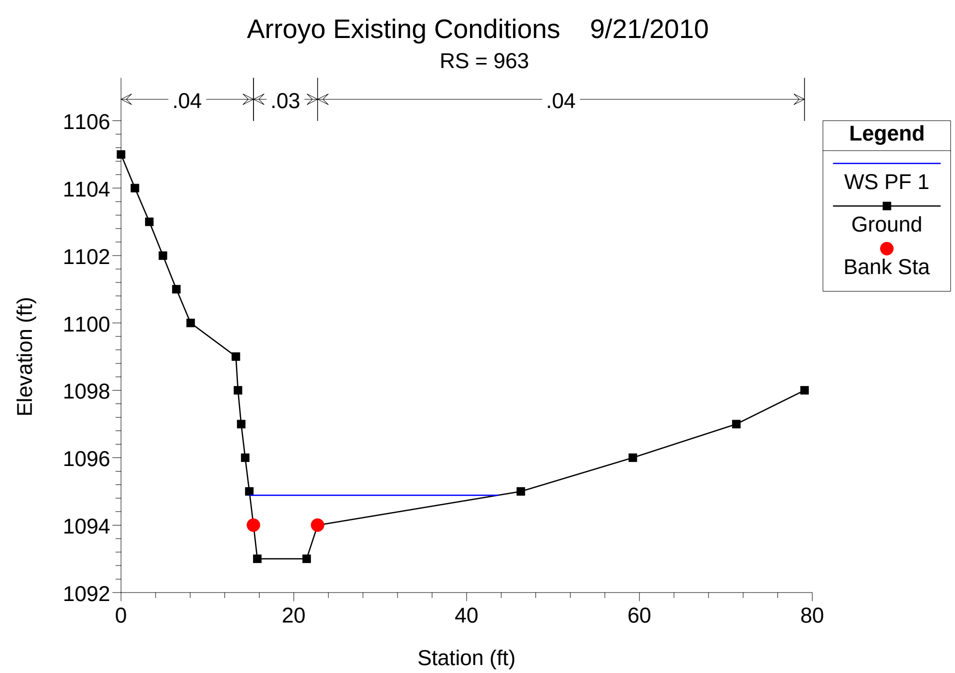

Arroyo Existing Conditions 9/21/2010
RS = 1186
.04
.03
.04
Legend
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)

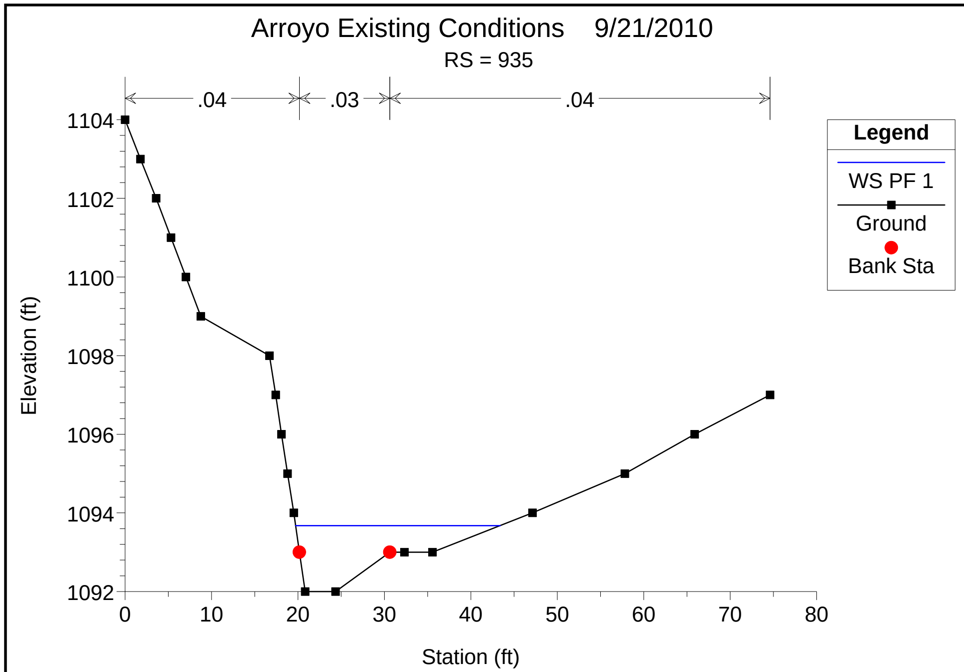

Arroyo Existing Conditions 9/21/2010
RS = 1134
.04
.03
.04
Legend
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)

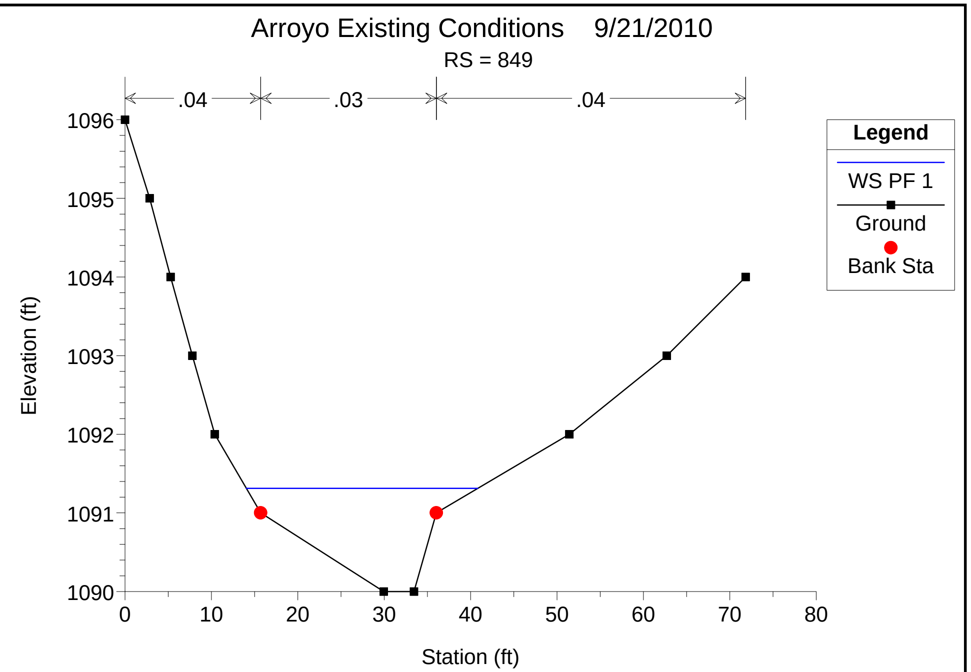

Arroyo Existing Conditions 9/21/2010
RS = 1086
.04
.03
.04
Legend
WS PF 1
Ground
Bank Sta
1102
1101
1100
1099
1098
1097
1096
Elevation (ft)
0
20
40
60
80
100
Station (ft)

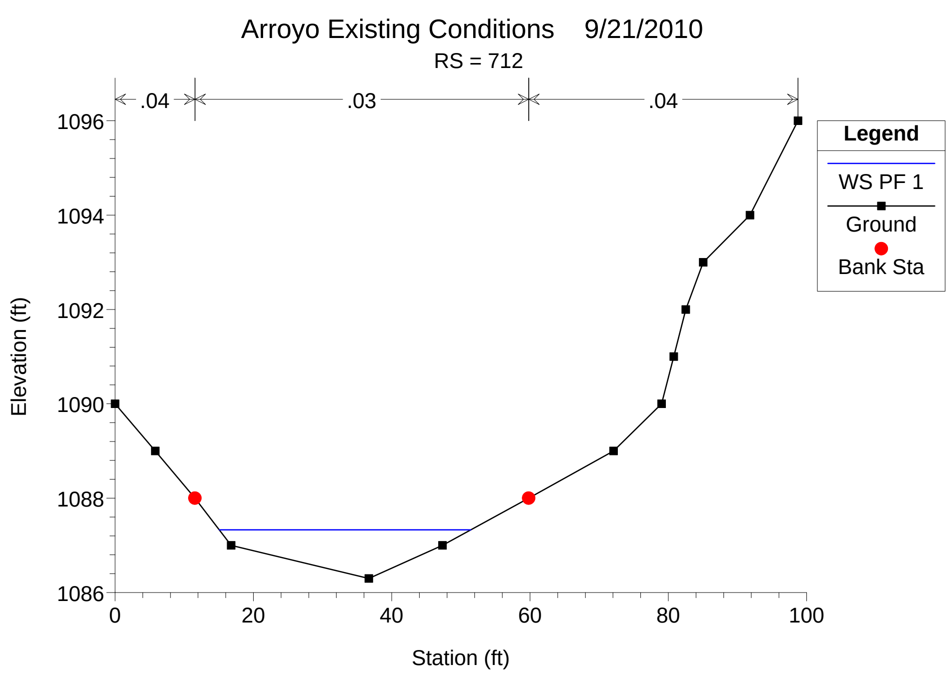

Arroyo Existing Conditions 9/21/2010
RS = 1044
.04
.03
.04
Legend
WS PF 1
Ground
Bank Sta
1108
1106
1104
1102
1100
1098
1096
Elevation (ft)
0
20
40
60
80
100
120
Station (ft)

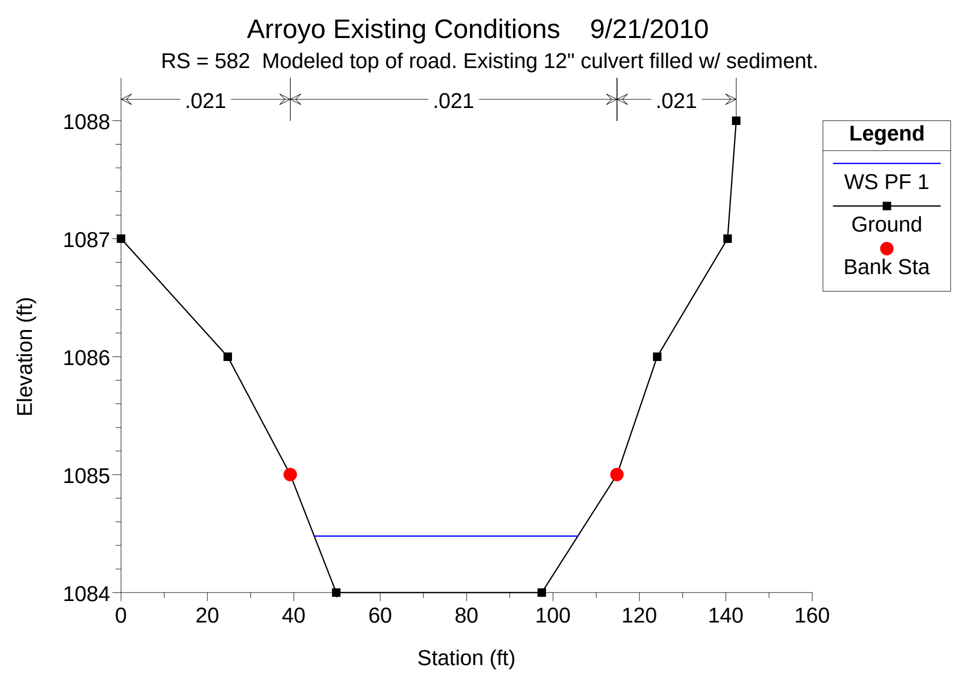

Arroyo Existing Conditions 9/21/2010
RS = 997
.04
.03
.04
Legend
WS PF 1
Ground
Bank Sta
1106
1104
1102
1100
1098
1096
1094
Elevation (ft)
0
20
40
60
80
100
Station (ft)

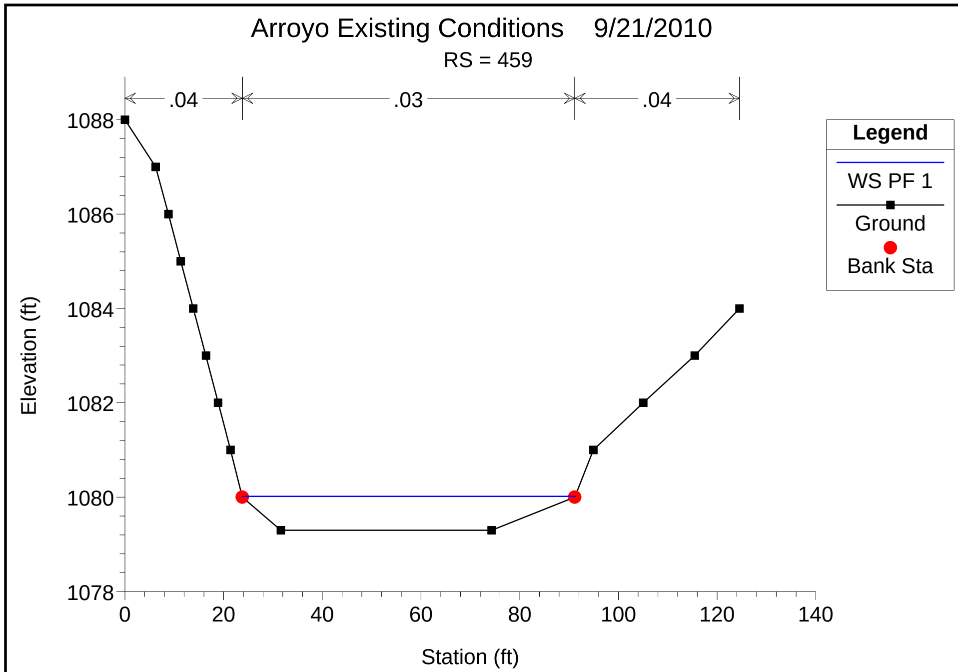

Arroyo Existing Conditions 9/21/2010
RS = 963
.04
.03
.04
Legend
WS PF 1
Ground
Bank Sta
1106
1104
1102
1100
1098
1096
1094
1092
Elevation (ft)
0
20
40
60
80
Station (ft)

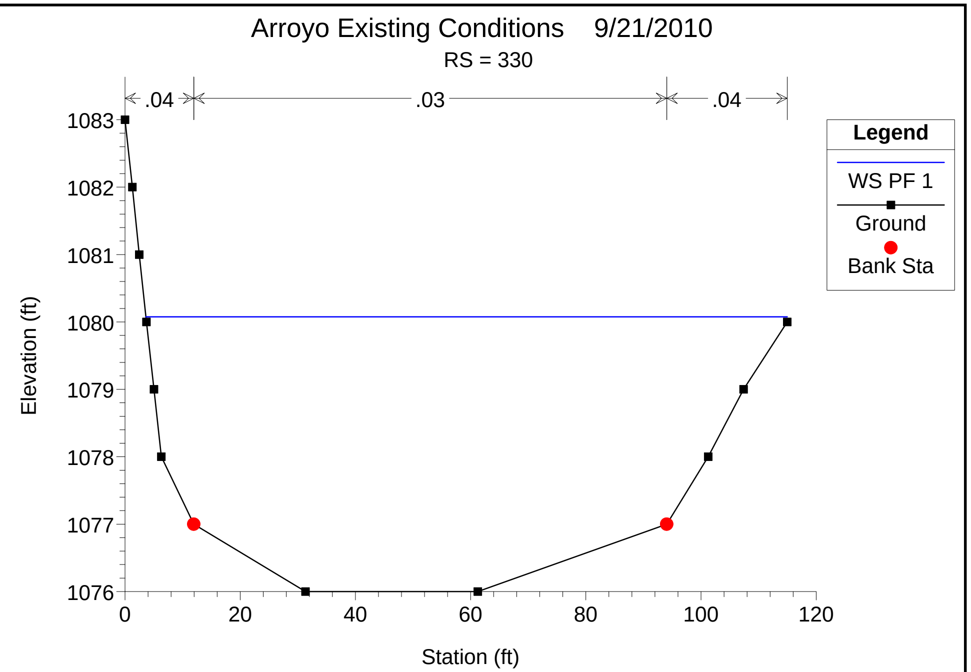

Arroyo Existing Conditions 9/21/2010
RS = 935
.04
.03
.04
Legend
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
1104
1102
1100
1098
1096
1094
1092
0
10
20
30
40
50
60
70
80

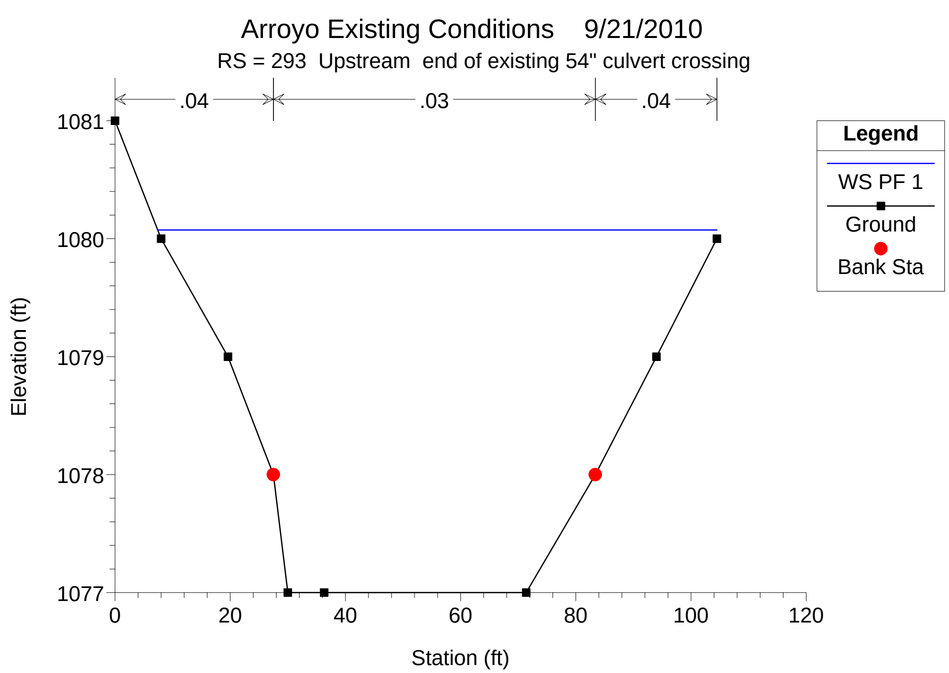

Arroyo Existing Conditions 9/21/2010
RS = 849
.04
.03
.04
Legend
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
1096
1095
1094
1093
1092
1091
1090
0
10
20
30
40
50
60
70
80

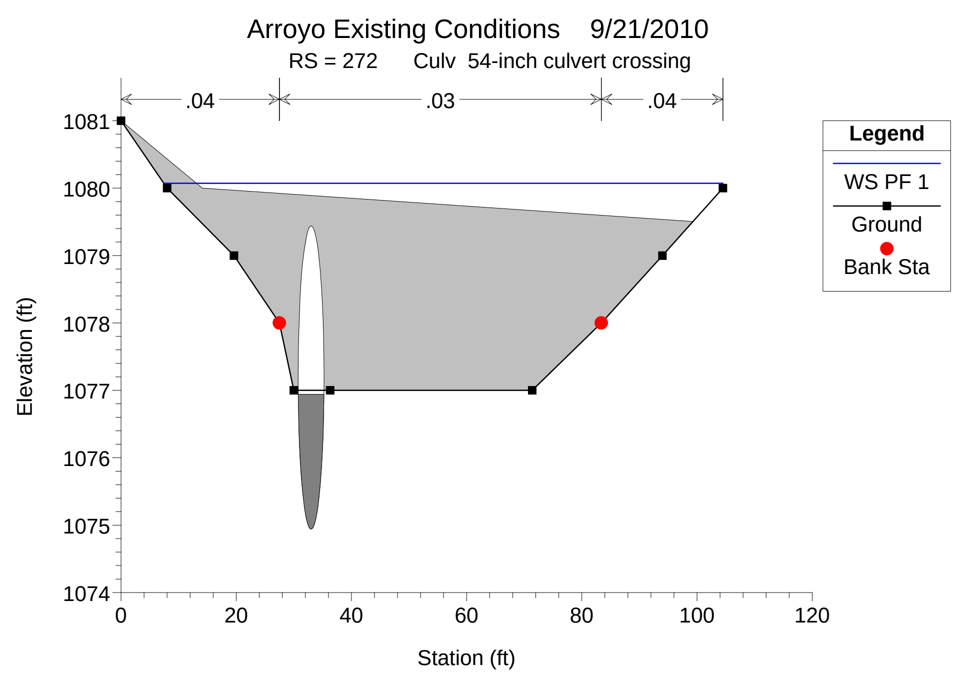

Arroyo Existing Conditions 9/21/2010
RS = 712
.04
.03
.04
Legend
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
1096
1094
1092
1090
1088
1086
0
20
40
60
80
100

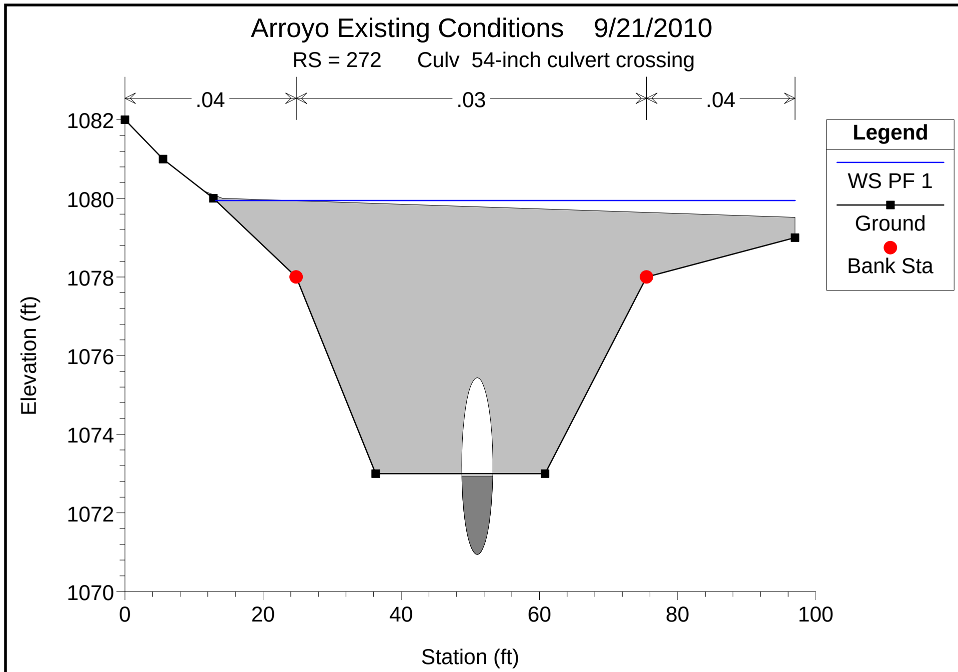

Arroyo Existing Conditions 9/21/2010
RS = 582 Modeled top of road. Existing 12" culvert filled w/ sediment.
.021
.021
.021
Legend
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
1088
1087
1086
1085
1084
0
20
40
60
80
100
120
140
160


Arroyo Existing Conditions 9/21/2010
RS = 459
.04
.03
.04
Legend
WS PF 1
Ground
Bank Sta
Elevation (ft)
1078
1080
1082
1084
1086
1088
Station (ft)
0
20
40
60
80
100
120
140


Arroyo Existing Conditions 9/21/2010
RS = 330
.04
.03
.04
Legend
WS PF 1
Ground
Bank Sta
Elevation (ft)
1076
1077
1078
1079
1080
1081
1082
1083
Station (ft)
0
20
40
60
80
100
120


Arroyo Existing Conditions 9/21/2010
RS = 293 Upstream end of existing 54" culvert crossing
.04
.03
.04
Legend
WS PF 1
Ground
Bank Sta
Elevation (ft)
1077
1078
1079
1080
1081
Station (ft)
0
20
40
60
80
100
120


Arroyo Existing Conditions 9/21/2010
RS = 272 Culv 54-inch culvert crossing
.04
.03
.04
Legend
WS PF 1
Ground
Bank Sta
Elevation (ft)
1074
1075
1076
1077
1078
1079
1080
1081
Station (ft)
0
20
40
60
80
100
120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.03
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Station (ft)
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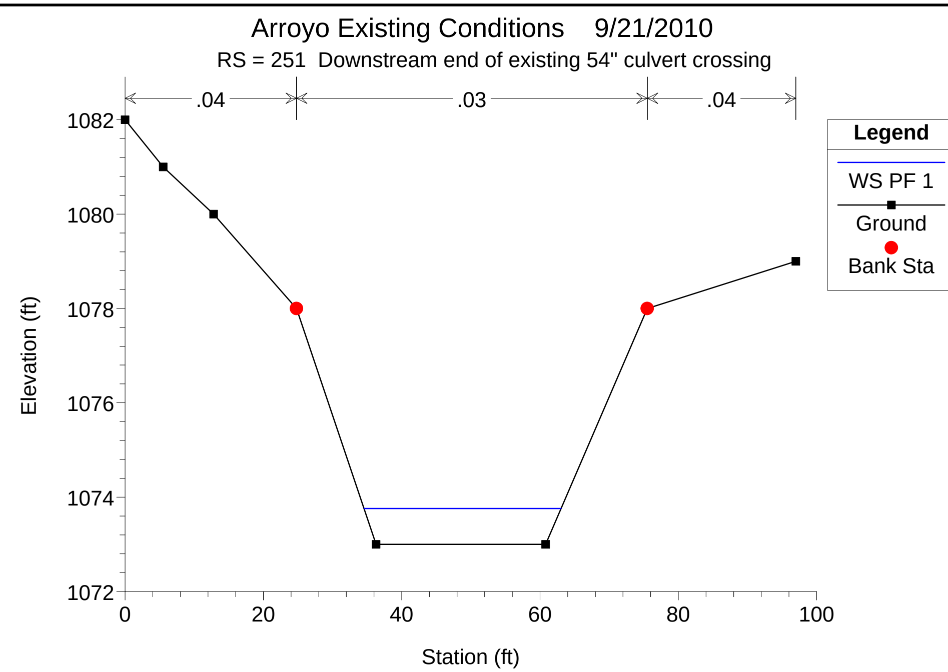
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.04
Legend
WS PF 1
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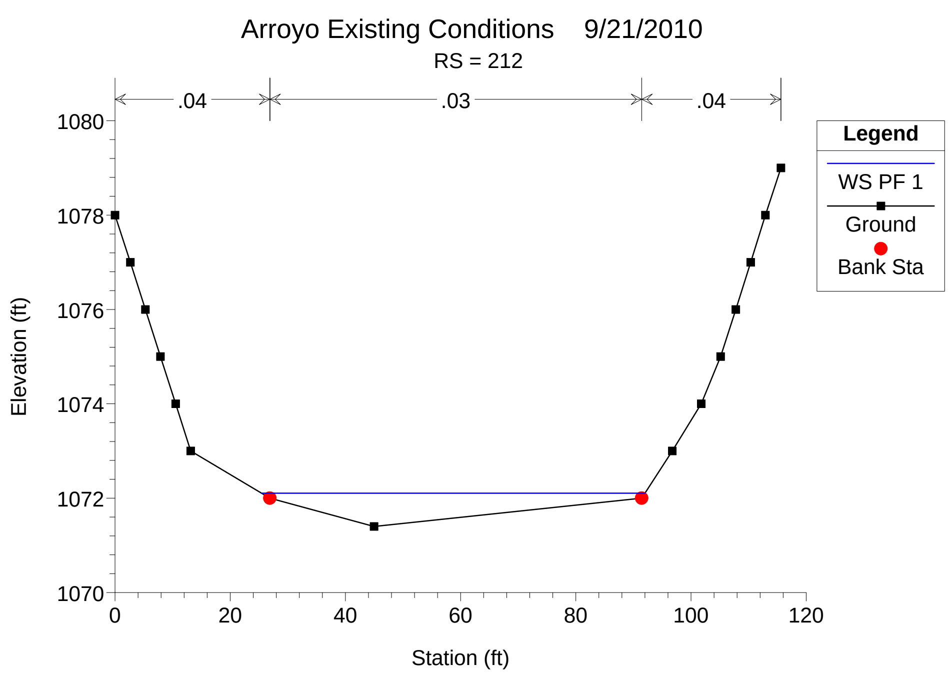
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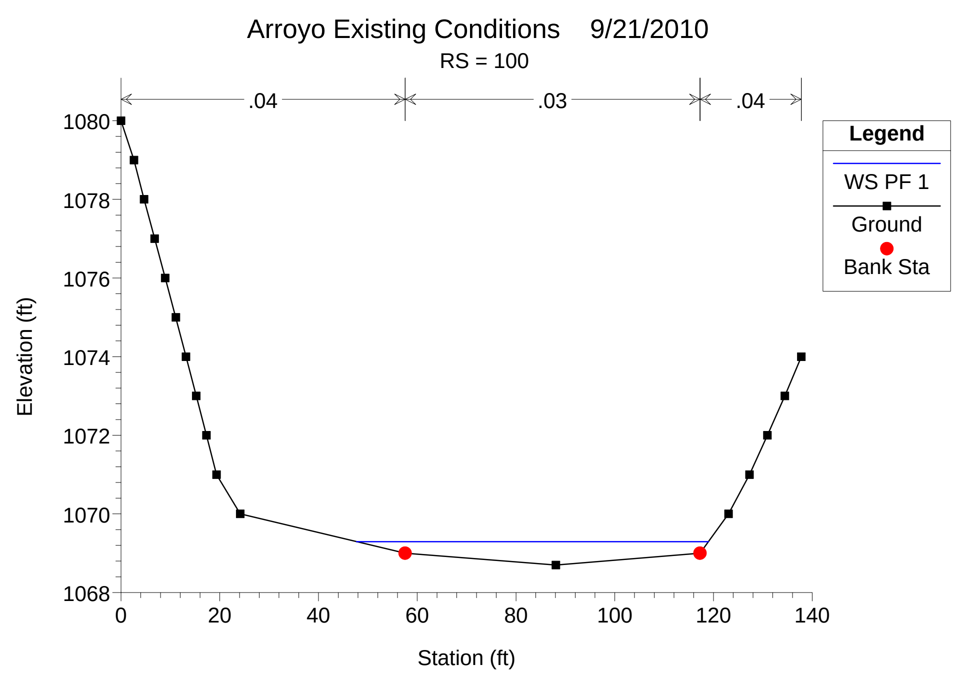
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1068
Station (ft)
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80
100
120
140

LYLE ENGINEERING, INC.	GLEN MOR 2 DRAINAGEWAY	PRELIMINARY HEC-RAS WORKMAP	Job # 10-12	September 2010

Appendix Q

Noise Study

NOISE TECHNICAL REPORT
GLEN MOR 2 STUDENT APARTMENTS, UNIVERSITY OF CALIFORNIA, RIVERSIDE

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ICF International. 2011. *Noise Technical Report, Glen Mor 2 Student Apartments, University of California, Riverside*. January. (ICF 374.10.) San Diego, CA. Prepared for University of California, Riverside, Riverside, CA.

Contents

Tables and Figures

Figures

Acronyms and Abbreviations

City	City of Riverside
CNEL	Community Noise Equivalent Level
dB	decibels
dBA	A-weighted sound level
EIR	environmental impact report
FHWA	Federal Highway Administration
FTA	Federal Transit Administration
HVAC	heating, ventilation, and air-conditioning
Hz	hertz
kHz	kilohertz
L_{dn}	day-night level
Leq	equivalent sound level
Leq[h]	1-hour A-weighted equivalent sound level
L_{max}	maximum sound level
LRDP	Long-Range Development Plan
L_{xx}	percentile-exceeded sound level
mPa	micropascals
RCNM	Roadway Construction Noise Model
RMS	root mean square
SLM	sound level meter
SPL	sound pressure level
TNM®	Traffic Noise Model
UCR	University of California, Riverside
VdB	vibration velocity level in dB

Introduction

The University of California, Riverside (UCR) is proposing construction of an 810-bed student housing community on approximately 21 acres of university-owned property on the eastern edge of the campus. Associated improvements would include a parking structure for residents, circulation improvements, indoor and outdoor commons facilities, a café, and an executive retreat center. The proposed apartment units are intended to house graduate students and upper-class undergraduates. The project would also entail restoration of a 0.4-mile stretch of an arroyo that runs through the northern part of the site.

Setting

The project site is located on the UCR campus, which is in the northeastern part of the City of Riverside (City), in western Riverside County, approximately 2.5 miles southeast of the State Route 91/Interstate 215/State Route 60 interchange. Located on nearly 1,200 acres at the foot of the Box Springs Mountains, the campus is bisected by State Route 60/Interstate 215, creating West Campus and East Campus areas. The West Campus is currently dominated by agricultural research fields but also supports the University Extension facility, administrative offices, and parking uses. The East Campus supports the historic campus core and a variety of academic, housing, administrative, and athletic and recreational uses. Regionally, the project area is approximately 50 miles east of Los Angeles, with access from State Route 60/Interstate 215 at University Avenue. Figure 1 identifies the campus location in the regional context.

The project site consists of approximately 21 acres on the East Campus, northwest of the Valencia Hill Drive/Big Springs Road intersection. Campus housing developments (Glen Mor 1, Aberdeen-Inverness, Lothian, and Pentland Hills) and associated recreational fields border the site to the north and west. Big Springs Road borders the site to the south. Valencia Hill Drive forms the eastern site boundary, with off-campus single- and multi-family residential developments situated across the street. Figure 2 identifies the project site in the context of existing campus facilities and adjacent uses. The larger surrounding area can be characterized using a boundary that follows Valencia Hill Drive and Watkins Drive, with the area to the west and south of this boundary characterized by largely developed campus lands and the area to the east and north characterized by established off-campus residential neighborhoods. A small commercial center is located at the intersection of Watkins Drive and Big Springs Road, with a church and the City's Islander Park situated beyond on the north side of Big Springs Road. The Box Springs Mountains lie beyond the developed area to the east of the campus and form a dramatic backdrop to the campus and the adjacent community.

The project site is partially developed with an existing surface parking lot (Lot 14), a vacant single-family residence, and unpaved pedestrian paths that provide access between the parking lot and nearby student residences. A paved driveway to the residence is located off Valencia Hill Drive, just south of Goins Court. Expansive, mature landscape elements are present along the Big Springs Road frontage and at the Big Springs Road/Valencia Hill Drive intersection.

Site topography is varied, with dominant features being a ridge running generally parallel to Big Springs Road and a natural drainage feature running along the northern edge of the site. The ridge rises approximately 35 to 50 feet above Big Springs Road and the generally level portion of the site, which is currently occupied by Parking Lot 14. From Valencia Hill Drive, the ridge lies perpendicular to the street, with site grades ranging from on grade to approximately 20 feet above ground level on Valencia Hill Drive. The vacant residence is located at the uppermost elevation of this ridge, approximately 120 feet west of Valencia Hill Drive.

Fundamentals of Noise

The following is a brief discussion of fundamental traffic noise concepts.

Sound, Noise, and Acoustics

Sound can be described as the mechanical energy of a vibrating object transmitted by pressure waves through a liquid or gaseous medium (e.g., air) to a hearing organ, such as a human ear. Noise is defined as loud, unexpected, or annoying sound.

In the science of acoustics, the fundamental model consists of a sound (or noise) source, a receiver, and the propagation path between the two. The loudness of the noise source and obstructions or atmospheric factors affecting the propagation path to the receiver determine the sound level and characteristics of the noise perceived by the receiver. The field of acoustics deals primarily with the propagation and control of sound.

Frequency, Sound Pressure Levels, and Decibels

Continuous sound can be described by frequency (pitch) and amplitude (loudness). A low-frequency sound is perceived as low in pitch. Frequency is expressed in terms of cycles per second, or hertz (Hz) (e.g., a frequency of 250 cycles per second is referred to as 250 Hz). High frequencies are sometimes more conveniently expressed in kilohertz (kHz), or thousands of hertz. The audible frequency range for humans is generally between 20 and 20,000 Hz.

The amplitude of pressure waves generated by a sound source determines the loudness of that source. Sound pressure amplitude is measured in micropascals (mPa). One mPa is approximately one hundred billionth (0.00000000001) of normal atmospheric pressure. Sound pressure amplitudes for different kinds of noise environments can range from less than 100 to 100,000,000 mPa. Because of this huge range of values, sound is rarely expressed in terms of mPa. Instead, a logarithmic scale is used to describe the sound pressure level (SPL) in terms of decibels (dB). The threshold of hearing for young people is about 0 dB, which corresponds to 20 mPa.

Addition of Decibels

Because decibels are logarithmic units, SPLs cannot be added or subtracted through ordinary arithmetic. Under the decibel scale, a doubling of sound energy corresponds to a 3 dB increase. In other words, when two identical sources are each producing sound of the same loudness, the resulting sound level at a given distance would be 3 dB higher than one source under the same conditions. For example, if one automobile produces an SPL of 70 dB when it passes an observer, two cars passing simultaneously would not produce 140 dB. Rather, they would combine to produce 73 dB. Under the decibel scale, three sources of equal loudness together produce a sound level 5 dB louder than one source.

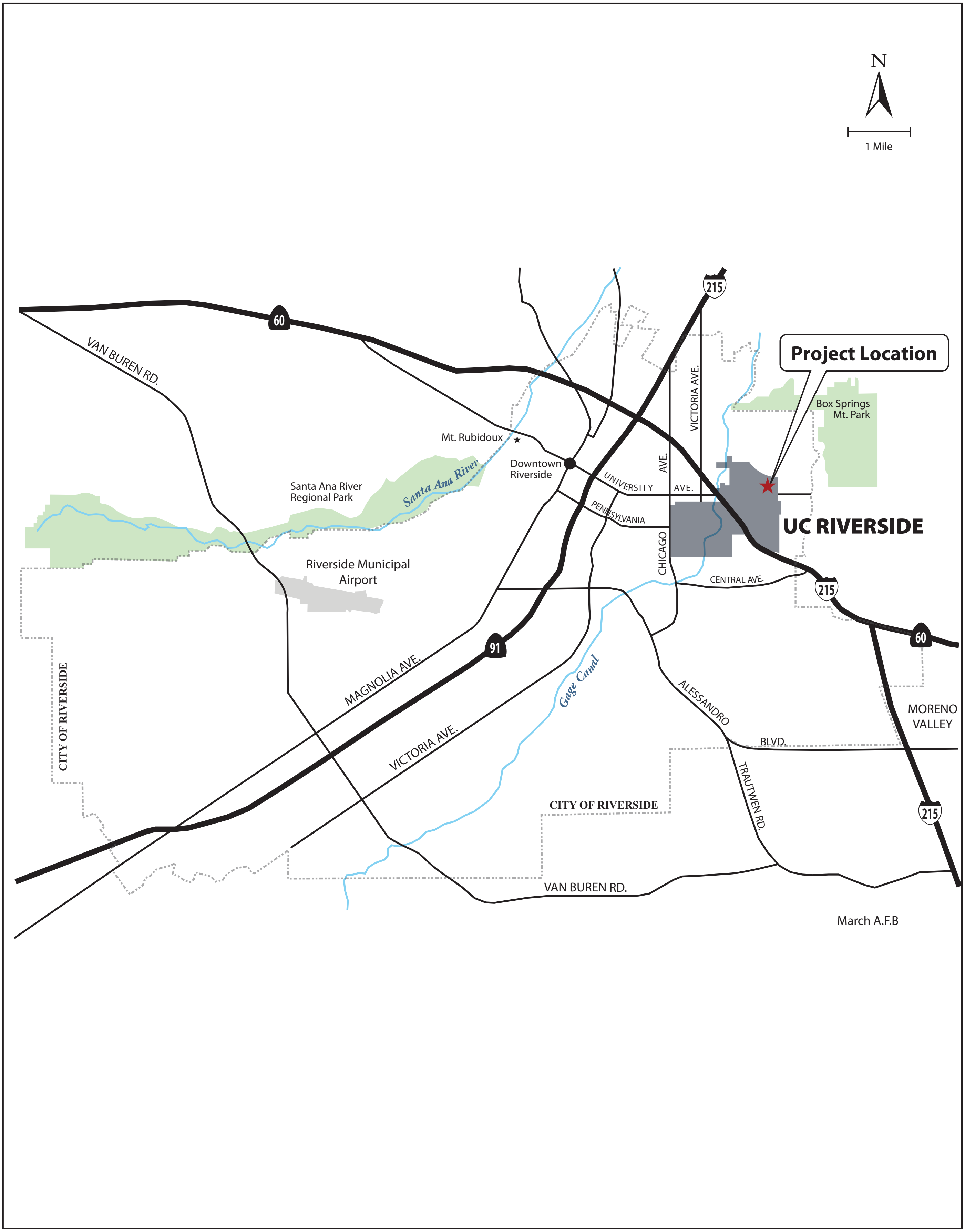

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Figure 1
Regional Location
UCR Glen Mor 2 Student Apartments

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Figure 2
Project Setting
UCR Glen Mor 2 Student Apartments

A-Weighted Decibels

The decibel scale alone does not adequately characterize how humans perceive noise. The dominant frequencies of a sound have a substantial effect on the human response to that sound. Although the intensity (energy per unit area) of the sound is a purely physical quantity, the loudness or human response is determined by the characteristics of the human ear.

Human hearing is limited in the range of audible frequencies as well as in the way it perceives the SPL in that range. In general, people are most sensitive to the frequency range of 1,000–8,000 Hz and perceive sounds within that range better than sounds of the same amplitude in higher or lower frequencies. To approximate the response of the human ear, sound levels of individual frequency bands are weighted, depending on human sensitivity to those frequencies. Then, an *A-weighted* sound level (expressed in units of dBA) can be computed based on this information.

The A-weighting network approximates the frequency response of the average young ear when listening to most ordinary sounds. When people make judgments regarding the relative loudness or annoyance of a sound, their judgments correlate well with the A-scale sound levels of those sounds. Other weighting networks have been devised to address high noise levels or other special problems (e.g., B, C, and D scales). Table 1 describes typical A-weighted noise levels for various noise sources.

Table 1. Typical A-Weighted Noise Levels

Common Outdoor Activities	Noise Level (dBA)	Common Indoor Activities
	— 110 —	Rock band
Jet fly-over at 1,000 feet		
	— 100 —	
Gas lawnmower at 3 feet		
	— 90 —	
Diesel truck at 50 feet at 50 mph		Food blender at 3 feet
	— 80 —	Garbage disposal at 3 feet
Noisy urban area, daytime		
Gas lawnmower, 100 feet	— 70 —	Vacuum cleaner at 10 feet
Commercial area		Normal speech at 3 feet
Heavy traffic at 300 feet	— 60 —	
		Large business office
Quiet urban daytime	— 50 —	Dishwasher (next room)
Quiet urban nighttime	— 40 —	Theater, large conference room (background)
Quiet suburban nighttime		
	— 30 —	Library
Quiet rural nighttime		Bedroom at night, concert hall (background)
	— 20 —	
		Broadcast/recording studio
	— 10 —	
Lowest threshold of human hearing	— 0 —	Lowest threshold of human hearing

Source: California Department of Transportation, 1998.

Human Response to Changes in Noise Levels

As discussed above, a doubling of sound energy results in a 3 dB increase in the sound level. However, when a sound level change is measured with precise instrumentation, the subjective human perception of a doubling of loudness will usually differ from the measured sound level.

Under controlled conditions in an acoustical laboratory, the trained healthy human ear is able to discern 1 dB changes in sound levels when exposed to steady single-frequency (pure-tone) signals in the midfrequency (1,000–8,000 Hz) range. In typical noisy environments, changes in noise of 1 to 2 dB are generally not perceptible. However, it is widely accepted that people are able to begin to detect sound level increases of 3 dB in typical noisy environments. Further, a 5 dB increase is generally perceived as a distinctly noticeable increase, and a 10 dB increase is generally perceived as a doubling of loudness. Therefore, a doubling of sound energy (e.g., doubling the volume of traffic on a highway or adding an equally powered noise source, such as a second heating, ventilation, and air-conditioning [HVAC] system), which would result in a 3 dB increase in sound, would generally be perceived as barely detectable.

Noise Descriptors

Noise in our daily environment fluctuates over time. Various noise descriptors have been developed to describe time-varying noise levels. The noise descriptors most commonly used in noise analysis are listed below.

- **Equivalent Sound Level (L_{eq}):** L_{eq} represents an average of the sound energy occurring over a specified period. In effect, L_{eq} is the steady-state sound level that contains the same acoustical energy as the time-varying sound that actually occurred during the same period. The 1-hour A-weighted equivalent sound level (L_{eq}[h]) is the energy average of A-weighted sound levels occurring during a 1-hour period.
- **Percentile-Exceeded Sound Level (L_{xx}):** L_{xx} represents the sound level exceeded for a given percentage of a specified period (e.g., L_{10} is the sound level exceeded 10 percent of the time, and L_{90} is the sound level exceeded 90 percent of the time).
- **Maximum Sound Level (L_{max}):** L_{max} is the highest instantaneous sound level measured during a specified period.
- **Day-Night Level (L_{dn}):** L_{dn} is the energy average of A-weighted sound levels occurring over a 24-hour period, with a 10 dB penalty applied to A-weighted sound levels occurring during nighttime hours between 10 p.m. and 7 a.m.
- **Community Noise Equivalent Level (CNEL):** Similar to L_{dn}, CNEL is the energy average of the A-weighted sound levels occurring over a 24-hour period, with a 10 dB penalty applied to A-weighted sound levels occurring during the nighttime hours between 10 p.m. and 7 a.m. and a 5 dB penalty applied to the A-weighted sound levels occurring during evening hours between 7 p.m. and 10 p.m.

Vibration

Vibration is an oscillatory motion through a solid medium in which the motion's amplitude can be described in terms of displacement, velocity, or acceleration. Vibration *displacement* is the distance that a point on a surface moves away from its original static position. The instantaneous speed at which a point on a surface moves is described as the *velocity*, and the rate of change of speed is described as the *acceleration*. Each of these three vibration descriptors can be used to correlate vibration to human response, building damage, and acceptable equipment vibration. Vibration velocity and acceleration are most often used in seismic or groundborne vibration analyses.

Existing Setting

Noise-Sensitive Land Uses

Noise-sensitive land uses are generally defined as locations where people reside or where the presence of unwanted sound could adversely affect the use of the land. Noise-sensitive land uses typically include residences, hospitals, schools, guest lodging facilities, libraries, and certain types of passive recreational uses. Sensitive land uses in the project area include the following:

- single- and multi-family residences adjacent to the project site, to the east, across Valencia Hill Drive;
- on-campus student residences at the Lothian and Pentland Hills residence halls and the Glen Mor 1 apartments; and
- a day care center on the northeast corner of Big Springs Road and Watkins Drive.

The noise environment observed during ambient noise measurements in the project area was characterized primarily by noise from vehicular traffic on surrounding roadways. Other noise sources included the athletic fields north of the site and the on-site parking lot as well as ambient noise associated with a residential suburban neighborhood, including people talking, birds chirping, and periodic aircraft flyovers. Noise monitoring was conducted on and adjacent to the project site to quantify existing conditions in the area.[1]

Short-term (typically 10–15 minutes in duration) attended sound level measurements were taken using a Larson Davis Model 812 Sound Level Meter (SLM). This SLM is categorized as a Type 1 Precision Grade device. Noise was measured at seven representative locations (ST-1 through ST-7) in and around the project area. Field data sheets documenting field work for the project are provided in Appendix A.

The sound-measurement instrument used for the survey was set to “slow” for the time response and the dBA scale for all noise measurements. To ensure accuracy, laboratory calibration of the instrument was field checked before and after each measurement period using an acoustical calibrator. The accuracy of the acoustical calibrator is maintained through a program established by the manufacturer and traceable to the National Institute of Standards and Technology. The sound-measurement instrument meets the requirements of the American National Standards Institute’s standard S 1.4-1983 and the International Electrotechnical Commission’s publications 804 and 651. In all cases, the microphone height was 5 feet above the ground and equipped with a windscreen. A list of field instrumentation is included in Appendix B.

Table 2 summarizes the noise monitoring results, and Figure 3 shows the monitoring locations. As shown in Table 2, measured noise levels varied from 48 dBA L_{eq} at ST-5 and ST-7 to 57 dBA L_{eq} at ST-1.

---

[1] Noise monitoring was conducted by Peter Hardie of ICF International on May 26 and 27, 2010.

Table 2. Summary of Noise Monitoring

		Measurement Period				Measurement Results (dBA)					
Site ID	Measurement Location	Date	Start Time	Duration (mm:ss)	Noise Sources	L_{eq}	L_{max}	L_{min}	L_{90}	L_{50}	L_{10}
ST-1	Intramural football fields	5-26-10	19:09	15:00	Intramural football game, distant music, birds, distant aircraft, distant traffic	57.3	74.5	46.1	48.3	51.6	60.3
ST-2	3624 Valencia Hill Drive	5-26-10	19:28	15:00	Intramural football game, distant music, birds, distant aircraft, distant traffic	52.6	66.7	45.6	47.4	49.1	54.1
ST-3	University Village Apartments pool	5-27-10	10:45	15:00	Traffic along West Big Springs Road, birds	52.0	68.4	44.0	45.3	48.8	55.6
ST-4	University Village Apartments	5-27-10	1108	15:00	Traffic along West Big Springs Road, birds	49.6	60.4	43.6	45.4	48.1	52.7
ST-5	3706 Valencia Hill Drive	5-27-10	11:39	15:00	Traffic along Watkins Drive, birds	48.0	60.7	44.3	45.7	47.1	49.7
ST-6	3592 Valencia Hill Drive	5-27-10	12:02	15:00	Traffic along Watkins Drive, birds, distant aircraft	49.0	57.4	45.0	47.1	48.4	50.7
ST-7	Common area of Glen Mor 1 Apartments	5-27-10	12:32	15:00	Birds, distant aircraft	48.0	58.9	43.6	45.8	46.9	49.2

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Figure 3
Noise Measurement and Modeling Locations
Glen Mor 2 Student Apartments Project

Vibration

Similar to the environmental setting for noise, the vibration environment is dominated by traffic-related vibration from nearby roadways and construction equipment. Heavy trucks can generate groundborne vibrations of varying magnitudes, depending on vehicle type, weight, and pavement conditions. Vibration levels were not readily perceptible at noise-/vibration-sensitive land uses in the project vicinity during the visits for noise measurements.

Applicable Regulations

Federal Standards

Federal regulations related to this analysis would not be applicable to the proposed project on the UCR campus.

State Regulations

Title 24 of the California Code of Regulations codifies Sound Transmission Control requirements, thereby establishing uniform minimum noise-insulation performance standards for new hotels, motels, dormitories, apartment houses, and dwellings other than detached single-family dwellings. Specifically, Title 24 states that interior noise levels attributable to exterior sources shall not exceed 45 dBA CNEL in any habitable room of new dwellings. Dwellings are to be designed so that interior noise levels will meet this standard for at least 10 years from the time of building permit application. This standard would apply to all new student housing developed within the UCR campus.

Local Regulations and Standards

Although UCR, as a state entity, is not subject to municipal regulation, the project would affect an off-campus area that is subject to City standards. For informational purposes, the City General Plan Noise Element is discussed below.

The UCR Long-Range Development Plan (LRDP) does not identify on-campus noise standards, but the LRDP Environmental Impact Report (EIR) did use noise thresholds for the analysis of campus development pursuant to the LRDP. The thresholds used in the analysis of the Glen Mor 2 project are based on the LRDP EIR thresholds.

City of Riverside General Plan Noise Element

Noise standards are addressed in Section N (Noise Element) of the City's General Plan (City of Riverside 2007). The Noise Element sets forth goals and policies to ensure land use compatibility with respect to noise. Among these is a goal to ensure that excessive noise levels do not significantly affect citizens and noise-sensitive land uses within the City. The Noise Element identifies noise compatibility for various land uses (see City General Plan Figure N-10, "Noise/Land Use Compatibility"). As shown in City General Plan Figure N-10, noise levels at single-family residential land uses are considered to be *normally acceptable* if the noise levels are 60 dBA CNEL or lower.

Noise levels are *conditionally acceptable* (i.e., new construction or development can be undertaken only if a detailed analysis of the noise-reduction requirements is made and needed noise-insulation features are incorporated into the design) if noise levels are 60 to 65 dBA CNEL. Noise levels between 65 and 70 dBA CNEL are *normally unacceptable*, and noise levels above 75 dBA CNEL are *clearly unacceptable*. Recreational outdoor uses such as playgrounds, neighborhood parks, golf courses, and riding stables are considered normally acceptable up to 70 dBA CNEL.

Methodology

This study provides a quantitative analysis of noise and vibration levels that would be generated by project construction, including noise and vibration from on-site construction equipment and off-site construction traffic, and increases in noise due to project operation, including noise from additional vehicular traffic on nearby roadways and the replacement of an existing parking lot with a parking structure.

Operation

Potential project-related noise effects from traffic were analyzed using the Federal Highway Administration's (FHWA's) Traffic Noise Model® (TNM®) lookup tables (FHWA 2004), which are based on FHWA algorithms for highway traffic noise prediction and analysis. The parameters used to estimate vehicular traffic noise were the receiver locations; average daily traffic volumes and posted speed limits; the percentages for automobiles, medium trucks, buses, motorcycles, and heavy trucks; and site conditions (terrain or structural shielding and the ground propagation characteristics).

Noise from the project's parking structure was analyzed by considering the nearest sensitive receptors as well as the acoustical center of the noise source, as described below. Parking-related noise "events" (e.g., car doors slamming or engine start-ups) were evaluated as well. Table 3 presents the L_{max} at 50 feet that would be generated by car doors slamming, engine start-ups, cars backing out, and remote keyless entry systems. The information is from a noise study, including a parking structure analysis, for a project located in the City of Santa Ana. The reference noise measurements used in the sample analysis were taken at a parking structure on a university campus. These noise events would be periodic and brief in nature.

Table 3. Typical Noise Levels Resulting from Parking Lot Activities

Event	Maximum Noise Level (L_{max}, dBA) at 50 feet
Car Start-Up	61
Car Backing Out	55
Remote Keyless Entry	64
Car Driving Away	62
Source: Weiland Associates, 2007.	

Noise levels for activities within the proposed parking structure were calculated and measured from the acoustical center of the parking structure and compared with levels from the acoustical center of the existing surface lot. Acoustical center analysis is a common method for estimating noise levels generated within larger areas. It acknowledges that noise is not stationary within an area. The acoustical center is the idealized point from which the energy sum of all activity near to and far from the receiver would be centered. For this project's parking structure analysis, the acoustical center represents the typical distance from the audible activity within the parking feature to the sensitive receivers. To calculate the distance from each representative receiver location to the acoustical center of the respective facilities, the farthest distance from which activity could occur is multiplied by the closest distance, and the square root of the resultant product is taken, as shown below.

$$\text{Acoustic Center Distance} = \text{Square Root } (D_{near} * D_{far})$$

Noise levels for each specific activity (e.g., car doors slamming, engine start-ups) were calculated and normalized over an hour-long period. Normalization of noise levels requires an assumption regarding the number of events per hour and the typical duration of the events, measured in seconds. The total number of seconds per hour that each event would occur was then normalized by correcting for the duration of the events, after which the total estimated noise level was derived.

Construction

Noise and groundborne vibration from construction were evaluated using FHWA's Roadway Construction Noise Model (RCNM) (FHWA 2008) and the Federal Transit Administration's (FTA's) *Transit Noise and Vibration Impact Assessment Manual* (FTA 2006).[2]

Similar to the methodology used in the analysis of parking structure noise levels, construction noise levels were estimated at the nearest receptors and the acoustical center. The construction noise analysis used the RCNM to quantify noise levels from the proposed project at sensitive receivers located on and off campus. The RCNM uses inputs for construction vehicle mix, duty cycles, distance to sensitive receivers, and intervening shielding to estimate resultant noise levels. One of the key parameters in the analysis of noise is source-receiver distance. The nearer the source, the louder the resultant noise level will be. For this analysis, the predicted noise level during construction at the nearest representative noise-sensitive receivers is presented as well as the acoustical center distance. The acoustical center represents the typical distance from the construction activity to the sensitive receivers, per the methodology described above. This approach accounts for the dynamic nature of construction activities within a typical project site.

For construction noise levels off campus, the acoustical center distances of construction were quantified using the Preliminary Cut and Fill Analysis for Glen Mor 2 Housing diagram provided by Flores Lund Consultants (Appendix C). The distance from the edge of the grading boundary to each modeled sensitive receiver was measured using both the referenced grading exhibit and Google Earth. This distance represents the closest construction activity to a sensitive receiver. The distance from the western boundary of the grading limits to each modeled sensitive receiver was then measured to determine the farthest construction activity. The resultant representative distance can be seen in Figure 4.

For construction noise levels on campus, the acoustical center of construction was also quantified using the Preliminary Cut and Fill Analysis for Glen Mor 2 Housing diagram. The distance from the western and northern edges of the grading boundary to the Lothian and Glen Mor 1 dormitories (respectively) was measured. This distance represents the nearest construction activity. The distance from the farthest eastern and southern grading boundaries to the respective dormitories

[2] This model is used for various types of construction projects, not just roadway projects. It incorporates levels from equipment that is common to many types of construction, thereby allowing an accurate representation of potential construction-related noise levels from a wide range of projects.

was measured to determine the farthest construction activity. The resultant representative distance can be seen in Figure 4. These values were used to calculate the acoustical center of construction for on- and off-campus receivers. The acoustical centers for each receiver are included below in Table 4.

Table 4. Acoustical Center Calculations for On- and Off-Campus Sensitive Receivers

Receiver	Closest Distance to Receiver (feet)	Farthest Distance to Receiver (feet)[1]	Distance from Acoustical Center of Construction[2]
Off-Campus Receivers			
ST-2	164	1,100	425
ST-3	240	1,015	494
ST-4	140	958	366
ST-5	149	963	379
ST-6	288	1,100	563
On-Campus Receivers			
ST-7	195	679	364
MR-2 Lothian	16	947	123

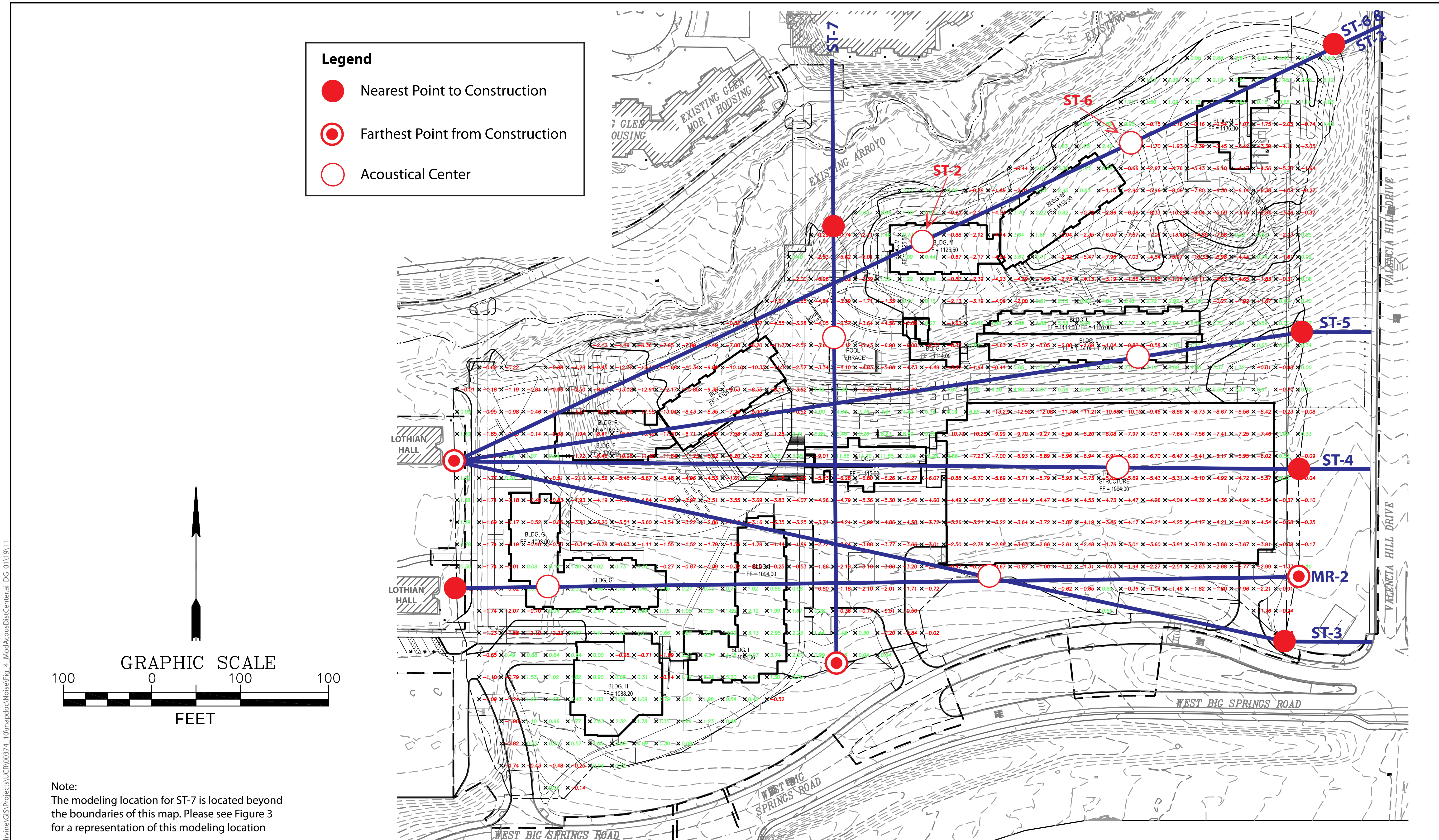
Notes:
[1] See Figure 4 for depiction of distance measurements.
[2] Distance from acoustical center is derived from the square root of the result of the closest distance multiplied by the farthest distance.

The mix of construction equipment that was analyzed was based on the equipment list provided by the client (Derouin pers. comm.). A worst-case time frame was developed using the equipment list provided and assuming overlapping construction phases. The equipment list was used for the RCNM inputs to analyze noise levels. Because the RCNM allows only 20 pieces of equipment per model, multiple models were used. The resultant noise levels were then manually added together.[3] Project-specific information is presented below.

The analysis conservatively assumes that there is no shielding on site, with the exception of sensitive receiver ST-3. ST-3 is located at a pool behind a two-story apartment complex. A conservative noise-reduction estimate of 5 dBA was included for this location.

In addition to acoustical center noise levels, construction analysis considers the maximum noise levels that would occur at the nearest noise-sensitive receivers. These noise levels, which represent the highest likely noise levels associated with construction at the edge of the project site, are not projected to occur for an extended period of time. The noise levels were developed using the worst-case equipment time frame and the distances to the nearest sensitive receptors, as measured using Google Earth and the Preliminary Cut and Fill Analysis for Glen Mor 2 Housing diagram. The list and representative distances were input into the RCNM. Similar to the acoustical center analysis, the analysis of noise at the nearest receptors conservatively assumes that there is no shielding on site, with the exception of sensitive receiver ST-3.

[3] A description of adding decibels together is included in the Fundamentals of Noise section, above.



Note:
The modeling location for ST-7 is located beyond the boundaries of this map. Please see Figure 3 for a representation of this modeling location

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Source: Flores Lund Consultants, 2010

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Figure 4
Modeled Acoustical Center Distance
Glen Mor 2 Student Apartments Project

Construction Haul Route Traffic

Potential project-related construction noise effects from haul route traffic were analyzed using FHWA's TNM® lookup tables (FHWA 2004), which are based on the FHWA's algorithms for highway traffic noise prediction and analysis. The parameters used to estimate vehicular traffic noise were the receiver locations, average daily traffic volumes and posted speed limits, vehicle mix, and site conditions (terrain or structural shielding and the ground propagation characteristics).

The existing roadway peak-hour traffic volumes were calculated from the project's traffic study (Kunzman Associates 2010) and traffic counts from the City (City of Riverside 2011) to establish baseline noise levels. The analysis assumes that the vehicle mix is representative of a typical residential street (i.e., 97 percent automobiles, 2 percent medium trucks, and 1 percent heavy trucks). Construction-period truck volumes provided by the client (Derouin pers. comm.) were added to the traffic mix, and the new proportions were placed in the model to determine the project's traffic noise contribution.

Vibration resulting from project construction activities was analyzed using the methodology contained in Section 12.2 of the FTA manual. Vibration source levels for a variety of construction equipment types are supplied in Table 12-2 of the manual, using root mean square (RMS) in inches per second at a reference distance of 25 feet from the source. The reference source vibration level was then adjusted to the actual distance of interest using the following equation:

$$L_v(D) = L_v(25\text{ feet}) - 30*\log(D/25)$$

$L_v(D)$ is the vibration level at the receiver, $L_v(25\text{ feet})$ is the reference source vibration level, and D is the distance from the construction activity to the receiver.

Thresholds

The LRDP EIR outlines thresholds of significance that are applicable to the proposed project as an implementing action under the LRDP.

Construction

Project construction would have a significant impact if construction activities lasting more than 1 day would increase ambient noise levels by 10 dBA L_{eq} or more over a 1-hour period at any on- or off-campus noise-sensitive location. Furthermore, project construction would have a significant impact if it would expose persons to groundborne vibration in excess of FTA-recommended thresholds for sensitive buildings, residences, and institutional land uses, as follows:[4]

- 80 VdB (i.e., vibration velocity levels in dB) at residences and buildings where people normally sleep (e.g., student housing buildings and nearby residences), or
- 83 VdB at other institutional buildings (FTA 2006).

[4] FTA's vibration thresholds also specify a 65 VdB standard at buildings where vibration would interfere with interior operations (e.g., sensitive on-campus research buildings). No such buildings exist in the vicinity of the project site, nor are any proposed as part of the project; therefore, this threshold has not been applied.

Operation

Permanent operational noise on the project site would be considered significant if would result in

- A permanent (i.e., long-term operational) increase of 5 dBA CNEL over ambient noise levels at any on- or off-campus noise-sensitive land use, or
- A permanent (i.e., long-term operational) increase of 3 dBA CNEL over ambient noise levels at any on- or off-campus noise-sensitive land use where the future resulting noise level would exceed 70 dBA CNEL (i.e., the noise level would be considered unacceptable for noise-sensitive uses by most public agencies).

Environmental Impacts and Mitigation

Noise from Construction Activity

On-Site Construction Noise

Construction of the proposed project is projected to begin in July 2011 and be finished in July 2013. Project construction is anticipated to increase noise levels temporarily at noise-sensitive locations on and off campus, including off-site residences east of the project site and on-campus residences west and north of the project site. The magnitude of the increases would depend on the type of construction activity, the noise levels generated by the various pieces of construction equipment, site geometry (i.e., shielding from intervening terrain or other structures), and the distance between the noise and the receptor.

Project construction would entail multiple phases. Therefore, noise would be generated on different areas of the site at different times. The most intensive phase of project construction would be the grading phase because the project would require a large amount of over-excavation and re-compaction of the soil to create building foundations that would be suitable for the proposed structures. Grading would occur on much of the site, including the western and eastern edges, which are near sensitive receptors. The phase of project construction that would require the largest amount of equipment is anticipated to occur in the second half of November 2011, when, according to the project contractor, the following phases would overlap: clearing/grubbing/demolition work, parking structure construction, miscellaneous grading, utilities trenching, building construction, and concrete work. This would entail a large amount of work throughout the site and generate the highest noise levels of any period of project construction.

The acoustical center for each of the representative on- and off-campus receivers was determined using the calculations described above in the Methodology section.[5] In addition to the receiver locations listed in Table 2, another modeled noise-receiver location was added to the list, the on-campus Lothian residence hall, located immediately west of the site (see the calculations presented above in Table 4).

[5] ST-1 was not included because this measurement location is at the on-campus athletic fields and does not represent a sensitive receptor.

Because noise-producing construction activities could be in progress on more than one part of the project site at any given time, the equipment list provided by the project contractor was used to develop a worst-case scenario with much of the construction equipment operating on the site at one time. The RCNM output table, which includes the list of construction equipment, is provided as Appendix D and summarized in Table 5, below. Although the RCNM contains a very broad spectrum of equipment, some types of construction equipment are not included in the model inputs. To account for the lack of a specific type of equipment, the closest possible match was used instead, based on professional judgment. For example, if the equipment list indicated that a skid-steer loader was required, a front-end loader was substituted. If a similar piece of equipment was not available, the "all other equipment > 5 hp" input was used, based on professional judgment.

Table 5. Equipment List for Worst-Case Construction Period

Number of pieces of equipment	Type of equipment	Type of equipment included in the RCNM?	Input used in lieu of equipment
8	Aerial Lifts	Yes (as man lifts)	--
3	Cranes	Yes	--
6	Forklifts	No	All other equipment > 5 hp
2	Trucks	Yes	--
7	Skid-steer Loaders	No	Front-end Loader
3	Backhoes	yes	--
1	Water Truck	No	Truck
2	Graders	Yes	--
6	Air Compressors	Yes	--
3	Scrapers	Yes	--
1	Rubber-tired Dozer	No	Dozer
5	Cement Mortar Mixers	Yes	--
1	Excavator	Yes	--
3	Pumps	Yes	--

The worst-case time frame uses 51 pieces of construction equipment. However, the RCNM is limited to 20 pieces of construction equipment per model. Because of this limitation, multiple models were created, and the resultant noise levels were added together manually in the energy domain (i.e., logarithmically, not arithmetically).

The RCNM modeling results for each modeling run are presented in Table 6, below.

Table 6. Modeled Noise Levels during Construction Modeling Runs

	Modeled Noise Level Calculated from the Acoustical Center			Modeled Noise Level Calculated from the Closest Distance to Receiver		
Receiver Location	Model 1 (hourly dBA Leq)	Model 2 (hourly dBA L_{eq})	Model 3 (hourly dBA L_{eq})	Model 1 (hourly dBA L_{eq})	Model 2 (hourly dBA L_{eq})	Model 3 (hourly dBA L_{eq})
ST-2	72	71	69	80	79	77
ST-3	66	64	63	72	71	69
ST-4	73	72	70	80	79	77
ST-5	73	72	70	81	80	78
ST-6	69	68	66	75	74	72
ST-7 (Glen Mor 1 Dorm)	73	72	70	79	77	76
MR-2 (Lothian Dorm)	83	81	80	100	99	97

Cumulative noise totals for both the acoustical center and the closest distance are presented in Table 7.

Table 7. Total Modeled Noise Levels during Construction

Receiver Location	Measured Ambient Noise Level	Modeled Noise Level Calculated from the Acoustical Center (hourly dBA L_{eq})	Modeled Noise Level Calculated from the Closest Distance to Receiver (hourly dBA L_{eq})
ST-2[6]	49	76	84
ST-3	52	69	76
ST-4	50	77	84
ST-5	48	77	85
ST-6	49	73	79
ST-7 (Glen Mor 1 Dorm)	48	77	82
MR-2 (Lothian Dorm)[7]	48	86	104

Modeled noise levels from the acoustical center of construction range from 69 dBA L_{eq} at modeled off-campus receiver ST-3 up to 86 dBA L_{eq} at modeled on-campus receiver MR-2 at the Lothian dormitory. Maximum noise levels modeled from the closest construction equipment would range from 76 dBA L_{eq} at ST-3 up to 104 dBA L_{eq} at MR-2. Noise levels of this nature are considerably higher than the existing noise level at any of these receivers and would completely dominate the existing noise environment.

[6] The measurement at ST-2 was taken to quantify noise levels associated with an athletic event at the existing on-campus sports fields and is not representative of normal ambient noise. Therefore, the noise level for ST-6 was used as a representative noise level for ST-2 because this receiver location is located across the street.

[7] No measurement taken at MR-2 during field measurements. Therefore, the noise level for ST-7 was used as a representative noise level for MR-2 because this receiver has similar uses.

Calculations from both the acoustical center and the closest construction distance indicate that all receivers would experience an increase in noise that would be greater than 10 dBA L_{eq} compared with existing noise levels. The project would result in a significant impact at each receiver location. Because the predicted noise levels would exceed the threshold, mitigation is warranted. Noise-reduction methods are prescribed below under the "Construction Noise Control Measures" heading to reduce noise levels to the greatest extent practicable.

Construction Haul Route Traffic

During construction, the proposed project would increase traffic noise levels along the proposed construction haul route. Sensitive receivers would be subject to increased noise levels associated with haul trucks on haul route roadways. Table 8 provides noise level data for existing traffic and existing traffic plus haul route traffic.

Table 8. Haul Route Traffic Noise

Road Segment	Existing Traffic Noise Level (peak-hour L_{eq} dBA) [a]	Existing Traffic plus Haul Route Traffic Noise Level (peak-hour L_{eq} dBA) [a]	Project-Related Increase (dB) [a]
Campus Drive between Big Springs Road and Aberdeen Drive	56	60	4
Aberdeen Drive between Campus Drive and Linden Street	57	60	3
Linden Street between Aberdeen Drive and Iowa Avenue	64	65	1
Iowa Avenue between Linden Street and Martin Luther King Boulevard	71	71	0

[a] Noise levels rounded to the nearest whole number.

Sources: FHWA 2008, City of Riverside 2011, Kunzman Associates 2010.

The proposed project's haul traffic would increase noise levels along the haul route compared with existing modeled conditions. Traffic noise increases would range from 4 dB along Campus Drive to 1 dB along Linden Street. Iowa Avenue would increase marginally but not more than 1 dB. The proposed haul route traffic would not increase noise levels along these roadways more than 10 dBA. Therefore, the impacts would be less than significant.

Noise from Project Operation

Implementation of the proposed project would result in noise from ongoing operations associated with the proposed parking structure and typical college campus activities (e.g., students talking and various student activities). Other noises would be generated by traffic traveling to and from the site on adjacent roadways as well as the HVAC equipment. Predicted noise levels from these sources are discussed in the following sections.

Off-site Traffic Noise

Project-related traffic has the potential to affect noise levels in the surrounding area. Traffic noise levels at existing noise-sensitive receivers were modeled using FHWA's lookup tables, which are based on FHWA's TNM® computer model. The parameters used to estimate vehicular traffic noise were the typical distance between the roadway centerline and the receiver, the typical average daily traffic volumes and posted speed limits, and the percentages of automobiles, medium trucks, buses, motorcycles, and heavy trucks.

Noise from motor vehicle traffic associated with the proposed project was analyzed using the data from the project's traffic study (Kunzman Associates 2010). Average daily traffic volumes[8] for the existing-year, opening-year (2013) without-project, opening-year (2013) with-project, without-project (2015), and with-project (2015) scenarios were used to predict changes in traffic noise along roadway segments with sensitive receptors that would be affected by project traffic. The segments modeled in the traffic analysis and this noise analysis were

- Big Springs Road between Watkins Drive and Valencia Hills Drive, and
- Watkins Road between Big Springs Road and Valencia Hills Drive.

Modeled receivers included the on- and off-campus noise measurement locations (ST-3, ST-4, and ST-7) and two additional modeled-only receivers (MR-1 and MR-2).[9] Modeled on-campus receivers included an area next to the Glen Mor 1 residence hall (ST-7), which currently receives some traffic noise from Watkins Drive, and an area adjacent to the Lothian residence hall (MR-2), which currently receives some traffic noise from Big Springs Road. The modeled receiver locations are shown in Figure 3. These locations were modeled to assess changes in noise levels along roadways in the project area.

The modeled traffic noise levels for the existing-year scenario are presented in Table 9. The existing traffic noise levels at off-campus noise-sensitive land uses were found to range from approximately 45 dBA CNEL at ST-2, ST-5, and ST-6 (residences east of the project site along Valencia Hills Drive) to approximately 55 dBA CNEL at ST-3 and ST-4 (apartments along Big Springs Road).

Opening-year (2013) without-project and opening-year with-project traffic noise levels also were modeled using the TNM® lookup tables (see Table 9). As shown in Table 9, below, opening-year with-project noise levels at off-campus receivers would be highest (56 dBA CNEL) at ST- 4. No off-campus receiver would experience a 5 dBA project-related increase due to project-related traffic during the opening year.

LRPD buildout-year (2015) without-project and with-project traffic noise levels are also presented in Table 9, below. As shown in the table, LRDP buildout with-project noise levels at off-campus receivers would be highest (58 dBA CNEL) at ST-3 and ST-4. No off-campus receiver would experience a 5 dBA project-related increase due to project-related traffic during the opening year.

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[8] Average daily traffic volumes were not provided in the traffic study; therefore, the project assumed that the peak-hour traffic volumes presented in the traffic analysis were representative of 10 percent of the average daily traffic volumes.

[9] ST-1, ST-2, and ST-6 are not shown in this table because no project-related operational traffic would use Valencia Hill Drive because of the presence of a barricade. No project-related driveways would be located along Valencia Hills Drive at the completion of the proposed project.

Table 9. Modeled Traffic Noise Levels

Receptor #	Receptor Location	Modeled Existing Noise Level (dBA CNEL)	Modeled Opening-Year (2013) Without-Project Noise Level (dBA CNEL)	Modeled Opening-Year (2013) With-Project Noise Level (dBA CNEL)	Estimated Increase: Modeled Opening Year with Project – Modeled Existing (dB)	Modeled LRDP Buildout-Year (2015) Without-Project Noise Level (dBA CNEL)	Modeled LRDP Buildout-Year (2015) With-Project Noise Level (dBA CNEL)	Estimated Increase: Modeled Opening Year with Project – Modeled Existing (dB)	Criterion Noise Level (dBA CNEL) (exterior/interior noise level)
ST-3	277 W Big Springs Drive (pool)	55	55	55	0	57	58	3	65
ST-4	277 W Big Springs Drive (apt.)	55	55	56	1	57	58	3	65
ST-7	Glen Mor 1 Residence Hall	36	36	37	1	38	39	1	65
MR-1	3653 Watkins Drive	52	52	52	0	54	55	3	65
MR-2	Lothian Residence Hall	41	41	42	1	43	43	2	65

Source: FHWA, 2008.

Table 9 shows the existing, the with- and without-project opening-year, and the with- and without-project LRDP buildout-year noise levels for on-campus measurement locations ST-7 and MR-2. ST-7 is located at the existing Glen Mor 1 dormitories, just north of the project site. MR-2, a modeled-only location, is located west of the project site at the Lothian residence hall. According to the traffic noise modeling, noise from existing traffic at both receivers (ST-7 and MR-2) is 36 and 41 dBA CNEL, respectively. Opening-year traffic noise is not anticipated to increase beyond those levels. With the inclusion of project traffic, there would be a 1 dB increase at each on-campus location. LRDP buildout-year without-project noise levels would be 38 and 43 dBA CNEL at ST-7 and MR-2, respectively. With the inclusion of the proposed project, noise levels would be expected to increase to 39 at ST-7 but would remain at 43 dBA at MR-2.

Because project-related traffic noise is not anticipated to increase ambient noise levels by 5 dB CNEL or greater, impacts associated with increased traffic from the proposed project would be less than significant.

Parking Structure Noise

The project site currently features a surface parking lot that generates noise due to typical parking lot functions, such as car doors slamming, engine start-ups, remote keyless entry systems, and cars driving away. These noises are received by nearby on- and off-campus receivers. Table 10 shows the estimated L_{max} noise level generated by these individual events at a reference distance of 50 feet from the edge of the existing parking lot. The table also shows the estimated L_{eq} for the parking lot as a whole, as measured at a 50-foot distance from the nearest off-campus receiver (ST-4) and two representative on-campus receivers (ST-7 and MR-2). All noise levels, as received by the respective receivers, represent noise from the acoustical center. (The distances used to calculate the acoustical center for the parking lot are shown below in Table 10.)

The project proposes a multi-level parking structure. This would generate parking-related noises, similar to those of the existing parking lot. The parking structure would accommodate a greater number of cars than the existing surface lot. Table 11 presents the same information as Table 10 but for the proposed parking structure, including data for L_{eq} at 50 feet from the edge of the proposed structure and from ST-4, ST-7, and MR-2. These noise levels represent noise generated at the estimated acoustical center of the structure (see Table 10). Note that the acoustical center of the parking structure is closer to the off-campus receptor than the existing surface lot but farther away from the two on-campus receivers.

Table 10. Operational Noise from Existing Parking Lot

Noise Source	L_{max} @ 50 Feet	Duration of Event (Seconds)	Existing Number of events per hour	Duration of Events (Seconds)	Correction for Duration of Events (dB)	Estimated Hourly Noise Level	Estimated Existing Average Noise Level: 50 Feet (dBA L_{eq})	ST-4 (dBA L_{eq})[1]	ST-7/MR-2 (dBA L_{eq})[2]
Door Slam	57	0.1	240	24	-22	35			
Car Start-up	61	1	240	240	-12	49			
Car Backing Out	55	5	240	1200	-5	50			
Remote Keyless Entry	64	1	120	120	-15	49			
Car Driving Away	62	5	240	1200	-5	57			
TOTAL							**59**	**41**	**39/41**

Notes:
[1] The closest off-campus sensitive receiver.
[2] On-campus receivers.
Source: Wieland Associates, 2007.

Table 11. Operational Noise from Proposed Parking Structure

Noise Source	L_{max} @ 50 Feet	Duration of Event (Seconds)	Future Number of events per hour	Total Duration of Events (Seconds)	Correction for Duration of Events (dB)	Estimated Hourly Noise Level	Estimated Future Proposed Average Noise Level: 50 Feet (dBA L_{eq})	ST-4 (dBA L_{eq})[1]	ST-7/MR-2 (dBA L_{eq})[2]
Door Slam	57	0.1	320	32	-21	36			
Car Start-up[1]	61	1	320	320	-11	50			
Car Backing Out	55	5	320	1600	-4	51			
Remote Keyless Entry	64	1	160	160	-14	50			
Car Driving Away	62	5	320	1600	-4	58			
TOTAL							**60**	**45**	**41/37**

Notes:
[1] The closest off-campus sensitive receiver.
[2] On-campus receivers.
Source: Wieland Associates, 2007.

The acoustical centers of the existing parking lot (379 feet) and the proposed parking structure (270 feet) were used to analyze parking noise for off-campus receivers. For on-campus receivers ST-7 and MR-2, the acoustical centers of the existing parking lot (509 and 412 feet, respectively) and the proposed parking structure (466 and 725 feet, respectively) were used to analyze parking noise. Table 12 shows the calculations for the acoustical center for the closest off-campus receiver and the closest on-campus receivers.

Table 12. Parking Structure Acoustical Center Noise

	Existing Parking Lot			Proposed Parking Structure		
Receiver	Closest Distance to Receiver (ft)	Farthest Distance to Receiver (ft)	Acoustical Center[a]	Farthest Distance to Receiver (ft)	Farthest Distance from Receiver (ft)	Acoustical Center[a]
ST-4	150	960	379	140	515	270
ST-7	450	575	509	395	550	466
MR-2	175	970	412	565	930	725

Note:

[a] Rounded to the nearest whole foot.

This analysis considers a conservative scenario in which the design of the parking structure offers no acoustical shielding, though, in reality, features such as finished grades, exterior walls, internal columns, and angled parking levels and ramps would serve to lessen noise emitted from within the structure. The analysis also assumes a conservative scenario in which 50 percent of the parking spaces (both in the existing parking lot and the proposed parking structure) would be vacated within 1 hour and 50 percent of the vacating vehicles would have remote keyless entry systems that would beep or honk to indicate that the doors have been locked or unlocked.

Table 10 shows that the noise level from the existing parking lot is estimated to be 59 dBA L_{eq} at a distance of 50 feet. Table 11 shows that the noise level from the proposed parking structure is anticipated to increase to 60 dBA L_{eq} at a distance of 50 feet. Using the distance from the acoustic center of the existing parking lot (379 feet) and the proposed parking garage (270 feet) to the closest off-campus sensitive receiver, the estimated noise levels would be 41 dBA L_{eq} for the existing parking lot and 45 dBA L_{eq} for the proposed parking garage. This 4 dB increase in the noise level would be due to the location of the parking structure, which would be closer to the off-campus receiver, and an increase in the number of events. However, this 4 dB increase is below the 5 dB threshold used to identify significant impacts.

It should also be noted that the existing noise level, as measured during field measurements, was higher than the modeled result for the parking lot and parking structure. This is because ambient conditions include additional noise sources beyond the parking structure. At receiver ST-4, for instance, the existing measured noise level was approximately 50 dBA L_{eq}, which is higher than the modeled 44 dBA level. The increase from the parking structure would result in only a 1 dB increase over the ambient noise level under actual conditions, resulting in a noise level of 51 dBA L_{eq} at receiver ST-4.[10] This is below the 5 dB increase threshold. Therefore, impacts on off-campus receivers from the proposed parking garage would be less than significant.

[10] Noise is not additive like normal arithmetic values. Noise is based on a logarithmic scale; therefore, a noise source of 50 dBA plus a second noise source of 50 dBA would not equal 100 dBA. The resultant noise level would increase 3 dB to 53 dBA.

Tables 10 and 11 show noise levels using the distance from the acoustic center of the existing parking lot (509 feet for ST-7 and 412 feet for MR-2) and the proposed parking structure (466 feet for ST-7 and 725 feet for MR-2) to the closest on-campus sensitive receivers. Noise modeling estimates noise levels of 39 dBA L_{eq} and 41 dBA L_{eq}, respectively, for the existing parking lot and 41 and 37 dBA L_{eq}, respectively, for the proposed parking structure at modeled on-campus receivers. This would represent a 2 dB increase at ST-7 and a 4 dB reduction at MR-2 from the existing parking lot noise level. These levels are below the 5 dBA threshold identified in the LRDP EIR. Impacts on on-campus receivers from the proposed parking structure would be less than significant.

It should be noted that parking areas also produce noise from sources that are less predictable and quantifiable, such as car alarms, car stereos, and students talking in common areas. These noise sources are generated at the existing parking lot and would be generated at the proposed structure as well. Because these noise sources are highly variable, the noise levels would depend on factors such as the type of alarm or stereo, distance, shielding, volume, or number of people in the common area. Because the project-related parking structure would house more cars than the existing surface lot, instances of these noise events are likely to increase accordingly. These noise events would be audible at nearby receivers, including on- and off-campus residences, but would be short and intermittent in nature. Though these types of noises may be perceived as a nuisance at affected receivers, they would not represent a significant increase in the overall noise level.

Though the parking structure is not anticipated to result in a significant impact, design features could be included that would shield noise-sensitive off-campus receivers from occasional nuisance noise that is likely to be generated at the parking structure. The east-facing side of the proposed parking structure could be constructed as a solid wall, which would shield noise directed at sensitive receivers located to the east of the campus along Valencia Hill Drive.

On-site Stationary Noise

HVAC units would be installed at the new residential dormitories on the project site. These units could increase noise levels at surrounding noise-sensitive receivers. The campus shields all new stationary sources of noise, such as HVAC systems, to limit noise levels received by on- and off-campus residences. No other on-site sources would generate noise that would affect on- or off-campus areas. Therefore, impacts from on-site stationary noise would be less than significant.

Vibration

Vibration could occur from heavy equipment and trucks associated with construction and operations. Vibration levels from typical construction equipment, which could be used for the proposed project, are presented in Table 13.

Table 13. Typical Vibration from Construction Equipment

Equipment	Approximate Lv[1] at 25 Feet
Large Bulldozer	87
Loaded Trucks	86
Vibratory Roller	94

[1] RMS velocity in decibels (Vdb) are 1 micro-inch/second.
Source: FTA, 2006.

Table 13, above, shows the velocity in decibels (Vdb) for construction equipment that would most likely be used for the proposed project, measured at a reference distance of 25 feet. The LRDP EIR vibration threshold is 80 Vdb at locations where people sleep. Vibration levels were analyzed using the acoustical centers for construction noise at the closest off-campus sensitive receiver (ST-4) and on-campus sensitive receivers (ST-7 and MR-2), 366 , 364, and 123 feet, respectively. Vibration levels from the largest piece of equipment (a vibratory roller) would be approximately 73 Vdb at MR-2, which is the closest sensitive receiver, well below the LRDP threshold. However, based on the preliminary grading diagram, construction equipment could be as close as 16 feet to the Lothian dormitory (MR-2). At this distance vibration levels would be approximately 100 Vdb. This vibration level would be significantly above the 80 Vdb threshold in the LRDP EIR. A vibration level of this magnitude would be considered to be a significant impact on on-campus receivers and would require mitigation.

Mitigation Measures

Construction Noise Control Measures

The analysis above concludes that noise from project construction would be received by both on- and off-campus receivers and that noise levels would increase by more than 10 dBA L_{eq} for more than 1 hour. In addition, noise levels would vary over time, depending on the construction phase.

This analysis provides a conservative estimate of the noise levels that would be received during the most intensive periods of project construction, with several construction phases overlapping. Although the noise would cease once project construction is complete, the increased noise would exceed the significance threshold identified in the LRDP EIR. Accordingly, mitigation is warranted to reduce noise impacts. The LRDP EIR identifies programs and practices and mitigation measures that UCR is committed to implement during on-campus construction. LRDP EIR measures pertaining to construction are listed below.

Program and Practice 4.10-2: The UCR campus shall limit the hours of exterior construction activities to the hours between 7:00 a.m. and 9:00 p.m. Monday through Friday and, when necessary, 8:00 a.m. and 6:00 p.m. on Saturday. Construction traffic shall follow the transportation routes prescribed for all construction traffic to minimize the impacts of this traffic (including noise impacts) on the surrounding community.

This measure, along with Program and Practice 4.10-7(a), which identifies identical time restrictions for project construction, would be incorporated into the project. These measures provide construction time limits and coordination measures. Although they would not actually reduce noise levels, they would limit noise to periods when it would be generally less obtrusive to sensitive receivers.

Program and Practice 4.10-7(b): The campus shall continue to require, by contract specification, that construction equipment be muffled or otherwise shielded. Contracts shall specify that engine-driven equipment shall be fitted with appropriate noise mufflers.

Program and Practice 4.10-7(c): The campus shall continue to require stationary construction equipment and vehicle staging to be placed so that noise is directed away from sensitive receptors.

These measures would be incorporated into project construction and would result in a minor reduction in construction noise levels received by on- and off-campus receivers. However, the noise reduction achieved by these measures would be limited. Project construction would still result in an increase in noise levels of more than 10 dB, and the project would still result in a significant impact.

Program and Practice 4.10-7(d): The campus shall continue to conduct regular meetings, as needed, with on-campus constituents to provide advance notice of construction activities and coordinate these activities with the academic calendar, scheduled events, and other situations, as needed.

Program and Practice 4.10-8: The campus shall continue to conduct meetings, as needed, with off-campus constituents who are affected by campus construction to provide advance notice of construction activities and ensure that the mutual needs of the particular construction project and of those affected by construction noise are met to the extent feasible.

These two campus- and public-coordination measures would be incorporated into the project but would not reduce noise levels generated by project construction.

In addition to the LRDP measures identified above, the measures listed below should be incorporated into project contract specifications to minimize construction noise to the extent practicable.

1. All noise-producing construction equipment and vehicles using internal combustion engines will be equipped with mufflers; air-inlet silencers, where appropriate; and any other shrouds, shields, or other noise-reducing features in good operating condition that meet or exceed original factory specification. Mobile or fixed “package” equipment (e.g., arc-welders, air compressors) will be equipped with shrouds and noise-control features that are readily available for that type of equipment.
2. Electrically powered equipment will be used instead of pneumatic or internal combustion powered equipment, where feasible.
3. Material stockpiles and mobile equipment staging, parking, and maintenance areas will be located as far as practicable from noise-sensitive receptors.
4. Construction site and access road speed limits will be established and enforced during the construction period.
5. The use of noise-producing signals, including horns, whistles, alarms, and bells, will be for safety warning purposes only.

6. No project-related public address or music system will be audible at any adjacent receptor.
7. The on-site construction supervisor will have the responsibility and authority to receive and resolve noise complaints. A clear appeal process to a designated campus representative will be established prior to construction commencement that will allow for resolution of noise problems that cannot be immediately solved by the site supervisor.

These measures would be incorporated into project construction and result in a minor reduction in construction noise levels received by on- and off-campus receivers, but construction would still result in an increase in noise levels of more than 10 dB, and the project would still result in a significant impact.

Construction Vibration Control Measures

The analysis presented above concludes that project construction would result in a significant vibration impact at on-campus residences. The LRDP EIR identifies the following mitigation measure for vibration:

Mitigation Measure 4-10-2(a): The campus shall notify all academic and residential facilities within 300 feet of approved construction sites of the planned schedule of vibration-causing activities so that occupants and/or researchers can take necessary precautionary measures to avoid negative effects on their activities and/or research.

This campus coordination measure would be incorporated into the project but would not reduce vibration levels. Therefore, this impact would remain significant. In addition to the LRDP EIR mitigation measure, the following mitigation measure should be incorporated into project construction to ensure that vibration levels received by on-campus residences would be less than significant:

- During construction, no high-vibration construction equipment (e.g., vibratory rollers) shall be permitted within 75 feet of the Lothian dormitory when the dormitory is occupied. If it is necessary for high-vibration construction equipment to encroach within 75 feet, a qualified vibratory specialist shall be contracted to monitor vibration levels at the Lothian dormitory. If vibration levels exceed 80 Vdb, high-vibration construction activities within 75 feet of the Lothian dormitory shall cease until such time that vibration impacts can be adequately addressed.

Operational Mitigation Measures

The project, as proposed, would not result in significant operational noise impacts. Noise levels at all sensitive receivers would be below thresholds that would require mitigation. No mitigation measures are prescribed, and impacts would be less than significant.

References

California Department of Transportation. 1998. *Technical Noise Supplement (TeNS), A Technical Supplement to the Traffic Noise Analysis Protocol.* Environmental Program, Environmental Engineering—Noise, Air Quality, and Hazardous Waste Management Office. October. Sacramento, CA.

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Federal Highway Administration. 2008. *FHWA Roadway Construction Noise Model, Version 1.1.* U.S. Department of Transportation. Washington, D.C.

Federal Transit Administration. 2006. *Transit Noise and Vibration Impact Assessment.* May. Prepared for the Office of Planning and Environment. Washington, D.C.

Kunzman Associates. 2010. *University of California Riverside Glen Mor 2 Student Apartments Project, Traffic Impact Analysis*. December. Orange, CA.

Wieland Associates. 2007. *Environmental Noise Study for the Proposed City Place Sky Lofts in the City of Santa Ana.* (929-07.) Irvine, CA. Prepared for P&D Consultants. Orange, CA.

Personal Communication

Derouin, Mike. Project manager. Barnhart Balfour Beatty, Los Angeles, CA. October 27, 2010—email.

APPENDICES

Appendix A: Field Data Sheets

FIELD NOISE MEASUREMENT DATA

Jones & Stokes

PROJECT: **UCR Glen Mor 2** PROJ. #:

SITE IDENTIFICATION: ST-1 / ST-2 OBSERVER(S): Peter Hardie
ADDRESS: UCR INTRAMURAL FIELD CORNER WATKINS / VAL HILL
START DATE / TIME: 5-26-10 7:09 END DATE / TIME:

METEROLOGICAL CONDITIONS:
TEMP: 67 °F HUMIDITY: 44.5 %R.H. WIND: CALM **LIGHT** MODERATE VARIABLE
WINDSPEED: 3-5 MPH DIR: N NE E SE S SW **W** NW STEADY GUSTY
SKY: ~~SUNNY~~ **CLEAR** OVRCST PRTLY CLOUDY FOG RAIN OTHER:

ACOUSTIC MEASUREMENTS:
INSTRUMENT: LD 812 TYPE: **1** 2 SERIAL #: 0432
CALIBRATOR: CAL 200 SERIAL #: 6644
CALIBRATION CHECK: PRE-TEST 94 dBA SPL POST-TEST 94 dBA SPL WINDSCREEN ✓

SETTINGS: **A-WEIGHTED** **SLOW** FAST FRONTAL **RANDOM** **ANSI** OTHER:

REC #	START	END	L_{eq}	L_{max}	L_{min}	L_{90}	L_{50}	L_{10}	OTHER:	(TYPE?)
ST-1	7:09	7:24	57.3	79.5	46.1	48.3	51.6	60.3		
ST-2	7:28	7:43	52.6	66.7	45.6	47.4	49.1	54.1		

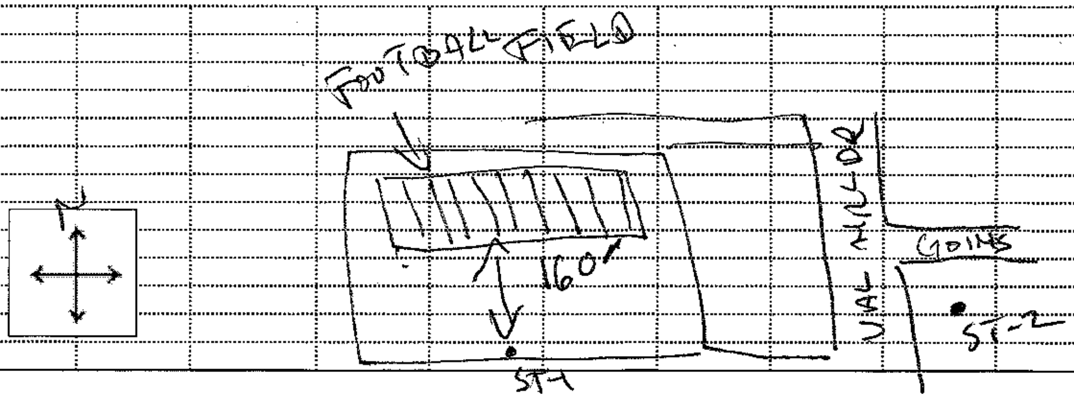
COMMENTS: NOISES INCLUDE PEOPLE CHEERING + FOOT BALL PLAYERS. REFS WHISTLES

SOURCE INFO AND TRAFFIC COUNTS:
PRIMARY NOISE SOURCE: TRAFFIC AIRCRAFT RAIL INDUSTRIAL **AMBIENT** **OTHER:** INTRAMURAL FOOT BALL GAME / MUSIC
ROADWAY TYPE:
TRAFFIC COUNT DURATION: ___-MIN SPEED #2 COUNT SPEED

	NB / EB	SB / WB	NB / EB	SB / WB	NB / EB	SB / WB	NB / EB	SB / WB
AUTOS:								
MED. TRUCKS:								
HVY TRUCKS:								
BUSES:								
MOTORCYCLES:								

SPEED ESTIMATED BY: RADAR / DRIVING / OBSERVER
OTHER SOURCES: ~~DIST. AIRCRAFT~~ / **RUSTLING LEAVES** / DIST. BARKING DOGS / **BIRDS** / DIST. INDUSTRIAL
DIST. CHILDREN PLAYING / ~~DIST. TRAFFIC~~ / DIST. LANDSCAPING ACTIVITIES / OTHER:

DESCRIPTION / SKETCH:
TERRAIN: HARD SOFT **MIXED** FLAT OTHER:
PHOTOS:
OTHER COMMENTS / SKETCH:



→ 1ST 3 MINS WERE HALF TIME OF THE GAME. NOISE LEVEL WAS 49.7.

3624 VALENCIA HILLS DR → MAJOR NOISE SOURCES HERE - U 216

FIELD NOISE MEASUREMENT DATA

Jones & Stokes

PROJECT: **UCR Glen Mor 2** PROJ. #:

SITE IDENTIFICATION: ST-3
ADDRESS:
START DATE / TIME: 10-45 5-27-10
OBSERVER(S): Peter Hardie
END DATE / TIME:

METEROLOGICAL CONDITIONS:
TEMP: ~~65~~ °F 70 HUMIDITY: 40.5 %R.H. WIND: **CALM** **LIGHT** **MODERATE** **VARIABLE**
WINDSPEED: 0-2 MPH DIR: **N NE E SE S SW W NW** **STEADY** **GUSTY**
SKY: **SUNNY** **CLEAR** **OVRCST** **PRTLY CLOUDY** **FOG** **RAIN** **OTHER:**

ACOUSTIC MEASUREMENTS:
INSTRUMENT: LD 812 TYPE: 1 2 SERIAL #: 6432
CALIBRATOR: CAL 200 SERIAL #: 6654
CALIBRATION CHECK: PRE-TEST 93.5 dBA SPL POST-TEST 93.8 dBA SPL WINDSCREEN ✓

SETTINGS: **A-WEIGHTED** **SLOW** **FAST** **FRONTAL** **RANDOM** **ANSI** **OTHER:**

REC #	START	END	L_{eq}	L_{max}	L_{min}	L_{90}	L_{50}	L_{10}	OTHER:	(TYPE?)
ST-3	10:45	11:00	52.0	68.4	44.0	45.3	48.8	55.6		

COMMENTS: MAIN NOISE SOURCE IS CARS ON RDWAY

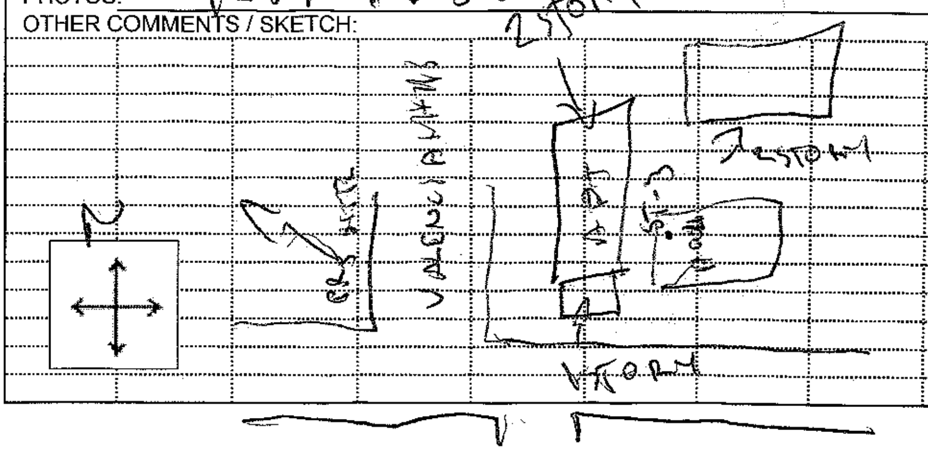
SOURCE INFO AND TRAFFIC COUNTS:
PRIMARY NOISE SOURCE: **TRAFFIC** **AIRCRAFT** **RAIL** **INDUSTRIAL** **AMBIENT** **OTHER:**
ROADWAY TYPE:
TRAFFIC COUNT DURATION: ____-MIN

	NB / EB	SB / WB	SPEED NB / EB	SPEED SB / WB	#2 COUNT NB / EB	#2 COUNT SB / WB	SPEED NB / EB	SPEED SB / WB
AUTOS:	810	32						
MED. TRUCKS:								
HVY TRUCKS:								
BUSES:								
MOTORCYCLES:								

SPEED ESTIMATED BY: RADAR / DRIVING / OBSERVER

OTHER SOURCES: **DIST. AIRCRAFT / RUSTLING LEAVES / DIST. BARKING DOGS / BIRDS / DIST. INDUSTRIAL / DIST. CHILDREN PLAYING / DIST. TRAFFIC / DIST. LANDSCAPING ACTIVITIES / OTHER:**

DESCRIPTION / SKETCH:
TERRAIN: **HARD** **SOFT** **MIXED** **FLAT** **OTHER:**
PHOTOS: 1234 NE S W
OTHER COMMENTS / SKETCH:



FIELD NOISE MEASUREMENT DATA

Jones & Stokes

PROJECT: **UCR Glen Mor 2** PROJ. #

SITE IDENTIFICATION: ST-4 OBSERVER(S): Peter Hardie
ADDRESS: UNIVERSITY VILLAGE APTS.
START DATE / TIME: 11:08 5-27-10 END DATE / TIME:

METEROLOGICAL CONDITIONS:
TEMP: 68 °F HUMIDITY: 38 %R.H. WIND: **CALM LIGHT MODERATE VARIABLE**
WINDSPEED: 0-2 MPH DIR: **N NE E SE S SW W NW** **STEADY GUSTY**
SKY: **SUNNY CLEAR OVRCST PRTLY CLOUDY FOG RAIN OTHER:**

ACOUSTIC MEASUREMENTS:
INSTRUMENT: LD 812 TYPE: 1 2 SERIAL #: 0432
CALIBRATOR: CAL 200 SERIAL #: 1664
CALIBRATION CHECK: PRE-TEST 93.8 dBA SPL POST-TEST 94.2 dBA SPL WINDSCREEN ✓

SETTINGS: **A-WEIGHTED SLOW FAST FRONTAL RANDOM ANSI OTHER:**

REC #	START	END	L_{eq}	L_{max}	L_{min}	L_{90}	L_{50}	L_{10}	OTHER:	(TYPE?)
ST-4	11:08	11:23	49.6	60.4	43.6	45.4	48.1	52.7		

COMMENTS: I-215 IS AUDIBLE & SEEN [illegible]

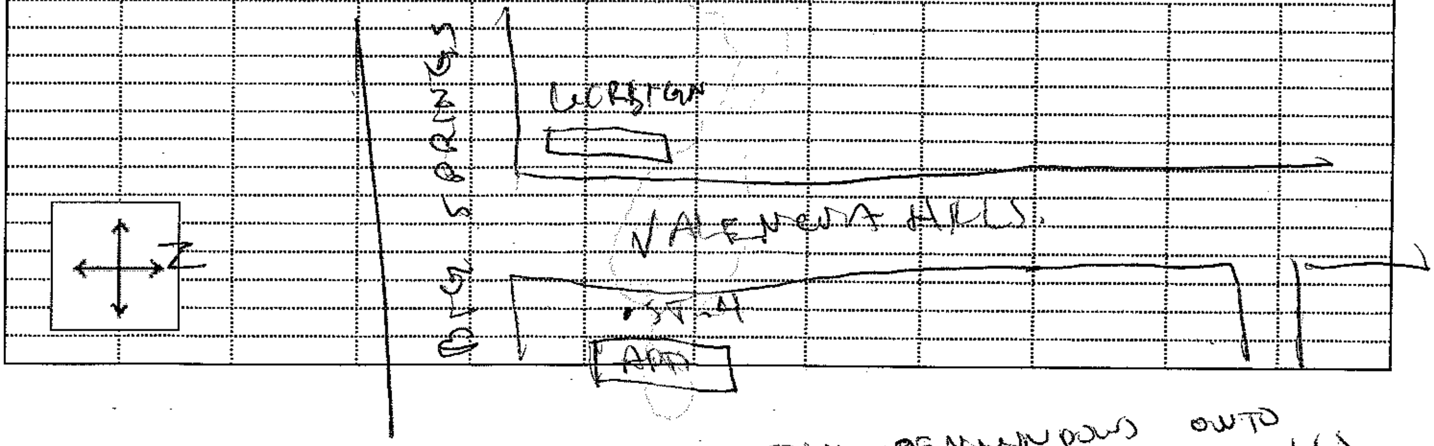
SOURCE INFO AND TRAFFIC COUNTS:
PRIMARY NOISE SOURCE: **TRAFFIC AIRCRAFT RAIL INDUSTRIAL AMBIENT OTHER:**
ROADWAY TYPE:
TRAFFIC COUNT DURATION: -MIN SPEED #2 COUNT SPEED

	NB / EB	SB / WB	NB / EB	SB / WB	NB / EB	SB / WB	NB / EB	SB / WB
AUTOS:	26	17						
MED. TRUCKS:								
HVY TRUCKS:								
BUSES:								
MOTORCYCLES:								

SPEED ESTIMATED BY: **RADAR / DRIVING / OBSERVER**

OTHER SOURCES: **DIST. AIRCRAFT / RUSTLING LEAVES / DIST. BARKING DOGS / BIRDS / DIST. INDUSTRIAL DIST. CHILDREN PLAYING / DIST. TRAFFIC / DIST. LANDSCAPING ACTIVITIES / OTHER:**

DESCRIPTION / SKETCH:
TERRAIN: **HARD SOFT MIXED FLAT OTHER:**
PHOTOS: 5678 NBSW
OTHER COMMENTS / SKETCH:



APTS HAS OPEN WINDOWS ONTO VALENCIA HILLS

FIELD NOISE MEASUREMENT DATA

Jones & Stokes

PROJECT: UCR Glen Mor 2 PROJ. #

SITE IDENTIFICATION: ST-5
ADDRESS: 3706 VALENCIA HILLS DR
START DATE / TIME: 11:39 5-27-10
OBSERVER(S): Peter Hardie
END DATE / TIME:

METEROLOGICAL CONDITIONS:
TEMP: 70 °F HUMIDITY: 41 %R.H. WIND: CALM LIGHT MODERATE VARIABLE
WINDSPEED: 0-2 MPH DIR: N NE E SE S SW W NW STEADY GUSTY
SKY: SUNNY CLEAR OVRCST PRTLY CLOUDY FOG RAIN OTHER:

ACOUSTIC MEASUREMENTS:
INSTRUMENT: LD 812 TYPE: 1 2 SERIAL #: 0432
CALIBRATOR: CAL 200 SERIAL #: 6644
CALIBRATION CHECK: PRE-TEST 94.2 dBA SPL POST-TEST 94.0 dBA SPL WINDSCREEN ✓

SETTINGS: A-WEIGHTED SLOW FAST FRONTAL RANDOM ANSI OTHER:

REC #	START	END	L_{eq}	L_{max}	L_{min}	L_{90}	L_{50}	L_{10}	OTHER:	(TYPE?)	
ST-5	11:39	11:54	48.0	60.7	44.3	45.7	47.1	49.7			

COMMENTS:

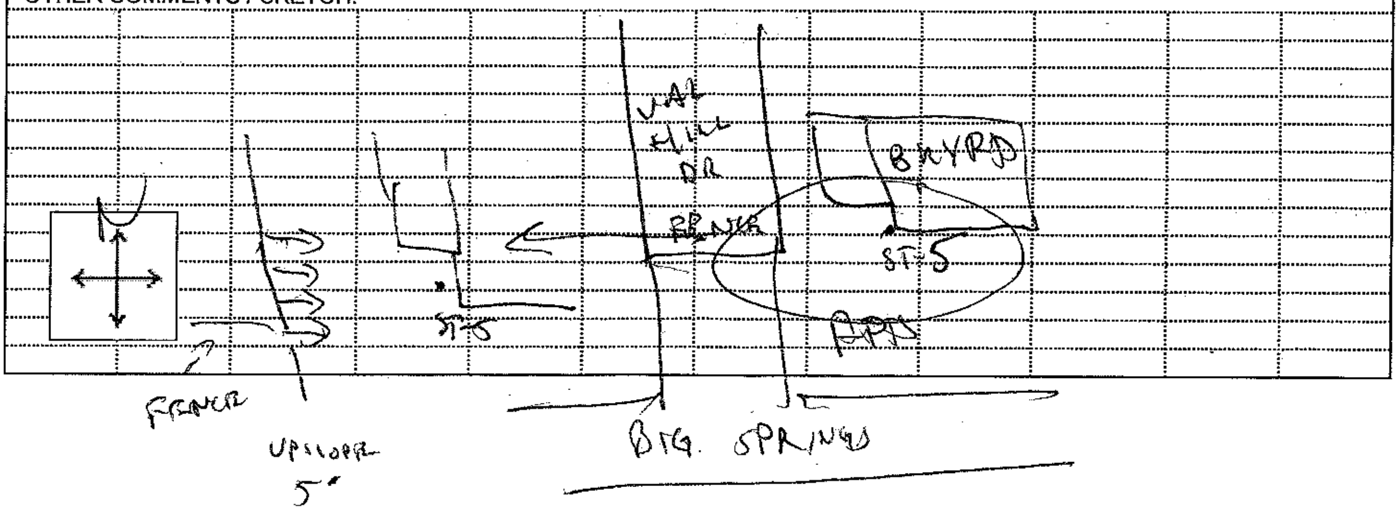
SOURCE INFO AND TRAFFIC COUNTS:
PRIMARY NOISE SOURCE: TRAFFIC AIRCRAFT RAIL INDUSTRIAL AMBIENT OTHER:
ROADWAY TYPE:
TRAFFIC COUNT DURATION: ____-MIN

	NB / EB	SB / WB	SPEED NB / EB	SPEED SB / WB	#2 COUNT NB / EB	#2 COUNT SB / WB	SPEED NB / EB	SPEED SB / WB
AUTOS:								
MED. TRUCKS:								
HVY TRUCKS:								
BUSES:								
MOTORCYCLES:								

SPEED ESTIMATED BY: RADAR / DRIVING / OBSERVER

OTHER SOURCES: DIST. AIRCRAFT / RUSTLING LEAVES / DIST. BARKING DOGS / BIRDS / DIST. INDUSTRIAL
DIST. CHILDREN PLAYING / DIST. TRAFFIC / DIST. LANDSCAPING ACTIVITIES / OTHER:

DESCRIPTION / SKETCH:
TERRAIN: HARD SOFT MIXED FLAT OTHER:
PHOTOS:
OTHER COMMENTS / SKETCH:



FIELD NOISE MEASUREMENT DATA

Jones & Stokes

PROJECT: **UCR Glen Mor 2** PROJ. #

SITE IDENTIFICATION: ST-6
ADDRESS: 3592 VALENCIA HILLS DR
START DATE / TIME: 12:02 5-27-10
OBSERVER(S): Peter Hardie
END DATE / TIME:

METEROLOGICAL CONDITIONS:
TEMP: 72 °F HUMIDITY: 43 %R.H. WIND: **CALM LIGHT MODERATE VARIABLE**
WINDSPEED: 0-3 MPH DIR: **N NE E SE S SW W NW** **STEADY GUSTY**
SKY: **SUNNY CLEAR OVRCST PRTLY CLOUDY FOG RAIN** **OTHER:**

ACOUSTIC MEASUREMENTS:
INSTRUMENT: LD 812 TYPE: 1 2 SERIAL #: 0432
CALIBRATOR: CAL200 SERIAL #: 6644
CALIBRATION CHECK: PRE-TEST 94.0 dBA SPL POST-TEST 94 dBA SPL WINDSCREEN ✓

SETTINGS: **A-WEIGHTED SLOW FAST FRONTAL RANDOM ANSI** **OTHER:**

REC #	START	END	L_{eq}	L_{max}	L_{min}	L_{90}	L_{50}	L_{10}	OTHER:	(TYPE?)	
ST-6	12:02	12:17	49.0	57.4	45.0	47.1	48.4	50.7			

COMMENTS:

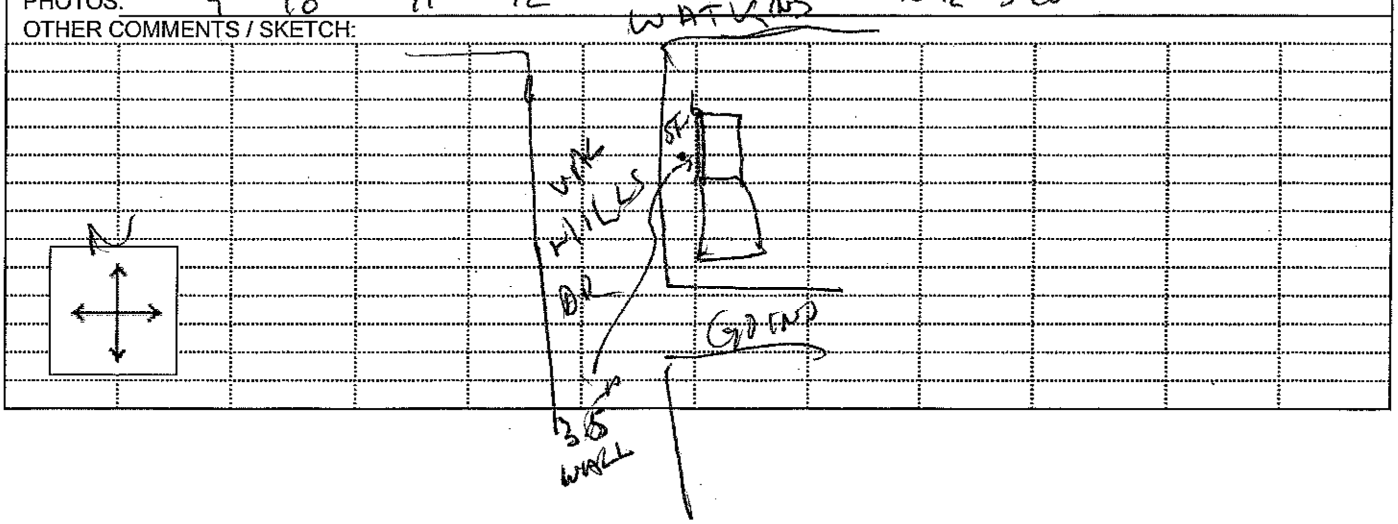
SOURCE INFO AND TRAFFIC COUNTS:
PRIMARY NOISE SOURCE: **TRAFFIC AIRCRAFT RAIL INDUSTRIAL AMBIENT OTHER:**
ROADWAY TYPE:
TRAFFIC COUNT DURATION: -MIN

	NB / EB	SB / WB	SPEED NB / EB	SPEED SB / WB	#2 COUNT NB / EB	#2 COUNT SB / WB	SPEED NB / EB	SPEED SB / WB
AUTOS:		III						
MED. TRUCKS:								
HVY TRUCKS:								
BUSES:								
MOTORCYCLES:								

SPEED ESTIMATED BY: **RADAR / DRIVING / OBSERVER**

OTHER SOURCES: **DIST. AIRCRAFT / RUSTLING LEAVES / DIST. BARKING DOGS / BIRDS / DIST. INDUSTRIAL**
DIST. CHILDREN PLAYING / DIST. TRAFFIC / DIST. LANDSCAPING ACTIVITIES / OTHER:

DESCRIPTION / SKETCH:
TERRAIN: **HARD SOFT MIXED FLAT OTHER:** NE SW
PHOTOS: 9 10 11 12
OTHER COMMENTS / SKETCH:



FIELD NOISE MEASUREMENT DATA

Jones & Stokes

PROJECT: **UCR Glen Mor 2** PROJ. #

SITE IDENTIFICATION: ST-7 OBSERVER(S): Peter Hardie
ADDRESS: IN COMMON AREA OF DORMS
START DATE / TIME: ~~1226~~ 1232 5-27-10 END DATE / TIME:

METEROLOGICAL CONDITIONS:
TEMP: 70 °F HUMIDITY: 45 %R.H. WIND: **CALM LIGHT MODERATE VARIABLE**
WINDSPEED: 0-2 MPH DIR: **N NE E SE S SW W NW** **STEADY GUSTY**
SKY: **SUNNY CLEAR OVRCST PRTLY CLOUDY FOG RAIN OTHER:**

ACOUSTIC MEASUREMENTS:
INSTRUMENT: LD 812 TYPE: 1 2 SERIAL #: 0432
CALIBRATOR: CAL200 SERIAL #: 6644
CALIBRATION CHECK: PRE-TEST 94 dBA SPL POST-TEST 94 dBA SPL WINDSCREEN ✓

SETTINGS: **A-WEIGHTED SLOW FAST FRONTAL RANDOM ANSI OTHER:**

REC #	START	END	L_{eq}	L_{max}	L_{min}	L_{90}	L_{50}	L_{10}	OTHER:	(TYPE?)
ST-7	1232		48.0	58.9	43.6	45.8	46.9	49.2		

COMMENTS:

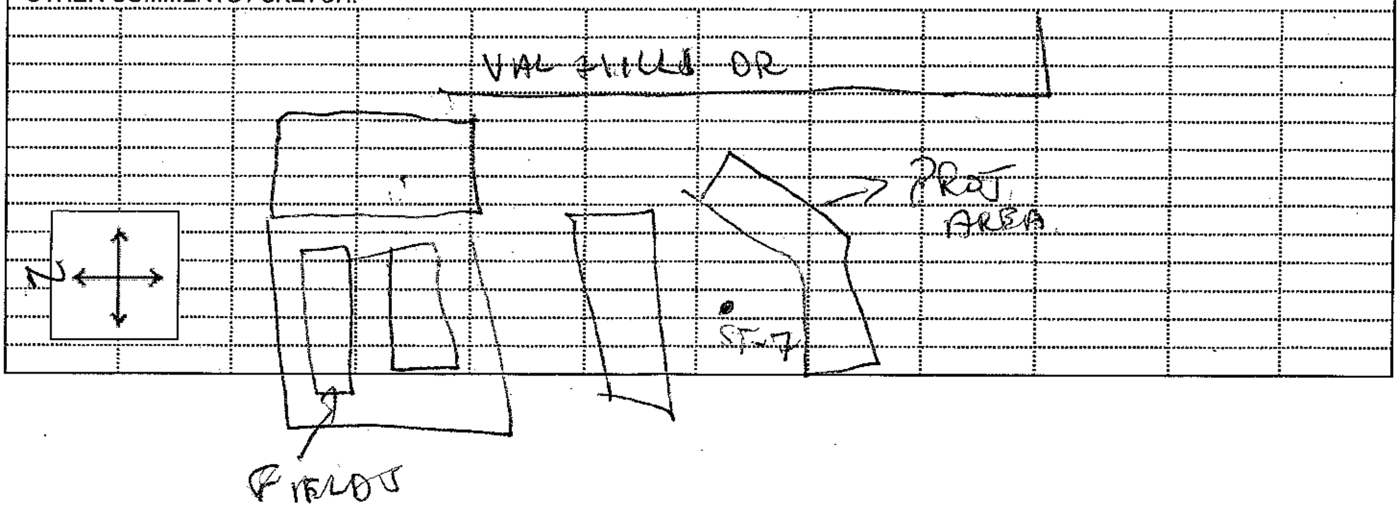
SOURCE INFO AND TRAFFIC COUNTS:
PRIMARY NOISE SOURCE: **TRAFFIC AIRCRAFT RAIL INDUSTRIAL AMBIENT OTHER:** HELICOPTER
ROADWAY TYPE:
TRAFFIC COUNT DURATION: ___-MIN

	NB / EB	SB / WB	SPEED NB / EB	SPEED SB / WB	#2 COUNT NB / EB	#2 COUNT SB / WB	SPEED NB / EB	SPEED SB / WB
AUTOS:								
MED. TRUCKS:								
HVY TRUCKS:								
BUSES:								
MOTORCYCLES:								

SPEED ESTIMATED BY: **RADAR / DRIVING / OBSERVER**

OTHER SOURCES: **DIST. AIRCRAFT / RUSTLING LEAVES / DIST. BARKING DOGS / BIRDS / DIST. INDUSTRIAL DIST. CHILDREN PLAYING / DIST. TRAFFIC / DIST. LANDSCAPING ACTIVITIES / OTHER:**

DESCRIPTION / SKETCH:
TERRAIN: **HARD SOFT MIXED FLAT OTHER:**
PHOTOS: 13 14 15 16 N E S W
OTHER COMMENTS / SKETCH:



Appendix B: List of Field Instrumentation and Calibration Records

List of Field Instrumentation

- **Sound Level Meter** (for short-term noise measurements)
    - Larson Davis Model 812 Type 1 Integrating Sound Level Meter, Serial Number 0432
    - Preamplifier, Model 828, Serial Number 1368
    - Random Incidence Microphone Model 2559, Serial Number 2496
- **Acoustical Calibrators**
    - Larson Davis Model Ca 200 (114 dB SPL @ 250 Hz). Serial Number 0125.
- **Meteorology Instrumentation**
    - Kestrel Model K3000 Digital Hygrometer/Thermometer/Anemometer, Serial Number 475332
- **Other Equipment**
    - Handheld Traffic Tally Counters

PCB PIEZOTRONICS
A PCB GROUP COMPANY

Certificate of Calibration and Conformance

Certificate Number 2010-134175

Instrument Model 812, Serial Number 0432, was calibrated on 16SEP2010. The instrument meets factory specifications per Procedure D0001.8160, ANSI S1.4 1983, IEC 651-Type 1 1979, and IEC 804-Type 1 1985.

Instrument found to be in calibration as received: YES
Date Calibrated: 16SEP2010
Calibration due:

Calibration Standards Used

MANUFACTURER	MODEL	SERIAL NUMBER	INTERVAL	CAL. DUE	TRACEABILITY NO.
Larson Davis	LDSigGn/2209	0277 / 0109	12 Months	24MAR2011	2010-127832

Reference Standards are traceable to the National Institute of Standards and Technology (NIST)

Calibration Environmental Conditions

Temperature: 23 ° Centigrade

Relative Humidity: 29 %

Affirmations

This Certificate attests that this instrument has been calibrated under the stated conditions with Measurement and Test Equipment (M&TE) Standards traceable to the U.S. National Institute of Standards and Technology (NIST). All of the Measurement Standards have been calibrated to their manufacturers' specified accuracy / uncertainty. Evidence of traceability and accuracy is on file at Provo Engineering & Manufacturing Center. An acceptable accuracy ratio between the Standard(s) and the item calibrated has been maintained. This instrument meets or exceeds the manufacturer's published specification unless noted.

This calibration complies with the requirements of ISO 17025 and ANSI Z540. The collective uncertainty of the Measurement Standard used does not exceed 25% of the applicable tolerance for each characteristic calibrated unless otherwise noted.

The results documented in this certificate relate only to the item(s) calibrated or tested. A one year calibration is recommended, however calibration interval assignment and adjustment are the responsibility of the end user. This certificate may not be reproduced, except in full, without the written approval of the issuer.

"As received" data is the same as shipped data.
Tested with 828-1368

Signed: Ron Harris
Technician: Ron Harris

PCB PIEZOTRONICS
A PCB GROUP COMPANY

Certificate of Calibration and Conformance

Certificate Number 2010-134173

Instrument Model 828, Serial Number 1368, was calibrated on 16SEP2010. The instrument meets factory specifications per Procedure D0001.8135.

Instrument found to be in calibration as received: YES
Date Calibrated: 16SEP2010
Calibration due:

Calibration Standards Used

MANUFACTURER	MODEL	SERIAL NUMBER	INTERVAL	CAL. DUE	TRACEABILITY NO.
Hewlett Packard	34401A	MY41044529	12 Months	15JAN2011	4629111
Larson Davis	LDSigGn/2209	0277 / 0109	12 Months	24MAR2011	2010-127832

Reference Standards are traceable to the National Institute of Standards and Technology (NIST)

Calibration Environmental Conditions

Temperature: 23 ° Centigrade

Relative Humidity: 29 %

Affirmations

This Certificate attests that this instrument has been calibrated under the stated conditions with Measurement and Test Equipment (M&TE) Standards traceable to the U.S. National Institute of Standards and Technology (NIST). All of the Measurement Standards have been calibrated to their manufacturers' specified accuracy / uncertainty. Evidence of traceability and accuracy is on file at Provo Engineering & Manufacturing Center. An acceptable accuracy ratio between the Standard(s) and the item calibrated has been maintained. This instrument meets or exceeds the manufacturer's published specification unless noted.

This calibration complies with the requirements of ISO 17025 and ANSI Z540. The collective uncertainty of the Measurement Standard used does not exceed 25% of the applicable tolerance for each characteristic calibrated unless otherwise noted.

The results documented in this certificate relate only to the item(s) calibrated or tested. A one year calibration is recommended, however calibration interval assignment and adjustment are the responsibility of the end user. This certificate may not be reproduced, except in full, without the written approval of the issuer.

"As received" data is the same as shipped data.

Signed: Ron Harris
Technician: Ron Harris

PCB PIEZOTRONICS
A PCB GROUP COMPANY

Certificate of Calibration and Conformance

Certificate Number 2010-134171

Microphone Model 2559, Serial Number 2496, was calibrated on 16SEP2010. The microphone meets factory specifications per Test Procedure D0001.8167.

Instrument found to be in calibration as received: YES
Date Calibrated: 16SEP2010
Calibration due:

Calibration Standards Used

MANUFACTURER	MODEL	SERIAL NUMBER	INTERVAL	CAL. DUE	TRACEABILITY NO.
Larson Davis	2559	2504	12 Months	29SEP2010	16910-1
Hewlett Packard	34401A	3146A62099	12 Months	03NOV2010	4548881
Larson Davis	PRM916	0102	12 Months	17DEC2010	2009-125069
Larson Davis	CAL250	42630	12 Months	27APR2011	2010-129123
Larson Davis	2900	0575	12 Months	18JUN2011	2010-130730
Larson Davis	PRM915	0102	12 Months	17AUG2011	2010-132962
Larson Davis	PRM902	0206	12 Months	17AUG2011	2010-132963
Larson Davis	2559	3034LF	12 Months	18AUG2011	2010-133036
Larson Davis	PRM902	0529	12 Months	08SEP2011	2010-133837
Larson Davis	PRM902	0528	12 Months	08SEP2011	2010-133838
Larson Davis	MTS1000 / 2201	1000 / 0100	12 Months	10SEP2011	SM090910

Reference Standards are traceable to the National Institute of Standards and Technology (NIST)

Calibration Environmental Conditions

Environmental test conditions as printed on microphone calibration chart.

Affirmations

This Certificate attests that this instrument has been calibrated under the stated conditions with Measurement and Test Equipment (M&TE) Standards traceable to the U.S. National Institute of Standards and Technology (NIST). All of the Measurement Standards have been calibrated to their manufacturers' specified accuracy / uncertainty. Evidence of traceability and accuracy is on file at Provo Engineering & Manufacturing Center. An acceptable accuracy ratio between the Standard(s) and the item calibrated has been maintained. This instrument meets or exceeds the manufacturer's published specification unless noted.

This calibration complies with the requirements of ISO 17025 and ANSI Z540. The collective uncertainty of the Measurement Standard used does not exceed 25% of the applicable tolerance for each characteristic calibrated unless otherwise noted.

The results documented in this certificate relate only to the item(s) calibrated or tested. A one year calibration is recommended, however calibration interval assignment and adjustment are the responsibility of the end user. This certificate may not be reproduced, except in full, without the written approval of the issuer.

"AS RECEIVED" data is the same as shipped data.

Signed: Abraham Ortega
Technician: Abraham Ortega

PCB PIEZOTRONICS
A PCB GROUP COMPANY

Certificate of Calibration and Conformance

Certificate Number 2010-134152

Instrument Model CAL200, Serial Number 6644, was calibrated on 15SEP2010. The instrument meets factory specifications per Procedure D0001.8190.

Instrument found to be in calibration as received: NO
Date Calibrated: 15SEP2010
Calibration due:

Calibration Standards Used

MANUFACTURER	MODEL	SERIAL NUMBER	INTERVAL	CAL. DUE	TRACEABILITY NO.
Larson Davis	2559	2504	12 Months	29SEP2010	16910-1
PCB	1502B02FJ15PSIA	1342	12 Months	23NOV2010	3341845067
Larson Davis	2900	0661	12 Months	02APR2011	2010-128279
Hewlett Packard	34401A	3146A10352	12 Months	12AUG2011	4877885
Larson Davis	PRM915	0112	12 Months	09SEP2011	2010-133976
Larson Davis	PRM902	0480	12 Months	09SEP2011	2010-133975
Larson Davis	MTS1000/2201	0111	12 Months	09SEP2011	SM090910

Reference Standards are traceable to the National Institute of Standards and Technology (NIST)

Calibration Environmental Conditions

Environmental test conditions as shown on calibration report.

Affirmations

This Certificate attests that this instrument has been calibrated under the stated conditions with Measurement and Test Equipment (M&TE) Standards traceable to the U.S. National Institute of Standards and Technology (NIST). All of the Measurement Standards have been calibrated to their manufacturers' specified accuracy / uncertainty. Evidence of traceability and accuracy is on file at Provo Engineering & Manufacturing Center. An acceptable accuracy ratio between the Standard(s) and the item calibrated has been maintained. This instrument meets or exceeds the manufacturer's published specification unless noted.

This calibration complies with the requirements of ISO 17025 and ANSI Z540. The collective uncertainty of the Measurement Standard used does not exceed 25% of the applicable tolerance for each characteristic calibrated unless otherwise noted.

The results documented in this certificate relate only to the item(s) calibrated or tested. A one year calibration is recommended, however calibration interval assignment and adjustment are the responsibility of the end user. This certificate may not be reproduced, except in full, without the written approval of the issuer.

See "As Received" data.

Signed: Scott Montgomery
Technician: Scott Montgomery

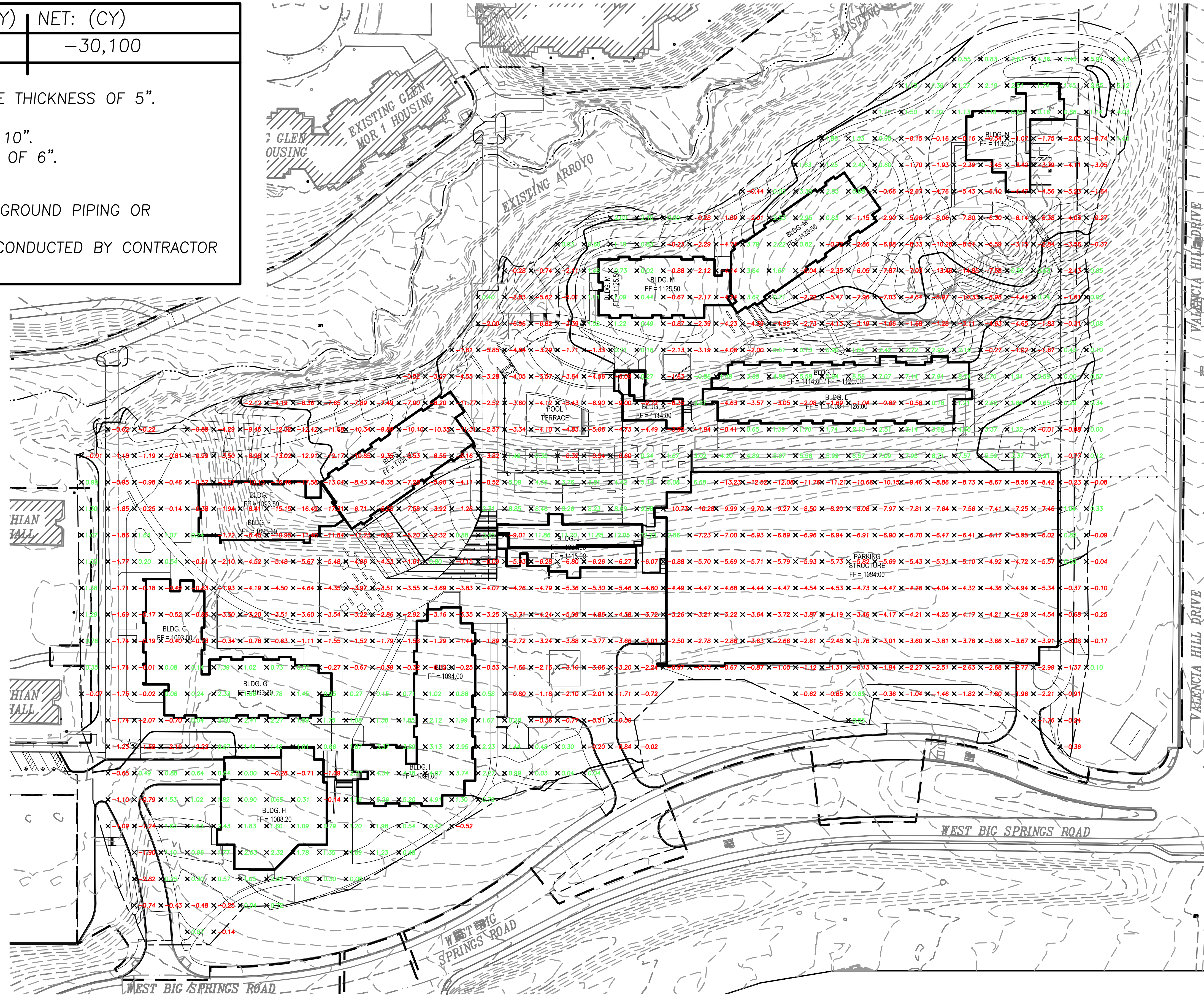
Appendix C: Preliminary Cut and Fill Analysis for Glen Mor 2 Housing diagram

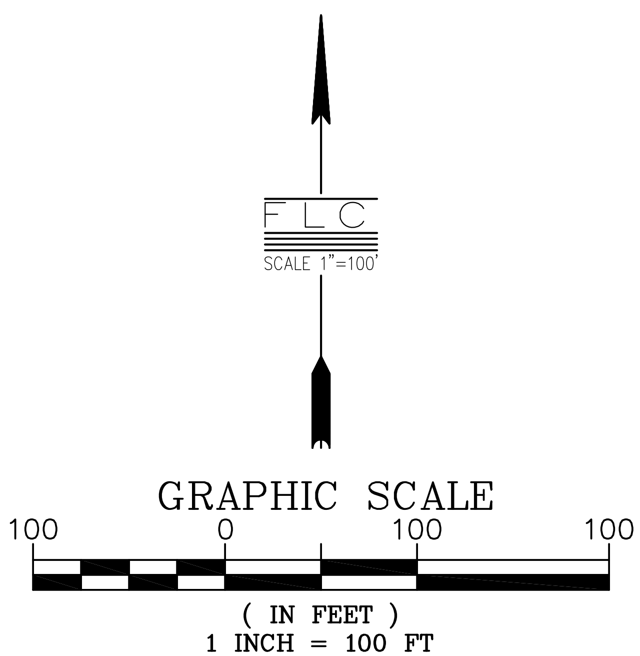
UCR Glen Mor 2 Student Apartments | PRELIMINARY CUT AND FILL ANALYSIS
GLEN MOR 2 HOUSING

CUT REQUIRED: (CY)	FILL REQUIRED: (CY)	NET: (CY)
−47,600	17,500	−30,100

ASSUMPTIONS:

- REMOVAL OF EXISTING PARKING LOT, AVERAGE THICKNESS OF 5".
- SLAB ON GRADE THICKNESS OF 9".
- PROPOSED PAVED ROADWAY FULL DEPTH OF 10".
- PROPOSED PCC HARDSCAPE WALKWAY DEPTH OF 6".
- 15% SHINKAGE OF SOIL IS INCLUDED.
- OVER EXCAVATION OF SITE IS NOT INCLUDED.
- EARTHWORK DOES NOT ACCOUNT FOR UNDERGROUND PIPING OR STRUCTURAL PILES/ COLUMNS.
- FINAL EARTHWORK CALCULATIONS SHALL BE CONDUCTED BY CONTRACTOR PRIOR TO BID.





Flores Lund Consultants
19 October 2010

Appendix D: Construction Noise Model

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 01/10/2011
Case Description: Glen Mor

**** Receptor #1 ****

		Baselines (dBA)		
Description	Land Use	Daytime	Evening	Night
ST-4	Residential	49.6	49.6	49.6

Equipment

Description	Impact Device	Usage (%)	Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Man Lift	No	20		74.7	366.0	0.0
Man Lift	No	20		74.7	366.0	0.0
Man Lift	No	20		74.7	366.0	0.0
Man Lift	No	20		74.7	366.0	0.0
Man Lift	No	20		74.7	366.0	0.0
Man Lift	No	20		74.7	366.0	0.0
Man Lift	No	20		74.7	366.0	0.0
Man Lift	No	20		74.7	366.0	0.0
Pickup Truck	No	40		75.0	366.0	0.0
Pickup Truck	No	40		75.0	366.0	0.0
Pickup Truck	No	40		75.0	366.0	0.0
Crane	No	16		80.6	366.0	0.0
Crane	No	16		80.6	366.0	0.0
All Other Equipment > 5 HP	No	50	85.0		366.0	0.0
Crane	No	16		80.6	366.0	0.0
All Other Equipment > 5 HP	No	50	85.0		366.0	0.0
All Other Equipment > 5 HP	No	50	85.0		366.0	0.0
All Other Equipment > 5 HP	No	50	85.0		366.0	0.0
All Other Equipment > 5 HP	No	50	85.0		366.0	0.0
All Other Equipment > 5 HP	No	50	85.0		366.0	0.0

Results

			Noise Limits (dBA)						Noise Limit Exceedance (dBA)					
	Calculated (dBA)		Day		Evening		Night		Day		Evening		Night	
Equipment	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Man Lift	57.4	50.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Man Lift	57.4	50.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Man Lift	57.4	50.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Man Lift	57.4	50.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Man Lift	57.4	50.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Man Lift	57.4	50.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Man Lift	57.4	50.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Man Lift	57.4	50.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Pickup Truck	57.7	53.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Pickup Truck	57.7	53.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Pickup Truck	57.7	53.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Crane	63.3	55.3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Crane	63.3	55.3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
All Other Equipment > 5 HP	67.7	64.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Crane	63.3	55.3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
All Other Equipment > 5 HP	67.7	64.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

All Other Equipment > 5 HP	67.7	64.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
All Other Equipment > 5 HP	67.7	64.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
All Other Equipment > 5 HP	67.7	64.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
All Other Equipment > 5 HP	67.7	64.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	67.7	73.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

**** Receptor #2 ****

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
ST-3	Residential	52.0	52.0	52.0

Equipment

Description	Impact Device	Usage (%)	Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Man Lift	No	20		74.7	494.0	5.0
Man Lift	No	20		74.7	494.0	5.0
Man Lift	No	20		74.7	494.0	5.0
Man Lift	No	20		74.7	494.0	5.0
Man Lift	No	20		74.7	494.0	5.0
Man Lift	No	20		74.7	494.0	5.0
Man Lift	No	20		74.7	494.0	5.0
Man Lift	No	20		74.7	494.0	5.0
Pickup Truck	No	40		75.0	494.0	5.0
Pickup Truck	No	40		75.0	494.0	5.0
Pickup Truck	No	40		75.0	494.0	5.0
Crane	No	16		80.6	494.0	5.0
Crane	No	16		80.6	494.0	5.0
All Other Equipment > 5 HP	No	50	85.0		494.0	5.0
Crane	No	16		80.6	494.0	5.0
All Other Equipment > 5 HP	No	50	85.0		494.0	5.0
All Other Equipment > 5 HP	No	50	85.0		494.0	5.0
All Other Equipment > 5 HP	No	50	85.0		494.0	5.0
All Other Equipment > 5 HP	No	50	85.0		494.0	5.0
All Other Equipment > 5 HP	No	50	85.0		494.0	5.0

Results

	Calculated (dBA)		Noise Limits (dBA)						Noise Limit Exceedance (dBA)					
			Day		Evening		Night		Day		Evening		Night	
Equipment	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Man Lift	49.8	42.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Man Lift	49.8	42.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Man Lift	49.8	42.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Man Lift	49.8	42.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Man Lift	49.8	42.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Man Lift	49.8	42.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Man Lift	49.8	42.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Man Lift	49.8	42.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Pickup Truck	50.1	46.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Pickup Truck	50.1	46.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Pickup Truck	50.1	46.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Crane	55.7	47.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Crane	55.7	47.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
All Other Equipment > 5 HP	60.1	57.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Crane	55.7	47.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

All Other Equipment > 5 HP	60.1	57.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
All Other Equipment > 5 HP	60.1	57.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
All Other Equipment > 5 HP	60.1	57.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
All Other Equipment > 5 HP	60.1	57.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
All Other Equipment > 5 HP	60.1	57.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	60.1	65.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

**** Receptor #3 ****

		Baselines (dBA)		
Description	Land Use	Daytime	Evening	Night
ST-5	Residential	48.0	48.0	48.0

Equipment

Description	Impact Device	Usage (%)	Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Man Lift	No	20		74.7	379.0	0.0
Man Lift	No	20		74.7	379.0	0.0
Man Lift	No	20		74.7	379.0	0.0
Man Lift	No	20		74.7	379.0	0.0
Man Lift	No	20		74.7	379.0	0.0
Man Lift	No	20		74.7	379.0	0.0
Man Lift	No	20		74.7	379.0	0.0
Man Lift	No	20		74.7	379.0	0.0
Pickup Truck	No	40		75.0	379.0	0.0
Pickup Truck	No	40		75.0	379.0	0.0
Pickup Truck	No	40		75.0	379.0	0.0
Crane	No	16		80.6	379.0	0.0
Crane	No	16		80.6	379.0	0.0
All Other Equipment > 5 HP	No	50	85.0		379.0	0.0
Crane	No	16		80.6	379.0	0.0
All Other Equipment > 5 HP	No	50	85.0		379.0	0.0
All Other Equipment > 5 HP	No	50	85.0		379.0	0.0
All Other Equipment > 5 HP	No	50	85.0		379.0	0.0
All Other Equipment > 5 HP	No	50	85.0		379.0	0.0
All Other Equipment > 5 HP	No	50	85.0		379.0	0.0

Results

			Noise Limits (dBA)						Noise Limit Exceedance (dBA)					
	Calculated (dBA)		Day		Evening		Night		Day		Evening		Night	
Equipment	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Man Lift	57.1	50.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Man Lift	57.1	50.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Man Lift	57.1	50.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Man Lift	57.1	50.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Man Lift	57.1	50.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Man Lift	57.1	50.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Man Lift	57.1	50.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Man Lift	57.1	50.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Pickup Truck	57.4	53.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Pickup Truck	57.4	53.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Pickup Truck	57.4	53.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Crane	63.0	55.0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Crane	63.0	55.0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
All Other Equipment > 5 HP	67.4	64.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Crane	63.0	55.0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
All Other Equipment > 5 HP	67.4	64.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
All Other Equipment > 5 HP	67.4	64.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
All Other Equipment > 5 HP	67.4	64.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
All Other Equipment > 5 HP	67.4	64.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
All Other Equipment > 5 HP	67.4	64.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	67.4	72.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

**** Receptor #4 ****

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
ST-6	Residential	49.0	49.0	49.0

Equipment

Description	Impact Device	Usage (%)	Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Man Lift	No	20		74.7	563.0	0.0
Man Lift	No	20		74.7	563.0	0.0
Man Lift	No	20		74.7	563.0	0.0
Man Lift	No	20		74.7	563.0	0.0
Man Lift	No	20		74.7	563.0	0.0
Man Lift	No	20		74.7	563.0	0.0
Man Lift	No	20		74.7	563.0	0.0
Man Lift	No	20		74.7	563.0	0.0
Pickup Truck	No	40		75.0	563.0	0.0
Pickup Truck	No	40		75.0	563.0	0.0
Pickup Truck	No	40		75.0	563.0	0.0
Crane	No	16		80.6	563.0	0.0
Crane	No	16		80.6	563.0	0.0
All Other Equipment > 5 HP	No	50	85.0		563.0	0.0
Crane	No	16		80.6	563.0	0.0
All Other Equipment > 5 HP	No	50	85.0		563.0	0.0
All Other Equipment > 5 HP	No	50	85.0		563.0	0.0
All Other Equipment > 5 HP	No	50	85.0		563.0	0.0
All Other Equipment > 5 HP	No	50	85.0		563.0	0.0
All Other Equipment > 5 HP	No	50	85.0		563.0	0.0

Results

	Calculated (dBA)		Noise Limits (dBA) Day		Evening		Night		Noise Limit Exceedance (dBA) Day		Evening		Night	
Equipment	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Man Lift	53.7	46.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Man Lift	53.7	46.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Man Lift	53.7	46.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Man Lift	53.7	46.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Man Lift	53.7	46.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Man Lift	53.7	46.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Man Lift	53.7	46.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Man Lift	53.7	46.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Pickup Truck	54.0	50.0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Pickup Truck	54.0	50.0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Pickup Truck	54.0	50.0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Crane	59.5	51.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Crane	59.5	51.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

All Other Equipment > 5 HP	64.0	61.0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Crane	59.5	51.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
All Other Equipment > 5 HP	64.0	61.0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
All Other Equipment > 5 HP	64.0	61.0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
All Other Equipment > 5 HP	64.0	61.0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
All Other Equipment > 5 HP	64.0	61.0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
All Other Equipment > 5 HP	64.0	61.0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	64.0	69.3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

**** Receptor #5 ****

Baselines (dBA)

Description	Land Use	Daytime	Evening	Night
ST-7 Glen mor 1	Residential	48.0	48.0	48.0

Equipment

Description	Impact Device	Usage (%)	Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Man Lift	No	20		74.7	364.0	0.0
Man Lift	No	20		74.7	364.0	0.0
Man Lift	No	20		74.7	364.0	0.0
Man Lift	No	20		74.7	364.0	0.0
Man Lift	No	20		74.7	364.0	0.0
Man Lift	No	20		74.7	364.0	0.0
Man Lift	No	20		74.7	364.0	0.0
Man Lift	No	20		74.7	364.0	0.0
Pickup Truck	No	40		75.0	364.0	0.0
Pickup Truck	No	40		75.0	364.0	0.0
Pickup Truck	No	40		75.0	364.0	0.0
Crane	No	16		80.6	364.0	0.0
Crane	No	16		80.6	364.0	0.0
All Other Equipment > 5 HP	No	50	85.0		364.0	0.0
Crane	No	16		80.6	364.0	0.0
All Other Equipment > 5 HP	No	50	85.0		364.0	0.0
All Other Equipment > 5 HP	No	50	85.0		364.0	0.0
All Other Equipment > 5 HP	No	50	85.0		364.0	0.0
All Other Equipment > 5 HP	No	50	85.0		364.0	0.0
All Other Equipment > 5 HP	No	50	85.0		364.0	0.0

Results

	Calculated (dBA)		Noise Limits (dBA)						Noise Limit Exceedance (dBA)					
			Day		Evening		Night		Day		Evening		Night	
Equipment	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Man Lift	57.5	50.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Man Lift	57.5	50.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Man Lift	57.5	50.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Man Lift	57.5	50.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Man Lift	57.5	50.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Man Lift	57.5	50.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Man Lift	57.5	50.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Man Lift	57.5	50.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Pickup Truck	57.8	53.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Pickup Truck	57.8	53.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Pickup Truck	57.8	53.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Crane	63.3	55.3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Crane	63.3	55.3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
All Other Equipment > 5 HP	67.8	64.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Crane	63.3	55.3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
All Other Equipment > 5 HP	67.8	64.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
All Other Equipment > 5 HP	67.8	64.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
All Other Equipment > 5 HP	67.8	64.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
All Other Equipment > 5 HP	67.8	64.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
All Other Equipment > 5 HP	67.8	64.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	67.8	73.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

**** Receptor #6 ****

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
Lothian	Residential	48.0	48.0	48.0

Equipment

Description	Impact Device	Usage (%)	Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Man Lift	No	20		74.7	123.0	0.0
Man Lift	No	20		74.7	123.0	0.0
Man Lift	No	20		74.7	123.0	0.0
Man Lift	No	20		74.7	123.0	0.0
Man Lift	No	20		74.7	123.0	0.0
Man Lift	No	20		74.7	123.0	0.0
Man Lift	No	20		74.7	123.0	0.0
Man Lift	No	20		74.7	123.0	0.0
Pickup Truck	No	40		75.0	123.0	0.0
Pickup Truck	No	40		75.0	123.0	0.0
Pickup Truck	No	40		75.0	123.0	0.0
Crane	No	16		80.6	123.0	0.0
Crane	No	16		80.6	123.0	0.0
All Other Equipment > 5 HP	No	50	85.0		123.0	0.0
Crane	No	16		80.6	123.0	0.0
All Other Equipment > 5 HP	No	50	85.0		123.0	0.0
All Other Equipment > 5 HP	No	50	85.0		123.0	0.0
All Other Equipment > 5 HP	No	50	85.0		123.0	0.0
All Other Equipment > 5 HP	No	50	85.0		123.0	0.0
All Other Equipment > 5 HP	No	50	85.0		123.0	0.0

Results

	Calculated (dBA)		Noise Limits (dBA)						Noise Limit Exceedance (dBA)					
			Day		Evening		Night		Day		Evening		Night	
Equipment	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Man Lift	66.9	59.9	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Man Lift	66.9	59.9	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Man Lift	66.9	59.9	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Man Lift	66.9	59.9	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Man Lift	66.9	59.9	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Man Lift	66.9	59.9	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Man Lift	66.9	59.9	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Man Lift	66.9	59.9	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Pickup Truck	67.2	63.2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Pickup Truck	67.2	63.2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Pickup Truck	67.2	63.2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Crane	72.7	64.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Crane	72.7	64.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
All Other Equipment > 5 HP	77.2	74.2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Crane	72.7	64.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
All Other Equipment > 5 HP	77.2	74.2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
All Other Equipment > 5 HP	77.2	74.2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
All Other Equipment > 5 HP	77.2	74.2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
All Other Equipment > 5 HP	77.2	74.2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
All Other Equipment > 5 HP	77.2	74.2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	77.2	82.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

**** Receptor #7 ****

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
ST-2	Residential	49.0	49.0	49.0

Equipment

Description	Impact Device	Usage (%)	Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Man Lift	No	20		74.7	425.0	0.0
Man Lift	No	20		74.7	425.0	0.0
Man Lift	No	20		74.7	425.0	0.0
Man Lift	No	20		74.7	425.0	0.0
Man Lift	No	20		74.7	425.0	0.0
Man Lift	No	20		74.7	425.0	0.0
Man Lift	No	20		74.7	425.0	0.0
Man Lift	No	20		74.7	425.0	0.0
Pickup Truck	No	40		75.0	425.0	0.0
Pickup Truck	No	40		75.0	425.0	0.0
Pickup Truck	No	40		75.0	425.0	0.0
Crane	No	16		80.6	425.0	0.0
Crane	No	16		80.6	425.0	0.0
All Other Equipment > 5 HP	No	50	85.0		425.0	0.0
Crane	No	16		80.6	425.0	0.0
All Other Equipment > 5 HP	No	50	85.0		425.0	0.0
All Other Equipment > 5 HP	No	50	85.0		425.0	0.0
All Other Equipment > 5 HP	No	50	85.0		425.0	0.0
All Other Equipment > 5 HP	No	50	85.0		425.0	0.0
All Other Equipment > 5 HP	No	50	85.0		425.0	0.0

Results

	Calculated (dBA)		Noise Limits (dBA) Day		Evening		Night		Noise Limit Exceedance (dBA) Day		Evening		Night	
Equipment	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Man Lift	56.1	49.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Man Lift	56.1	49.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Man Lift	56.1	49.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Man Lift	56.1	49.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Man Lift	56.1	49.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Man Lift	56.1	49.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Man Lift	56.1	49.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Man Lift	56.1	49.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Pickup Truck	56.4	52.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Pickup Truck	56.4	52.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Pickup Truck	56.4	52.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Crane	62.0	54.0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Crane	62.0	54.0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
All Other Equipment > 5 HP	66.4	63.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Crane	62.0	54.0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
All Other Equipment > 5 HP	66.4	63.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
All Other Equipment > 5 HP	66.4	63.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
All Other Equipment > 5 HP	66.4	63.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
All Other Equipment > 5 HP	66.4	63.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
All Other Equipment > 5 HP	66.4	63.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	66.4	71.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 01/10/2011
Case Description: Glen Mor

**** Receptor #1 ****

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
ST-4	Residential	49.6	49.6	49.6

Equipment

Description	Impact Device	Usage (%)	Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Front End Loader	No	40		79.1	366.0	0.0
Front End Loader	No	40		79.1	366.0	0.0
Front End Loader	No	40		79.1	366.0	0.0
Front End Loader	No	40		79.1	366.0	0.0
Front End Loader	No	40		79.1	366.0	0.0
Front End Loader	No	40	80.0		366.0	0.0
Front End Loader	No	40		79.1	366.0	0.0
Backhoe	No	40		77.6	366.0	0.0
Backhoe	No	40		77.6	366.0	0.0
Backhoe	No	40		77.6	366.0	0.0
Grader	No	40	85.0		366.0	0.0
Grader	No	40	85.0		366.0	0.0
Compressor (air)	No	40		77.7	366.0	0.0
Compressor (air)	No	40		77.7	366.0	0.0
Compressor (air)	No	40		77.7	366.0	0.0
Compressor (air)	No	40		77.7	366.0	0.0
Compressor (air)	No	40		77.7	366.0	0.0
Compressor (air)	No	40		77.7	366.0	0.0
Dozer	No	40		81.7	366.0	0.0
Excavator	No	40		80.7	366.0	0.0

Results

	Calculated (dBA)		Noise Limits (dBA)						Noise Limit Exceedance (dBA)					
			Day		Evening		Night		Day		Evening		Night	
Equipment	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Front End Loader	61.8	57.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Front End Loader	61.8	57.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Front End Loader	61.8	57.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Front End Loader	61.8	57.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Front End Loader	61.8	57.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Front End Loader	62.7	58.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Front End Loader	61.8	57.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Backhoe	60.3	56.3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Backhoe	60.3	56.3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Backhoe	60.3	56.3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Grader	67.7	63.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Grader	67.7	63.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Compressor (air)	60.4	56.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Compressor (air)	60.4	56.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Compressor (air)	60.4	56.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Compressor (air)	60.4	56.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Compressor (air)	60.4	56.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Compressor (air)	60.4	56.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Dozer	64.4	60.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Excavator	63.4	59.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	67.7	71.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

**** Receptor #2 ****

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
ST-3	Residential	52.0	52.0	52.0

Equipment

Description	Impact Device	Usage (%)	Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Front End Loader	No	40		79.1	494.0	5.0
Front End Loader	No	40		79.1	494.0	5.0
Front End Loader	No	40		79.1	494.0	5.0
Front End Loader	No	40		79.1	494.0	5.0
Front End Loader	No	40		79.1	494.0	5.0
Front End Loader	No	40	80.0		494.0	5.0
Front End Loader	No	40		79.1	494.0	5.0
Backhoe	No	40		77.6	494.0	5.0
Backhoe	No	40		77.6	494.0	5.0
Backhoe	No	40		77.6	494.0	5.0
Grader	No	40	85.0		494.0	5.0
Grader	No	40	85.0		494.0	5.0
Compressor (air)	No	40		77.7	494.0	5.0
Compressor (air)	No	40		77.7	494.0	5.0
Compressor (air)	No	40		77.7	494.0	5.0
Compressor (air)	No	40		77.7	494.0	5.0
Compressor (air)	No	40		77.7	494.0	5.0
Compressor (air)	No	40		77.7	494.0	5.0
Dozer	No	40		81.7	494.0	5.0
Excavator	No	40		80.7	494.0	5.0

Results

	Calculated (dBA)		Noise Limits (dBA)						Noise Limit Exceedance (dBA)					
			Day		Evening		Night		Day		Evening		Night	
Equipment	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Front End Loader	54.2	50.2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Front End Loader	54.2	50.2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Front End Loader	54.2	50.2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Front End Loader	54.2	50.2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Front End Loader	54.2	50.2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Front End Loader	55.1	51.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Front End Loader	54.2	50.2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Backhoe	52.7	48.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Backhoe	52.7	48.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Backhoe	52.7	48.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Grader	60.1	56.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Grader	60.1	56.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Compressor (air)	52.8	48.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Compressor (air)	52.8	48.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Compressor (air)	52.8	48.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Compressor (air)		52.8	48.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Compressor (air)		52.8	48.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Compressor (air)		52.8	48.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Dozer		56.8	52.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Excavator		55.8	51.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Total	60.1	64.2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

**** Receptor #3 ****

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
ST-5	Residential	48.0	48.0	48.0

Equipment

Description	Impact Device	Usage (%)	Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Front End Loader	No	40		79.1	379.0	0.0
Front End Loader	No	40		79.1	379.0	0.0
Front End Loader	No	40		79.1	379.0	0.0
Front End Loader	No	40		79.1	379.0	0.0
Front End Loader	No	40		79.1	379.0	0.0
Front End Loader	No	40	80.0		379.0	0.0
Front End Loader	No	40		79.1	379.0	0.0
Backhoe	No	40		77.6	379.0	0.0
Backhoe	No	40		77.6	379.0	0.0
Backhoe	No	40		77.6	379.0	0.0
Grader	No	40	85.0		379.0	0.0
Grader	No	40	85.0		379.0	0.0
Compressor (air)	No	40		77.7	379.0	0.0
Compressor (air)	No	40		77.7	379.0	0.0
Compressor (air)	No	40		77.7	379.0	0.0
Compressor (air)	No	40		77.7	379.0	0.0
Compressor (air)	No	40		77.7	379.0	0.0
Compressor (air)	No	40		77.7	379.0	0.0
Dozer	No	40		81.7	379.0	0.0
Excavator	No	40		80.7	379.0	0.0

Results

	Calculated (dBA)		Noise Limits (dBA) Day		Evening		Night		Noise Limit Exceedance (dBA) Day		Evening		Night	
Equipment	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Front End Loader	61.5	57.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Front End Loader	61.5	57.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Front End Loader	61.5	57.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Front End Loader	61.5	57.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Front End Loader	61.5	57.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Front End Loader	62.4	58.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Front End Loader	61.5	57.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Backhoe	60.0	56.0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Backhoe	60.0	56.0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Backhoe	60.0	56.0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Grader	67.4	63.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Grader	67.4	63.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Compressor (air)	60.1	56.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Compressor (air)	60.1	56.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Compressor (air)	60.1	56.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Compressor (air)	60.1	56.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Compressor (air)	60.1	56.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Compressor (air)	60.1	56.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Dozer	64.1	60.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Excavator	63.1	59.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	67.4	71.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

**** Receptor #4 ****

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
ST-6	Residential	49.0	49.0	49.0

Equipment

Description	Impact Device	Usage (%)	Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Front End Loader	No	40		79.1	563.0	0.0
Front End Loader	No	40		79.1	563.0	0.0
Front End Loader	No	40		79.1	563.0	0.0
Front End Loader	No	40		79.1	563.0	0.0
Front End Loader	No	40		79.1	563.0	0.0
Front End Loader	No	40	80.0		563.0	0.0
Front End Loader	No	40		79.1	563.0	0.0
Backhoe	No	40		77.6	563.0	0.0
Backhoe	No	40		77.6	563.0	0.0
Backhoe	No	40		77.6	563.0	0.0
Grader	No	40	85.0		563.0	0.0
Grader	No	40	85.0		563.0	0.0
Compressor (air)	No	40		77.7	563.0	0.0
Compressor (air)	No	40		77.7	563.0	0.0
Compressor (air)	No	40		77.7	563.0	0.0
Compressor (air)	No	40		77.7	563.0	0.0
Compressor (air)	No	40		77.7	563.0	0.0
Compressor (air)	No	40		77.7	563.0	0.0
Dozer	No	40		81.7	563.0	0.0
Excavator	No	40		80.7	563.0	0.0

Results

	Calculated (dBA)		Noise Limits (dBA) Day		Evening		Night		Noise Limit Exceedance (dBA) Day		Evening		Night	
Equipment	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Front End Loader	58.1	54.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Front End Loader	58.1	54.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Front End Loader	58.1	54.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Front End Loader	58.1	54.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Front End Loader	58.1	54.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Front End Loader	59.0	55.0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Front End Loader	58.1	54.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Backhoe	56.5	52.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Backhoe	56.5	52.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Backhoe	56.5	52.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Grader	64.0	60.0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Grader	64.0	60.0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Compressor (air)	56.6	52.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Compressor (air)	56.6	52.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Compressor (air)	56.6	52.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Compressor (air)	56.6	52.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Compressor (air)	56.6	52.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Compressor (air)	56.6	52.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Dozer	60.6	56.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Excavator	59.7	55.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	64.0	68.0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

**** Receptor #5 ****

Baselines (dBA)

Description	Land Use	Daytime	Evening	Night
ST-7 Glen mor 1	Residential	48.0	48.0	48.0

Equipment

Description	Impact Device	Usage (%)	Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Front End Loader	No	40		79.1	364.0	0.0
Front End Loader	No	40		79.1	364.0	0.0
Front End Loader	No	40		79.1	364.0	0.0
Front End Loader	No	40		79.1	364.0	0.0
Front End Loader	No	40		79.1	364.0	0.0
Front End Loader	No	40	80.0		364.0	0.0
Front End Loader	No	40		79.1	364.0	0.0
Backhoe	No	40		77.6	364.0	0.0
Backhoe	No	40		77.6	364.0	0.0
Backhoe	No	40		77.6	364.0	0.0
Grader	No	40	85.0		364.0	0.0
Grader	No	40	85.0		364.0	0.0
Compressor (air)	No	40		77.7	364.0	0.0
Compressor (air)	No	40		77.7	364.0	0.0
Compressor (air)	No	40		77.7	364.0	0.0
Compressor (air)	No	40		77.7	364.0	0.0
Compressor (air)	No	40		77.7	364.0	0.0
Compressor (air)	No	40		77.7	364.0	0.0
Dozer	No	40		81.7	364.0	0.0
Excavator	No	40		80.7	364.0	0.0

Results

			Noise Limits (dBA)						Noise Limit Exceedance (dBA)					
	Calculated (dBA)		Day		Evening		Night		Day		Evening		Night	
Equipment	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Front End Loader	61.9	57.9	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Front End Loader	61.9	57.9	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Front End Loader	61.9	57.9	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Front End Loader	61.9	57.9	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Front End Loader	61.9	57.9	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Front End Loader	62.8	58.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Front End Loader	61.9	57.9	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Backhoe	60.3	56.3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Backhoe	60.3	56.3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Backhoe	60.3	56.3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Grader	67.8	63.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Grader	67.8	63.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Compressor (air)	60.4	56.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Compressor (air)	60.4	56.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Compressor (air)	60.4	56.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Compressor (air)	60.4	56.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Compressor (air)	60.4	56.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Compressor (air)	60.4	56.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Dozer	64.4	60.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Excavator	63.5	59.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	67.8	71.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

**** Receptor #6 ****

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
Lothian	Residential	48.0	48.0	48.0

Equipment

Description	Impact Device	Usage (%)	Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Front End Loader	No	40		79.1	123.0	0.0
Front End Loader	No	40		79.1	123.0	0.0
Front End Loader	No	40		79.1	123.0	0.0
Front End Loader	No	40		79.1	123.0	0.0
Front End Loader	No	40		79.1	123.0	0.0
Front End Loader	No	40	80.0		123.0	0.0
Front End Loader	No	40		79.1	123.0	0.0
Backhoe	No	40		77.6	123.0	0.0
Backhoe	No	40		77.6	123.0	0.0
Backhoe	No	40		77.6	123.0	0.0
Grader	No	40	85.0		123.0	0.0
Grader	No	40	85.0		123.0	0.0
Compressor (air)	No	40		77.7	123.0	0.0
Compressor (air)	No	40		77.7	123.0	0.0
Compressor (air)	No	40		77.7	123.0	0.0
Compressor (air)	No	40		77.7	123.0	0.0
Compressor (air)	No	40		77.7	123.0	0.0
Compressor (air)	No	40		77.7	123.0	0.0
Dozer	No	40		81.7	123.0	0.0
Excavator	No	40		80.7	123.0	0.0

Results

	Calculated (dBA)		Noise Limits (dBA)						Noise Limit Exceedance (dBA)					
			Day		Evening		Night		Day		Evening		Night	
Equipment	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Front End Loader	71.3	67.3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Front End Loader	71.3	67.3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Front End Loader	71.3	67.3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Front End Loader	71.3	67.3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Front End Loader	71.3	67.3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Front End Loader	72.2	68.2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Front End Loader	71.3	67.3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Backhoe	69.7	65.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Backhoe	69.7	65.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Backhoe	69.7	65.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Grader	77.2	73.2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Equipment	Calculated Lmax	Calculated Leq	Noise Limits Day Lmax	Noise Limits Day Leq	Noise Limits Evening Lmax	Noise Limits Evening Leq	Noise Limits Night Lmax	Noise Limits Night Leq	Exceedance Day Lmax	Exceedance Day Leq	Exceedance Evening Lmax	Exceedance Evening Leq	Exceedance Night Lmax	Exceedance Night Leq
Grader	77.2	73.2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Compressor (air)	69.9	65.9	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Compressor (air)	69.9	65.9	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Compressor (air)	69.9	65.9	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Compressor (air)	69.9	65.9	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Compressor (air)	69.9	65.9	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Compressor (air)	69.9	65.9	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Dozer	73.9	69.9	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Excavator	72.9	68.9	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	77.2	81.2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

**** Receptor #7 ****

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
ST-2	Residential	49.0	49.0	49.0

Equipment

Description	Impact Device	Usage (%)	Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Front End Loader	No	40		79.1	425.0	0.0
Front End Loader	No	40		79.1	425.0	0.0
Front End Loader	No	40		79.1	425.0	0.0
Front End Loader	No	40		79.1	425.0	0.0
Front End Loader	No	40		79.1	425.0	0.0
Front End Loader	No	40	80.0		425.0	0.0
Front End Loader	No	40		79.1	425.0	0.0
Backhoe	No	40		77.6	425.0	0.0
Backhoe	No	40		77.6	425.0	0.0
Backhoe	No	40		77.6	425.0	0.0
Grader	No	40	85.0		425.0	0.0
Grader	No	40	85.0		425.0	0.0
Compressor (air)	No	40		77.7	425.0	0.0
Compressor (air)	No	40		77.7	425.0	0.0
Compressor (air)	No	40		77.7	425.0	0.0
Compressor (air)	No	40		77.7	425.0	0.0
Compressor (air)	No	40		77.7	425.0	0.0
Compressor (air)	No	40		77.7	425.0	0.0
Dozer	No	40		81.7	425.0	0.0
Excavator	No	40		80.7	425.0	0.0

Results

Equipment	Calculated (dBA) Lmax	Calculated (dBA) Leq	Noise Limits (dBA) Day Lmax	Day Leq	Evening Lmax	Evening Leq	Night Lmax	Night Leq	Noise Limit Exceedance (dBA) Day Lmax	Day Leq	Evening Lmax	Evening Leq	Night Lmax	Night Leq
Front End Loader	60.5	56.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Front End Loader	60.5	56.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Front End Loader	60.5	56.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Front End Loader	60.5	56.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Front End Loader	60.5	56.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Front End Loader	61.4	57.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Front End Loader	60.5	56.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Backhoe	59.0	55.0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Backhoe	59.0	55.0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Backhoe	59.0	55.0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Grader	66.4	62.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Grader	66.4	62.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Compressor (air)	59.1	55.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Compressor (air)	59.1	55.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Compressor (air)	59.1	55.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Compressor (air)	59.1	55.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Compressor (air)	59.1	55.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Compressor (air)	59.1	55.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Dozer	63.1	59.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Excavator	62.1	58.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	66.4	70.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 01/10/2011
Case Description: Glen Mor

**** Receptor #1 ****

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
ST-4	Residential	49.6	49.6	49.6

Equipment

Description	Impact Device	Usage (%)	Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Scraper	No	40		83.6	366.0	0.0
Scraper	No	40		83.6	366.0	0.0
Scraper	No	40		83.6	366.0	0.0
Vibratory Concrete Mixer	No	20		80.0	366.0	0.0
Vibratory Concrete Mixer	No	20		80.0	366.0	0.0
Vibratory Concrete Mixer	No	20		80.0	366.0	0.0
Vibratory Concrete Mixer	No	20		80.0	366.0	0.0
Vibratory Concrete Mixer	No	20		80.0	366.0	0.0
Pumps	No	50		80.9	366.0	0.0
Pumps	No	50		80.9	366.0	0.0
Pumps	No	50		80.9	366.0	0.0

Results

	Calculated (dBA)		Noise Limits (dBA) Day		Evening		Night		Noise Limit Exceedance (dBA) Day		Evening		Night	
Equipment	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Scraper	66.3	62.3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Scraper	66.3	62.3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Scraper	66.3	62.3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Vibratory Concrete Mixer	62.7	55.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Vibratory Concrete Mixer	62.7	55.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Vibratory Concrete Mixer	62.7	55.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Vibratory Concrete Mixer	62.7	55.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Vibratory Concrete Mixer	62.7	55.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Pumps	63.6	60.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Pumps	63.6	60.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Pumps	63.6	60.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	66.3	70.2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

**** Receptor #2 ****

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
ST-3	Residential	52.0	52.0	52.0

Equipment

Description	Impact Device	Usage (%)	Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)

Scraper	No	40		83.6	494.0	5.0
Scraper	No	40		83.6	494.0	5.0
Scraper	No	40		83.6	494.0	5.0
Vibratory Concrete Mixer	No	20		80.0	494.0	5.0
Vibratory Concrete Mixer	No	20		80.0	494.0	5.0
Vibratory Concrete Mixer	No	20		80.0	494.0	5.0
Vibratory Concrete Mixer	No	20		80.0	494.0	5.0
Vibratory Concrete Mixer	No	20		80.0	494.0	5.0
Pumps	No	50		80.9	494.0	5.0
Pumps	No	50		80.9	494.0	5.0
Pumps	No	50		80.9	494.0	5.0

Results

	Calculated (dBA)		Noise Limits (dBA)						Noise Limit Exceedance (dBA)					
			Day		Evening		Night		Day		Evening		Night	
Equipment	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Scraper	58.7	54.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Scraper	58.7	54.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Scraper	58.7	54.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Vibratory Concrete Mixer	55.1	48.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Vibratory Concrete Mixer	55.1	48.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Vibratory Concrete Mixer	55.1	48.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Vibratory Concrete Mixer	55.1	48.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Vibratory Concrete Mixer	55.1	48.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Pumps	56.0	53.0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Pumps	56.0	53.0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Pumps	56.0	53.0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	58.7	62.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

**** Receptor #3 ****

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
ST-5	Residential	48.0	48.0	48.0

Equipment

Description	Impact Device	Usage (%)	Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Scraper	No	40		83.6	379.0	0.0
Scraper	No	40		83.6	379.0	0.0
Scraper	No	40		83.6	379.0	0.0
Vibratory Concrete Mixer	No	20		80.0	379.0	0.0
Vibratory Concrete Mixer	No	20		80.0	379.0	0.0
Vibratory Concrete Mixer	No	20		80.0	379.0	0.0
Vibratory Concrete Mixer	No	20		80.0	379.0	0.0
Vibratory Concrete Mixer	No	20		80.0	379.0	0.0
Pumps	No	50		80.9	379.0	0.0
Pumps	No	50		80.9	379.0	0.0
Pumps	No	50		80.9	379.0	0.0

Results

Noise Limits (dBA) Noise Limit Exceedance (dBA)

Equipment	Calculated (dBA) Lmax	Calculated (dBA) Leq	Day Lmax	Day Leq	Evening Lmax	Evening Leq	Night Lmax	Night Leq	Day Lmax	Day Leq	Evening Lmax	Evening Leq	Night Lmax	Night Leq
Scraper	66.0	62.0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Scraper	66.0	62.0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Scraper	66.0	62.0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Vibratory Concrete Mixer	62.4	55.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Vibratory Concrete Mixer	62.4	55.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Vibratory Concrete Mixer	62.4	55.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Vibratory Concrete Mixer	62.4	55.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Vibratory Concrete Mixer	62.4	55.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Pumps	63.3	60.3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Pumps	63.3	60.3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Pumps	63.3	60.3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	66.0	69.9	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

**** Receptor #4 ****

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
ST-6	Residential	49.0	49.0	49.0

Equipment

Description	Impact Device	Usage (%)	Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Scraper	No	40		83.6	563.0	0.0
Scraper	No	40		83.6	563.0	0.0
Scraper	No	40		83.6	563.0	0.0
Vibratory Concrete Mixer	No	20		80.0	563.0	0.0
Vibratory Concrete Mixer	No	20		80.0	563.0	0.0
Vibratory Concrete Mixer	No	20		80.0	563.0	0.0
Vibratory Concrete Mixer	No	20		80.0	563.0	0.0
Vibratory Concrete Mixer	No	20		80.0	563.0	0.0
Pumps	No	50		80.9	563.0	0.0
Pumps	No	50		80.9	563.0	0.0
Pumps	No	50		80.9	563.0	0.0

Results

			Noise Limits (dBA)						Noise Limit Exceedance (dBA)					
	Calculated (dBA)		Day		Evening		Night		Day		Evening		Night	
Equipment	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Scraper	62.5	58.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Scraper	62.5	58.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Scraper	62.5	58.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Vibratory Concrete Mixer	59.0	52.0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Vibratory Concrete Mixer	59.0	52.0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Vibratory Concrete Mixer	59.0	52.0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Vibratory Concrete Mixer	59.0	52.0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Vibratory Concrete Mixer	59.0	52.0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Pumps	59.9	56.9	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Pumps	59.9	56.9	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Pumps	59.9	56.9	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	62.5	66.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

**** Receptor #5 ****

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
ST-7 Glen mor 1	Residential	48.0	48.0	48.0

Equipment

Description	Impact Device	Usage (%)	Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Scraper	No	40		83.6	364.0	0.0
Scraper	No	40		83.6	364.0	0.0
Scraper	No	40		83.6	364.0	0.0
Vibratory Concrete Mixer	No	20		80.0	364.0	0.0
Vibratory Concrete Mixer	No	20		80.0	364.0	0.0
Vibratory Concrete Mixer	No	20		80.0	364.0	0.0
Vibratory Concrete Mixer	No	20		80.0	364.0	0.0
Vibratory Concrete Mixer	No	20		80.0	364.0	0.0
Pumps	No	50		80.9	364.0	0.0
Pumps	No	50		80.9	364.0	0.0
Pumps	No	50		80.9	364.0	0.0

Results

Equipment	Calculated (dBA) Lmax	Leq	Noise Limits (dBA) Day Lmax	Day Leq	Evening Lmax	Evening Leq	Night Lmax	Night Leq	Noise Limit Exceedance (dBA) Day Lmax	Day Leq	Evening Lmax	Evening Leq	Night Lmax	Night Leq
Scraper	66.3	62.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Scraper	66.3	62.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Scraper	66.3	62.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Vibratory Concrete Mixer	62.8	55.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Vibratory Concrete Mixer	62.8	55.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Vibratory Concrete Mixer	62.8	55.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Vibratory Concrete Mixer	62.8	55.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Vibratory Concrete Mixer	62.8	55.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Pumps	63.7	60.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Pumps	63.7	60.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Pumps	63.7	60.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	66.3	70.2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

**** Receptor #6 ****

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
Lothian	Residential	48.0	48.0	48.0

Equipment

Description	Impact Device	Usage (%)	Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Scraper	No	40		83.6	123.0	0.0
Scraper	No	40		83.6	123.0	0.0
Scraper	No	40		83.6	123.0	0.0
Vibratory Concrete Mixer	No	20		80.0	123.0	0.0

Description	Impact Device	Usage (%)	Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Vibratory Concrete Mixer	No	20		80.0	123.0	0.0
Vibratory Concrete Mixer	No	20		80.0	123.0	0.0
Vibratory Concrete Mixer	No	20		80.0	123.0	0.0
Vibratory Concrete Mixer	No	20		80.0	123.0	0.0
Pumps	No	50		80.9	123.0	0.0
Pumps	No	50		80.9	123.0	0.0
Pumps	No	50		80.9	123.0	0.0

Results

	Calculated (dBA)		Noise Limits (dBA)						Noise Limit Exceedance (dBA)					
			Day		Evening		Night		Day		Evening		Night	
Equipment	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Scraper	75.8	71.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Scraper	75.8	71.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Scraper	75.8	71.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Vibratory Concrete Mixer	72.2	65.2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Vibratory Concrete Mixer	72.2	65.2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Vibratory Concrete Mixer	72.2	65.2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Vibratory Concrete Mixer	72.2	65.2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Vibratory Concrete Mixer	72.2	65.2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Pumps	73.1	70.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Pumps	73.1	70.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Pumps	73.1	70.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	75.8	79.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

**** Receptor #7 ****

		Baselines (dBA)		
Description	Land Use	Daytime	Evening	Night
ST-2	Residential	49.0	49.0	49.0

Equipment

Description	Impact Device	Usage (%)	Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Scraper	No	40		83.6	425.0	0.0
Scraper	No	40		83.6	425.0	0.0
Scraper	No	40		83.6	425.0	0.0
Vibratory Concrete Mixer	No	20		80.0	425.0	0.0
Vibratory Concrete Mixer	No	20		80.0	425.0	0.0
Vibratory Concrete Mixer	No	20		80.0	425.0	0.0
Vibratory Concrete Mixer	No	20		80.0	425.0	0.0
Vibratory Concrete Mixer	No	20		80.0	425.0	0.0
Pumps	No	50		80.9	425.0	0.0
Pumps	No	50		80.9	425.0	0.0
Pumps	No	50		80.9	425.0	0.0

Results

	Calculated (dBA)		Noise Limits (dBA)						Noise Limit Exceedance (dBA)					
			Day		Evening		Night		Day		Evening		Night	
Equipment	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Scraper	65.0	61.0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Scraper	65.0	61.0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Scraper	65.0	61.0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Vibratory Concrete Mixer	61.4	54.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Vibratory Concrete Mixer	61.4	54.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Vibratory Concrete Mixer	61.4	54.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Vibratory Concrete Mixer	61.4	54.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Vibratory Concrete Mixer	61.4	54.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Pumps	62.4	59.3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Pumps	62.4	59.3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Pumps	62.4	59.3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	65.0	68.9	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 01/10/2011
Case Description: Glen Mor

**** Receptor #1 ****

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
ST-4	Residential	49.6	49.6	49.6

Equipment

Description	Impact Device	Usage (%)	Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Man Lift	No	20		74.7	164.0	0.0
Man Lift	No	20		74.7	164.0	0.0
Man Lift	No	20		74.7	164.0	0.0
Man Lift	No	20		74.7	164.0	0.0
Man Lift	No	20		74.7	164.0	0.0
Man Lift	No	20		74.7	164.0	0.0
Man Lift	No	20		74.7	164.0	0.0
Man Lift	No	20		74.7	164.0	0.0
Pickup Truck	No	40		75.0	164.0	0.0
Pickup Truck	No	40		75.0	164.0	0.0
Pickup Truck	No	40		75.0	164.0	0.0
Crane	No	16		80.6	164.0	0.0
Crane	No	16		80.6	164.0	0.0
All Other Equipment > 5 HP	No	50	85.0		164.0	0.0
Crane	No	16		80.6	164.0	0.0
All Other Equipment > 5 HP	No	50	85.0		164.0	0.0
All Other Equipment > 5 HP	No	50	85.0		164.0	0.0
All Other Equipment > 5 HP	No	50	85.0		164.0	0.0
All Other Equipment > 5 HP	No	50	85.0		164.0	0.0
All Other Equipment > 5 HP	No	50	85.0		164.0	0.0

Results

	Calculated (dBA)		Noise Limits (dBA) Day		Evening		Night		Noise Limit Exceedance (dBA) Day		Evening		Night	
Equipment	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Man Lift	64.4	57.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Man Lift	64.4	57.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Man Lift	64.4	57.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Man Lift	64.4	57.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Man Lift	64.4	57.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Man Lift	64.4	57.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Man Lift	64.4	57.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Man Lift	64.4	57.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Pickup Truck	64.7	60.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Pickup Truck	64.7	60.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Pickup Truck	64.7	60.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Crane	70.2	62.3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Crane	70.2	62.3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
All Other Equipment > 5 HP	74.7	71.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Crane	70.2	62.3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
All Other Equipment > 5 HP	74.7	71.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

All Other Equipment > 5 HP	74.7	71.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
All Other Equipment > 5 HP	74.7	71.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
All Other Equipment > 5 HP	74.7	71.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
All Other Equipment > 5 HP	74.7	71.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	74.7	80.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

**** Receptor #2 ****

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
ST-3	Residential	52.0	52.0	52.0

Equipment

Description	Impact Device	Usage (%)	Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Man Lift	No	20		74.7	240.0	5.0
Man Lift	No	20		74.7	240.0	5.0
Man Lift	No	20		74.7	240.0	5.0
Man Lift	No	20		74.7	240.0	5.0
Man Lift	No	20		74.7	240.0	5.0
Man Lift	No	20		74.7	240.0	5.0
Man Lift	No	20		74.7	240.0	5.0
Man Lift	No	20		74.7	240.0	5.0
Pickup Truck	No	40		75.0	240.0	5.0
Pickup Truck	No	40		75.0	240.0	5.0
Pickup Truck	No	40		75.0	240.0	5.0
Crane	No	16		80.6	240.0	5.0
Crane	No	16		80.6	240.0	5.0
All Other Equipment > 5 HP	No	50	85.0		240.0	5.0
Crane	No	16		80.6	240.0	5.0
All Other Equipment > 5 HP	No	50	85.0		240.0	5.0
All Other Equipment > 5 HP	No	50	85.0		240.0	5.0
All Other Equipment > 5 HP	No	50	85.0		240.0	5.0
All Other Equipment > 5 HP	No	50	85.0		240.0	5.0
All Other Equipment > 5 HP	No	50	85.0		240.0	5.0

Results

	Calculated (dBA)		Noise Limits (dBA) Day		Evening		Night		Noise Limit Exceedance (dBA) Day		Evening		Night	
Equipment	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Man Lift	56.1	49.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Man Lift	56.1	49.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Man Lift	56.1	49.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Man Lift	56.1	49.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Man Lift	56.1	49.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Man Lift	56.1	49.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Man Lift	56.1	49.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Man Lift	56.1	49.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Pickup Truck	56.4	52.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Pickup Truck	56.4	52.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Pickup Truck	56.4	52.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Crane	61.9	54.0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Crane	61.9	54.0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
All Other Equipment > 5 HP	66.4	63.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Crane	61.9	54.0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

All Other Equipment > 5 HP	66.4	63.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
All Other Equipment > 5 HP	66.4	63.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
All Other Equipment > 5 HP	66.4	63.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
All Other Equipment > 5 HP	66.4	63.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
All Other Equipment > 5 HP	66.4	63.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	66.4	71.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

**** Receptor #3 ****

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
ST-5	Residential	48.0	48.0	48.0

Equipment

Description	Impact Device	Usage (%)	Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Man Lift	No	20		74.7	149.0	0.0
Man Lift	No	20		74.7	149.0	0.0
Man Lift	No	20		74.7	149.0	0.0
Man Lift	No	20		74.7	149.0	0.0
Man Lift	No	20		74.7	149.0	0.0
Man Lift	No	20		74.7	149.0	0.0
Man Lift	No	20		74.7	149.0	0.0
Man Lift	No	20		74.7	149.0	0.0
Pickup Truck	No	40		75.0	149.0	0.0
Pickup Truck	No	40		75.0	149.0	0.0
Pickup Truck	No	40		75.0	149.0	0.0
Crane	No	16		80.6	149.0	0.0
Crane	No	16		80.6	149.0	0.0
All Other Equipment > 5 HP	No	50	85.0		149.0	0.0
Crane	No	16		80.6	149.0	0.0
All Other Equipment > 5 HP	No	50	85.0		149.0	0.0
All Other Equipment > 5 HP	No	50	85.0		149.0	0.0
All Other Equipment > 5 HP	No	50	85.0		149.0	0.0
All Other Equipment > 5 HP	No	50	85.0		149.0	0.0
All Other Equipment > 5 HP	No	50	85.0		149.0	0.0

Results

	Calculated (dBA)		Noise Limits (dBA) Day		Evening		Night		Noise Limit Exceedance (dBA) Day		Evening		Night	
Equipment	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Man Lift	65.2	58.2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Man Lift	65.2	58.2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Man Lift	65.2	58.2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Man Lift	65.2	58.2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Man Lift	65.2	58.2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Man Lift	65.2	58.2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Man Lift	65.2	58.2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Man Lift	65.2	58.2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Pickup Truck	65.5	61.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Pickup Truck	65.5	61.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Pickup Truck	65.5	61.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Crane	71.1	63.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Crane	71.1	63.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
All Other Equipment > 5 HP	75.5	72.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Crane	71.1	63.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
All Other Equipment > 5 HP	75.5	72.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
All Other Equipment > 5 HP	75.5	72.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
All Other Equipment > 5 HP	75.5	72.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
All Other Equipment > 5 HP	75.5	72.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
All Other Equipment > 5 HP	75.5	72.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	75.5	80.9	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

**** Receptor #4 ****

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
ST-6	Residential	49.0	49.0	49.0

Equipment

Description	Impact Device	Usage (%)	Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Man Lift	No	20		74.7	288.0	0.0
Man Lift	No	20		74.7	288.0	0.0
Man Lift	No	20		74.7	288.0	0.0
Man Lift	No	20		74.7	288.0	0.0
Man Lift	No	20		74.7	288.0	0.0
Man Lift	No	20		74.7	288.0	0.0
Man Lift	No	20		74.7	288.0	0.0
Man Lift	No	20		74.7	288.0	0.0
Pickup Truck	No	40		75.0	288.0	0.0
Pickup Truck	No	40		75.0	288.0	0.0
Pickup Truck	No	40		75.0	288.0	0.0
Crane	No	16		80.6	288.0	0.0
Crane	No	16		80.6	288.0	0.0
All Other Equipment > 5 HP	No	50	85.0		288.0	0.0
Crane	No	16		80.6	288.0	0.0
All Other Equipment > 5 HP	No	50	85.0		288.0	0.0
All Other Equipment > 5 HP	No	50	85.0		288.0	0.0
All Other Equipment > 5 HP	No	50	85.0		288.0	0.0
All Other Equipment > 5 HP	No	50	85.0		288.0	0.0
All Other Equipment > 5 HP	No	50	85.0		288.0	0.0

Results

	Calculated (dBA)		Noise Limits (dBA) Day		Evening		Night		Noise Limit Exceedance (dBA) Day		Evening		Night	
Equipment	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Man Lift	59.5	52.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Man Lift	59.5	52.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Man Lift	59.5	52.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Man Lift	59.5	52.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Man Lift	59.5	52.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Man Lift	59.5	52.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Man Lift	59.5	52.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Man Lift	59.5	52.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Pickup Truck	59.8	55.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Pickup Truck	59.8	55.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Pickup Truck	59.8	55.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Crane	65.3	57.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Crane	65.3	57.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

All Other Equipment > 5 HP	69.8	66.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Crane	65.3	57.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
All Other Equipment > 5 HP	69.8	66.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
All Other Equipment > 5 HP	69.8	66.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
All Other Equipment > 5 HP	69.8	66.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
All Other Equipment > 5 HP	69.8	66.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
All Other Equipment > 5 HP	69.8	66.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	69.8	75.2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

**** Receptor #5 ****

Baselines (dBA)

Description	Land Use	Daytime	Evening	Night
ST-7 Glen mor 1	Residential	48.0	48.0	48.0

Equipment

Description	Impact Device	Usage (%)	Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Man Lift	No	20		74.7	195.0	0.0
Man Lift	No	20		74.7	195.0	0.0
Man Lift	No	20		74.7	195.0	0.0
Man Lift	No	20		74.7	195.0	0.0
Man Lift	No	20		74.7	195.0	0.0
Man Lift	No	20		74.7	195.0	0.0
Man Lift	No	20		74.7	195.0	0.0
Man Lift	No	20		74.7	195.0	0.0
Pickup Truck	No	40		75.0	195.0	0.0
Pickup Truck	No	40		75.0	195.0	0.0
Pickup Truck	No	40		75.0	195.0	0.0
Crane	No	16		80.6	195.0	0.0
Crane	No	16		80.6	195.0	0.0
All Other Equipment > 5 HP	No	50	85.0		195.0	0.0
Crane	No	16		80.6	195.0	0.0
All Other Equipment > 5 HP	No	50	85.0		195.0	0.0
All Other Equipment > 5 HP	No	50	85.0		195.0	0.0
All Other Equipment > 5 HP	No	50	85.0		195.0	0.0
All Other Equipment > 5 HP	No	50	85.0		195.0	0.0
All Other Equipment > 5 HP	No	50	85.0		195.0	0.0

Results

	Calculated (dBA)		Noise Limits (dBA)						Noise Limit Exceedance (dBA)					
			Day		Evening		Night		Day		Evening		Night	
Equipment	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Man Lift	62.9	55.9	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Man Lift	62.9	55.9	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Man Lift	62.9	55.9	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Man Lift	62.9	55.9	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Man Lift	62.9	55.9	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Man Lift	62.9	55.9	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Man Lift	62.9	55.9	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Man Lift	62.9	55.9	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Pickup Truck	63.2	59.2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Pickup Truck	63.2	59.2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Pickup Truck	63.2	59.2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Crane	68.7	60.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Crane	68.7	60.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
All Other Equipment > 5 HP	73.2	70.2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Crane	68.7	60.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
All Other Equipment > 5 HP	73.2	70.2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
All Other Equipment > 5 HP	73.2	70.2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
All Other Equipment > 5 HP	73.2	70.2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
All Other Equipment > 5 HP	73.2	70.2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
All Other Equipment > 5 HP	73.2	70.2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	73.2	78.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

**** Receptor #6 ****

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
Lothian	Residential	48.0	48.0	48.0

Equipment

Description	Impact Device	Usage (%)	Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Man Lift	No	20		74.7	16.0	0.0
Man Lift	No	20		74.7	16.0	0.0
Man Lift	No	20		74.7	16.0	0.0
Man Lift	No	20		74.7	16.0	0.0
Man Lift	No	20		74.7	16.0	0.0
Man Lift	No	20		74.7	16.0	0.0
Man Lift	No	20		74.7	16.0	0.0
Man Lift	No	20		74.7	16.0	0.0
Pickup Truck	No	40		75.0	16.0	0.0
Pickup Truck	No	40		75.0	16.0	0.0
Pickup Truck	No	40		75.0	16.0	0.0
Crane	No	16		80.6	16.0	0.0
Crane	No	16		80.6	16.0	0.0
All Other Equipment > 5 HP	No	50	85.0		16.0	0.0
Crane	No	16		80.6	16.0	0.0
All Other Equipment > 5 HP	No	50	85.0		16.0	0.0
All Other Equipment > 5 HP	No	50	85.0		16.0	0.0
All Other Equipment > 5 HP	No	50	85.0		16.0	0.0
All Other Equipment > 5 HP	No	50	85.0		16.0	0.0
All Other Equipment > 5 HP	No	50	85.0		16.0	0.0

Results

	Calculated (dBA)		Noise Limits (dBA) Day		Evening		Night		Noise Limit Exceedance (dBA) Day		Evening		Night	
Equipment	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Man Lift	84.6	77.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Man Lift	84.6	77.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Man Lift	84.6	77.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Man Lift	84.6	77.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Man Lift	84.6	77.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Man Lift	84.6	77.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Man Lift	84.6	77.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Man Lift	84.6	77.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Pickup Truck	84.9	80.9	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Pickup Truck	84.9	80.9	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Pickup Truck	84.9	80.9	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Crane	90.4	82.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Crane	90.4	82.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
All Other Equipment > 5 HP	94.9	91.9	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Crane	90.4	82.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
All Other Equipment > 5 HP	94.9	91.9	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
All Other Equipment > 5 HP	94.9	91.9	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
All Other Equipment > 5 HP	94.9	91.9	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
All Other Equipment > 5 HP	94.9	91.9	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
All Other Equipment > 5 HP	94.9	91.9	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	94.9	100.3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

**** Receptor #7 ****

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
ST-2	Residential	49.0	49.0	49.0

Equipment

Description	Impact Device	Usage (%)	Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Man Lift	No	20		74.7	164.0	0.0
Man Lift	No	20		74.7	164.0	0.0
Man Lift	No	20		74.7	164.0	0.0
Man Lift	No	20		74.7	164.0	0.0
Man Lift	No	20		74.7	164.0	0.0
Man Lift	No	20		74.7	164.0	0.0
Man Lift	No	20		74.7	164.0	0.0
Man Lift	No	20		74.7	164.0	0.0
Pickup Truck	No	40		75.0	164.0	0.0
Pickup Truck	No	40		75.0	164.0	0.0
Pickup Truck	No	40		75.0	164.0	0.0
Crane	No	16		80.6	164.0	0.0
Crane	No	16		80.6	164.0	0.0
All Other Equipment > 5 HP	No	50	85.0		164.0	0.0
Crane	No	16		80.6	164.0	0.0
All Other Equipment > 5 HP	No	50	85.0		164.0	0.0
All Other Equipment > 5 HP	No	50	85.0		164.0	0.0
All Other Equipment > 5 HP	No	50	85.0		164.0	0.0
All Other Equipment > 5 HP	No	50	85.0		164.0	0.0
All Other Equipment > 5 HP	No	50	85.0		164.0	0.0

Results

	Calculated (dBA)		Noise Limits (dBA) Day		Evening		Night		Noise Limit Exceedance (dBA) Day		Evening		Night	
Equipment	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Man Lift	64.4	57.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Man Lift	64.4	57.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Man Lift	64.4	57.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Man Lift	64.4	57.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Man Lift	64.4	57.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Man Lift	64.4	57.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Man Lift	64.4	57.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Man Lift	64.4	57.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Pickup Truck	64.7	60.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Pickup Truck	64.7	60.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Pickup Truck	64.7	60.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Crane	70.2	62.3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Crane	70.2	62.3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
All Other Equipment > 5 HP	74.7	71.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Crane	70.2	62.3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
All Other Equipment > 5 HP	74.7	71.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
All Other Equipment > 5 HP	74.7	71.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
All Other Equipment > 5 HP	74.7	71.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
All Other Equipment > 5 HP	74.7	71.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
All Other Equipment > 5 HP	74.7	71.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	74.7	80.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 01/10/2011
Case Description: Glen Mor

**** Receptor #1 ****

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
ST-4	Residential	49.6	49.6	49.6

Equipment

Description	Impact Device	Usage (%)	Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Front End Loader	No	40		79.1	164.0	0.0
Front End Loader	No	40		79.1	164.0	0.0
Front End Loader	No	40		79.1	164.0	0.0
Front End Loader	No	40		79.1	164.0	0.0
Front End Loader	No	40		79.1	164.0	0.0
Front End Loader	No	40		79.1	164.0	0.0
Front End Loader	No	40		79.1	164.0	0.0
Backhoe	No	40		77.6	164.0	0.0
Backhoe	No	40		77.6	164.0	0.0
Backhoe	No	40		77.6	164.0	0.0
Grader	No	40	85.0		164.0	0.0
Grader	No	40	85.0		164.0	0.0
Compressor (air)	No	40		77.7	164.0	0.0
Compressor (air)	No	40		77.7	164.0	0.0
Compressor (air)	No	40		77.7	164.0	0.0
Compressor (air)	No	40		77.7	164.0	0.0
Compressor (air)	No	40		77.7	164.0	0.0
Compressor (air)	No	40	80.0		164.0	0.0
Dozer	No	40		81.7	164.0	0.0
Dozer	No	40		81.7	164.0	0.0

Results

	Calculated (dBA)		Noise Limits (dBA) Day		Evening		Night		Noise Limit Exceedance (dBA) Day		Evening		Night	
Equipment	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Front End Loader	68.8	64.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Front End Loader	68.8	64.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Front End Loader	68.8	64.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Front End Loader	68.8	64.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Front End Loader	68.8	64.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Front End Loader	68.8	64.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Front End Loader	68.8	64.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Backhoe	67.2	63.3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Backhoe	67.2	63.3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Backhoe	67.2	63.3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Grader	74.7	70.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Grader	74.7	70.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Compressor (air)	67.4	63.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Compressor (air)	67.4	63.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Compressor (air)	67.4	63.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Compressor (air)	67.4	63.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Compressor (air)		67.4	63.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Compressor (air)		69.7	65.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Dozer		71.4	67.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Dozer		71.4	67.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Total	74.7	78.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

**** Receptor #2 ****

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
ST-3	Residential	52.0	52.0	52.0

Equipment

Description	Impact Device	Usage (%)	Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Front End Loader	No	40		79.1	240.0	5.0
Front End Loader	No	40		79.1	240.0	5.0
Front End Loader	No	40		79.1	240.0	5.0
Front End Loader	No	40		79.1	240.0	5.0
Front End Loader	No	40		79.1	240.0	5.0
Front End Loader	No	40		79.1	240.0	5.0
Front End Loader	No	40		79.1	240.0	5.0
Backhoe	No	40		77.6	240.0	5.0
Backhoe	No	40		77.6	240.0	5.0
Backhoe	No	40		77.6	240.0	5.0
Grader	No	40	85.0		240.0	5.0
Grader	No	40	85.0		240.0	5.0
Compressor (air)	No	40		77.7	240.0	5.0
Compressor (air)	No	40		77.7	240.0	5.0
Compressor (air)	No	40		77.7	240.0	5.0
Compressor (air)	No	40		77.7	240.0	5.0
Compressor (air)	No	40		77.7	240.0	5.0
Compressor (air)	No	40	80.0		240.0	5.0
Dozer	No	40		81.7	240.0	5.0
Dozer	No	40		81.7	240.0	5.0

Results

	Calculated (dBA)		Noise Limits (dBA)						Noise Limit Exceedance (dBA)					
			Day		Evening		Night		Day		Evening		Night	
Equipment	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Front End Loader	60.5	56.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Front End Loader	60.5	56.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Front End Loader	60.5	56.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Front End Loader	60.5	56.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Front End Loader	60.5	56.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Front End Loader	60.5	56.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Front End Loader	60.5	56.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Backhoe	58.9	55.0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Backhoe	58.9	55.0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Backhoe	58.9	55.0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Grader	66.4	62.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Grader	66.4	62.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Compressor (air)	59.0	55.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Compressor (air)	59.0	55.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Compressor (air)	59.0	55.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Compressor (air)	59.0	55.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Compressor (air)	59.0	55.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Compressor (air)	61.4	57.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Dozer	63.0	59.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Dozer	63.0	59.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	66.4	70.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

**** Receptor #3 ****

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
ST-5	Residential	48.0	48.0	48.0

Equipment

Description	Impact Device	Usage (%)	Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Front End Loader	No	40		79.1	149.0	0.0
Front End Loader	No	40		79.1	149.0	0.0
Front End Loader	No	40		79.1	149.0	0.0
Front End Loader	No	40		79.1	149.0	0.0
Front End Loader	No	40		79.1	149.0	0.0
Front End Loader	No	40		79.1	149.0	0.0
Front End Loader	No	40		79.1	149.0	0.0
Backhoe	No	40		77.6	149.0	0.0
Backhoe	No	40		77.6	149.0	0.0
Backhoe	No	40		77.6	149.0	0.0
Grader	No	40	85.0		149.0	0.0
Grader	No	40	85.0		149.0	0.0
Compressor (air)	No	40		77.7	149.0	0.0
Compressor (air)	No	40		77.7	149.0	0.0
Compressor (air)	No	40		77.7	149.0	0.0
Compressor (air)	No	40		77.7	149.0	0.0
Compressor (air)	No	40		77.7	149.0	0.0
Compressor (air)	No	40	80.0		149.0	0.0
Dozer	No	40		81.7	149.0	0.0
Dozer	No	40		81.7	149.0	0.0

Results

	Calculated (dBA)		Noise Limits (dBA) Day		Evening		Night		Noise Limit Exceedance (dBA) Day		Evening		Night	
Equipment	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Front End Loader	69.6	65.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Front End Loader	69.6	65.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Front End Loader	69.6	65.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Front End Loader	69.6	65.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Front End Loader	69.6	65.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Front End Loader	69.6	65.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Front End Loader	69.6	65.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Backhoe	68.1	64.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Backhoe	68.1	64.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Backhoe	68.1	64.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Grader	75.5	71.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Grader	75.5	71.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Compressor (air)	68.2	64.2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Compressor (air)	68.2	64.2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Compressor (air)	68.2	64.2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Compressor (air)	68.2	64.2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Compressor (air)	68.2	64.2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Compressor (air)	70.5	66.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Dozer	72.2	68.2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Dozer	72.2	68.2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	75.5	79.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

**** Receptor #4 ****

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
ST-6	Residential	49.0	49.0	49.0

Equipment

Description	Impact Device	Usage (%)	Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Front End Loader	No	40		79.1	288.0	0.0
Front End Loader	No	40		79.1	288.0	0.0
Front End Loader	No	40		79.1	288.0	0.0
Front End Loader	No	40		79.1	288.0	0.0
Front End Loader	No	40		79.1	288.0	0.0
Front End Loader	No	40		79.1	288.0	0.0
Front End Loader	No	40		79.1	288.0	0.0
Backhoe	No	40		77.6	288.0	0.0
Backhoe	No	40		77.6	288.0	0.0
Backhoe	No	40		77.6	288.0	0.0
Grader	No	40	85.0		288.0	0.0
Grader	No	40	85.0		288.0	0.0
Compressor (air)	No	40		77.7	288.0	0.0
Compressor (air)	No	40		77.7	288.0	0.0
Compressor (air)	No	40		77.7	288.0	0.0
Compressor (air)	No	40		77.7	288.0	0.0
Compressor (air)	No	40		77.7	288.0	0.0
Compressor (air)	No	40	80.0		288.0	0.0
Dozer	No	40		81.7	288.0	0.0
Dozer	No	40		81.7	288.0	0.0

Results

	Calculated (dBA)		Noise Limits (dBA) Day		Evening		Night		Noise Limit Exceedance (dBA) Day		Evening		Night	
Equipment	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Front End Loader	63.9	59.9	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Front End Loader	63.9	59.9	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Front End Loader	63.9	59.9	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Front End Loader	63.9	59.9	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Front End Loader	63.9	59.9	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Front End Loader	63.9	59.9	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Front End Loader	63.9	59.9	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Backhoe	62.4	58.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Backhoe	62.4	58.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Backhoe	62.4	58.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Grader	69.8	65.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Grader	69.8	65.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Compressor (air)	62.5	58.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Compressor (air)	62.5	58.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Compressor (air)	62.5	58.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Compressor (air)	62.5	58.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Compressor (air)	62.5	58.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Compressor (air)	64.8	60.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Dozer	66.5	62.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Dozer	66.5	62.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	69.8	74.0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

**** Receptor #5 ****

Baselines (dBA)

Description	Land Use	Daytime	Evening	Night
ST-7 Glen mor 1	Residential	48.0	48.0	48.0

Equipment

Description	Impact Device	Usage (%)	Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Front End Loader	No	40		79.1	195.0	0.0
Front End Loader	No	40		79.1	195.0	0.0
Front End Loader	No	40		79.1	195.0	0.0
Front End Loader	No	40		79.1	195.0	0.0
Front End Loader	No	40		79.1	195.0	0.0
Front End Loader	No	40		79.1	195.0	0.0
Front End Loader	No	40		79.1	195.0	0.0
Backhoe	No	40		77.6	195.0	0.0
Backhoe	No	40		77.6	195.0	0.0
Backhoe	No	40		77.6	195.0	0.0
Grader	No	40	85.0		195.0	0.0
Grader	No	40	85.0		195.0	0.0
Compressor (air)	No	40		77.7	195.0	0.0
Compressor (air)	No	40		77.7	195.0	0.0
Compressor (air)	No	40		77.7	195.0	0.0
Compressor (air)	No	40		77.7	195.0	0.0
Compressor (air)	No	40		77.7	195.0	0.0
Compressor (air)	No	40	80.0		195.0	0.0
Dozer	No	40		81.7	195.0	0.0
Dozer	No	40		81.7	195.0	0.0

Results

	Calculated (dBA)		Noise Limits (dBA)						Noise Limit Exceedance (dBA)					
			Day		Evening		Night		Day		Evening		Night	
Equipment	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Front End Loader	67.3	63.3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Front End Loader	67.3	63.3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Front End Loader	67.3	63.3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Front End Loader	67.3	63.3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Front End Loader	67.3	63.3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Front End Loader	67.3	63.3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Front End Loader	67.3	63.3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Backhoe	65.7	61.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Backhoe	65.7	61.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Backhoe	65.7	61.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Grader	73.2	69.2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Grader	73.2	69.2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Compressor (air)	65.8	61.9	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Compressor (air)	65.8	61.9	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Compressor (air)	65.8	61.9	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Compressor (air)	65.8	61.9	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Compressor (air)	65.8	61.9	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Compressor (air)	68.2	64.2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Dozer	69.8	65.9	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Dozer	69.8	65.9	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	73.2	77.3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

**** Receptor #6 ****

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
Lothian	Residential	48.0	48.0	48.0

Equipment

Description	Impact Device	Usage (%)	Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Front End Loader	No	40		79.1	16.0	0.0
Front End Loader	No	40		79.1	16.0	0.0
Front End Loader	No	40		79.1	16.0	0.0
Front End Loader	No	40		79.1	16.0	0.0
Front End Loader	No	40		79.1	16.0	0.0
Front End Loader	No	40		79.1	16.0	0.0
Front End Loader	No	40		79.1	16.0	0.0
Backhoe	No	40		77.6	16.0	0.0
Backhoe	No	40		77.6	16.0	0.0
Backhoe	No	40		77.6	16.0	0.0
Grader	No	40	85.0		16.0	0.0
Grader	No	40	85.0		16.0	0.0
Compressor (air)	No	40		77.7	16.0	0.0
Compressor (air)	No	40		77.7	16.0	0.0
Compressor (air)	No	40		77.7	16.0	0.0
Compressor (air)	No	40		77.7	16.0	0.0
Compressor (air)	No	40		77.7	16.0	0.0
Compressor (air)	No	40	80.0		16.0	0.0
Dozer	No	40		81.7	16.0	0.0
Dozer	No	40		81.7	16.0	0.0

Results

	Calculated (dBA)		Noise Limits (dBA)						Noise Limit Exceedance (dBA)					
			Day		Evening		Night		Day		Evening		Night	
Equipment	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Front End Loader	89.0	85.0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Front End Loader	89.0	85.0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Front End Loader	89.0	85.0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Front End Loader	89.0	85.0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Front End Loader	89.0	85.0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Front End Loader	89.0	85.0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Front End Loader	89.0	85.0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Backhoe	87.5	83.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Backhoe	87.5	83.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Backhoe	87.5	83.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Grader	94.9	90.9	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Grader	94.9	90.9	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Compressor (air)	87.6	83.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Compressor (air)	87.6	83.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Compressor (air)	87.6	83.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Compressor (air)	87.6	83.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Compressor (air)	87.6	83.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Compressor (air)	89.9	85.9	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Dozer	91.6	87.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Dozer	91.6	87.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	94.9	99.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

**** Receptor #7 ****

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
ST-2	Residential	49.0	49.0	49.0

Equipment

Description	Impact Device	Usage (%)	Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Front End Loader	No	40		79.1	164.0	0.0
Front End Loader	No	40		79.1	164.0	0.0
Front End Loader	No	40		79.1	164.0	0.0
Front End Loader	No	40		79.1	164.0	0.0
Front End Loader	No	40		79.1	164.0	0.0
Front End Loader	No	40		79.1	164.0	0.0
Front End Loader	No	40		79.1	164.0	0.0
Backhoe	No	40		77.6	164.0	0.0
Backhoe	No	40		77.6	164.0	0.0
Backhoe	No	40		77.6	164.0	0.0
Grader	No	40	85.0		164.0	0.0
Grader	No	40	85.0		164.0	0.0
Compressor (air)	No	40		77.7	164.0	0.0
Compressor (air)	No	40		77.7	164.0	0.0
Compressor (air)	No	40		77.7	164.0	0.0
Compressor (air)	No	40		77.7	164.0	0.0
Compressor (air)	No	40		77.7	164.0	0.0
Compressor (air)	No	40	80.0		164.0	0.0
Dozer	No	40		81.7	164.0	0.0
Dozer	No	40		81.7	164.0	0.0

Results

	Calculated (dBA)		Noise Limits (dBA) Day		Evening		Night		Noise Limit Exceedance (dBA) Day		Evening		Night	
Equipment	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Front End Loader	68.8	64.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Front End Loader	68.8	64.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Front End Loader	68.8	64.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Front End Loader	68.8	64.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Front End Loader	68.8	64.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Front End Loader	68.8	64.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Front End Loader	68.8	64.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Backhoe	67.2	63.3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Backhoe	67.2	63.3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Backhoe	67.2	63.3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Grader	74.7	70.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Grader	74.7	70.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Compressor (air)	67.4	63.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Compressor (air)	67.4	63.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Compressor (air)	67.4	63.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Compressor (air)	67.4	63.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Compressor (air)	67.4	63.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Compressor (air)	69.7	65.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Dozer	71.4	67.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Dozer	71.4	67.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	74.7	78.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 01/10/2011
Case Description: Glen Mor

**** Receptor #1 ****

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
ST-4	Residential	49.6	49.6	49.6

Equipment

Description	Impact Device	Usage (%)	Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Scraper	No	40		83.6	164.0	0.0
Scraper	No	40		83.6	164.0	0.0
Scraper	No	40		83.6	164.0	0.0
Vibratory Concrete Mixer	No	20		80.0	164.0	0.0
Vibratory Concrete Mixer	No	20		80.0	164.0	0.0
Vibratory Concrete Mixer	No	20		80.0	164.0	0.0
Vibratory Concrete Mixer	No	20		80.0	164.0	0.0
Vibratory Concrete Mixer	No	20		80.0	164.0	0.0
Pumps	No	50		80.9	164.0	0.0
Pumps	No	50		80.9	164.0	0.0
Pumps	No	50		80.9	164.0	0.0

Results

	Calculated (dBA)		Noise Limits (dBA) Day		Evening		Night		Noise Limit Exceedance (dBA) Day		Evening		Night	
Equipment	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Scraper	73.3	69.3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Scraper	73.3	69.3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Scraper	73.3	69.3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Vibratory Concrete Mixer	69.7	62.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Vibratory Concrete Mixer	69.7	62.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Vibratory Concrete Mixer	69.7	62.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Vibratory Concrete Mixer	69.7	62.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Vibratory Concrete Mixer	69.7	62.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Pumps	70.6	67.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Pumps	70.6	67.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Pumps	70.6	67.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	73.3	77.2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

**** Receptor #2 ****

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
ST-3	Residential	52.0	52.0	52.0

Equipment

Description	Impact Device	Usage (%)	Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)

Description	Impact Device	Usage (%)	Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Scraper	No	40		83.6	240.0	5.0
Scraper	No	40		83.6	240.0	5.0
Scraper	No	40		83.6	240.0	5.0
Vibratory Concrete Mixer	No	20		80.0	240.0	5.0
Vibratory Concrete Mixer	No	20		80.0	240.0	5.0
Vibratory Concrete Mixer	No	20		80.0	240.0	5.0
Vibratory Concrete Mixer	No	20		80.0	240.0	5.0
Vibratory Concrete Mixer	No	20		80.0	240.0	5.0
Pumps	No	50		80.9	240.0	5.0
Pumps	No	50		80.9	240.0	5.0
Pumps	No	50		80.9	240.0	5.0

Results

	Calculated (dBA)		Noise Limits (dBA)						Noise Limit Exceedance (dBA)					
			Day		Evening		Night		Day		Evening		Night	
Equipment	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Scraper	65.0	61.0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Scraper	65.0	61.0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Scraper	65.0	61.0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Vibratory Concrete Mixer	61.4	54.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Vibratory Concrete Mixer	61.4	54.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Vibratory Concrete Mixer	61.4	54.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Vibratory Concrete Mixer	61.4	54.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Vibratory Concrete Mixer	61.4	54.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Pumps	62.3	59.3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Pumps	62.3	59.3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Pumps	62.3	59.3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	65.0	68.9	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

**** Receptor #3 ****

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
ST-5	Residential	48.0	48.0	48.0

Equipment

Description	Impact Device	Usage (%)	Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Scraper	No	40		83.6	149.0	0.0
Scraper	No	40		83.6	149.0	0.0
Scraper	No	40		83.6	149.0	0.0
Vibratory Concrete Mixer	No	20		80.0	149.0	0.0
Vibratory Concrete Mixer	No	20		80.0	149.0	0.0
Vibratory Concrete Mixer	No	20		80.0	149.0	0.0
Vibratory Concrete Mixer	No	20		80.0	149.0	0.0
Vibratory Concrete Mixer	No	20		80.0	149.0	0.0
Pumps	No	50		80.9	149.0	0.0
Pumps	No	50		80.9	149.0	0.0
Pumps	No	50		80.9	149.0	0.0

Results

Noise Limits (dBA)   Noise Limit Exceedance (dBA)

Equipment	Calculated (dBA) Lmax	Calculated (dBA) Leq	Day Lmax	Day Leq	Evening Lmax	Evening Leq	Night Lmax	Night Leq	Day Lmax	Day Leq	Evening Lmax	Evening Leq	Night Lmax	Night Leq
Scraper	74.1	70.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Scraper	74.1	70.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Scraper	74.1	70.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Vibratory Concrete Mixer	70.5	63.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Vibratory Concrete Mixer	70.5	63.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Vibratory Concrete Mixer	70.5	63.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Vibratory Concrete Mixer	70.5	63.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Vibratory Concrete Mixer	70.5	63.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Pumps	71.5	68.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Pumps	71.5	68.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Pumps	71.5	68.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	74.1	78.0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

**** Receptor #4 ****

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
ST-6	Residential	49.0	49.0	49.0

Equipment

Description	Impact Device	Usage (%)	Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Scraper	No	40		83.6	288.0	0.0
Scraper	No	40		83.6	288.0	0.0
Scraper	No	40		83.6	288.0	0.0
Vibratory Concrete Mixer	No	20		80.0	288.0	0.0
Vibratory Concrete Mixer	No	20		80.0	288.0	0.0
Vibratory Concrete Mixer	No	20		80.0	288.0	0.0
Vibratory Concrete Mixer	No	20		80.0	288.0	0.0
Vibratory Concrete Mixer	No	20		80.0	288.0	0.0
Pumps	No	50		80.9	288.0	0.0
Pumps	No	50		80.9	288.0	0.0
Pumps	No	50		80.9	288.0	0.0

Results

			Noise Limits (dBA)						Noise Limit Exceedance (dBA)					
	Calculated (dBA)		Day		Evening		Night		Day		Evening		Night	
Equipment	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Scraper	68.4	64.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Scraper	68.4	64.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Scraper	68.4	64.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Vibratory Concrete Mixer	64.8	57.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Vibratory Concrete Mixer	64.8	57.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Vibratory Concrete Mixer	64.8	57.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Vibratory Concrete Mixer	64.8	57.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Vibratory Concrete Mixer	64.8	57.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Pumps	65.7	62.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Pumps	65.7	62.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Pumps	65.7	62.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	68.4	72.3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

**** Receptor #5 ****

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
ST-7 Glen mor 1	Residential	48.0	48.0	48.0

Equipment

Description	Impact Device	Usage (%)	Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Scraper	No	40		83.6	195.0	0.0
Scraper	No	40		83.6	195.0	0.0
Scraper	No	40		83.6	195.0	0.0
Vibratory Concrete Mixer	No	20		80.0	195.0	0.0
Vibratory Concrete Mixer	No	20		80.0	195.0	0.0
Vibratory Concrete Mixer	No	20		80.0	195.0	0.0
Vibratory Concrete Mixer	No	20		80.0	195.0	0.0
Vibratory Concrete Mixer	No	20		80.0	195.0	0.0
Pumps	No	50		80.9	195.0	0.0
Pumps	No	50		80.9	195.0	0.0
Pumps	No	50		80.9	195.0	0.0

Results

	Calculated (dBA)		Noise Limits (dBA) Day		Evening		Night		Noise Limit Exceedance (dBA) Day		Evening		Night	
Equipment	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Scraper	71.8	67.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Scraper	71.8	67.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Scraper	71.8	67.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Vibratory Concrete Mixer	68.2	61.2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Vibratory Concrete Mixer	68.2	61.2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Vibratory Concrete Mixer	68.2	61.2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Vibratory Concrete Mixer	68.2	61.2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Vibratory Concrete Mixer	68.2	61.2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Pumps	69.1	66.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Pumps	69.1	66.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Pumps	69.1	66.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	71.8	75.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

**** Receptor #6 ****

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
Lothian	Residential	48.0	48.0	48.0

Equipment

Description	Impact Device	Usage (%)	Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Scraper	No	40		83.6	16.0	0.0
Scraper	No	40		83.6	16.0	0.0
Scraper	No	40		83.6	16.0	0.0
Vibratory Concrete Mixer	No	20		80.0	16.0	0.0

Vibratory Concrete Mixer	No	20		80.0	16.0	0.0
Vibratory Concrete Mixer	No	20		80.0	16.0	0.0
Vibratory Concrete Mixer	No	20		80.0	16.0	0.0
Vibratory Concrete Mixer	No	20		80.0	16.0	0.0
Pumps	No	50		80.9	16.0	0.0
Pumps	No	50		80.9	16.0	0.0
Pumps	No	50		80.9	16.0	0.0

Results

	Calculated (dBA)		Noise Limits (dBA)						Noise Limit Exceedance (dBA)					
			Day		Evening		Night		Day		Evening		Night	
Equipment	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Scraper	93.5	89.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Scraper	93.5	89.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Scraper	93.5	89.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Vibratory Concrete Mixer	89.9	82.9	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Vibratory Concrete Mixer	89.9	82.9	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Vibratory Concrete Mixer	89.9	82.9	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Vibratory Concrete Mixer	89.9	82.9	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Vibratory Concrete Mixer	89.9	82.9	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Pumps	90.8	87.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Pumps	90.8	87.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Pumps	90.8	87.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	93.5	97.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

**** Receptor #7 ****

		Baselines (dBA)		
Description	Land Use	Daytime	Evening	Night
ST-2	Residential	49.0	49.0	49.0

Equipment

Description	Impact Device	Usage (%)	Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Scraper	No	40		83.6	164.0	0.0
Scraper	No	40		83.6	164.0	0.0
Scraper	No	40		83.6	164.0	0.0
Vibratory Concrete Mixer	No	20		80.0	164.0	0.0
Vibratory Concrete Mixer	No	20		80.0	164.0	0.0
Vibratory Concrete Mixer	No	20		80.0	164.0	0.0
Vibratory Concrete Mixer	No	20		80.0	164.0	0.0
Vibratory Concrete Mixer	No	20		80.0	164.0	0.0
Pumps	No	50		80.9	164.0	0.0
Pumps	No	50		80.9	164.0	0.0
Pumps	No	50		80.9	164.0	0.0

Results

	Calculated (dBA)		Noise Limits (dBA)						Noise Limit Exceedance (dBA)					
			Day		Evening		Night		Day		Evening		Night	
Equipment	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Scraper	73.3	69.3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Scraper	73.3	69.3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Scraper	73.3	69.3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Vibratory Concrete Mixer	69.7	62.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Vibratory Concrete Mixer	69.7	62.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Vibratory Concrete Mixer	69.7	62.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Vibratory Concrete Mixer	69.7	62.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Vibratory Concrete Mixer	69.7	62.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Pumps	70.6	67.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Pumps	70.6	67.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Pumps	70.6	67.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	73.3	77.2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Appendix R

Fire Flow Analysis

Carl Sepponen
Civil Engineer

California Registration
Civil No. 26391

UC Riverside
Glen Mor 2 Fire Water Hydraulic Model
January 24, 2011

A hydraulic water model was prepared of the UC Riverside East Campus to check the residual pressures of the proposed fire water distribution system in the Glen Mor 2 development. The hydraulic water model used was EPANET 2.0. Most of the East Campus is a combined distribution system serving domestic and fire needs from the same pipelines. The proposed Glen Mor 2 development will have separate domestic and fire water pipelines.

Much of the information for this work was taken from the "Detailed Project Program" by Bechard Long & Associates, Inc., Section 5.0, Domestic Water System.

The hydraulic model included the 8-inch diameter, and larger, pipelines, and several 6-inch diameter pipelines that completed pipeline loops. The largest pipeline is a 12-inch diameter Transite pipeline that runs between the campus pump station and two water storage tanks located to the south. All the fire water pipelines in the proposed Glen Mor 2 development will be 8-inch diameter (except a six-inch diameter pipe that will connect the project to the Glen Mor 1 system).

The maximum day demand (MDD) for the campus was estimated from data in the Detailed Project Program. The peak demand in the report in the 2006 – 2010 period is 4201 gpm. The MDD was estimated to be 3415 gpm. The demand during the fire flow testing was assumed to be 50% of the MDD, which was used to calibrate the model.

The model was calibrated using available fire flow data from two fire hydrants:

1. Data for fire hydrant (FH) C5-4 (model Node19) located at the NE corner of Lothian, E wing, was used: 102 psi static, 90 psi residual, and 1169 gpm observed flow. The elevation of the FH was estimated to be 1088 feet. The model gave results that were approximately 2 psi lower than the actual fire flow test results. Therefore it is possible some of the assumptions made in the model are conservative.
2. Data for FH C5-9 (model Node 55) located along the east side of Pentland Way Building A (Glen Mor 1) was also used: 90 psi static, 70 psi residual, and 924 gpm observed flow. The elevation of the FH was estimated to be 1114 feet. The computer closely replicated the static pressure, within 2 psi. The model gave results that were approximately 5 psi lower than the actual fire flow test results. Therefore it is possible some of the assumptions made in the model are conservative.

The following assumptions were made in preparing the water model:

1. The East Campus Pump Station has been upgraded and can meet all demands (Project W-14 in the Detailed Project Program).
2. The pump curve can be approximated by a straight line between 1500 gpm at 135 psi (310 feet) and 8000 gpm at 125 psi (290 feet).

3. An 8-inch diameter pipeline was constructed in the west end of North Campus Drive, which completes a pipeline loop (Project W-12 in the Detailed Project Program).
4. An 8-inch diameter pipeline was constructed just north of Sproul Hall, which completes a pipeline loop. (Project W-13 in the Detailed Project Program).
5. The bottom elevation of the two water storage tanks is 1300 and have a 15-foot water level at the time of the fire demand.
6. The emergency City water connection is ignored for this work and assumed to remain closed.
7. A six-inch diameter pipeline will cross a foot bridge that will connect Glen Mor 1 with the proposed Glen Mor 2 project.
8. A"C" value of 125 was used throughout the model for all pipes.

Model Results

The hydraulic model was run with a 1500 gpm fire flow at the furthest most FH along with a MDD of 3840 gpm spread throughout the campus. The minimum pressure was 42 psi, which is higher than the 20 psi needed for the fire department. Therefore the proposed Glen Mor 2 fire pipeline meets the minimum pressure requirement.

As noted before, the calibration of the model with the FH flow tests indicated that the model likely is somewhat conservative, in which case the pressures during the fire scenario would really be slightly higher than 42 psi.

The computer model was also used to check pressures if the 1500 gpm fire flow were in 4 other locations. The results demonstrated that the fire at node 42 was the most critical. Each of the other tests showed the lowest pressure at Node 42, but they were higher than when the fire flow was located at Node 42:

- Node 27 fire, lowest pressure 45.8 psi at Node 42
- Node 30 fire, lowest pressure 46.3 psi at Node 42
- Node 40 fire, lowest pressure 47.1 psi at Node 42
- Node 33 fire, lowest pressure 47.6 psi at Node 42

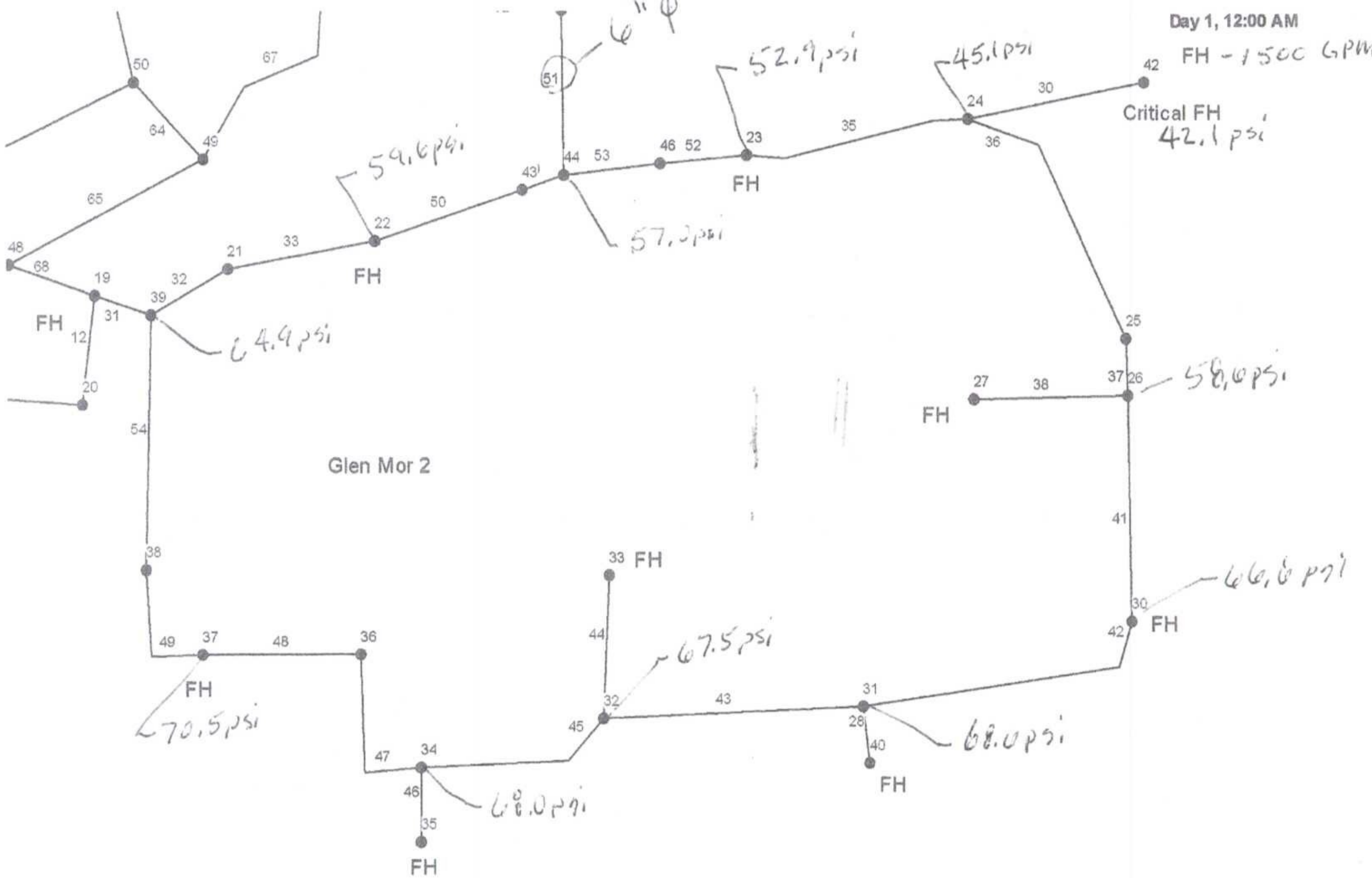
The model was used to examine the situation if either of the two pipelines that serve Glen Mor 2 project were out of service. If the 6" connection to Glen Mor 1 were out, the pressure due to a fire at Node 42 would be 40 psi (compared to the 42 psi previously). If the 8" connection were out, the pressure due to a fire at Node 42 would be just 11 psi. If the 6" connection were increased to 8", the resulting pressure at Node 42 would be 24 psi under similar circumstances.

Respectfully submitted,

Carl Sepponen, Consultant
California Professional Engineer #C 26391 (registration expires 3/31/2012)

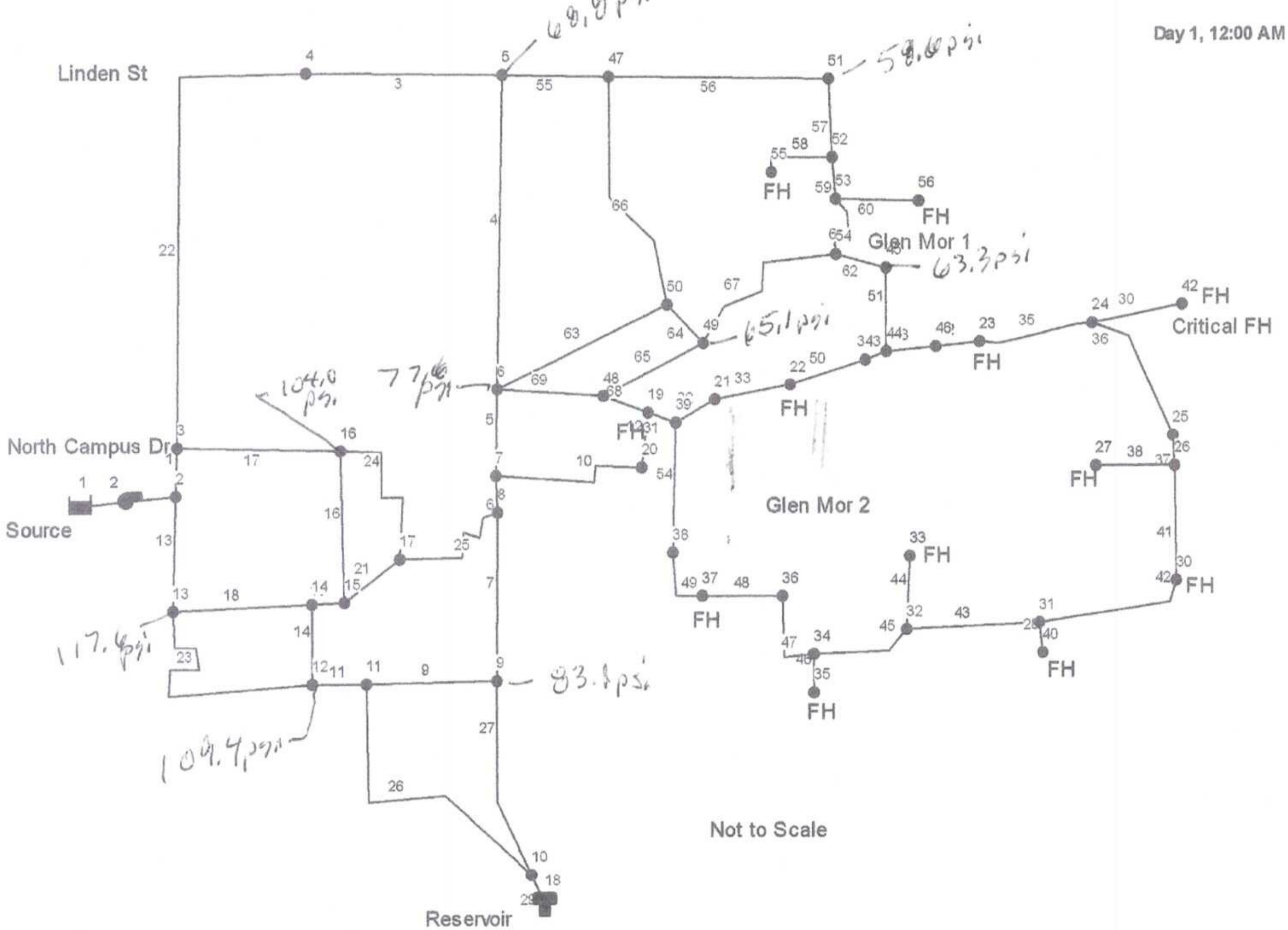
3.

Glen Mor 2 Max Day plus 1500 GPPM Fire Flow at FH 42



EPANET 2

Glen Mor 2 Max Day plus 1500 GPPM Fire Flow at FH 42



4.

EPANET 2

Glen Mor 2 Max Day plus 1500 GPPM Fire Flow at FH 42

Network Table - Nodes

Node ID	Elevation ft	Demand GPM	Pressure psi
Junc 2	1040	100.00	122.69
Junc 3	1040	0.00	118.39
Junc 4	1060	400.00	97.29
Junc 5	1100	250.00	68.80
Junc 6	1080	150.00	77.63
Junc 7	1070	200.00	86.51
Junc 8	1070	0.00	92.08
Junc 9	1120	500.00	83.13
Junc 10	1300	0.00	8.52
Junc 11	1080	300.00	100.59
Junc 12	1060	200.00	109.40
Junc 13	1045	300.00	117.59
Junc 14	1060	300.00	107.40
Junc 15	1060	300.00	104.16
Junc 16	1060	300.00	104.05
Junc 17	1060	300.00	99.90
Junc 19	1095	0.00	69.85
Junc 20	1090	0.00	73.29
Junc 21	1105	0.00	64.50
Junc 22	1115	0.00	59.63
Junc 23	1125	0.00	52.93
Junc 24	1139	20.00	45.10
Junc 25	1110	0.00	58.44
Junc 26	1110	0.00	58.59
Junc 27	1110	0.00	58.59
Junc 30	1095	0.00	65.59

Glen Mor 2 Max Day plus 1500 GPPM Fire Flow at FH 42

Node ID	Elevation ft	Demand GPM	Pressure psi
Junc 31	1090	0.00	68.59
Junc 32	1094	0.00	67.53
Junc 33	1094	20.00	67.53
Junc 34	1094	0.00	68.01
Junc 35	1090	0.00	69.74
Junc 36	1091	0.00	69.61
Junc 37	1090	0.00	70.52
Junc 38	1090	20.00	70.80
Junc 39	1105	0.00	64.93
Junc 40	1090	0.00	68.59
Junc 42	1140	1500.00	42.14
Junc 43	1120	0.00	57.10
Junc 44	1120	0.00	56.99
Junc 45	1109	0.00	63.26
Junc 46	1125	20.00	53.69
Junc 47	1100	0.00	68.49
Junc 48	1090	0.00	72.48
Junc 49	1107	40.00	65.11
Junc 50	1100	40.00	68.37
Junc 51	1122	0.00	58.64
Junc 52	1125	0.00	57.25
Junc 53	1120	0.00	59.33
Junc 54	1115	80.00	61.38
Junc 55	1114	0.00	62.01
Junc 56	1120	0.00	59.33
Resvr 1	1020	-3727.71	0.00
Tank 18	1305	-1612.30	6.50

Glen Mor 2 Max Day plus 1500 GPPM Fire Flow at FH 42

Network Table - Links

Link ID	Length ft	Diameter in	Flow GPM	Velocity fps
Pipe 1	200	8	1647.84	10.52
Pipe 3	1450	6	444.27	5.04
Pipe 4	1100	8	-111.50	0.71
Pipe 5	600	8	-939.84	6.00
Pipe 6	200	8	-1895.73	12.10
Pipe 7	1000	8	-1241.82	7.93
Pipe 9	900	12	-321.83	0.91
Pipe 11	600	12	-429.53	1.22
Pipe 13	700	12	-1979.87	5.62
Pipe 14	500	6	311.98	3.54
Pipe 15	160	6	750.34	8.51
Pipe 16	900	8	98.03	0.63
Pipe 17	1000	8	803.57	5.13
Pipe 18	760	8	738.36	4.71
Pipe 21	850	6	352.31	4.00
Pipe 22	2000	8	844.27	5.39
Pipe 23	1600	12	-941.51	2.67
Pipe 24	1250	8	601.59	3.84
Pipe 25	900	8	653.91	4.17
Pipe 26	2000	6	-192.31	2.18
Pipe 27	1500	12	-1419.99	4.03
Pipe 29	50	12	-1612.30	4.57
Pipe 10	900	8	755.89	4.82
Pipe 12	250	8	-755.89	4.82
Pipe 31	50	8	1191.40	7.60
Pipe 32	120	8	626.18	4.00

Glen Mor 2 Max Day plus 1500 GPPM Fire Flow at FH 42

Link ID	Length ft	Diameter in	Flow GPM	Velocity fps
Pipe 33	152	8	626.18	4.00
Pipe 35	210	8	994.78	6.35
Pipe 36	300	8	-525.22	3.35
Pipe 37	60	8	-525.22	3.35
Pipe 38	150	8	0.00	0.00
Pipe 41	195	8	-525.22	3.35
Pipe 42	320	8	-525.22	3.35
Pipe 43	260	8	-525.22	3.35
Pipe 44	75	8	20.00	0.13
Pipe 45	175	8	-545.22	3.48
Pipe 46	50	8	0.00	0.00
Pipe 47	110	8	-545.22	3.48
Pipe 48	170	8	-545.22	3.48
Pipe 49	100	8	-545.22	3.48
Pipe 28	70	8	0.00	0.00
Pipe 30	140	8	1500.00	9.57
Pipe 39	30	8	-626.18	4.00
Pipe 50	100	8	-626.18	4.00
Pipe 51	250	6	-388.60	4.41
Pipe 52	90	8	-994.78	6.35
Pipe 53	130	8	-1014.78	6.48
Pipe 54	215	8	565.22	3.61
Pipe 55	330	8	305.77	1.95
Pipe 56	750	8	197.58	1.26
Pipe 57	220	8	197.58	1.26
Pipe 58	200	8	0.00	0.00
Pipe 59	200	8	197.58	1.26
Pipe 60	270	8	0.00	0.00

Glen Mor 2 Max Day plus 1500 GPPM Fire Flow at FH 42

Link ID	Length ft	Diameter in	Flow GPM	Velocity fps
Pipe 61	270	8	197.58	1.26
Pipe 62	120	6	388.60	4.41
Pipe 63	800	8	267.30	1.71
Pipe 64	200	8	335.49	2.14
Pipe 65	400	8	24.47	0.16
Pipe 66	850	8	-108.19	0.69
Pipe 67	350	8	271.02	1.73
Pipe 68	250	8	-435.51	2.78
Pipe 69	500	8	-411.04	2.62
Pump 2	#N/A	#N/A	3727.71	0.00

Appendix S

Traffic Impact Analysis

UNIVERSITY OF CALIFORNIA, RIVERSIDE

GLEN MOR 2 STUDENT APARTMENTS PROJECT

TRAFFIC IMPACT ANALYSIS

Prepared by:

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Carl Ballard, and
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University of California, Riverside

Glen Mor 2 Student Apartments Project

Traffic Impact Analysis

This report contains the traffic impact analysis for the proposed Glen Mor 2 Student Apartments project. The project site is located in the northwest corner of the Valencia Hill Drive/Big Springs Road intersection on the University of California, Riverside. The project Opening Year is 2013. The Year 2015 was analyzed in this report to be consistent with the UC Riverside LRDP EIR.

The traffic report contains documentation of existing traffic conditions, traffic generated by the project, distribution of the project traffic to roads outside the project, and an analysis of future traffic conditions. Each of these topics is contained in a separate section of the report. The first section is "Findings", and subsequent sections expand upon the findings. In this way, information on any particular aspect of the study can be easily located by the reader.

Although this is a technical report, every effort has been made to write the report clearly and concisely. To assist the reader with those terms unique to transportation engineering, a glossary of terms is provided in Appendix A.

I. Findings

This section summarizes the existing traffic conditions, project traffic impacts, and the proposed mitigation measures.

A. Existing Traffic Conditions

1. The project site is currently an existing surface parking lot (Lot 14).

2. Existing roadways adjacent to the project include Aberdeen Drive, Campus Drive, Valencia Hill Drive, Watkins Drive, Linden Street, Big Springs Road, and Eucalyptus Drive.

3. The study area intersections currently operate at Level of Service D or better during the peak hours for existing traffic conditions.

B. Traffic Impacts

1. The proposed land uses for the approximately 21 acre project site consist of a new apartment-style student housing complex providing a total of 810 student beds. The proposed building program includes five residential buildings, a food emporium, a resident services office, a community annex, and an Executive Retreat. The parking structure will consist of 597 parking spaces. The proposed project will have three access driveways to Big Springs Road. Two of the driveways have been analyzed within this traffic report. The third driveway to parking lot 14 will only serve as a proposed service entrance to the project site. The parking lot 14 modifications will involve a loss of 16 parking spaces (leaving 62 parking spaces) in the portion of the parking lot that will be retained.

2. The proposed development is projected to generate approximately 3,243 daily vehicle trips, 72 of which will occur during the morning peak hour and 181 of which will occur during the evening peak hour.

3. For Existing Plus Ambient Growth traffic conditions, the study area intersections are projected to operate at Level of Service B or better during the peak hours, except for the following study area intersection that is projected to operate at Level of Service E during the peak hours, without improvements:

   Watkins Drive (NS) at:
   Big Springs Road (EW) - #8

4. For Existing Plus Ambient Growth Plus Project traffic conditions, the study area intersections are projected to operate at Level of Service C or better during the peak hours, except for the following study area intersection that is projected to operate at Level of Service E during the peak hours, without improvements:

Watkins Drive (NS) at:
Big Springs Road (EW) - #8

5. For Existing Plus Ambient Growth Plus Project traffic conditions, a traffic signal is projected to be warranted at the following study area intersection (see Appendix D):

Watkins Drive (NS) at:
Big Springs Road (EW)[1] - #8

6. For Year 2015 Without Project traffic conditions, the study area intersections are projected to operate at Level of Service C or better during the peak hours, except for the following study area intersection that is projected to operate at Level of Service F during the peak hours, without improvements:

Watkins Drive (NS) at:
Big Springs Road (EW) - #8

7. For Year 2015 With Project traffic conditions, the study area intersections are projected to operate at Level of Service D or better during the peak hours, except for the following study area intersection that is projected to operate at Level of Service F during the peak hours, without improvements:

Watkins Drive (NS) at:
Big Springs Road (EW) - #8

C. Recommendations

The following measures are recommended to mitigate the impact of the project on traffic circulation:

1. Site-specific circulation and access recommendations are depicted on Figure 19.

2. As shown in Table 5, the project site does significantly impact the following study area intersection for Existing Plus Ambient Growth Plus Project traffic conditions. The following measure is recommended for implementation at the study area intersection significantly impacted by the project (see Table 5):

Watkins Drive (NS) at:
Big Springs Road (EW) - #8
- Install Traffic Signal

3. As shown in Table 8, the project site does significantly impact the following study area intersections for Year 2015 With Project traffic conditions. The following measure is recommended for implementation at the study area intersection significantly impacted by the project (see Table 8):

[1] The traffic signal is on the City of Riverside traffic signal priority list.

Watkins Drive (NS) at:

Big Springs Road (EW) - #8

- Install Traffic Signal

4. Fair share calculations for the intersection of Watkins Drive/Big Springs Road are provided within Table 9.

In accordance with LRDP 4.14-4, the following recommendations are good design practices for the proposed development:

1. Sufficient on-site parking should be provided to meet University of California, Riverside parking code requirements.

2. On-site traffic signing and striping should be implemented in conjunction with detailed construction plans for the project.

3. Sight distance at the project accesses to Big Springs Road should be reviewed with respect to California Department of Transportation/City of Riverside standards (see Appendix E) in conjunction with the preparation of final grading, landscaping, and street improvement plans.

II. Congestion Management Program Methodology

This section discusses the Congestion Management Plan. The purpose, prescribed methodology, and definition of a significant traffic impact are discussed.

A. Congestion Management Plan

The Congestion Management Plan is a result of Proposition 111 which was a statewide initiative approved by the voters in June, 1990. The proposition allowed for a nine cent per gallon state gasoline tax increase over a five year period.

Proposition 111 explicitly stated that the new gas tax revenues were to be used to fix existing traffic problems and was not to be used to promote future development. For a City to get its share of the Proposition 111 gas tax, it has to follow certain procedures specified by the State Legislature. The legislation requires that a traffic impact analysis be prepared for new development. The traffic impact analysis is prepared to monitor and fix traffic problems caused by new development.

The Legislature requires that adjacent jurisdictions use a standard methodology for conducting a traffic impact analysis. To assure that adjacent jurisdictions use a standard methodology in preparing a traffic impact analysis, one common procedure is that all Cities within a County, and the County agency itself, adopt and use one standard methodology for conducting a traffic impact analysis.

Although each City has developed standards for preparing a traffic impact analysis, traffic impact analysis requirements do vary in detail from one City to another, but not in overall intent or concept. The general approach selected by each City for conducting a traffic impact analysis has common elements.

The general approach for conducting a traffic impact analysis is that existing peak hour traffic is counted and the percent of roadway capacity currently being used is determined. Then growth in traffic is accounted for and added to existing traffic and the percent of roadway capacity used is again determined. The project traffic is then added and the percent of roadway capacity used is again determined. If the new project adds traffic to an overcrowded facility, then the new project has to mitigate the traffic impact so that the facility operates at a level that is no worse than before the project traffic was added.

If the project size is below a certain minimum threshold level, then a project does not have to have a traffic impact analysis prepared, once it is shown or agreed that the project is below the minimum threshold.

If a project is bigger than the minimum threshold size, then a traffic impact analysis is required.

B. Prescribed Methodology for a Traffic Impact Analysis

The traffic impact analysis must include all monitored intersections to which the project adds traffic above a certain minimum amount.

In the City of Riverside, the minimum project added traffic that is needed before an intersection has to be studied is 50 or more peak hour trips.

The University of California, Riverside LRDP allows Level of Service D to be used as a maximum acceptable threshold for the study area intersections.

A significant impact occurs at a study intersection when the addition of project generated trips causes either peak hour Level of Service to degrade from acceptable Level of Service (A thru D) to unacceptable Level of Service (E or F) or peak hour delay to increase as follows:

Level of Service A/B	=	By 10.0 seconds
Level of Service C	=	By 8.0 seconds
Level of Service D	=	By 5.0 seconds
Level of Service E	=	By 2.0 seconds
Level of Service F	=	By 1.0 seconds

In the University of California, Riverside LRDP, the technique used to assess the capacity needs of an intersection is known as the Intersection Delay Method (see Appendix C) based on the 2000 Highway Capacity Manual. To calculate delay, the volume of traffic using the intersection is compared with the capacity of the intersection.

The Level of Service analysis for signalized intersections has been performed using optimized signal timing. This analysis has included an assumed lost time of three seconds per phase. Signal timing optimization has considered pedestrian safety and signal coordination requirements. Appropriate time for pedestrian crossings has also been considered in the signalized intersection analysis.

Project traffic is generated using rates and procedures contained in the UC Riverside LRDP EIR Traffic Impact Study prepared by Wilbur Smith Associates (March 18, 2004).

The project generated traffic was added to the study area intersections, and a full intersection analysis was conducted, even when the project added traffic failed to meet the minimum thresholds that require an intersection analysis.

C. Mitigation Measures

If a project is large enough to require that a traffic impact analysis be prepared, and if the project adds traffic to an intersection above a minimum threshold, and if the intersection is operating at above an acceptable level of operation, then the project must mitigate its traffic impact.

Traffic mitigation can be in many forms including adding lanes. Lanes can sometimes be obtained through restriping or elimination of parking, and sometimes require spot roadway widening.

III. Project Description

This section discusses the project's location and proposed development. Figure 1 shows the project location and Figure 2 illustrates the site plan.

A. Location

The project site is located in the northwest corner of the Valencia Hill Drive/Big Springs Road intersection on the University of California, Riverside.

B. Proposed Development

The proposed land uses for the approximately 21 acre project site consist of a new apartment-style student housing complex providing a total of 810 student beds. The proposed building program includes five residential buildings, a food emporium, a resident services office, a community annex, and an Executive Retreat. The parking structure will consist of 597 parking spaces. The proposed project will have three access driveways to Big Springs Road. Two of the driveways have been analyzed within this traffic report. The third driveway to parking lot 14 will only serve as a proposed service entrance to the project site. The parking lot 14 modifications will involve a loss of 16 parking spaces (leaving 62 parking spaces) in the portion of the parking lot that will be retained.

Adjacent to the project site, Valencia Hill Drive and Box Springs Road have been constructed at their ultimate cross-section width.

Figure 1
Project Location Map

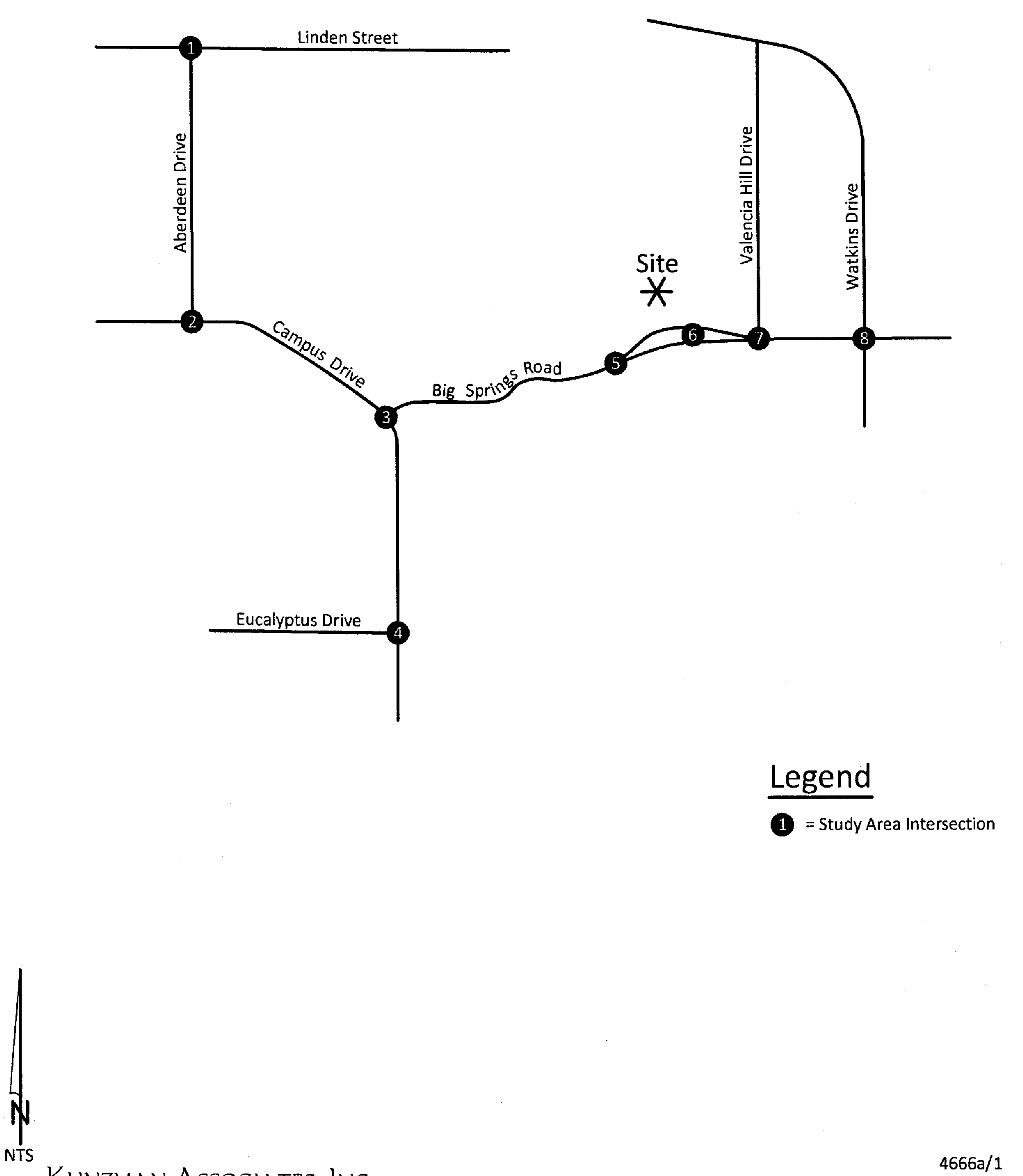

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Figure 2
Site Plan

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IV. Existing Traffic Conditions

The traffic conditions as they exist today are discussed below and illustrated on Figures 3 to 6.

A. Study Area

Based upon discussion with City of Riverside staff, the study area includes the following intersections:

Aberdeen Drive (NS) at:
Linden Street (EW) - #1
Campus Drive (EW) - #2

Campus Drive (NS) at:
Big Springs Road (EW) - #3
Eucalyptus Drive (EW) - #4

Project West Driveway (NS) at:
Big Springs Road (EW) - #5

Project East Driveway (NS) at:
Big Springs Road (EW) - #6

Valencia Hill Drive (NS) at:
Big Springs Road (EW) - #7

Watkins Drive (NS) at:
Big Springs Road (EW) - #8

B. Surrounding Street System

Roadways that will be utilized by the development include Aberdeen Drive, Campus Drive, Valencia Hill Drive, Watkins Drive, Linden Street, Big Springs Road, and Eucalyptus Drive.

Aberdeen Drive: This north-south two lane divided roadway is not classified on the City of Riverside General Plan Circulation Element. It extends from Linden Street to Campus Drive.

Campus Drive: This roadway is subdivided into four segments: North, East, South, and West, but is two lanes undivided in the study area. Campus Drive is not classified on the City of Riverside General Plan Circulation Element.

Valencia Hill Drive: This north-south two lane undivided roadway is not classified on the City of Riverside General Plan Circulation Element. Barricades were put in place on Valencia drive in January 2008 to prevent through traffic.

Watkins Drive: This north-south to east-west roadway is two lane divided. It is classified as an Arterial (88 foot right-of-way) on the City of Riverside General Plan Circulation Element.

Linden Street: This east-west two lane undivided roadway is not classified on the City of Riverside General Plan Circulation Element.

Big Springs Road: This east-west two lane undivided to two lane divided roadway is not classified on the City of Riverside General Plan Circulation Element. It extends from Campus Drive to east of Watkins Drive.

Eucalyptus Drive: This east-west two lane undivided roadway is not classified on the City of Riverside General Plan Circulation Element. It extends west of Campus Drive.

C. Existing Travel Lanes and Intersection Controls

Figure 3 identifies the existing roadway conditions for study area roadways. The number of through lanes for existing roadways and the existing intersection controls are identified.

D. Existing Intersection Delay

The technique used to assess the capacity needs of an intersection is known as the Intersection Delay Method (see Appendix C). To calculate delay, the volume of traffic using the intersection is compared with the capacity of the intersection.

The existing delay and Level of Service for intersections in the vicinity of the project are shown in Table 1. Existing delay is based upon manual weekday morning and evening peak hour counts made for Kunzman Associates, Inc. in May 2010 (see Figures 4 and 5). Traffic count worksheets are provided in Appendix B.

There are two peak hours in a weekday. The morning peak hour is between 7 AM and 9 AM, and the evening peak hour is between 4 PM and 6 PM. The actual peak hour within the two hour interval is the four consecutive 15 minute periods with the highest total volume when all movements are added together. Thus, the evening peak hour at one intersection may be 4:45 PM to 5:45 PM if those four consecutive 15 minute periods have the highest combined volume.

The study area intersections currently operate at Level of Service D or better during the peak hours for existing traffic conditions. Existing delay worksheets are provided in Appendix C.

E. Existing City of Riverside Circulation Plan

Figure 6 shows the current City of Riverside General Plan Circulation Element. Both existing and future roadways are included in the Circulation Element of the General Plan and are graphically depicted on Figure 6. This figure shows the nature and extent of arterial highways that are needed to adequately serve the ultimate development depicted by the land use element of the General Plan.

F. Transit Service

The study area is currently served by the Riverside Transit Agency Routes 10 and 51 along Aberdeen Drive, Campus Drive, Watkins Drive, Linden Street, and Big Springs Road. The University of California, Riverside Transportation & Parking Services departments operates a free campus shuttle service. It is called the Highlander Shuttle. The service operates two routes (Braveheart Loop and Trolley Express).

Table 1

Existing Intersection Delay and Level of Service

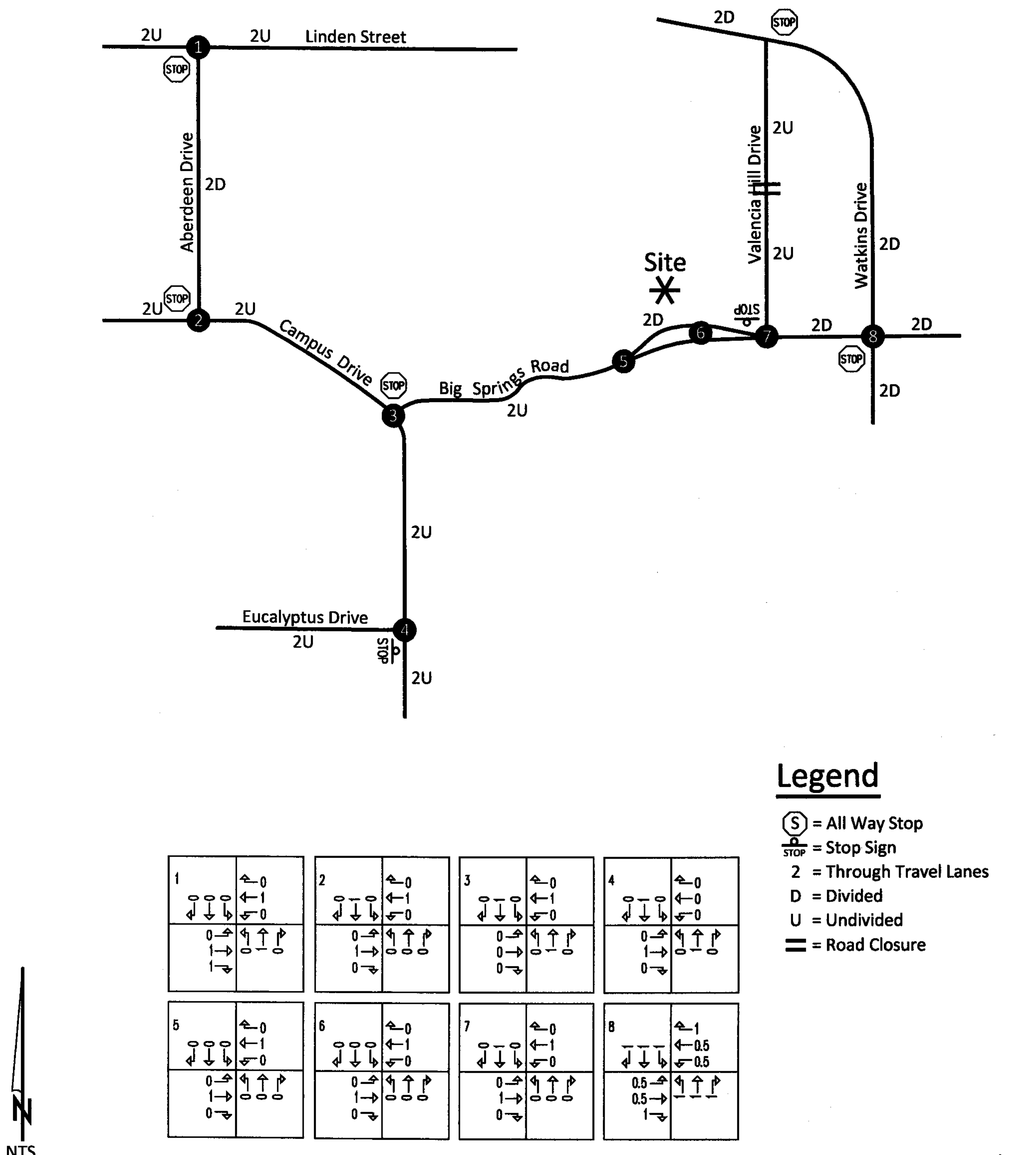
Intersection	Traffic Control[3]	Intersection Approach Lanes[1]												Peak Hour Delay-LOS[2]	
		Northbound			Southbound			Eastbound			Westbound				
		L	T	R	L	T	R	L	T	R	L	T	R	Morning	Evening
Aberdeen Drive (NS) at:															
Linden Street (EW) - #1	AWS	0	1	0	0	0	0	0	1	1	0	1	0	8.9-A	12.7-B
Campus Drive (EW) - #2	AWS	0	0	0	0	1	0	0	1	0	0	1	0	8.5-A	9.5-A
Campus Drive (NS) at:															
Big Springs Road (EW) - #3	AWS	0	1	0	0	1	0	0	0	0	0	1	0	8.7-A	9.5-A
Eucalyptus Drive (EW) - #4	CSS	0	1	0	0	1	0	0	1	0	0	0	0	10.7-B	11.3-B
Valencia Hill Drive (NS) at:															
Big Springs Road (EW) - #7	CSS	0	0	0	0	1	0	0	1	0	0	1	0	9.9-A	10.3-B
Watkins Drive (NS) at:															
Big Springs Road (EW) - #8	AWS	1	1	1	1	1	1	0.5	0.5	1	0.5	0.5	1	30.7-D	33.2-D

[1] When a right turn lane is designated, the lane can either be striped or unstriped. To function as a right turn lane there must be sufficient width for right turning vehicle to travel outside the through lanes.
L = Left; T = Through; R = Right

[2] Delay and level of service has been calculated using the following analysis software: Traffix, Version 7.9.0215 (2008). Per the 2000 Highway Capacity Manual, overall average intersection delay and level of service are shown for intersections with traffic signal or all way stop control. For intersections with cross street stop control, the delay and level of service for the worst individual movement (or movements sharing a single lane) are shown.

[3] AWS = All Way Stop; CSS = Cross Street Stop

Figure 3
Existing Through Travel Lanes and Intersection Controls



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Intersection reference numbers are in upper left corner of turning movement boxes.

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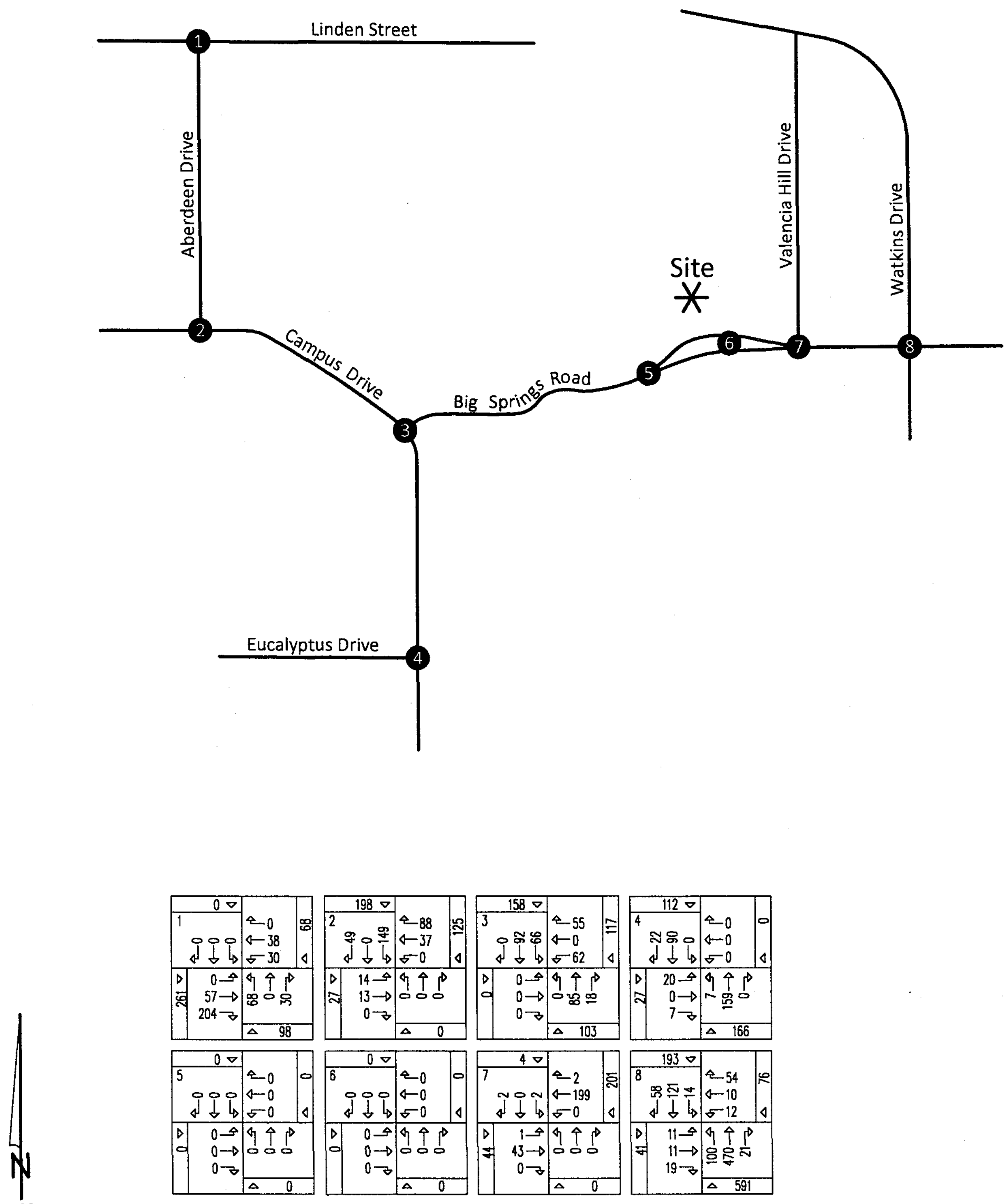
Figure 4
Existing Morning Peak Hour Intersection Turning Movement Volumes



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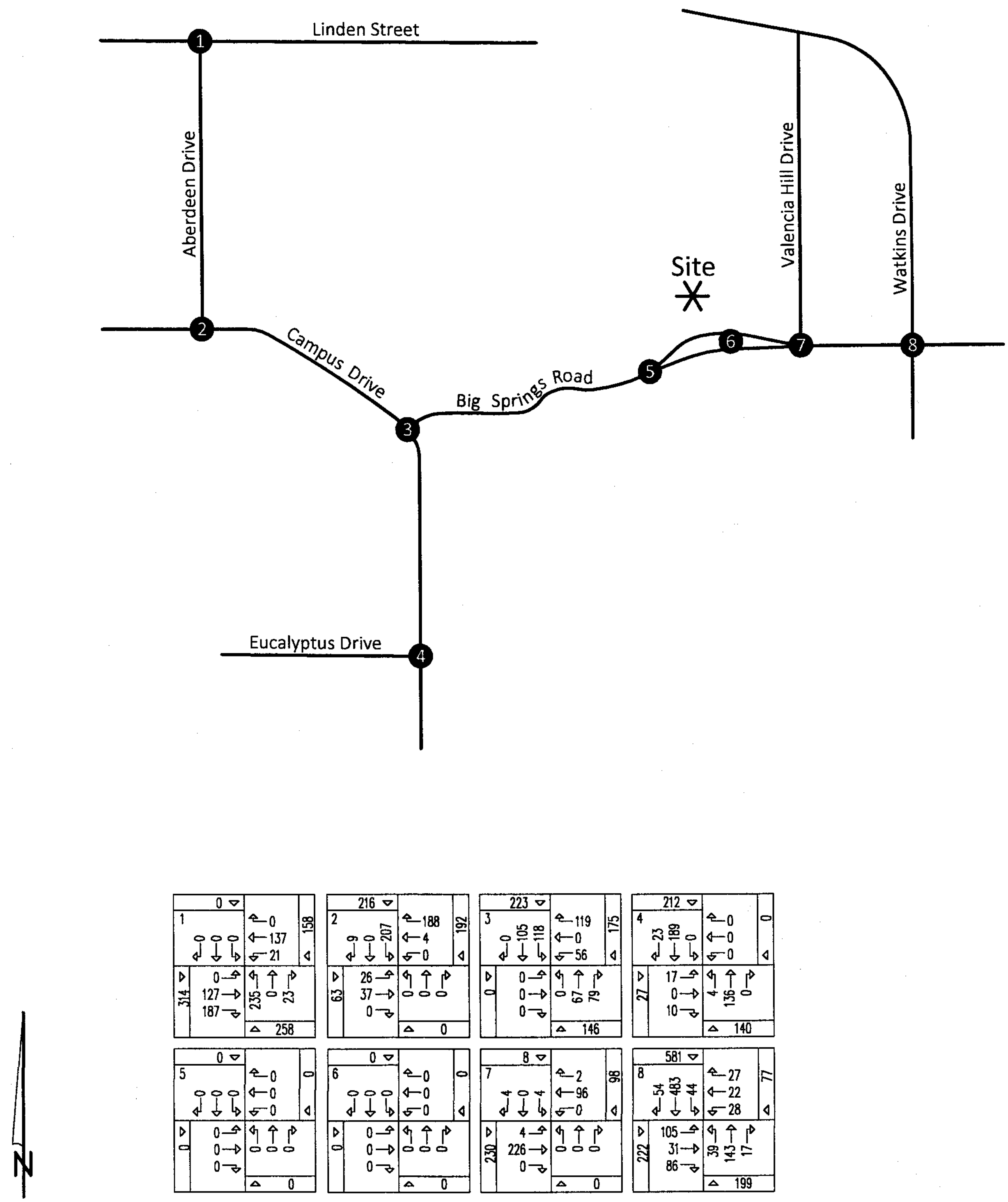
KUNZMAN ASSOCIATES, INC. Intersection reference numbers are in upper left corner of turning movement boxes.

OVER 30 YEARS OF EXCELLENT SERVICE

Figure 5
Existing Evening Peak Hour Intersection Turning Movement Volumes



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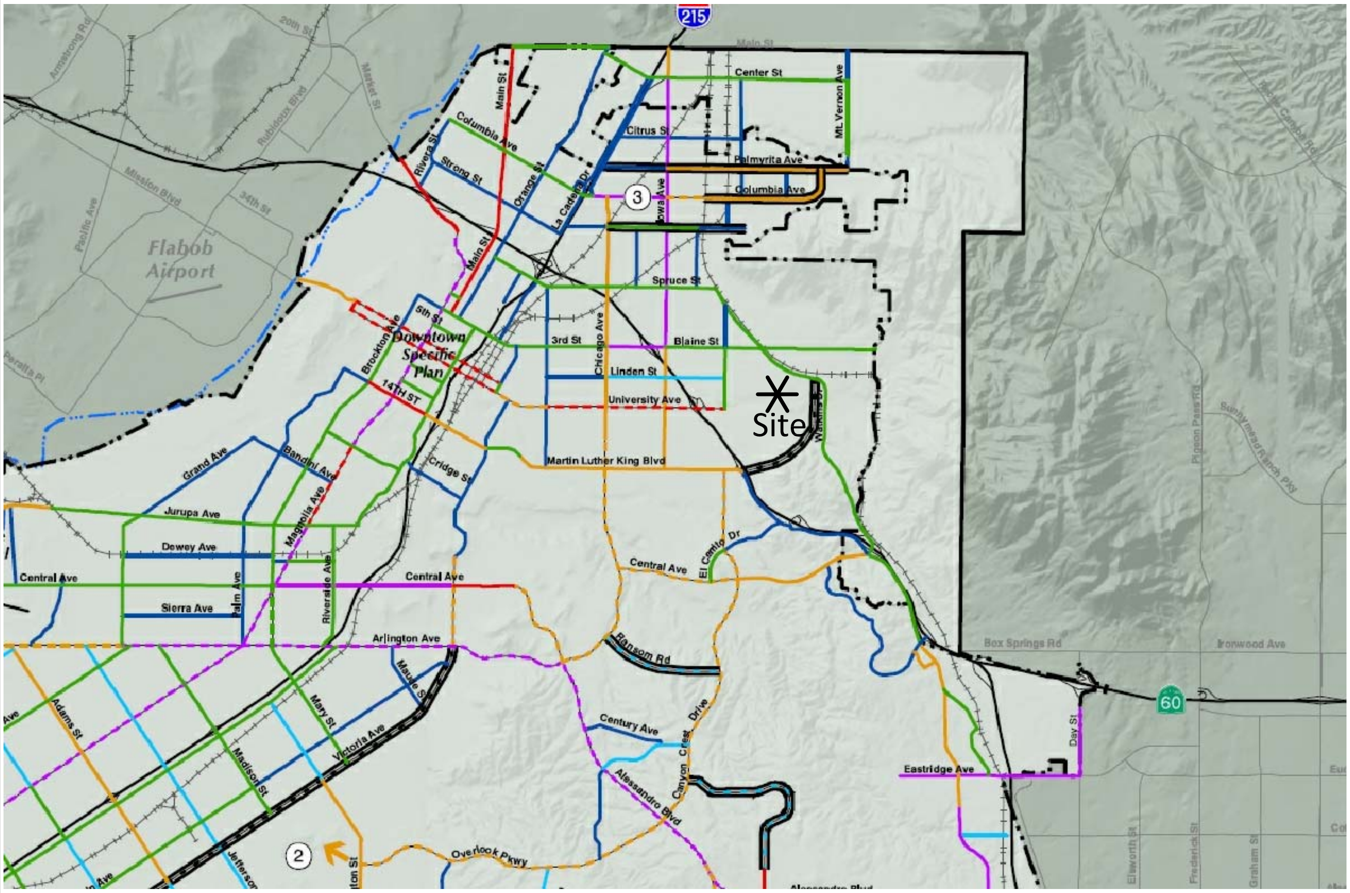
4666a/5

Intersection reference numbers are in upper left corner of turning movement boxes.

OVER 30 YEARS OF EXCELLENT SERVICE

Figure 6
City of Riverside General Plan Circulation Element



Legend

66 FT COLLECTOR	2 LANES
80 FT COLLECTOR	2 LANES
88 FT ARTERIAL	4 LANES
100 FT ARTERIAL	4 LANES
110 FT ARTERIAL	4 LANES
120 FT ARTERIAL	6 LANES
144 FT ARTERIAL	8 LANES

N

NTS

KUNZMAN ASSOCIATES, INC.

Source: City of Riverside

4666a/6

OVER 30 YEARS OF EXCELLENT SERVICE

V. Project Traffic

The proposed land uses for the approximately 21 acre project site consist of a new apartment-style student housing complex providing a total of 810 student beds. The proposed building program includes five residential buildings, a food emporium, a resident services office, a community annex, and an Executive Retreat. The parking structure will consist of 597 parking spaces. The proposed project will have three access driveways to Big Springs Road. Two of the driveways have been analyzed within this traffic report. The third driveway to parking lot 14 will only serve as a proposed service entrance to the project site. The parking lot 14 modifications will involve a loss of 16 parking spaces (leaving 62 parking spaces) in the portion of the parking lot that will be retained.

A. Site Traffic

1. Trip Generation

The traffic generated by the project is determined by multiplying an appropriate trip generation rate by the quantity of land use. Trip generation rates are predicated on the assumption that energy costs, the availability of roadway capacity, the availability of vehicles to drive, and our life styles remain similar to what we know today. A major change in these variables may affect trip generation rates.

Trip generation rates were determined for daily traffic, morning peak hour inbound and outbound traffic, and evening peak hour inbound and outbound traffic for the proposed land uses. By multiplying the traffic generation rates by the land use quantities, the traffic volumes are determined. Table 2 exhibits the traffic generation rates, project peak hour volumes, and project daily traffic volumes. Project traffic is generated using rates and procedures contained in the UC Riverside LRDP EIR Traffic Impact Study prepared by Wilbur Smith Associates (March 18, 2004).

The proposed development is projected to generate approximately 3,243 daily vehicle trips, 72 of which will occur during the morning peak hour and 181 of which will occur during the evening peak hour.

2. Trip Distribution

Figures 7 and 8 contain the directional distributions of the project traffic that are based upon the existing directional distribution of traffic and other additional information on future development from the LRDP.

3. Trip Assignment

Based on the identified traffic generation and distributions, project morning and evening peak hour intersection turning movement volumes are shown on Figures 9 and 10, respectively.

Table 2

Project Traffic Generation[1]

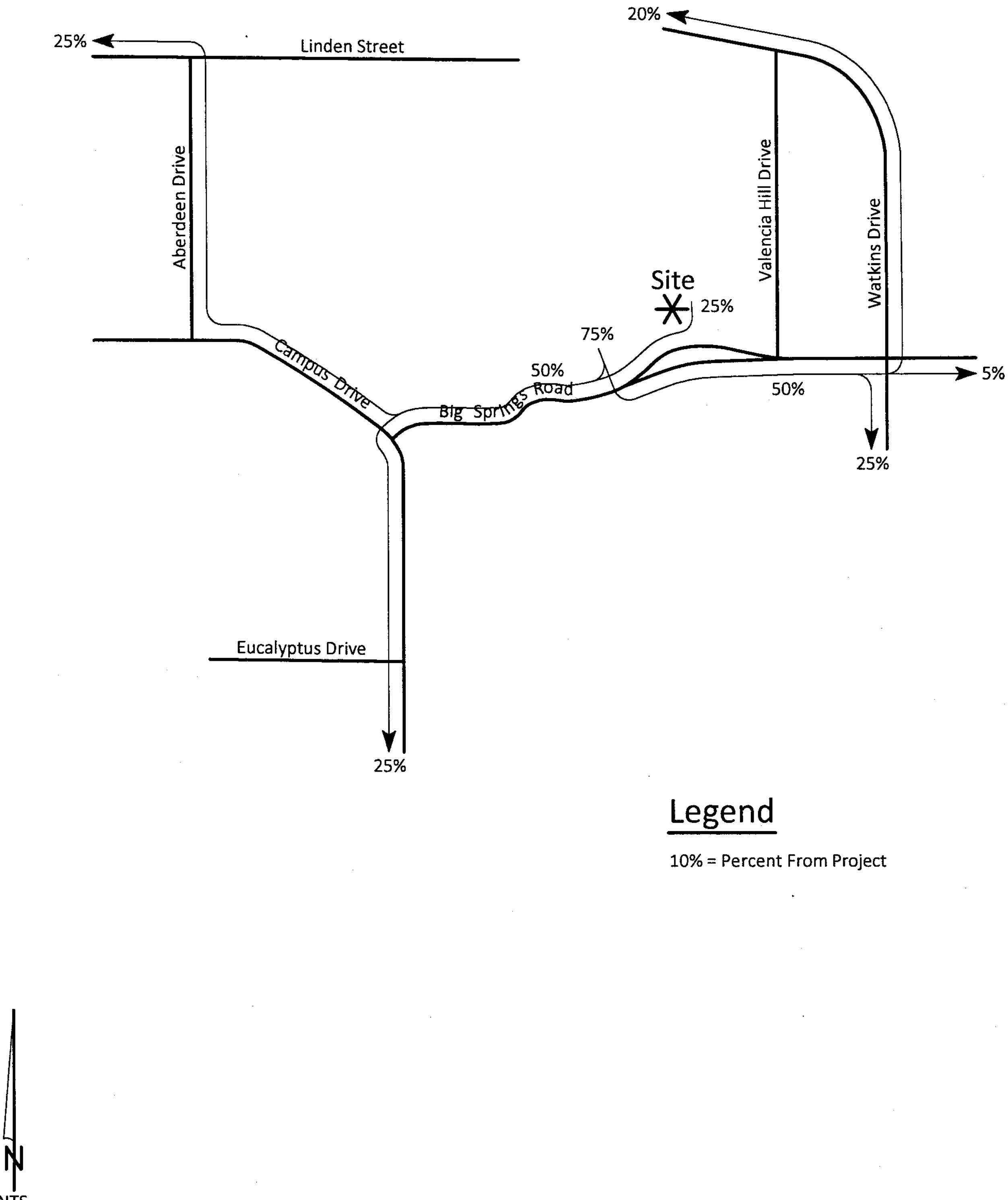
Land Use	Quantity[2]	Units[3]	Peak Hour Morning Inbound	Peak Hour Morning Outbound	Peak Hour Morning Total	Peak Hour Evening Inbound	Peak Hour Evening Outbound	Peak Hour Evening Total	Daily
Trip Generation Rates									
On-Campus Apartments	810	ST	0.039	0.049	0.088	0.099	0.125	0.224	4.004
Trips Generated									
On-Campus Apartments	810	ST	32	40	72	80	101	181	3,243

[1] Source: UC Riverside LRDP EIR Traffic Impact Study, Wilbur Smith Associates, March 18, 2004. The traffic generation rates include ancillary uses.

[2] The five apartment-style buildings will provide a total of 810 beds for students. The trip generation includes anciallary uses such as the resident director and Executive Retreat.

[3] ST = Students

Figure 7
Project Outbound Traffic Distribution



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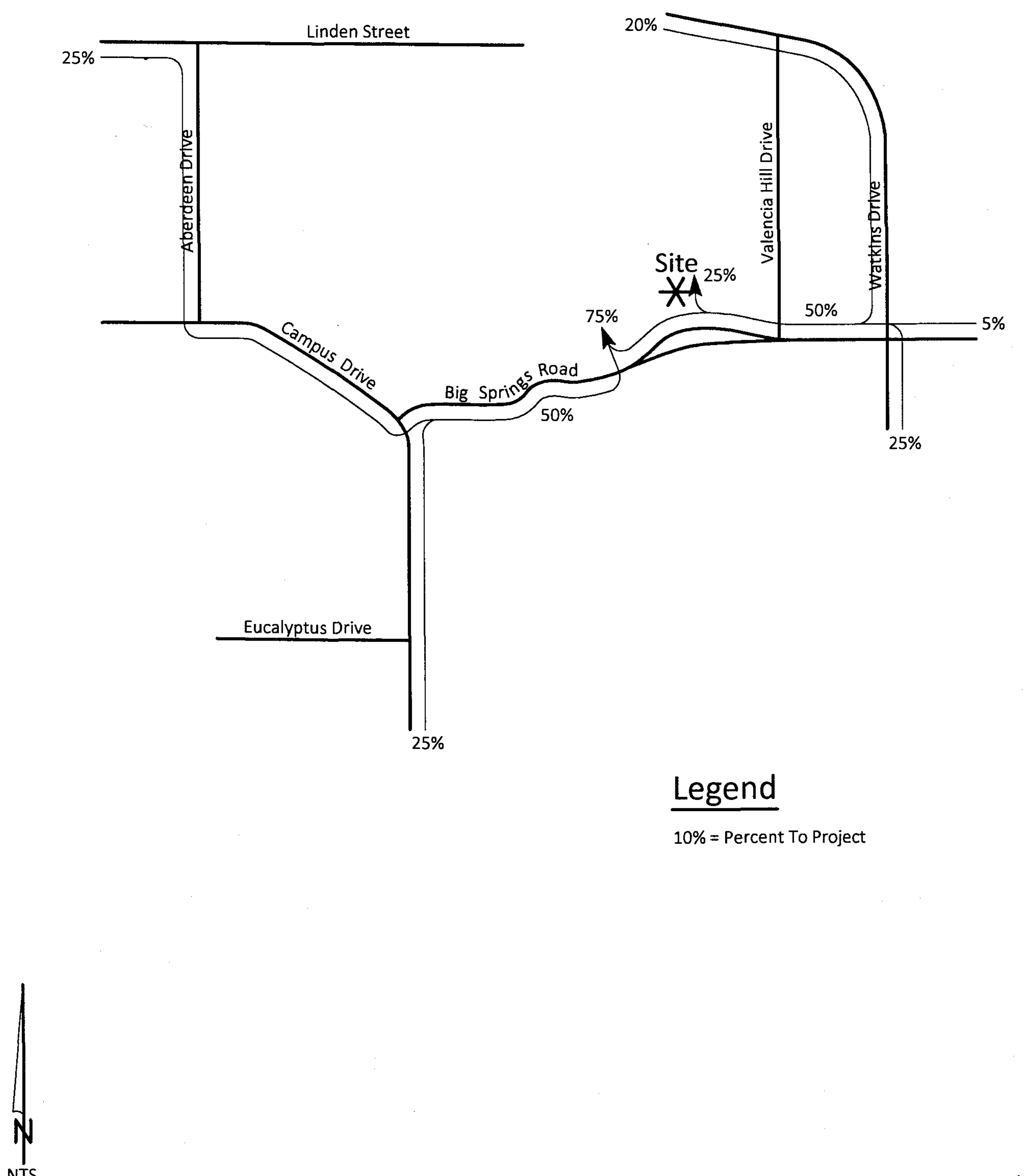
OVER 30 YEARS OF EXCELLENT SERVICE

Figure 8
Project Inbound Traffic Distribution



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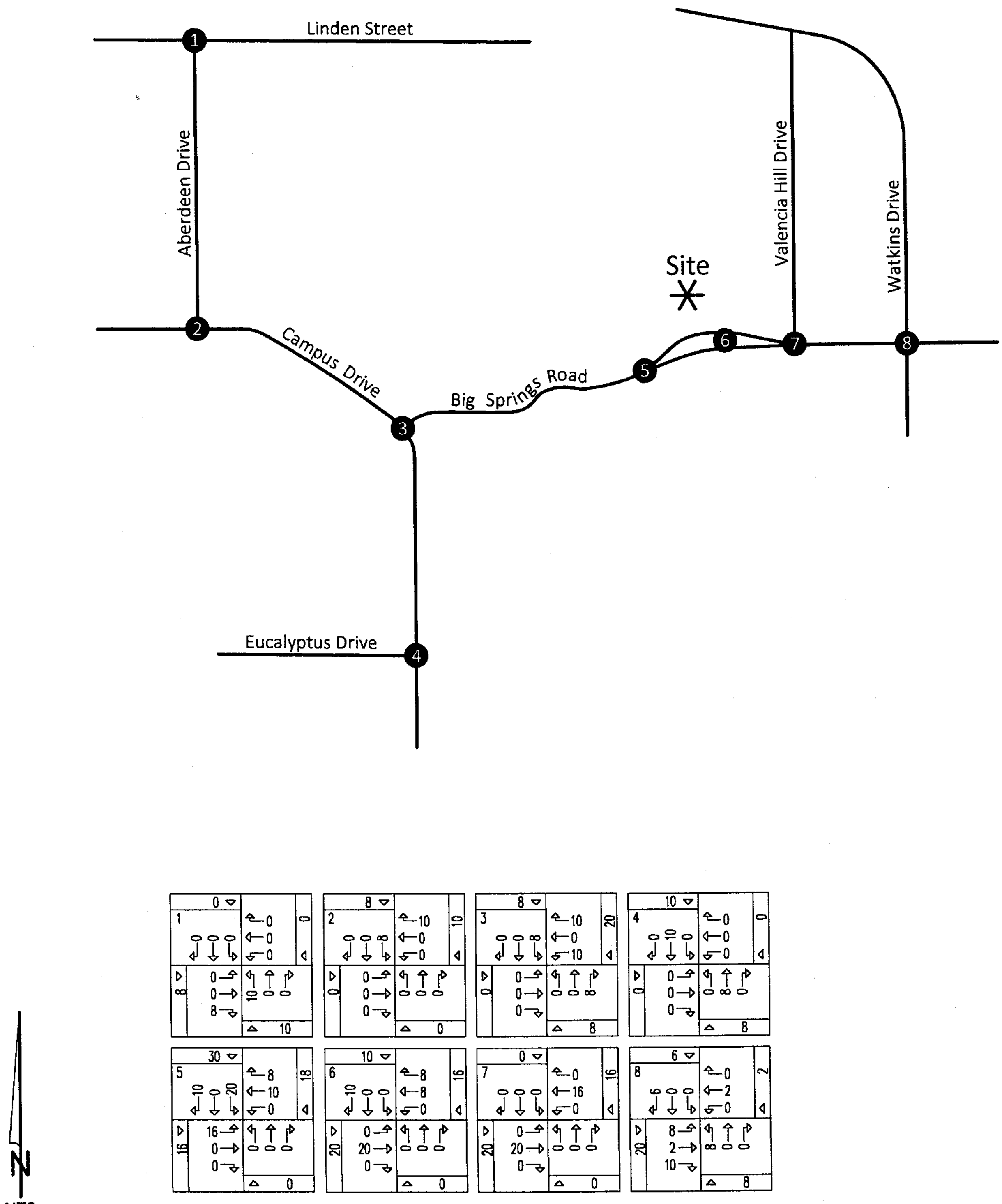
OVER 30 YEARS OF EXCELLENT SERVICE

Figure 9
Project Morning Peak Hour Intersection Turning Movement Volumes



4666a/9

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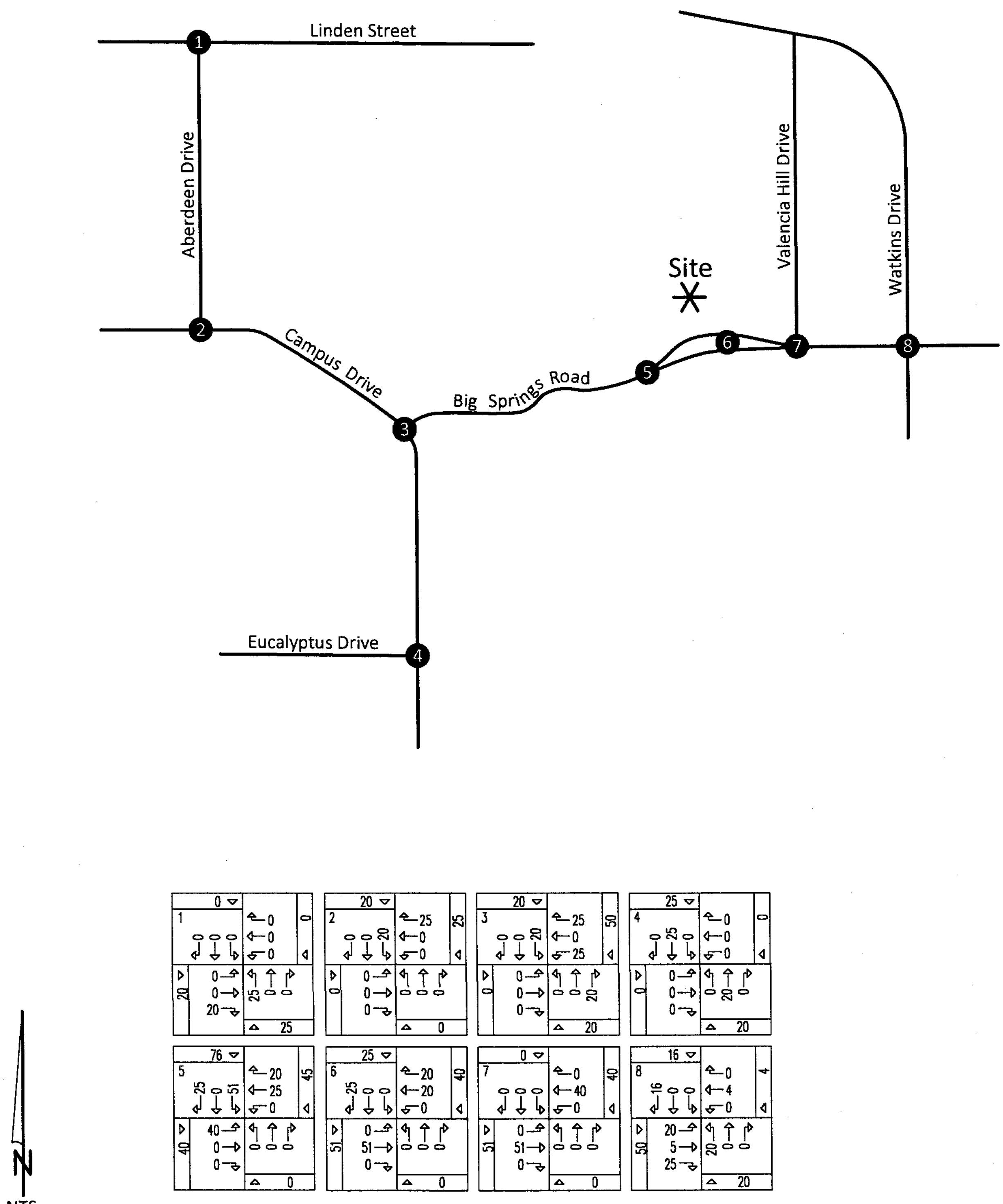
Intersection reference numbers are in upper left corner of turning movement boxes.

OVER 30 YEARS OF EXCELLENT SERVICE

Figure 10
Project Evening Peak Hour Intersection Turning Movement Volumes



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OVER 30 YEARS OF EXCELLENT SERVICE

4666a/10

Intersection reference numbers are in upper left corner of turning movement boxes.

VI. Existing Plus Ambient Growth Traffic Conditions

Once the areawide growth is assigned to the existing street network, the traffic impact can be assessed. Figures 11 and 12 illustrate the Existing Plus Ambient Growth traffic conditions.

A. Method of Projection

To assess Existing Plus Ambient Growth traffic conditions, areawide growth in combined with existing traffic and areawide growth. The Opening Year for analysis purposes in this report is 2013.

To account for areawide growth on roadways, traffic volumes have been calculated based on a 1.7 percent annual growth rate of existing traffic volumes over a three (3) year period. The areawide growth rate was obtained from the UC Riverside LRDP EIR Traffic Impact Study prepared by Wilbur Smith Associates (March 18, 2004).

B. Existing Plus Ambient Growth Intersection Delay

The technique used to assess the capacity needs of an intersection is known as the Intersection Delay Method (see Appendix C). To calculate delay, the volume of traffic using the intersection is compared with the capacity of the intersection.

The delay and Level of Service for Existing Plus Ambient Growth traffic conditions have been calculated and are shown in Table 3. Existing Plus Ambient Growth morning and evening peak hour intersection turning movement volumes are shown on Figures 11 and 12, respectively.

The study area intersections are projected to operate at Level of Service B or better during the peak hours for Existing Plus Ambient Growth traffic conditions, except for the following study area intersection that is projected to operate at Level of Service E during the peak hours, without improvements (see Table 3):

Watkins Drive (NS) at:
Big Springs Road (EW) - #8

Existing Plus Ambient Growth delay worksheets are provided in Appendix C.

Table 3

Existing Plus Ambient Growth Intersection Delay and Level of Service

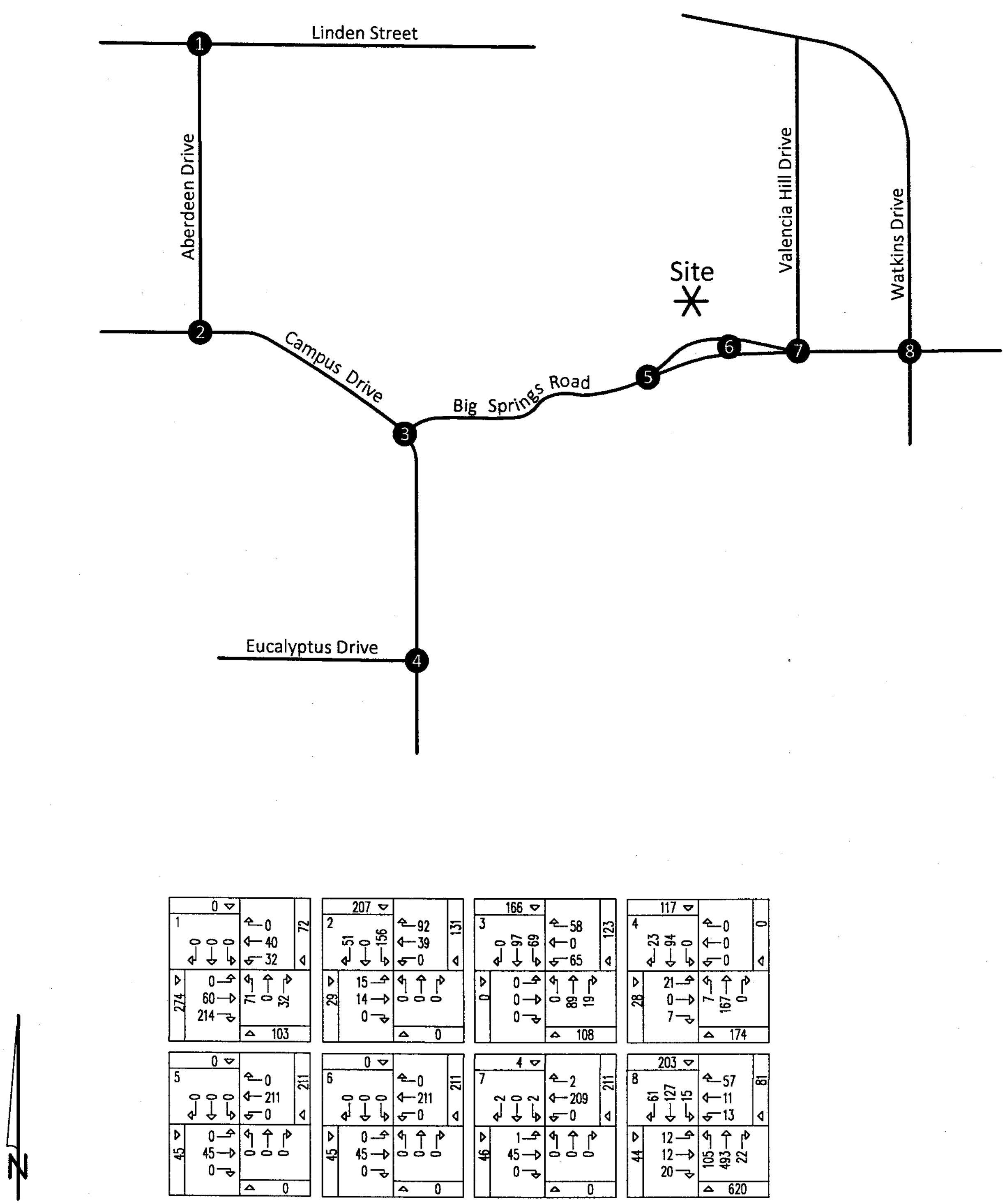
Intersection	Traffic Control[3]	Intersection Approach Lanes[1]												Peak Hour Delay-LOS[2]	
		Northbound			Southbound			Eastbound			Westbound				
		L	T	R	L	T	R	L	T	R	L	T	R	Morning	Evening
Aberdeen Drive (NS) at:															
Linden Street (EW) - #1	AWS	0	1	0	0	0	0	0	1	1	0	1	0	9.0-A	13.5-B
Campus Drive (EW) - #2	AWS	0	0	0	0	1	0	0	1	0	0	1	0	8.6-A	9.8-A
Campus Drive (NS) at:															
Big Springs Road (EW) - #3	AWS	0	1	0	0	1	0	0	0	0	0	1	0	8.8-A	9.8-A
Eucalyptus Drive (EW) - #4	CSS	0	1	0	0	1	0	0	1	0	0	0	0	10.9-B	11.5-B
Valencia Hill Drive (NS) at:															
Big Springs Road (EW) - #7	CSS	0	0	0	0	1	0	0	1	0	0	1	0	10.0-A	10.4-B
Watkins Drive (NS) at:															
Big Springs Road (EW) - #8															
- Without Improvements	AWS	1	1	1	1	1	1	0.5	0.5	1	0.5	0.5	1	38.6-E	41.6-E
- With Improvements	**TS**	1	1	1	1	1	1	0.5	0.5	1	0.5	0.5	1	10.1-B	11.6-B

[1] When a right turn lane is designated, the lane can either be striped or unstriped. To function as a right turn lane there must be sufficient width for right turning vehicle to travel outside the through lanes.
L = Left; T = Through; R = Right; **1** = Improvement

[2] Delay and level of service has been calculated using the following analysis software: Traffix, Version 7.9.0215 (2008). Per the 2000 Highway Capacity Manual, overall average intersection delay and level of service are shown for intersections with traffic signal or all way stop control. For intersections with cross street stop control, the delay and level of service for the worst individual movement (or movements sharing a single lane) are shown.

[3] AWS = All Way Stop; CSS = Cross Street Stop; TS = Traffic Signal

Figure 11
Existing Plus Ambient Growth
Morning Peak Hour Intersection Turning Movement Volumes



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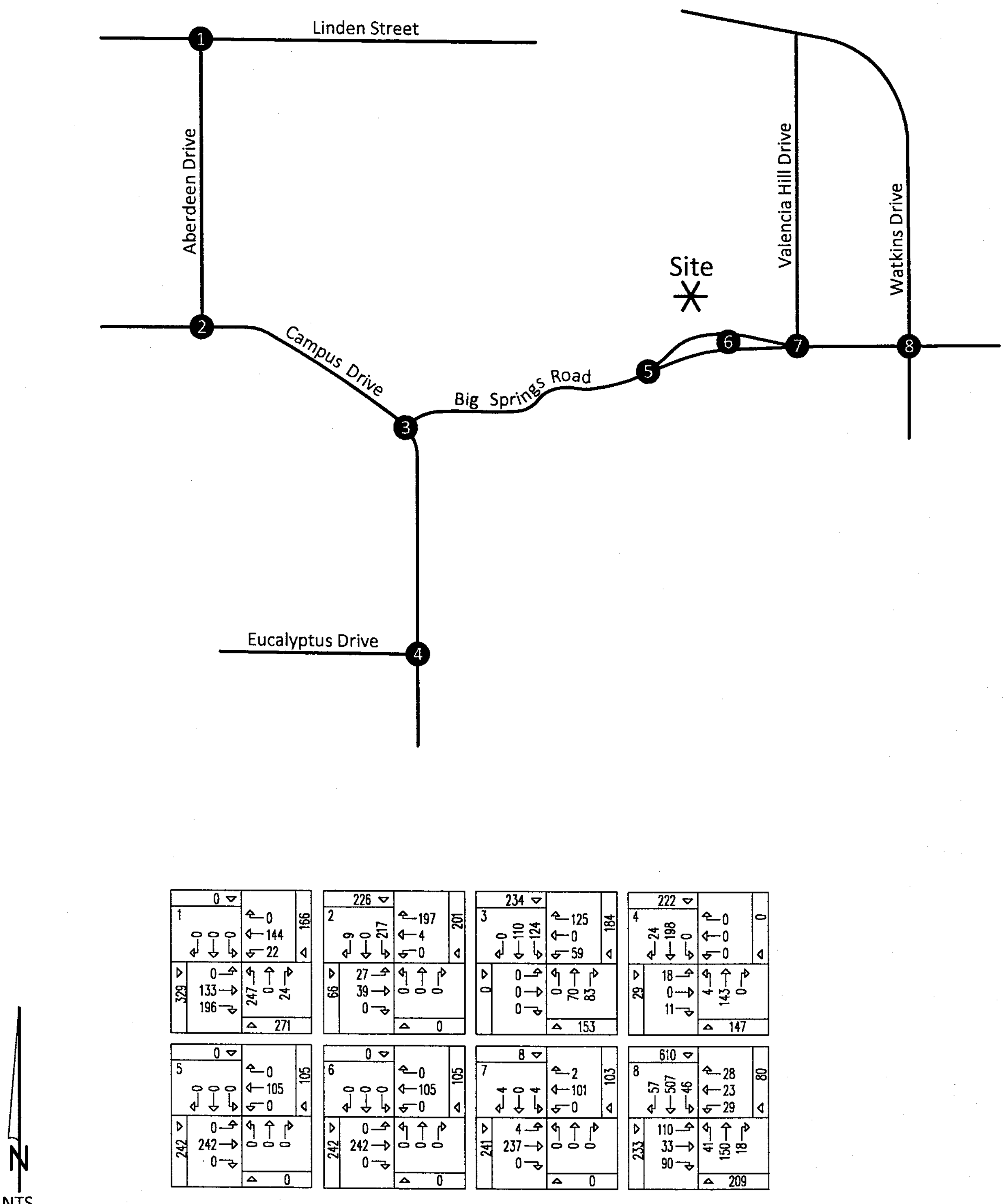
Intersection reference numbers are in upper left corner of turning movement boxes.

OVER 30 YEARS OF EXCELLENT SERVICE

Figure 12
Existing Plus Ambient Growth
Evening Peak Hour Intersection Turning Movement Volumes



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4666a/12

Intersection reference numbers are in upper left corner of turning movement boxes.

OVER 30 YEARS OF EXCELLENT SERVICE

VII. Existing Plus Ambient Growth Plus Project Traffic Conditions

Once the project-related traffic is assigned to the existing street network and added to existing volumes and combined with areawide growth, the traffic impact can be assessed. Figures 13 and 14 illustrate the Existing Plus Ambient Growth Plus Project traffic conditions.

A. Method of Projection

To assess Existing Plus Ambient Growth Plus Project traffic conditions, project traffic is combined with existing traffic and areawide growth. The Opening Year for analysis purposes in this report is 2013.

To account for areawide growth on roadways, traffic volumes have been calculated based on a 1.7 percent annual growth rate of existing traffic volumes over a three (3) year period. The areawide growth rate was obtained from the UC Riverside LRDP EIR Traffic Impact Study prepared by Wilbur Smith Associates (March 18, 2004).

B. Existing Plus Ambient Growth Plus Project Intersection Delay

The technique used to assess the capacity needs of an intersection is known as the Intersection Delay Method (see Appendix C). To calculate delay, the volume of traffic using the intersection is compared with the capacity of the intersection.

The delay and Level of Service for Existing Plus Ambient Growth Plus Project traffic conditions have been calculated and are shown in Table 4. Existing Plus Ambient Growth Plus Project morning and evening peak hour intersection turning movement volumes are shown on Figures 13 and 14, respectively.

The study area intersections are projected to operate at Level of Service C or better during the peak hours for Existing Plus Ambient Growth Plus Project traffic conditions, except for the following study area intersection that is projected to operate at Level of Service E during the peak hours, without improvements (see Table 4):

Watkins Drive (NS) at:
Big Springs Road (EW) - #8

Existing Plus Ambient Growth Plus Project delay worksheets are provided in Appendix C.

C. Existing Plus Ambient Growth Plus Project Traffic Signal Warrant Analysis

For Existing Plus Ambient Growth Plus Project traffic conditions, a traffic signal is projected to be warranted at the following study area intersection (see Appendix D):

Watkins Drive (NS) at:
Big Springs Road (EW)[1] - #8

D. Significant Transportation Impact

The University of California, Riverside LRDP allows Level of Service D to be used as a maximum acceptable threshold for the study area intersections.

A significant impact occurs at a study intersection when the addition of project generated trips causes either peak hour Level of Service to degrade from acceptable Level of Service (A thru D) to unacceptable Level of Service (E or F) or peak hour delay to increase as follows:

Level of Service A/B	=	By 10.0 seconds
Level of Service C	=	By 8.0 seconds
Level of Service D	=	By 5.0 seconds
Level of Service E	=	By 2.0 seconds
Level of Service F	=	By 1.0 seconds

As shown in Table 5, the project does significantly impact the following study area intersection for Existing Plus Ambient Growth Plus Project traffic conditions. The following measure is recommended for implementation at the study area intersection significantly impacted by the project (see Table 5):

Watkins Drive (NS) at:
Big Springs Road (EW) - #8
- Install Traffic Signal

Fair share calculations for the intersection of Watkins Drive/Big Springs Road are provided within Table 9.

[1] The traffic signal is on the City of Riverside traffic signal priority list.

Table 4

Existing Plus Ambient Growth Plus Project Intersection Delay and Level of Service

Intersection	Traffic Control[3]	Intersection Approach Lanes[1]												Peak Hour Delay-LOS[2]	
		Northbound			Southbound			Eastbound			Westbound				
		L	T	R	L	T	R	L	T	R	L	T	R	Morning	Evening
Aberdeen Drive (NS) at:															
Linden Street (EW) - #1	AWS	0	1	0	0	0	0	0	1	1	0	1	0	9.2-A	15.1-C
Campus Drive (EW) - #2	AWS	0	0	0	0	1	0	0	1	0	0	1	0	8.7-A	10.4-B
Campus Drive (NS) at:															
Big Springs Road (EW) - #3	AWS	0	1	0	0	1	0	0	0	0	0	1	0	9.0-A	10.9-B
Eucalyptus Drive (EW) - #4	CSS	0	1	0	0	1	0	0	1	0	0	0	0	11.1-B	12.0-B
Project West Driveway (NS) at:															
Big Springs Road (EW) - #6	**CSS**	0	0	0	0	**1**	0	0	1	0	0	1	0	10.3-B	11.7-B
Project West Driveway (NS) at:															
Big Springs Road (EW) - #6	**CSS**	0	0	0	0	1	**1**	0	1	0	0	1	0	9.5-A	9.1-A
Valencia Hill Drive (NS) at:															
Big Springs Road (EW) - #7	CSS	0	0	0	0	1	0	0	1	0	0	1	0	10.2-B	11.2-B
Watkins Drive (NS) at:															
Big Springs Road (EW) - #8															
- Without Improvements	AWS	1	1	1	1	1	1	0.5	0.5	1	0.5	0.5	1	42.8-E	46.9-E
- With Improvements	**TS**	1	1	1	1	1	1	0.5	0.5	1	0.5	0.5	1	10.6-B	11.8-B

[1] When a right turn lane is designated, the lane can either be striped or unstriped. To function as a right turn lane there must be sufficient width for right turning vehicle to travel outside the through lanes.

L = Left; T = Through; R = Right; **1** = Improvement

[2] Delay and level of service has been calculated using the following analysis software: Traffix, Version 7.9.0215 (2008). Per the 2000 Highway Capacity Manual, overall average intersection delay and level of service are shown for intersections with traffic signal or all way stop control. For intersections with cross street stop control, the delay and level of service for the worst individual movement (or movements sharing a single lane) are shown.

[3] AWS = All Way Stop; CSS = Cross Street Stop; TS = Traffic Signal

Table 5

Existing Plus Ambient Growth Plus Project Traffic Contribution

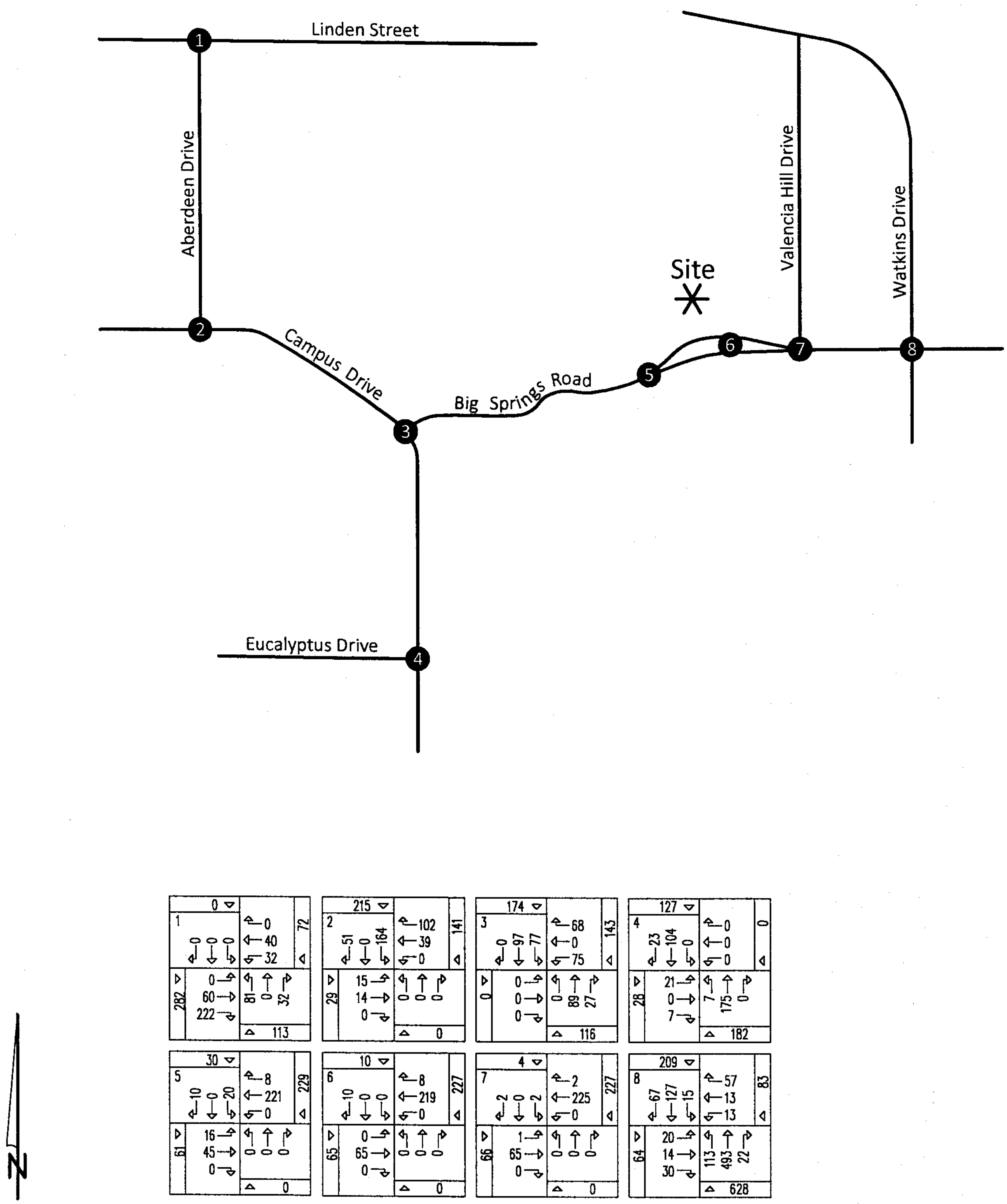
Intersection	Peak Hour	Existing Plus Ambient Growth		Existing Plus Ambient Growth Plus Project							
				Without Mitigation				With Mitigation			
		Delay	LOS[1]	Delay	LOS	Project Impact	Significant Impact[2]	Delay	LOS	Project Impact	Significant Impact
Aberdeen Drive (NS) at:											
Linden Street (EW) - #1	AM	9.0	A	9.2	A	0.2	No				
	PM	13.5	B	15.1	C	1.6	No				
Campus Drive (EW) - #2	AM	8.6	A	8.7	A	0.1	No				
	PM	9.8	A	10.4	B	0.6	No				
Campus Drive (NS) at:											
Big Springs Road (EW) - #3	AM	8.8	A	9.0	A	0.2	No				
	PM	9.8	A	10.9	B	1.1	No				
Eucalyptus Drive (EW) - #4	AM	10.9	B	11.1	B	0.2	No				
	PM	11.5	B	12.0	B	0.5	No				
Valencia Hill Drive (NS) at:											
Big Springs Road (EW) - #7	AM	10.0	A	10.2	B	0.2	No				
	PM	10.4	B	11.2	B	0.8	No				
Watkins Drive (NS) at:											
Big Springs Road (EW) - #8	AM	38.6	E	42.8	E	4.2	Yes	10.1	B	-28.5	No
	PM	41.6	E	46.9	E	5.3	Yes	11.6	B	-30.0	No

[1] LOS = Level of Service

[2] A significant impact occurs at a study intersection when the addition of project generated trips causes either peak hour Level of Service to degrade from acceptable Level of Service (A thru D) to unacceptable Level of Service (E or F) or peak hour delay to increase as follows:

Level of Service A/B = By 10.0 Seconds
Level of Service C = By 8.0 Seconds
Level of Service D = By 5.0 Seconds
Level of Service E = By 2.0 Seconds
Level of Service F = By 1.0 Seconds

Figure 13
Existing Plus Ambient Growth Plus Project
Morning Peak Hour Intersection Turning Movement Volumes



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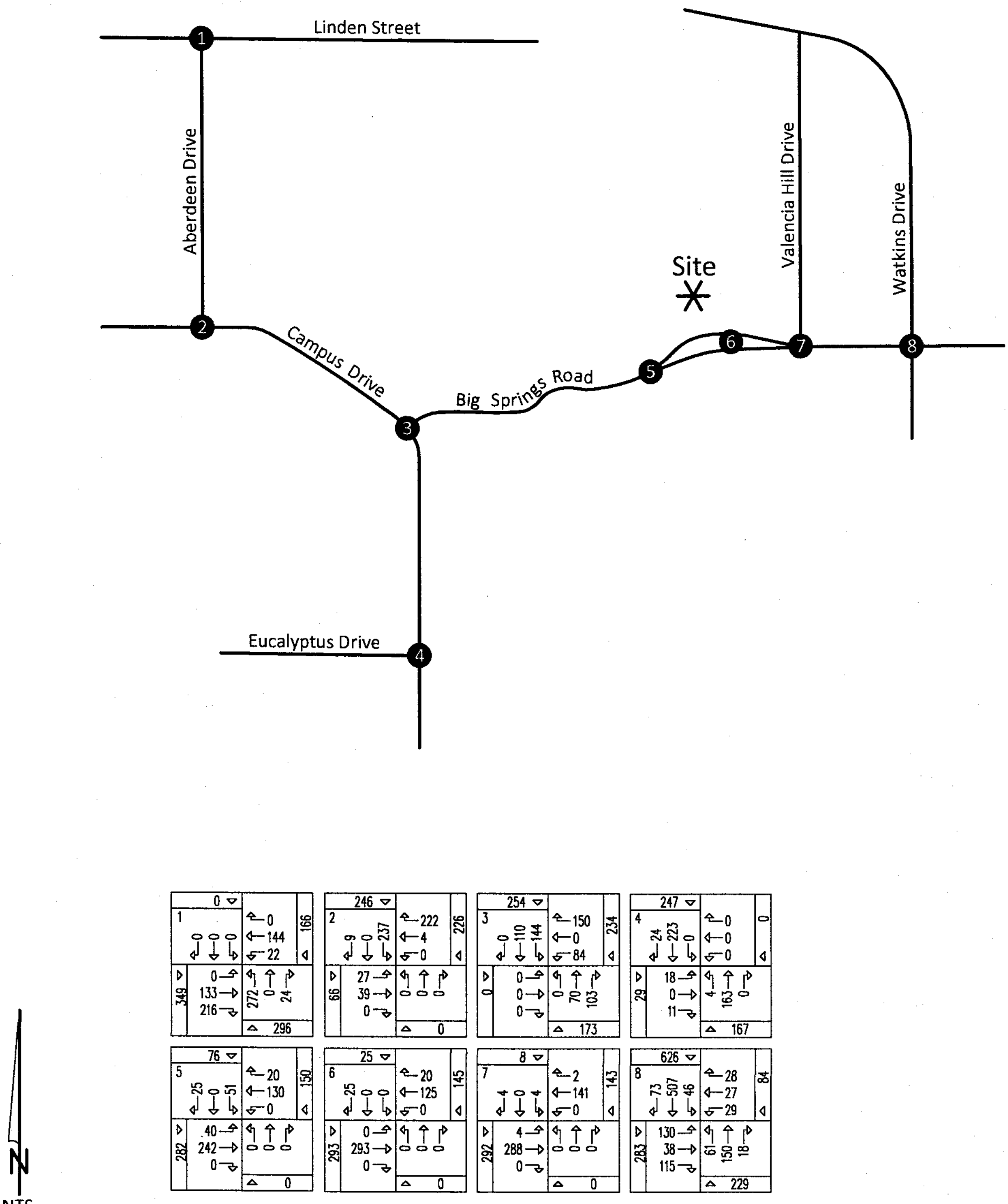
OVER 30 YEARS OF EXCELLENT SERVICE

4666a/13

Intersection reference numbers are in upper left corner of turning movement boxes.

Figure 14
Existing Plus Ambient Growth Plus Project
Evening Peak Hour Intersection Turning Movement Volumes



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OVER 30 YEARS OF EXCELLENT SERVICE

4666a/14

Intersection reference numbers are in upper left corner of turning movement boxes.

VIII. Year 2015 Traffic Conditions

In this section, Year 2015 traffic conditions without and with the project are discussed. Figures 15 to 18 depict the Year 2015 traffic conditions.

A. Method of Projection

The Year 2015 traffic volume forecasts have been obtained from the UC Riverside LRDP EIR Traffic Impact Study prepared by Wilbur Smith Associates (March 18, 2004). The Year 2015 forecasts include the regional background cumulative traffic in the vicinity of the study area.

Quality control checks and forecast adjustments were performed as necessary to ensure that all future traffic volume forecasts reflect a minimum of 10% growth over existing traffic volumes. The result of this traffic forecasting procedure is a series of traffic volumes suitable for traffic operations analysis.

B. Year 2015 Intersection Delay

The technique used to assess the capacity needs of an intersection is known as the Intersection Delay Method (see Appendix C). To calculate delay, the volume of traffic using the intersection is compared with the capacity of the intersection.

The delay and Level of Service for Year 2015 Without Project traffic conditions have been calculated and are shown in Table 6. Year 2015 Without Project morning and evening peak hour intersection turning movement volumes are shown on Figures 15 and 16, respectively.

The study area intersections are projected to operate at Level of Service C or better during the peak hours for Year 2015 Without Project traffic conditions, except for the following study area intersection that is projected to operate at Level of Service F during the peak hours, without improvements (see Table 6):

Watkins Drive (NS) at:
    Big Springs Road (EW) - #8

Year 2015 Without Project delay worksheets are provided in Appendix C.

The delay and Level of Service for Year 2015 With Project traffic conditions have been calculated and are shown in Table 7. Year 2015 With Project morning and evening peak hour intersection turning movement volumes are shown on Figures 17 and 18, respectively.

The study area intersections are projected to operate at Level of Service D or better during the peak hours for Year 2015 With Project traffic conditions, except for the following study area intersection that is projected to operate at Level of Service F during the peak hours, without improvements (see Table 7):

Watkins Drive (NS) at:
Big Springs Road (EW) - #8

Year 2015 With Project delay worksheets are provided in Appendix C.

C. Significant Transportation Impact

The University of California, Riverside LRDP allows Level of Service D to be used as a maximum acceptable threshold for the study area intersections.

A significant impact occurs at a study intersection when the addition of project generated trips causes either peak hour Level of Service to degrade from acceptable Level of Service (A thru D) to unacceptable Level of Service (E or F) or peak hour delay to increase as follows:

Level of Service A/B	=	By 10.0 seconds
Level of Service C	=	By 8.0 seconds
Level of Service D	=	By 5.0 seconds
Level of Service E	=	By 2.0 seconds
Level of Service F	=	By 1.0 seconds

As shown in Table 8, the project site does significantly impact the following study area intersection for Year 2015 With Project traffic conditions. The following measure is recommended for implementation at the study area intersection significantly impacted by the project (see Table 8):

Watkins Drive (NS) at:
Big Springs Road (EW) - #8
- Install Traffic Signal

Fair share calculations for the intersection of Watkins Drive/Big Springs Road are provided within Table 9.

Table 6

Year 2015 Without Project Intersection Delay and Level of Service

Intersection	Traffic Control[3]	Intersection Approach Lanes[1]												Peak Hour Delay-LOS[2]	
		Northbound			Southbound			Eastbound			Westbound				
		L	T	R	L	T	R	L	T	R	L	T	R	Morning	Evening
Aberdeen Drive (NS) at:															
Linden Street (EW) - #1	AWS	0	1	0	0	0	0	0	1	1	0	1	0	11.7-B	24.9-C
Campus Drive (EW) - #2	AWS	0	0	0	0	1	0	0	1	0	0	1	0	12.2-B	17.0-C
Campus Drive (NS) at:															
Big Springs Road (EW) - #3	AWS	0	1	0	0	1	0	0	0	0	0	1	0	9.9-A	16.9-C
Eucalyptus Drive (EW) - #4	CSS	0	1	0	0	1	0	0	1	0	0	0	0	12.0-B	16.5-C
Valencia Hill Drive (NS) at:															
Big Springs Road (EW) - #7	CSS	0	0	0	0	1	0	0	1	0	0	1	0	10.9-B	11.4-B
Watkins Drive (NS) at:															
Big Springs Road (EW) - #8															
- Without Improvements	AWS	1	1	1	1	1	1	0.5	0.5	1	0.5	0.5	1	61.6-F	174.7-F
- With Improvements	**TS**	1	1	1	1	1	1	0.5	0.5	1	0.5	0.5	1	10.9-B	14.3-B

[1] When a right turn lane is designated, the lane can either be striped or unstriped. To function as a right turn lane there must be sufficient width for right turning vehicle to travel outside the through lanes.
L = Left; T = Through; R = Right; **1** = Improvement

[2] Delay and level of service has been calculated using the following analysis software: Traffix, Version 7.9.0215 (2008). Per the 2000 Highway Capacity Manual, overall average intersection delay and level of service are shown for intersections with traffic signal or all way stop control. For intersections with cross street stop control, the delay and level of service for the worst individual movement (or movements sharing a single lane) are shown.

[3] AWS = All Way Stop; CSS = Cross Street Stop; TS = Traffic Signal

Table 7

Year 2015 With Project Intersection Delay and Level of Service

Intersection	Traffic Control[3]	Intersection Approach Lanes[1]												Peak Hour Delay-LOS[2]	
		Northbound			Southbound			Eastbound			Westbound				
		L	T	R	L	T	R	L	T	R	L	T	R	Morning	Evening
Aberdeen Drive (NS) at:															
Linden Street (EW) - #1	AWS	0	1	0	0	0	0	0	1	1	0	1	0	12.0-B	29.8-D
Campus Drive (EW) - #2	AWS	0	0	0	0	1	0	0	1	0	0	1	0	12.5-B	19.2-C
Campus Drive (NS) at:															
Big Springs Road (EW) - #3	AWS	0	1	0	0	1	0	0	0	0	0	1	0	10.2-B	20.3-C
Eucalyptus Drive (EW) - #4	CSS	0	1	0	0	1	0	0	1	0	0	0	0	12.2-B	17.3-C
Project West Driveway (NS) at:															
Big Springs Road (EW) - #6	**CSS**	0	0	0	0	**1**	0	0	1	0	0	1	0	11.8-B	15.2-C
Project West Driveway (NS) at:															
Big Springs Road (EW) - #6	**CSS**	0	0	0	0	1	**1**	0	1	0	0	1	0	10.5-B	9.4-A
Valencia Hill Drive (NS) at:															
Big Springs Road (EW) - #7	CSS	0	0	0	0	1	0	0	1	0	0	1	0	11.1-B	12.2-B
Watkins Drive (NS) at:															
Big Springs Road (EW) - #8															
- Without Improvements	AWS	1	1	1	1	1	1	0.5	0.5	1	0.5	0.5	1	64.2-F	178.8-F
- With Improvements	**TS**	1	1	1	1	1	1	0.5	0.5	1	0.5	0.5	1	11.0-B	14.8-B

[1] When a right turn lane is designated, the lane can either be striped or unstriped. To function as a right turn lane there must be sufficient width for right turning vehicle to travel outside the through lanes.
L = Left; T = Through; R = Right; **1** = Improvement

[2] Delay and level of service has been calculated using the following analysis software: Traffix, Version 7.9.0215 (2008). Per the 2000 Highway Capacity Manual, overall average intersection delay and level of service are shown for intersections with traffic signal or all way stop control. For intersections with cross street stop control, the delay and level of service for the worst individual movement (or movements sharing a single lane) are shown.

[3] AWS = All Way Stop; CSS = Cross Street Stop; TS = Traffic Signal

Table 8

Year 2015 With Project Traffic Contribution

Intersection	Peak Hour	Year 2015 Without Project		Year 2015 With Project							
				Without Mitigation				With Mitigation			
		Delay	LOS[1]	Delay	LOS	Project Impact	Significant Impact[2]	Delay	LOS	Project Impact	Significant Impact
Aberdeen Drive (NS) at:											
Linden Street (EW) - #1	AM	11.7	B	12.0	B	0.3	No				
	PM	24.9	C	29.8	D	4.9	No				
Campus Drive (EW) - #2	AM	12.2	B	12.5	B	0.3	No				
	PM	17.0	C	19.2	C	2.2	No				
Campus Drive (NS) at:											
Big Springs Road (EW) - #3	AM	9.9	A	10.2	B	0.3	No				
	PM	16.9	C	20.3	C	3.4	No				
Eucalyptus Drive (EW) - #4	AM	12.0	B	12.2	B	0.2	No				
	PM	16.5	C	17.3	C	0.8	No				
Valencia Hill Drive (NS) at:											
Big Springs Road (EW) - #7	AM	10.9	B	11.1	B	0.2	No				
	PM	11.4	B	12.2	B	0.8	No				
Watkins Drive (NS) at:											
Big Springs Road (EW) - #8	AM	61.6	F	64.2	F	2.6	Yes	11.0	B	-50.6	No
	PM	174.7	F	178.8	F	4.1	Yes	14.8	B	-159.9	No

[1] LOS = Level of Service

[2] A significant impact occurs at a study intersection when the addition of project generated trips causes either peak hour Level of Service to degrade from acceptable Level of Service (A thru D) to unacceptable Level of Service (E or F) or peak hour delay to increase as follows:

Level of Service A/B = By 10.0 Seconds
Level of Service C = By 8.0 Seconds
Level of Service D = By 5.0 Seconds
Level of Service E = By 2.0 Seconds
Level of Service F = By 1.0 Seconds

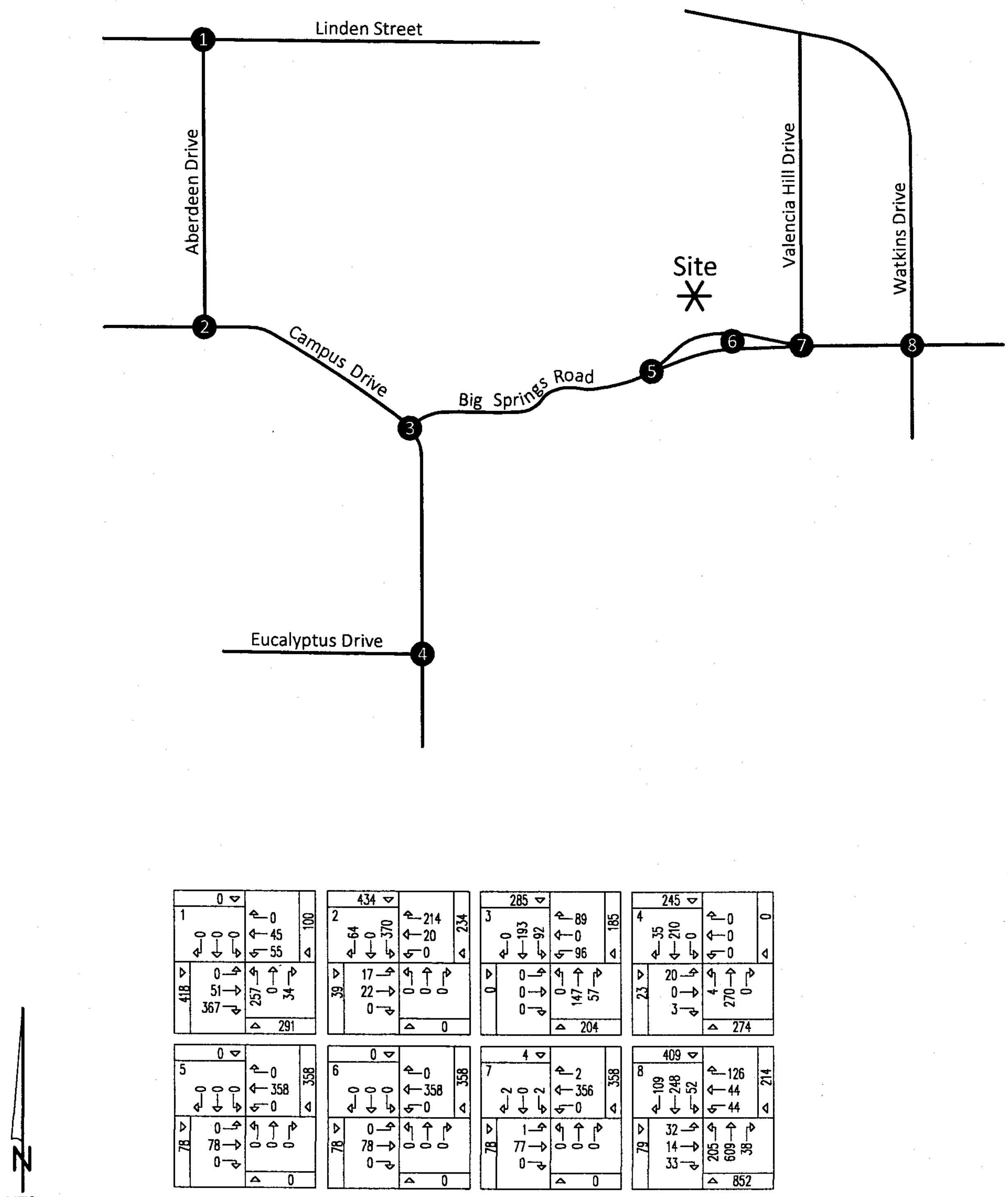
Table 9

Project Fair Share Traffic Calculations

		Existing		Year 2015 With Project		Project		Total New Traffic		Project % of New Traffic		
Intersection	Improvement	Morning	Evening	Morning	Evening	Morning	Evening	Morning	Evening	Morning	Evening	Average
Watkins Drive (NS) at:												
Big Springs Road (EW) - #8	Install Traffic Signal[1]	901	1,079	1,590	2,202	36	90	689	1,123	5.2%	8.0%	6.6%

[1] The traffic signal is on the City of Riverside traffic signal priority list.

Figure 15
Year 2015 Without Project
Morning Peak Hour Intersection Turning Movement Volumes

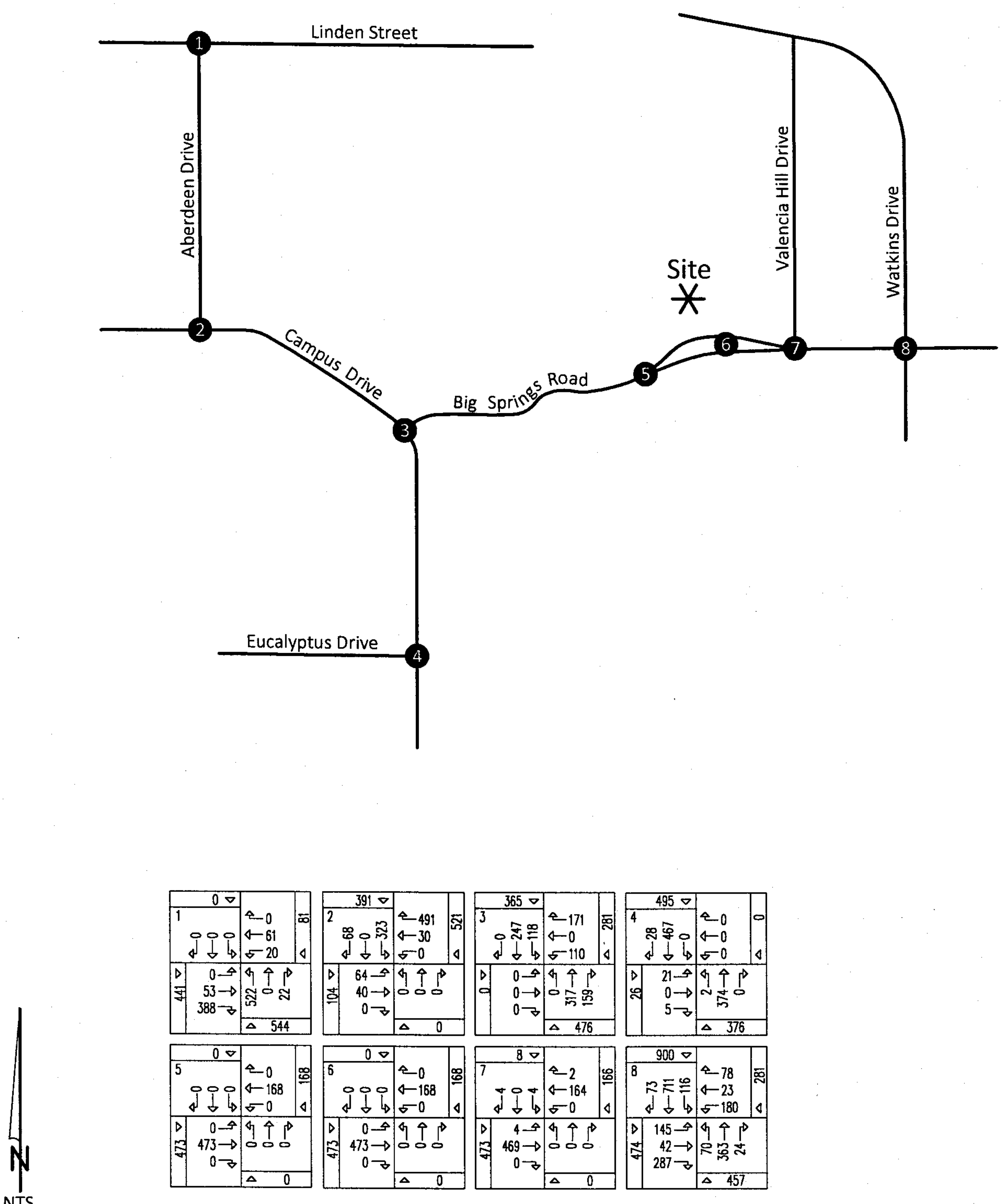


4666a/15

KUNZMAN ASSOCIATES, INC. Intersection reference numbers are in upper left corner of turning movement boxes.

OVER 30 YEARS OF EXCELLENT SERVICE

Figure 16
Year 2015 Without Project
Evening Peak Hour Intersection Turning Movement Volumes



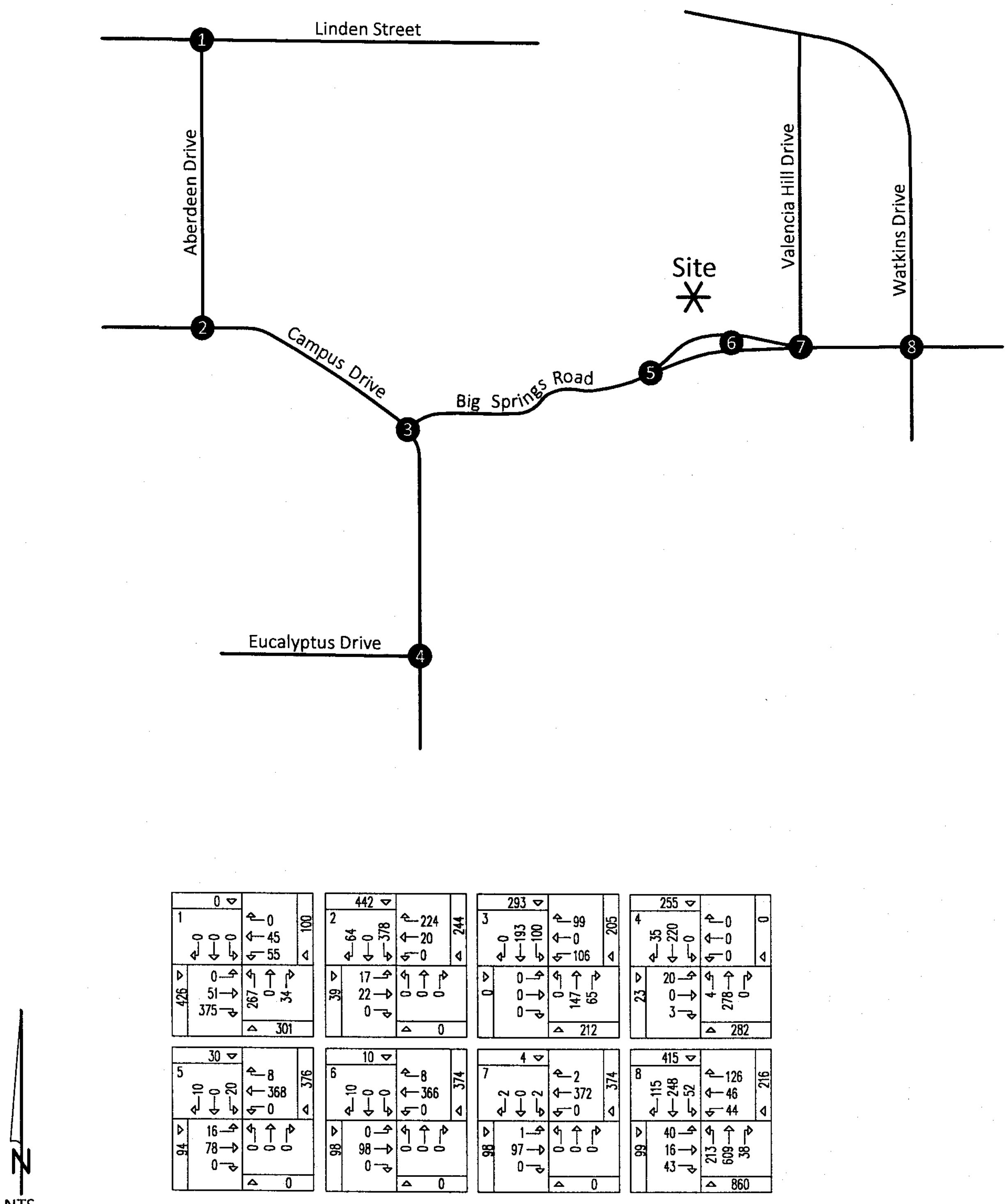
4666a/16

KUNZMAN ASSOCIATES, INC.

Intersection reference numbers are in upper left corner of turning movement boxes.

OVER 30 YEARS OF EXCELLENT SERVICE

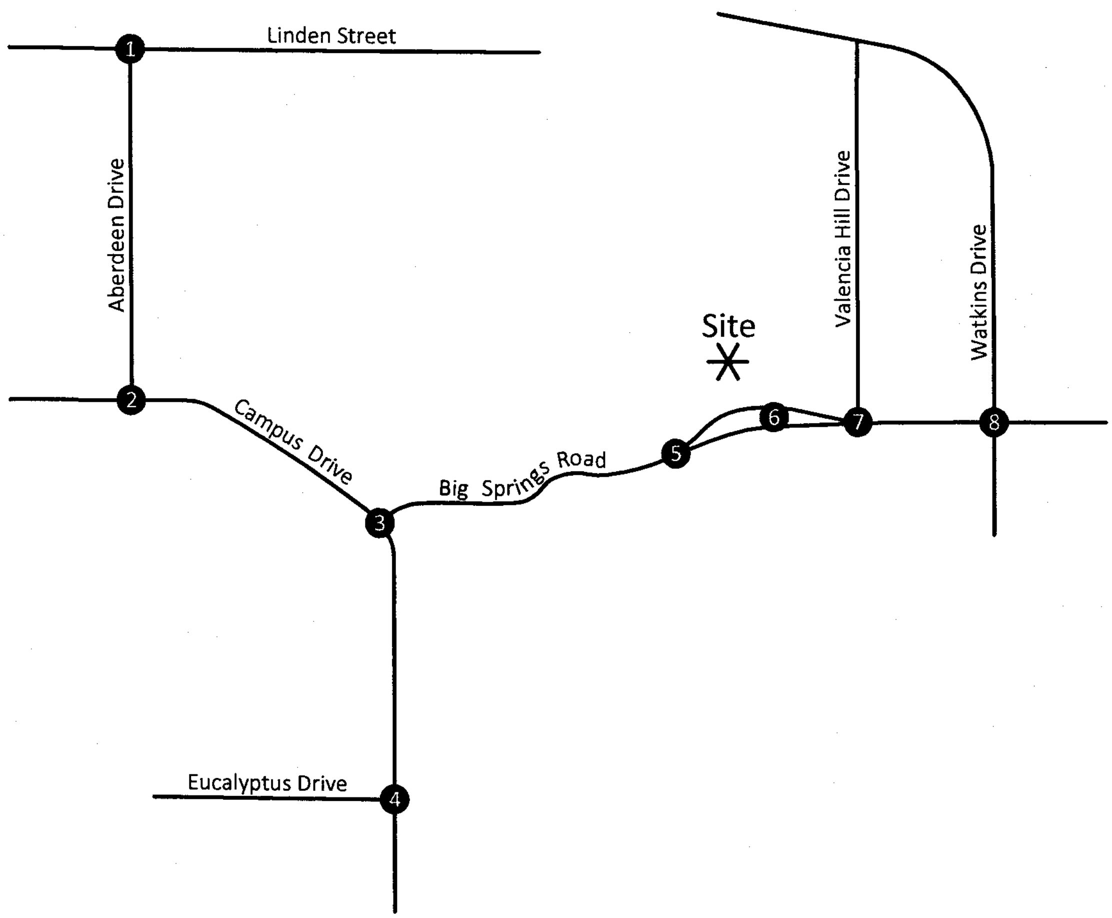
Figure 17
Year 2015 With Project
Morning Peak Hour Intersection Turning Movement Volumes

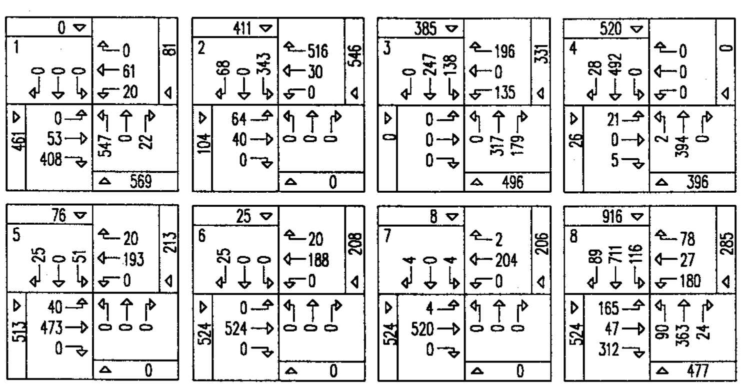


4666a/17

Intersection reference numbers are in upper left corner of turning movement boxes.

Figure 18
Year 2015 With Project
Evening Peak Hour Intersection Turning Movement Volumes





NTS

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KUNZMAN ASSOCIATES, INC.

Intersection reference numbers are in upper left corner of turning movement boxes.

OVER 30 YEARS OF EXCELLENT SERVICE

IX. Conclusions

A. Site Access

The proposed project will have three access driveways to Big Springs Road. Two of the driveways have been analyzed within this traffic report. The third driveway to parking lot 14 will only serve as a proposed service entrance to the project site. The parking lot 14 modifications will involve a loss of 16 parking spaces (leaving 62 parking spaces) in the portion of the parking lot that will be retained.

Over time, the University of California, Riverside LRDP has the ultimate intent to limit general vehicular circulation in the central campus, but allow transit, service, and emergency vehicle access. The Year 2015 traffic conditions in the LRDP continued to provide the existing internal circulation system that is consistent with this traffic study.

B. Mitigation Measures

The following measures are recommended to mitigate the impact of the project on traffic circulation:

1. Site-specific circulation and access recommendations are depicted on Figure 19.

2. As shown in Table 5, the project site does significantly impact the following study area intersection for Existing Plus Ambient Growth Plus Project traffic conditions. The following measure is recommended for implementation at the study area intersection significantly impacted by the project (see Table 5):

   Watkins Drive (NS) at:
   Big Springs Road (EW) - #8
   - Install Traffic Signal

3. As shown in Table 8, the project site does significantly impact the following study area intersections for Year 2015 With Project traffic conditions. The following measure is recommended for implementation at the study area intersection significantly impacted by the project (see Table 8):

   Watkins Drive (NS) at:
   Big Springs Road (EW) - #8
   - Install Traffic Signal

4. Fair share calculations for the intersection of Watkins Drive/Big Springs Road are provided within Table 9.

In accordance with LRDP 4.14-4, the following recommendations are good design practices for the proposed development:

1. Sufficient on-site parking should be provided to meet University of California, Riverside parking code requirements.

2. On-site traffic signing and striping should be implemented in conjunction with detailed construction plans for the project.

3. Sight distance at the project accesses to Big Springs Road should be reviewed with respect to California Department of Transportation/City of Riverside standards (see Appendix E) in conjunction with the preparation of final grading, landscaping, and street improvement plans.

Figure 19
Circulation Recommendations

In accordance with LRDP 4.14-4, the following recommendations are good design practices for the proposed development:

1. Sufficient on-site parking should be provided to meet University of California, Riverside parking code requirements.

2. On-site traffic signing and striping should be implemented in conjunction with detailed construction plans for the project.

3. Sight distance at the project accesses to Big Springs Road should be reviewed with respect to California Department of Transportation/City of Riverside standards (see Appendix E) in conjunction with the preparation of final grading, landscaping, and street improvement plans.

Legend

STOP = Stop Sign

= Full Access Driveway

= Right Turns In/Out Only Access Driveway

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Appendices

Appendix A – Glossary of Transportation Terms

Appendix B – Traffic Count Worksheets

Appendix C – Explanation and Calculation of Intersection Delay

Appendix D – Traffic Signal Warrant Worksheet

Appendix E – Sight Distance Requirements

APPENDIX A

Glossary of Transportation Terms

GLOSSARY OF TRANSPORTATION TERMS

COMMON ABBREVIATIONS

AC:	Acres
ADT:	Average Daily Traffic
Caltrans:	California Department of Transportation
DU:	Dwelling Unit
ICU:	Intersection Capacity Utilization
LOS:	Level of Service
TSF:	Thousand Square Feet
V/C:	Volume/Capacity
VMT:	Vehicle Miles Traveled

TERMS

AVERAGE DAILY TRAFFIC: The total volume during a year divided by the number of days in a year. Usually only weekdays are included.

BANDWIDTH: The number of seconds of green time available for through traffic in a signal progression.

BOTTLENECK: A constriction along a travelway that limits the amount of traffic that can proceed downstream from its location.

CAPACITY: The maximum number of vehicles that can be reasonably expected to pass over a given section of a lane or a roadway in a given time period.

CHANNELIZATION: The separation or regulation of conflicting traffic movements into definite paths of travel by the use of pavement markings, raised islands, or other suitable means to facilitate the safe and orderly movements of both vehicles and pedestrians.

CLEARANCE INTERVAL: Nearly same as yellow time. If there is an all red interval after the end of a yellow, then that is also added into the clearance interval.

CORDON: An imaginary line around an area across which vehicles, persons, or other items are counted (in and out).

CYCLE LENGTH: The time period in seconds required for one complete signal cycle.

CUL-DE-SAC STREET: A local street open at one end only, and with special provisions for turning around.

DAILY CAPACITY: The daily volume of traffic that will result in a volume during the peak hour equal to the capacity of the roadway.

DELAY: The time consumed while traffic is impeded in its movement by some element over which it has no control, usually expressed in seconds per vehicle.

DEMAND RESPONSIVE SIGNAL: Same as traffic-actuated signal.

DENSITY: The number of vehicles occupying in a unit length of the through traffic lanes of a roadway at any given instant. Usually expressed in vehicles per mile.

DETECTOR: A device that responds to a physical stimulus and transmits a resulting impulse to the signal controller.

DESIGN SPEED: A speed selected for purposes of design. Features of a highway, such as curvature, superelevation, and sight distance (upon which the safe operation of vehicles is dependent) are correlated to design speed.

DIRECTIONAL SPLIT: The percent of traffic in the peak direction at any point in time.

DIVERSION: The rerouting of peak hour traffic to avoid congestion.

FORCED FLOW: Opposite of free flow.

FREE FLOW: Volumes are well below capacity. Vehicles can maneuver freely and travel is unimpeded by other traffic.

GAP: Time or distance between successive vehicles in a traffic stream, rear bumper to front bumper.

HEADWAY: Time or distance spacing between successive vehicles in a traffic stream, front bumper to front bumper.

INTERCONNECTED SIGNAL SYSTEM: A number of intersections that are connected to achieve signal progression.

LEVEL OF SERVICE: A qualitative measure of a number of factors, which include speed and travel time, traffic interruptions, freedom to maneuver, safety, driving comfort and convenience, and operating costs.

LOOP DETECTOR: A vehicle detector consisting of a loop of wire embedded in the roadway, energized by alternating current and producing an output circuit closure when passed over by a vehicle.

MINIMUM ACCEPTABLE GAP: Smallest time headway between successive vehicles in a traffic stream into which another vehicle is willing and able to cross or merge.

MULTI-MODAL: More than one mode; such as automobile, bus transit, rail rapid transit, and bicycle transportation modes.

OFFSET: The time interval in seconds between the beginning of green at one intersection and the beginning of green at an adjacent intersection.

PLATOON: A closely grouped component of traffic that is composed of several vehicles moving, or standing ready to move, with clear spaces ahead and behind.

ORIGIN-DESTINATION SURVEY: A survey to determine the point of origin and the point of destination for a given vehicle trip.

PASSENGER CAR EQUIVALENTS: One car is one Passenger Car Equivalent. A truck is equal to 2 or 3 Passenger Car Equivalents in that a truck requires longer to start, goes slower, and accelerates slower. Loaded trucks have a higher Passenger Car Equivalent than empty trucks.

PEAK HOUR: The 60 consecutive minutes with the highest number of vehicles.

PRETIMED SIGNAL: A type of traffic signal that directs traffic to stop and go on a predetermined time schedule without regard to traffic conditions. Also, fixed time signal.

PROGRESSION: A term used to describe the progressive movement of traffic through several signalized intersections.

SCREEN-LINE: An imaginary line or physical feature across which all trips are counted, normally to verify the validity of mathematical traffic models.

SIGNAL CYCLE: The time period in seconds required for one complete sequence of signal indications.

SIGNAL PHASE: The part of the signal cycle allocated to one or more traffic movements.

STARTING DELAY: The delay experienced in initiating the movement of queued traffic from a stop to an average running speed through a signalized intersection.

TRAFFIC-ACTUATED SIGNAL: A type of traffic signal that directs traffic to stop and go in accordance with the demands of traffic, as registered by the actuation of detectors.

TRIP: The movement of a person or vehicle from one location (origin) to another (destination). For example, from home to store to home is two trips, not one.

TRIP-END: One end of a trip at either the origin or destination; i.e. each trip has two trip-ends. A trip-end occurs when a person, object, or message is transferred to or from a vehicle.

TRIP GENERATION RATE: The quality of trips produced and/or attracted by a specific land use stated in terms of units such as per dwelling, per acre, and per 1,000 square feet of floor space.

TRUCK: A vehicle having dual tires on one or more axles, or having more than two axles.

UNBALANCED FLOW: Heavier traffic flow in one direction than the other. On a daily basis, most facilities have balanced flow. During the peak hours, flow is seldom balanced in an urban area.

VEHICLE MILES OF TRAVEL: A measure of the amount of usage of a section of highway, obtained by multiplying the average daily traffic by length of facility in miles.

APPENDIX B

Traffic Count Worksheets

KUNZMAN ASSOCIATES, INC. TRAFFIC COUNT

North/South Street: Aberdeen Drive
East/West Street: Linden Street
Counter: Ken
Date: 05/19/10

Morning Peak Hour

Time	Northbound			Southbound			Eastbound			Westbound		
	Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right
7:00 AM	9	0	6	0	0	0	0	7	16	2	13	0
7:15 AM	10	0	5	0	0	0	0	10	32	5	8	0
7:30 AM	15	0	4	0	0	0	0	16	28	6	7	0
7:45 AM	13	0	5	0	0	0	0	22	66	2	4	0
8:00 AM	30	0	10	0	0	0	0	20	63	11	12	0
8:15 AM	7	0	6	0	0	0	0	9	41	4	10	0
8:30 AM	18	0	9	0	0	0	0	6	34	13	12	0
8:45 AM	16	0	3	0	0	0	0	15	56	9	12	0
Total	118	0	48	0	0	0	0	105	336	52	78	0

Peak Hour Volumes	68	0	30	0	0	0	0	57	204	30	38	0
Peak Hour Factor	0.613			0.000			0.741			0.680		

Mid-day Peak Hour

Time	Northbound			Southbound			Eastbound			Westbound		
	Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right
N/A	0	0	0	0	0	0	0	0	0	0	0	0
#VALUE!	0	0	0	0	0	0	0	0	0	0	0	0
#VALUE!	0	0	0	0	0	0	0	0	0	0	0	0
#VALUE!	0	0	0	0	0	0	0	0	0	0	0	0
#VALUE!	0	0	0	0	0	0	0	0	0	0	0	0
#VALUE!	0	0	0	0	0	0	0	0	0	0	0	0
#VALUE!	0	0	0	0	0	0	0	0	0	0	0	0
#VALUE!	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0

Peak Hour Volumes	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!
Peak Hour Factor	#VALUE!			#VALUE!			#VALUE!			#VALUE!		

Evening Peak Hour

Time	Northbound			Southbound			Eastbound			Westbound		
	Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right
4:00 PM	57	0	12	0	0	0	0	24	48	9	26	0
4:15 PM	43	0	12	0	0	0	0	35	27	5	33	0
4:30 PM	47	0	4	0	0	0	0	25	37	5	37	0
4:45 PM	53	0	5	0	0	0	0	20	66	4	16	0
5:00 PM	92	0	10	0	0	0	0	23	64	4	41	0
5:15 PM	46	0	1	0	0	0	0	34	37	6	34	0
5:30 PM	47	0	7	0	0	0	0	34	43	5	35	0
5:45 PM	50	0	5	0	0	0	0	36	43	6	27	0
Total	435	0	56	0	0	0	0	231	365	44	249	0

Peak Hour Volumes	235	0	23	0	0	0	0	127	187	21	137	0
Peak Hour Factor	0.632			0.000			0.902			0.878		

KUNZMAN ASSOCIATES, INC. TRAFFIC COUNT

North/South Street: Aberdeen Drive
East/West Street: Campus Drive
Counter: Ken
Date: 05/20/10

Morning Peak Hour

	Northbound			Southbound			Eastbound			Westbound		
Time	Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right
7:00 AM	0	0	0	4	0	8	0	1	0	0	6	9
7:15 AM	0	0	0	18	0	0	2	1	0	0	10	13
7:30 AM	0	0	0	19	0	7	5	2	0	0	4	10
7:45 AM	0	0	0	40	0	12	2	2	0	0	12	26
8:00 AM	0	0	0	39	0	17	4	2	0	0	13	17
8:15 AM	0	0	0	34	0	10	1	3	0	0	4	11
8:30 AM	0	0	0	36	0	10	7	6	0	0	8	34
8:45 AM	0	0	0	32	0	10	3	5	0	0	6	21
Total	0	0	0	222	0	74	24	22	0	0	63	141

Peak Hour Volumes	0	0	0	149	0	49	14	13	0	0	37	88
Peak Hour Factor	0.000			0.884			0.519			0.744		

Mid-day Peak Hour

	Northbound			Southbound			Eastbound			Westbound		
Time	Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right
N/A	0	0	0	0	0	0	0	0	0	0	0	0
#VALUE!	0	0	0	0	0	0	0	0	0	0	0	0
#VALUE!	0	0	0	0	0	0	0	0	0	0	0	0
#VALUE!	0	0	0	0	0	0	0	0	0	0	0	0
#VALUE!	0	0	0	0	0	0	0	0	0	0	0	0
#VALUE!	0	0	0	0	0	0	0	0	0	0	0	0
#VALUE!	0	0	0	0	0	0	0	0	0	0	0	0
#VALUE!	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0

Peak Hour Volumes	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!
Peak Hour Factor	#VALUE!			#VALUE!			#VALUE!			#VALUE!		

Evening Peak Hour

	Northbound			Southbound			Eastbound			Westbound		
Time	Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right
4:00 PM	0	0	0	0	0	0	0	0	0	0	0	0
4:15 PM	0	0	0	37	0	4	5	1	0	0	3	35
4:30 PM	0	0	0	48	0	3	8	9	0	0	2	39
4:45 PM	0	0	0	40	0	4	4	6	0	0	1	31
5:00 PM	0	0	0	65	0	0	10	11	0	0	1	71
5:15 PM	0	0	0	54	0	2	4	11	0	0	0	47
5:30 PM	0	0	0	33	0	0	9	7	0	0	0	33
5:45 PM	0	0	0	41	0	1	8	3	0	0	0	41
Total	0	0	0	318	0	14	48	48	0	0	7	297

Peak Hour Volumes	0	0	0	207	0	9	26	37	0	0	4	188
Peak Hour Factor	0.000			0.831			0.750			0.667		

KUNZMAN ASSOCIATES, INC. TRAFFIC COUNT

North/South Street: Campus Drive
East/West Street: Big Springs Road
Counter: Thao
Date: 05/19/10

Morning Peak Hour												
	Northbound			Southbound			Eastbound			Westbound		
Time	Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right
7:00 AM	0	12	5	5	3	0	0	0	0	7	0	4
7:15 AM	0	10	4	9	12	0	0	0	0	5	0	11
7:30 AM	0	10	3	11	5	0	0	0	0	8	0	12
7:45 AM	0	22	3	21	18	0	0	0	0	21	0	16
8:00 AM	0	18	6	23	32	0	0	0	0	13	0	15
8:15 AM	0	27	4	6	21	0	0	0	0	17	0	13
8:30 AM	0	18	5	16	21	0	0	0	0	11	0	11
8:45 AM	0	20	4	14	31	0	0	0	0	18	0	11
Total	0	137	34	105	143	0	0	0	0	100	0	93

Peak Hour Volumes	0	85	18	66	92	0	0	0	0	62	0	55
Peak Hour Factor	0.831			0.718			0.000			0.791		

Mid-day Peak Hour												
	Northbound			Southbound			Eastbound			Westbound		
Time	Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right
N/A	0	0	0	0	0	0	0	0	0	0	0	0
#VALUE!	0	0	0	0	0	0	0	0	0	0	0	0
#VALUE!	0	0	0	0	0	0	0	0	0	0	0	0
#VALUE!	0	0	0	0	0	0	0	0	0	0	0	0
#VALUE!	0	0	0	0	0	0	0	0	0	0	0	0
#VALUE!	0	0	0	0	0	0	0	0	0	0	0	0
#VALUE!	0	0	0	0	0	0	0	0	0	0	0	0
#VALUE!	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0

Peak Hour Volumes	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!
Peak Hour Factor	#VALUE!			#VALUE!			#VALUE!			#VALUE!		

Evening Peak Hour												
	Northbound			Southbound			Eastbound			Westbound		
Time	Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right
4:00 PM	0	65	11	18	33	0	0	0	0	10	0	28
4:15 PM	0	17	15	13	25	0	0	0	0	10	0	24
4:30 PM	0	11	16	16	15	0	0	0	0	15	0	20
4:45 PM	0	24	10	22	30	0	0	0	0	17	0	23
5:00 PM	0	21	30	30	32	0	0	0	0	19	0	40
5:15 PM	0	10	20	36	21	0	0	0	0	14	0	23
5:30 PM	0	12	19	30	22	0	0	0	0	6	0	33
5:45 PM	0	14	10	12	21	0	0	0	0	13	0	22
Total	0	174	131	177	199	0	0	0	0	104	0	213

Peak Hour Volumes	0	67	79	118	105	0	0	0	0	56	0	119
Peak Hour Factor	0.716			0.899			0.000			0.742		

KUNZMAN ASSOCIATES, INC. TRAFFIC COUNT

North/South Street: Campus Drive
East/West Street: Eucalyptus Drive
Counter: Thao
Date: 05/20/10

Morning Peak Hour												
	Northbound			Southbound			Eastbound			Westbound		
Time	Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right
7:00 AM	1	17	0	0	11	4	2	0	1	0	0	0
7:15 AM	1	15	0	0	13	3	2	0	1	0	0	0
7:30 AM	3	25	0	0	9	9	6	1	3	0	0	0
7:45 AM	1	29	0	0	12	6	2	0	3	0	1	0
8:00 AM	2	65	0	0	21	11	4	0	1	0	0	0
8:15 AM	1	30	0	0	24	7	7	0	4	0	0	0
8:30 AM	3	33	0	0	23	2	2	0	1	0	0	0
8:45 AM	1	31	0	0	22	2	7	0	1	0	0	0
Total	13	245	0	0	135	44	32	1	15	0	1	0

Peak Hour Volumes	7	159	0	0	90	22	20	0	7	0	0	0
Peak Hour Factor	0.619			0.875			0.614			0.000		

Mid-day Peak Hour												
	Northbound			Southbound			Eastbound			Westbound		
Time	Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right
N/A	0	0	0	0	0	0	0	0	0	0	0	0
#VALUE!	0	0	0	0	0	0	0	0	0	0	0	0
#VALUE!	0	0	0	0	0	0	0	0	0	0	0	0
#VALUE!	0	0	0	0	0	0	0	0	0	0	0	0
#VALUE!	0	0	0	0	0	0	0	0	0	0	0	0
#VALUE!	0	0	0	0	0	0	0	0	0	0	0	0
#VALUE!	0	0	0	0	0	0	0	0	0	0	0	0
#VALUE!	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0

Peak Hour Volumes	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!
Peak Hour Factor	#VALUE!			#VALUE!			#VALUE!			#VALUE!		

Evening Peak Hour												
	Northbound			Southbound			Eastbound			Westbound		
Time	Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right
4:00 PM	5	56	0	0	39	4	6	0	1	0	0	0
4:15 PM	3	32	0	0	27	2	2	0	1	0	0	0
4:30 PM	0	24	0	0	39	7	4	0	3	0	0	0
4:45 PM	2	30	0	0	42	5	2	0	2	0	0	0
5:00 PM	2	42	0	0	66	5	9	0	6	0	0	0
5:15 PM	0	30	0	0	39	3	5	0	1	0	0	0
5:30 PM	0	34	0	0	42	10	1	0	1	0	0	0
5:45 PM	0	28	0	0	29	0	5	0	0	0	0	0
Total	12	276	0	0	323	36	34	0	15	0	0	0

Peak Hour Volumes	4	136	0	0	189	23	17	0	10	0	0	0
Peak Hour Factor	0.795			0.746			0.450			0.000		

KUNZMAN ASSOCIATES, INC. TRAFFIC COUNT

North/South Street: Valencia Hill Drive
East/West Street: Big Springs Road
Counter: Giancarlo
Date: 05/20/10

Morning Peak Hour												
	Northbound			Southbound			Eastbound			Westbound		
Time	Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right
7:00 AM	0	0	0	0	0	0	1	8	0	0	13	0
7:15 AM	0	0	0	1	0	0	1	1	0	0	31	0
7:30 AM	0	0	0	0	0	0	0	3	0	0	33	0
7:45 AM	0	0	0	1	0	1	0	8	0	0	55	1
8:00 AM	0	0	0	1	0	0	0	10	0	0	59	1
8:15 AM	0	0	0	0	0	0	0	15	0	0	39	0
8:30 AM	0	0	0	0	0	1	0	10	0	0	46	0
8:45 AM	0	0	0	0	0	1	0	12	0	0	34	2
Total	0	0	0	3	0	3	2	67	0	0	310	4

Peak Hour Volumes	0	0	0	2	0	2	0	43	0	0	199	2
Peak Hour Factor	0.000			0.500			0.717			0.838		

Mid-day Peak Hour												
	Northbound			Southbound			Eastbound			Westbound		
Time	Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right
10:00 AM	0	0	0	0	0	0	0	0	0	0	0	0
10:15 AM	0	0	0	0	0	0	0	0	0	0	0	0
10:30 AM	0	0	0	0	0	0	0	0	0	0	0	0
10:45 AM	0	0	0	0	0	0	0	0	0	0	0	0
11:00 AM	0	0	0	0	0	0	0	0	0	0	0	0
11:15 AM	0	0	0	0	0	0	0	0	0	0	0	0
11:30 AM	0	0	0	0	0	0	0	0	0	0	0	0
11:45 AM	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0

Peak Hour Volumes	0	0	0	0	0	0	0	0	0	0	0	0
Peak Hour Factor	0.000			0.000			0.000			0.000		

Evening Peak Hour												
	Northbound			Southbound			Eastbound			Westbound		
Time	Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right
4:00 PM	0	0	0	0	0	1	0	35	0	0	25	0
4:15 PM	0	0	0	0	0	2	0	34	0	0	20	1
4:30 PM	0	0	0	0	0	0	0	40	0	0	23	0
4:45 PM	0	0	0	1	0	1	1	42	0	0	29	1
5:00 PM	0	0	0	1	0	0	1	84	0	0	27	1
5:15 PM	0	0	0	2	0	3	2	60	0	0	17	0
5:30 PM	0	0	0	2	0	0	1	35	0	0	22	2
5:45 PM	0	0	0	0	0	0	1	44	0	0	24	1
Total	0	0	0	6	0	7	6	374	0	0	187	6

Peak Hour Volumes	0	0	0	4	0	4	4	226	0	0	96	2
Peak Hour Factor	0.000			0.400			0.676			0.817		

KUNZMAN ASSOCIATES, INC. TRAFFIC COUNT

North/South Street: Watkins Drive
East/West Street: Big Springs Road
Counter: Giancarlo
Date: 05/19/10

Morning Peak Hour

	Northbound			Southbound			Eastbound			Westbound		
Time	Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right
7:00 AM	11	78	1	2	18	5	1	1	7	2	0	6
7:15 AM	13	101	2	3	23	5	1	3	2	4	0	10
7:30 AM	23	135	7	2	34	7	0	2	3	3	2	15
7:45 AM	40	140	6	3	39	27	2	2	3	2	5	15
8:00 AM	24	94	6	6	25	19	8	4	11	3	3	14
8:15 AM	16	63	5	3	23	16	2	2	4	3	3	4
8:30 AM	16	50	6	3	23	25	5	2	1	2	4	9
8:45 AM	28	44	11	14	22	23	9	0	1	3	8	5
Total	171	705	44	36	207	127	28	16	32	22	25	78

Peak Hour Volumes	100	470	21	14	121	58	11	11	19	12	10	54
Peak Hour Factor	0.794			0.699			0.446			0.864		

Mid-day Peak Hour

	Northbound			Southbound			Eastbound			Westbound		
Time	Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right
10:00 AM	0	0	0	0	0	0	0	0	0	0	0	0
10:15 AM	0	0	0	0	0	0	0	0	0	0	0	0
10:30 AM	0	0	0	0	0	0	0	0	0	0	0	0
10:45 AM	0	0	0	0	0	0	0	0	0	0	0	0
11:00 AM	0	0	0	0	0	0	0	0	0	0	0	0
11:15 AM	0	0	0	0	0	0	0	0	0	0	0	0
11:30 AM	0	0	0	0	0	0	0	0	0	0	0	0
11:45 AM	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0

Peak Hour Volumes	0	0	0	0	0	0	0	0	0	0	0	0
Peak Hour Factor	0.000			0.000			0.000			0.000		

Evening Peak Hour

	Northbound			Southbound			Eastbound			Westbound		
Time	Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right
4:00 PM	14	40	1	7	85	12	25	6	18	7	3	5
4:15 PM	10	32	4	11	84	5	21	5	26	5	4	9
4:30 PM	10	38	4	4	114	10	15	9	26	7	4	9
4:45 PM	8	32	2	11	101	12	17	3	20	6	9	9
5:00 PM	9	33	4	9	125	13	32	11	28	5	8	9
5:15 PM	11	34	3	16	132	15	33	12	21	11	5	8
5:30 PM	10	32	2	13	118	10	27	7	18	6	4	8
5:45 PM	9	44	8	6	108	16	13	1	19	6	5	2
Total	81	285	28	77	867	93	183	54	176	53	42	59

Peak Hour Volumes	39	143	17	44	483	54	105	31	86	28	22	27
Peak Hour Factor	0.816			0.891			0.782			0.802		

APPENDIX C

Explanation and Calculation of Intersection Delay

EXPLANATION AND CALCULATION OF INTERSECTION LEVEL OF SERVICE USING DELAY METHODOLOGY

The levels of service at the unsignalized and signalized intersections are calculated using the delay methodology in the 2000 Highway Capacity Manual. This methodology views an intersection as consisting of several lane groups. A lane group is a set of lanes serving a movement. If there are two northbound left turn lanes, then the lane group serving the northbound left turn movement has two lanes. Similarly, there may be three lanes in the lane group serving the northbound through movement, one lane in the lane group serving the northbound right turn movement, and so forth. It is also possible for one lane to serve two lane groups. A shared lane might result in there being 1.5 lanes in the northbound left turn lane group and 2.5 lanes in the northbound through lane group.

For each lane group, there is a capacity. That capacity is calculated by multiplying the number of lanes in the lane group times a theoretical maximum lane capacity per lane times 12 adjustment factors.

Each of the 12 adjustment factors has a value of approximately 1.00. A value less than 1.00 is generally assigned when a less than desirable condition occurs.

The 12 adjustment factors are as follows:

1. Peak hour factor (to account for peaking within the peak hour)
2. Lane utilization factor (to account for not all lanes loading equally)
3. Lane width
4. Percent of heavy trucks
5. Approach grade
6. Parking
7. Bus stops at intersections
8. Area type (CBD or other)
9. Right turns
10. Left turns

11. Pedestrian activity

12. Signal progression

The maximum theoretical lane capacity and the 12 adjustment factors for it are all unknowns for which approximate estimates have been recommended in the 2000 Highway Capacity Manual. For the most part, the recommended values are not based on statistical analysis but rather on educated estimates. However, it is possible to use the delay method and get reasonable results as will be discussed below.

Once the lane group volume is known and the lane group capacity is known, a volume to capacity ratio can be calculated for the lane group.

With a volume to capacity ratio calculated, average delay per vehicle in a lane group can be estimated. The average delay per vehicle in a lane group is calculated using a complex formula provided by the 2000 Highway Capacity Manual, which can be simplified and described as follows:

Delay per vehicle in a lane group is a function of the following:

1. Cycle length

2. Amount of red time faced by a lane group

3. Amount of yellow time for that lane group

4. The volume to capacity ratio of the lane group

The average delay per vehicle for each lane group is calculated, and eventually an overall average delay for all vehicles entering the intersection is calculated. This average delay per vehicle is then used to judge Level of Service. The Level of Services are defined in the table that follows this discussion.

Experience has shown that when a maximum lane capacity of 1,900 vehicles per hour is used (as recommended in the 2000 Highway Capacity Manual), little or no yellow time penalty is used, and none of the 12 penalty factors are applied, calculated delay is realistic. The delay calculation for instance assumes that yellow time is totally unused. Yet experience shows that most of the yellow time is used.

An idiosyncrasy of the delay methodology is that it is possible to add traffic to an intersection and reduce the average total delay per vehicle. If the average total delay is 30 seconds per vehicle for all vehicles traveling through an intersection, and traffic is added to a movement that has an average total delay of 15 seconds per vehicle, then the overall average total delay is reduced.

The delay calculation for a lane group is based on a concept that the delay is a function of the amount of unused capacity available. As the volume approaches capacity and there is no more unused capacity available, then the delay rapidly increases. Delay is not proportional to volume, but rather increases rapidly as the unused capacity approaches zero.

Because delay is not linearly related to volumes, the delay does not reflect how close an intersection is to overloading. If an intersection is operating at Level of Service C and has an average total delay of 18 seconds per vehicle, you know very little as to what percent the traffic can increase before Level of Service E is reached.

LEVEL OF SERVICE DESCRIPTION[1]

Level of Service	Description	Average Total Delay Per Vehicle (Seconds)	
		Signalized	Unsignalized
A	Level of Service A occurs when progression is extremely favorable and most vehicles arrive during the green phase. Most vehicles do not stop at all. Short cycle lengths may also contribute to low delay.	0 to 10.00	0 to 10.00
B	Level of Service B generally occurs with good progression and/or short cycle lengths. More vehicles stop than for Level of Service A, causing higher levels of average total delay.	10.01 to 20.00	10.01 to 15.00
C	Level of Service C generally results when there is fair progression and/or longer cycle lengths. Individual cycle failures may begin to appear in this level. The number of vehicles stopping is significant at this level, although many still pass through the intersection without stopping.	20.01 to 35.00	15.01 to 25.00
D	Level of Service D generally results in noticeable congestion. Longer delays may result from some combination of unfavorable progression, long cycle lengths, or high volume to capacity ratios. Many vehicles stop, and the proportion of vehicles not stopping declines. Individual cycle failures are noticeable.	35.01 to 55.00	25.01 to 35.00
E	Level of Service E is considered to be the limit of acceptable delay. These high delay values generally indicate poor progression, long cycle lengths, and high volume to capacity ratios. Individual cycle failures are frequent occurrences.	55.01 to 80.00	35.01 to 50.00
F	Level of Service F is considered to be unacceptable to most drivers. This condition often occurs with oversaturation, i.e., when arrival flow rates exceed the capacity of the intersection. It may also occur at high volume to capacity ratios below 1.00 with many individual cycle failures. Poor progression and long cycle lengths may also be major contributing causes to such delay levels.	80.01 and up	50.01 and up

[1] Source: Highway Capacity Manual Special Report 209, Transportation Research Board, National Research Council, Washington, D.C., 2000.

Existing

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--------------------------------------------------------------------------------
                    Glen Mor 2 Student Apartments Project
                                  Existing
                              Morning Peak Hour
--------------------------------------------------------------------------------

                      Level Of Service Computation Report
            2000 HCM 4-Way Stop Method (Base Volume Alternative)
********************************************************************************
Intersection #1 Aberdeen Drive (NS) / Linden Street (EW)
********************************************************************************
Cycle (sec):            0                Critical Vol./Cap.(X):         0.335
Loss Time (sec):        0 (Y+R=4.0 sec)  Average Delay (sec/veh):         8.9
Optimal Cycle:          0                Level Of Service:                  A
********************************************************************************
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Stop Sign        Stop Sign        Stop Sign        Stop Sign
Rights:           Include          Include          Include          Include
Min. Green:     0     0     0    0     0     0    0     0     0    0     0     0
Lanes:        0  0  1! 0  0    0  0  0  0  0    0  0  1  0  1    0  1  0  0  0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:      68     0    30     0     0     0     0    57   204    30    38     0
Growth Adj:  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00
Initial Bse:   68     0    30     0     0     0     0    57   204    30    38     0
User Adj:    1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00
PHF Adj:     0.61  1.00  0.61  1.00  1.00  1.00  1.00  0.74  0.74  0.68  0.68  1.00
PHF Volume:   111     0    49     0     0     0     0    77   275    44    56     0
Reduct Vol:     0     0     0     0     0     0     0     0     0     0     0     0
Reduced Vol:  111     0    49     0     0     0     0    77   275    44    56     0
PCE Adj:     1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00
MLF Adj:     1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00
FinalVolume:  111     0    49     0     0     0     0    77   275    44    56     0
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Adjustment:  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00
Lanes:       0.69  0.00  0.31  0.00  0.00  0.00  0.00  1.00  1.00  0.44  0.56  0.00
Final Sat.:   494     0   218     0     0     0     0   710   822   318   403     0
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:     0.22  xxxx  0.22  xxxx  xxxx  xxxx  xxxx  0.11  0.33  0.14  0.14  xxxx
Crit Moves:  ****                                            ****        ****
Delay/Veh:    9.1   0.0   9.1   0.0   0.0   0.0   0.0   8.3   9.0   8.6   8.6   0.0
Delay Adj:   1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00
AdjDel/Veh:   9.1   0.0   9.1   0.0   0.0   0.0   0.0   8.3   9.0   8.6   8.6   0.0
LOS by Move:    A     *     A     *     *     *     *     A     A     A     A     *
ApproachDel:        9.1            xxxxxx               8.9               8.6
Delay Adj:         1.00             xxxxx              1.00              1.00
ApprAdjDel:         9.1            xxxxxx               8.9               8.6
LOS by Appr:          A                 *                 A                 A
AllWayAvgQ:   0.3   0.3   0.3   0.0   0.0   0.0   0.0   0.1   0.5   0.1   0.1   0.1
********************************************************************************
Note: Queue reported is the number of cars per lane.
********************************************************************************
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--------------------------------------------------------------------------------
                  Glen Mor 2 Student Apartments Project
                                 Existing
                            Evening Peak Hour
--------------------------------------------------------------------------------

                    Level Of Service Computation Report
           2000 HCM 4-Way Stop Method (Base Volume Alternative)
********************************************************************************
Intersection #1 Aberdeen Drive (NS) / Linden Street (EW)
********************************************************************************
Cycle (sec):             0              Critical Vol./Cap.(X):          0.614
Loss Time (sec):         0 (Y+R=4.0 sec) Average Delay (sec/veh):        12.7
Optimal Cycle:           0              Level Of Service:                   B
********************************************************************************
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Stop Sign        Stop Sign        Stop Sign        Stop Sign
Rights:          Include          Include          Include          Include
Min. Green:    0     0     0    0     0     0    0     0     0    0     0     0
Lanes:       0  0  1! 0  0   0  0  0  0  0   0  0  1  0  1   0  1  0  0  0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:     235     0    23     0     0     0     0   127   187    21   137     0
Growth Adj:  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00
Initial Bse:  235     0    23     0     0     0     0   127   187    21   137     0
User Adj:    1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00
PHF Adj:     0.63  1.00  0.63  1.00  1.00  1.00  1.00  0.90  0.90  0.88  0.88  1.00
PHF Volume:   372     0    36     0     0     0     0   141   207    24   156     0
Reduct Vol:     0     0     0     0     0     0     0     0     0     0     0     0
Reduced Vol:  372     0    36     0     0     0     0   141   207    24   156     0
PCE Adj:     1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00
MLF Adj:     1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00
FinalVolume:  372     0    36     0     0     0     0   141   207    24   156     0
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Adjustment:  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00
Lanes:       0.91  0.00  0.09  0.00  0.00  0.00  0.00  1.00  1.00  0.13  0.87  0.00
Final Sat.:   606     0    59     0     0     0     0   592   670    81   530     0
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:     0.61  xxxx  0.61  xxxx  xxxx  xxxx  xxxx  0.24  0.31  0.29  0.29  xxxx
Crit Moves:              ****                               ****        ****
Delay/Veh:   15.7   0.0  15.7   0.0   0.0   0.0   0.0  10.3  10.0  10.7  10.7   0.0
Delay Adj:   1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00
AdjDel/Veh:  15.7   0.0  15.7   0.0   0.0   0.0   0.0  10.3  10.0  10.7  10.7   0.0
LOS by Move:    C     *     C     *     *     *     *     B     A     B     B     *
ApproachDel:       15.7            xxxxxx              10.1              10.7
Delay Adj:         1.00             xxxxx              1.00              1.00
ApprAdjDel:        15.7            xxxxxx              10.1              10.7
LOS by Appr:          C                 *                 B                 B
AllWayAvgQ:   1.4   1.4   1.4   0.0   0.0   0.0   0.0   0.3   0.4   0.4   0.4   0.4
********************************************************************************
Note: Queue reported is the number of cars per lane.
********************************************************************************
```

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--------------------------------------------------------------------------------
                    Glen Mor 2 Student Apartments Project
                                 Existing
                             Morning Peak Hour
--------------------------------------------------------------------------------

                      Level Of Service Computation Report
             2000 HCM 4-Way Stop Method (Base Volume Alternative)
********************************************************************************
Intersection #2 Aberdeen Drive (NS) / Campus Drive (EW)
********************************************************************************
Cycle (sec):           0                 Critical Vol./Cap.(X):         0.280
Loss Time (sec):       0 (Y+R=4.0 sec)  Average Delay (sec/veh):         8.5
Optimal Cycle:         0                 Level Of Service:                  A
********************************************************************************
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Stop Sign        Stop Sign        Stop Sign        Stop Sign
Rights:           Include          Include          Include          Include
Min. Green:     0    0     0    0    0     0    0    0     0    0    0     0
Lanes:        0  0  0  0  0   0  0  1! 0  0   0  1  0  0  0   0  0  0  1  0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:       0    0     0  149    0    49   14   13     0    0   37    88
Growth Adj:  1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
Initial Bse:    0    0     0  149    0    49   14   13     0    0   37    88
User Adj:    1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
PHF Adj:     1.00 1.00  1.00 0.88 1.00  0.88 0.52 0.52  1.00 1.00 0.74  0.74
PHF Volume:     0    0     0  169    0    55   27   25     0    0   50   118
Reduct Vol:     0    0     0    0    0     0    0    0     0    0    0     0
Reduced Vol:    0    0     0  169    0    55   27   25     0    0   50   118
PCE Adj:     1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
MLF Adj:     1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
FinalVolume:    0    0     0  169    0    55   27   25     0    0   50   118
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Adjustment:  1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
Lanes:       0.00 0.00  0.00 0.75 0.00  0.25 0.52 0.48  0.00 0.00 0.30  0.70
Final Sat.:     0    0     0  602    0   198  381  354     0    0  253   601
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:     xxxx xxxx  xxxx 0.28 xxxx  0.28 0.07 0.07  xxxx xxxx 0.20  0.20
Crit Moves:                             ****      ****              ****
Delay/Veh:    0.0  0.0   0.0  9.0  0.0   9.0  8.0  8.0   0.0  0.0  8.0   8.0
Delay Adj:   1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
AdjDel/Veh:   0.0  0.0   0.0  9.0  0.0   9.0  8.0  8.0   0.0  0.0  8.0   8.0
LOS by Move:    *    *     *    A    *     A    A    A     *    *    A     A
ApproachDel:    xxxxxx            9.0              8.0              8.0
Delay Adj:       xxxxx           1.00             1.00             1.00
ApprAdjDel:     xxxxxx            9.0              8.0              8.0
LOS by Appr:       *                A                A                A
AllWayAvgQ:   0.0  0.0   0.0  0.4  0.4   0.4  0.1  0.1   0.1  0.2  0.2   0.2
********************************************************************************
Note: Queue reported is the number of cars per lane.
********************************************************************************
```

Glen Mor 2 Student Apartments Project
Existing
Evening Peak Hour

Level Of Service Computation Report
2000 HCM 4-Way Stop Method (Base Volume Alternative)

Intersection #2 Aberdeen Drive (NS) / Campus Drive (EW)

Cycle (sec):	0	Critical Vol./Cap.(X):	0.364
Loss Time (sec):	0 (Y+R=4.0 sec)	Average Delay (sec/veh):	9.5
Optimal Cycle:	0	Level Of Service:	A

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Stop Sign			Stop Sign			Stop Sign			Stop Sign		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	0 0 0 0 0			0 0 1! 0 0			0 1 0 0 0			0 0 0 1 0		
Volume Module:												
Base Vol:	0	0	0	207	0	9	26	37	0	0	4	188
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	0	0	0	207	0	9	26	37	0	0	4	188
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	0.83	1.00	0.83	0.75	0.75	1.00	1.00	0.67	0.67
PHF Volume:	0	0	0	249	0	11	35	49	0	0	6	282
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	0	0	0	249	0	11	35	49	0	0	6	282
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	0	0	0	249	0	11	35	49	0	0	6	282
Saturation Flow Module:												
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	0.00	0.00	0.00	0.96	0.00	0.04	0.41	0.59	0.00	0.00	0.02	0.98
Final Sat.:	0	0	0	683	0	30	286	407	0	0	18	832
Capacity Analysis Module:												
Vol/Sat:	xxxx	xxxx	xxxx	0.36	xxxx	0.36	0.12	0.12	xxxx	xxxx	0.34	0.34
Crit Moves:				****				****				****
Delay/Veh:	0.0	0.0	0.0	10.4	0.0	10.4	8.6	8.6	0.0	0.0	9.0	9.0
Delay Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	0.0	0.0	0.0	10.4	0.0	10.4	8.6	8.6	0.0	0.0	9.0	9.0
LOS by Move:	*	*	*	B	*	B	A	A	*	*	A	A
ApproachDel:		xxxxxx			10.4			8.6			9.0	
Delay Adj:		xxxxx			1.00			1.00			1.00	
ApprAdjDel:		xxxxxx			10.4			8.6			9.0	
LOS by Appr:		*			B			A			A	
AllWayAvgQ:	0.0	0.0	0.0	0.5	0.5	0.5	0.1	0.1	0.1	0.5	0.5	0.5

Note: Queue reported is the number of cars per lane.

```
--------------------------------------------------------------------------------
                   Glen Mor 2 Student Apartments Project
                                Existing
                            Morning Peak Hour
--------------------------------------------------------------------------------

                   Level Of Service Computation Report
          2000 HCM 4-Way Stop Method (Base Volume Alternative)
********************************************************************************
Intersection #3 Campus Drive (NS) / Big Springs Road (EW)
********************************************************************************
Cycle (sec):           0              Critical Vol./Cap.(X):         0.279
Loss Time (sec):       0 (Y+R=4.0 sec) Average Delay (sec/veh):        8.7
Optimal Cycle:         0              Level Of Service:                  A
********************************************************************************
Approach:      North Bound      South Bound      East Bound       West Bound
Movement:     L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Stop Sign        Stop Sign        Stop Sign        Stop Sign
Rights:          Include          Include          Include          Include
Min. Green:    0    0    0    0    0    0    0    0    0    0    0    0
Lanes:        0  0  0  1  0   0  1  0  0  0   0  0  0  0  0   0  0  1! 0  0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:      0   85   18   66   92    0    0    0    0   62    0   55
Growth Adj:  1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00
Initial Bse:   0   85   18   66   92    0    0    0    0   62    0   55
User Adj:    1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00
PHF Adj:     1.00 0.83 0.83 0.72 0.72 1.00 1.00 1.00 1.00 0.79 1.00 0.79
PHF Volume:    0  102   22   92  128    0    0    0    0   78    0   70
Reduct Vol:    0    0    0    0    0    0    0    0    0    0    0    0
Reduced Vol:   0  102   22   92  128    0    0    0    0   78    0   70
PCE Adj:     1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00
MLF Adj:     1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00
FinalVolume:   0  102   22   92  128    0    0    0    0   78    0   70
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Adjustment:  1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00
Lanes:       0.00 0.83 0.17 0.42 0.58 0.00 0.00 0.00 0.00 0.53 0.00 0.47
Final Sat.:    0  657  139  329  459    0    0    0    0  405    0  359
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:     xxxx 0.16 0.16 0.28 0.28 xxxx xxxx xxxx xxxx 0.19 xxxx 0.19
Crit Moves:       ****           ****                          ****
Delay/Veh:    0.0  8.1  8.1  9.1  9.1  0.0  0.0  0.0  0.0  8.5  0.0  8.5
Delay Adj:   1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00
AdjDel/Veh:   0.0  8.1  8.1  9.1  9.1  0.0  0.0  0.0  0.0  8.5  0.0  8.5
LOS by Move:    *    A    A    A    A    *    *    *    *    A    *    A
ApproachDel:        8.1              9.1            xxxxxx             8.5
Delay Adj:         1.00             1.00             xxxxx            1.00
ApprAdjDel:         8.1              9.1            xxxxxx             8.5
LOS by Appr:          A                A                 *               A
AllWayAvgQ:   0.2  0.2  0.2  0.4  0.4  0.4  0.0  0.0  0.0  0.2  0.2  0.2
********************************************************************************
Note: Queue reported is the number of cars per lane.
********************************************************************************
```

Glen Mor 2 Student Apartments Project
Existing
Evening Peak Hour

Level Of Service Computation Report
2000 HCM 4-Way Stop Method (Base Volume Alternative)

Intersection #3 Campus Drive (NS) / Big Springs Road (EW)

Cycle (sec):	0	Critical Vol./Cap.(X):	0.342
Loss Time (sec):	0 (Y+R=4.0 sec)	Average Delay (sec/veh):	9.5
Optimal Cycle:	0	Level Of Service:	A

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:		Stop Sign			Stop Sign			Stop Sign			Stop Sign	
Rights:		Include			Include			Include			Include	
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:		0 0 0 1 0			0 1 0 0 0			0 0 0 0 0			0 0 1! 0 0	
Volume Module:												
Base Vol:	0	67	79	118	105	0	0	0	0	56	0	119
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	0	67	79	118	105	0	0	0	0	56	0	119
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	0.72	0.72	0.90	0.90	1.00	1.00	1.00	1.00	0.74	1.00	0.74
PHF Volume:	0	94	110	131	117	0	0	0	0	75	0	160
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	0	94	110	131	117	0	0	0	0	75	0	160
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	0	94	110	131	117	0	0	0	0	75	0	160
Saturation Flow Module:												
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	0.00	0.46	0.54	0.53	0.47	0.00	0.00	0.00	0.00	0.32	0.00	0.68
Final Sat.:	0	357	421	384	342	0	0	0	0	239	0	507
Capacity Analysis Module:												
Vol/Sat:	xxxx	0.26	0.26	0.34	0.34	xxxx	xxxx	xxxx	xxxx	0.32	xxxx	0.32
Crit Moves:		****			****					****		
Delay/Veh:	0.0	8.9	8.9	10.1	10.1	0.0	0.0	0.0	0.0	9.4	0.0	9.4
Delay Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	0.0	8.9	8.9	10.1	10.1	0.0	0.0	0.0	0.0	9.4	0.0	9.4
LOS by Move:	*	A	A	B	B	*	*	*	*	A	*	A
ApproachDel:		8.9			10.1			xxxxxx			9.4	
Delay Adj:		1.00			1.00			xxxxx			1.00	
ApprAdjDel:		8.9			10.1			xxxxxx			9.4	
LOS by Appr:		A			B			*			A	
AllWayAvgQ:	0.3	0.3	0.3	0.5	0.5	0.5	0.0	0.0	0.0	0.4	0.4	0.4

Note: Queue reported is the number of cars per lane.

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--------------------------------------------------------------------------------
                    Glen Mor 2 Student Apartments Project
                                  Existing
                              Morning Peak Hour
--------------------------------------------------------------------------------

                      Level Of Service Computation Report
             2000 HCM Unsignalized Method (Base Volume Alternative)
********************************************************************************
Intersection #4 Campus Drive (NS) / Eucalyptus Drive (EW)
********************************************************************************
Average Delay (sec/veh):        1.3        Worst Case Level Of Service: B[ 10.7]
********************************************************************************
Approach:       North Bound      South Bound       East Bound       West Bound
Movement:      L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:       Uncontrolled     Uncontrolled      Stop Sign        Stop Sign
Rights:           Include          Include          Include          Include
Lanes:         0  1  0  0  0    0  0  0  1  0    0  0  1! 0  0    0  0  0  0  0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:        7  159     0     0   90    22    20    0     7     0    0     0
Growth Adj:   1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Initial Bse:     7  159     0     0   90    22    20    0     7     0    0     0
User Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:      0.62 0.62  1.00  1.00 0.88  0.88  0.61 1.00  0.61  1.00 1.00  1.00
PHF Volume:     11  257     0     0  103    25    33    0    11     0    0     0
Reduct Vol:      0    0     0     0    0     0     0    0     0     0    0     0
FinalVolume:    11  257     0     0  103    25    33    0    11     0    0     0
------------|---------------||---------------||---------------||---------------|
Critical Gap Module:
Critical Gp:   4.1 xxxx xxxxx xxxxx xxxx xxxxx   6.4  6.5   6.2 xxxxx xxxx xxxxx
FollowUpTim:   2.2 xxxx xxxxx xxxxx xxxx xxxxx   3.5  4.0   3.3 xxxxx xxxx xxxxx
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol:   128 xxxx xxxxx  xxxx xxxx xxxxx   395  395   115  xxxx xxxx xxxxx
Potent Cap.:  1470 xxxx xxxxx  xxxx xxxx xxxxx   614  545   942  xxxx xxxx xxxxx
Move Cap.:    1470 xxxx xxxxx  xxxx xxxx xxxxx   610  541   942  xxxx xxxx xxxxx
Volume/Cap:   0.01 xxxx  xxxx  xxxx xxxx  xxxx  0.05 0.00  0.01  xxxx xxxx  xxxx
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
2Way95thQ:     0.0 xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
Control Del:   7.5 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
LOS by Move:     A    *     *     *    *     *     *    *     *     *    *     *
Movement:      LT - LTR - RT    LT - LTR - RT    LT - LTR - RT    LT - LTR - RT
Shared Cap.:  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx  672 xxxxx  xxxx xxxx xxxxx
SharedQueue:   0.0 xxxx xxxxx xxxxx xxxx xxxxx xxxxx  0.2 xxxxx xxxxx xxxx xxxxx
Shrd ConDel:   7.5 xxxx xxxxx xxxxx xxxx xxxxx xxxxx 10.7 xxxxx xxxxx xxxx xxxxx
Shared LOS:      A    *     *     *    *     *     *    B     *     *    *     *
ApproachDel:       xxxxxx           xxxxxx             10.7           xxxxxx
ApproachLOS:          *                *                 B                *
********************************************************************************
Note: Queue reported is the number of cars per lane.
********************************************************************************
```

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--------------------------------------------------------------------------------
                     Glen Mor 2 Student Apartments Project
                                   Existing
                               Evening Peak Hour
--------------------------------------------------------------------------------
                      Level Of Service Computation Report
            2000 HCM Unsignalized Method (Base Volume Alternative)
********************************************************************************
Intersection #4 Campus Drive (NS) / Eucalyptus Drive (EW)
********************************************************************************
Average Delay (sec/veh):      1.4       Worst Case Level Of Service: B[ 11.3]
********************************************************************************
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R   L  -  T  -  R    L  -  T  -  R   L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:       Uncontrolled     Uncontrolled      Stop Sign        Stop Sign
Rights:           Include          Include          Include          Include
Lanes:        0  1  0  0  0   0  0  0  1  0    0  0  1! 0  0   0  0  0  0  0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:        4  136    0     0  189   23     17    0   10     0    0    0
Growth Adj:   1.00 1.00 1.00  1.00 1.00 1.00   1.00 1.00 1.00  1.00 1.00 1.00
Initial Bse:     4  136    0     0  189   23     17    0   10     0    0    0
User Adj:     1.00 1.00 1.00  1.00 1.00 1.00   1.00 1.00 1.00  1.00 1.00 1.00
PHF Adj:      0.80 0.80 1.00  1.00 0.75 0.75   0.45 1.00 0.45  1.00 1.00 1.00
PHF Volume:      5  171    0     0  253   31     38    0   22     0    0    0
Reduct Vol:      0    0    0     0    0    0      0    0    0     0    0    0
FinalVolume:     5  171    0     0  253   31     38    0   22     0    0    0
------------|---------------||---------------||---------------||---------------|
Critical Gap Module:
Critical Gp:  4.1 xxxx xxxxx xxxxx xxxx xxxxx   6.4  6.5   6.2 xxxxx xxxx xxxxx
FollowUpTim:  2.2 xxxx xxxxx xxxxx xxxx xxxxx   3.5  4.0   3.3 xxxxx xxxx xxxxx
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol:  284 xxxx xxxxx  xxxx xxxx xxxxx   450  450   269  xxxx xxxx xxxxx
Potent Cap.: 1290 xxxx xxxxx  xxxx xxxx xxxxx   571  508   775  xxxx xxxx xxxxx
Move Cap.:   1290 xxxx xxxxx  xxxx xxxx xxxxx   569  506   775  xxxx xxxx xxxxx
Volume/Cap:  0.00 xxxx  xxxx  xxxx xxxx  xxxx  0.07 0.00  0.03  xxxx xxxx  xxxx
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
2Way95thQ:    0.0 xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
Control Del:  7.8 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
LOS by Move:    A    *     *     *    *     *     *    *     *     *    *     *
Movement:     LT - LTR - RT   LT - LTR - RT    LT - LTR - RT   LT - LTR - RT
Shared Cap.: xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx  631 xxxxx  xxxx xxxx xxxxx
SharedQueue:  0.0 xxxx xxxxx xxxxx xxxx xxxxx xxxxx  0.3 xxxxx xxxxx xxxx xxxxx
Shrd ConDel:  7.8 xxxx xxxxx xxxxx xxxx xxxxx xxxxx 11.3 xxxxx xxxxx xxxx xxxxx
Shared LOS:     A    *     *     *    *     *     *    B     *     *    *     *
ApproachDel:      xxxxxx           xxxxxx            11.3            xxxxxx
ApproachLOS:         *                *                B                *
********************************************************************************
Note: Queue reported is the number of cars per lane.
********************************************************************************
```

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--------------------------------------------------------------------------------
                  Glen Mor 2 Student Apartments Project
                                Existing
                           Morning Peak Hour
--------------------------------------------------------------------------------

                     Level Of Service Computation Report
          2000 HCM Unsignalized Method (Base Volume Alternative)
********************************************************************************
Intersection #7 Valencia Hill Drive (NS) / Big Springs Road (EW)
********************************************************************************
Average Delay (sec/veh):        0.3       Worst Case Level Of Service: A[  9.9]
********************************************************************************
Approach:       North Bound      South Bound       East Bound       West Bound
Movement:      L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Stop Sign        Stop Sign       Uncontrolled     Uncontrolled
Rights:          Include          Include          Include          Include
Lanes:         0  0  0  0  0   0  0  1! 0  0   0  1  0  0  0   0  0  0  1  0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:       0    0     0     2    0     2     1   43     0     0  199     2
Growth Adj:  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Initial Bse:    0    0     0     2    0     2     1   43     0     0  199     2
User Adj:    1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:     1.00 1.00  1.00  0.50 1.00  0.50  0.72 0.72  1.00  1.00 0.84  0.84
PHF Volume:     0    0     0     4    0     4     1   60     0     0  237     2
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
FinalVolume:    0    0     0     4    0     4     1   60     0     0  237     2
------------|---------------||---------------||---------------||---------------|
Critical Gap Module:
Critical Gp:xxxxx xxxx xxxxx   6.4  6.5   6.2   4.1 xxxx xxxxx xxxxx xxxx xxxxx
FollowUpTim:xxxxx xxxx xxxxx   3.5  4.0   3.3   2.2 xxxx xxxxx xxxxx xxxx xxxxx
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol: xxxx xxxx xxxxx   301  301   239   240 xxxx xxxxx  xxxx xxxx xxxxx
Potent Cap.: xxxx xxxx xxxxx   694  615   805  1339 xxxx xxxxx  xxxx xxxx xxxxx
Move Cap.:   xxxx xxxx xxxxx   694  614   805  1339 xxxx xxxxx  xxxx xxxx xxxxx
Volume/Cap:  xxxx xxxx  xxxx  0.01 0.00  0.00  0.00 xxxx  xxxx  xxxx xxxx  xxxx
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
2Way95thQ:   xxxx xxxx xxxxx  xxxx xxxx xxxxx   0.0 xxxx xxxxx  xxxx xxxx xxxxx
Control Del:xxxxx xxxx xxxxx xxxxx xxxx xxxxx   7.7 xxxx xxxxx xxxxx xxxx xxxxx
LOS by Move:    *    *     *     *    *     *     A    *     *     *    *     *
Movement:      LT - LTR - RT   LT - LTR - RT   LT - LTR - RT   LT - LTR - RT
Shared Cap.: xxxx xxxx xxxxx  xxxx  745 xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
SharedQueue:xxxxx xxxx xxxxx xxxxx  0.0 xxxxx   0.0 xxxx xxxxx xxxxx xxxx xxxxx
Shrd ConDel:xxxxx xxxx xxxxx xxxxx  9.9 xxxxx   7.7 xxxx xxxxx xxxxx xxxx xxxxx
Shared LOS:     *    *     *     *    A     *     A    *     *     *    *     *
ApproachDel:      xxxxxx              9.9            xxxxxx           xxxxxx
ApproachLOS:         *                 A                *                *
********************************************************************************
Note: Queue reported is the number of cars per lane.
********************************************************************************
```

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-------------------------------------------------------------------------------
                 Glen Mor 2 Student Apartments Project
                               Existing
                           Evening Peak Hour
-------------------------------------------------------------------------------
                   Level Of Service Computation Report
         2000 HCM Unsignalized Method (Base Volume Alternative)
*******************************************************************************
Intersection #7 Valencia Hill Drive (NS) / Big Springs Road (EW)
*******************************************************************************
Average Delay (sec/veh):       0.5       Worst Case Level Of Service: B[ 10.3]
*******************************************************************************
Approach:      North Bound      South Bound       East Bound        West Bound
Movement:     L  -  T  -  R   L  -  T  -  R   L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Stop Sign        Stop Sign       Uncontrolled      Uncontrolled
Rights:          Include          Include          Include           Include
Lanes:        0  0  0  0  0   0  0  1! 0  0   0  1  0  0  0   0  0  0  1  0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:       0    0     0     4    0     4     4  226     0     0   96     2
Growth Adj:  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Initial Bse:    0    0     0     4    0     4     4  226     0     0   96     2
User Adj:    1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:     1.00 1.00  1.00  0.40 1.00  0.40  0.68 0.68  1.00  1.00 0.82  0.82
PHF Volume:     0    0     0    10    0    10     6  334     0     0  118     2
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
FinalVolume:    0    0     0    10    0    10     6  334     0     0  118     2
------------|---------------||---------------||---------------||---------------|
Critical Gap Module:
Critical Gp:xxxxx xxxx xxxxx   6.4  6.5   6.2   4.1 xxxx xxxxx xxxxx xxxx xxxxx
FollowUpTim:xxxxx xxxx xxxxx   3.5  4.0   3.3   2.2 xxxx xxxxx xxxxx xxxx xxxxx
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol: xxxx xxxx xxxxx   465  465   119   120 xxxx xxxxx  xxxx xxxx xxxxx
Potent Cap.: xxxx xxxx xxxxx   559  498   938  1480 xxxx xxxxx  xxxx xxxx xxxxx
Move Cap.:   xxxx xxxx xxxxx   558  496   938  1480 xxxx xxxxx  xxxx xxxx xxxxx
Volume/Cap:  xxxx xxxx  xxxx  0.02 0.00  0.01  0.00 xxxx  xxxx  xxxx xxxx  xxxx
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
2Way95thQ:   xxxx xxxx xxxxx  xxxx xxxx xxxxx   0.0 xxxx xxxxx  xxxx xxxx xxxxx
Control Del:xxxxx xxxx xxxxx xxxxx xxxx xxxxx   7.4 xxxx xxxxx xxxxx xxxx xxxxx
LOS by Move:    *    *     *     *    *     *     A    *     *     *    *     *
Movement:     LT - LTR - RT   LT - LTR - RT   LT - LTR - RT    LT - LTR - RT
Shared Cap.: xxxx xxxx xxxxx  xxxx  700 xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
SharedQueue:xxxxx xxxx xxxxx xxxxx  0.1 xxxxx   0.0 xxxx xxxxx xxxxx xxxx xxxxx
Shrd ConDel:xxxxx xxxx xxxxx xxxxx 10.3 xxxxx   7.4 xxxx xxxxx xxxxx xxxx xxxxx
Shared LOS:     *    *     *     *    B     *     A    *     *     *    *     *
ApproachDel:      xxxxxx             10.3            xxxxxx            xxxxxx
ApproachLOS:         *                 B                *                 *
*******************************************************************************
Note: Queue reported is the number of cars per lane.
*******************************************************************************
```

Glen Mor 2 Student Apartments Project
Existing
Morning Peak Hour

Level Of Service Computation Report
2000 HCM 4-Way Stop Method (Base Volume Alternative)

Intersection #8 Watkins Drive (NS) / Big Springs Road (EW)

Cycle (sec):	0	Critical Vol./Cap.(X):	0.964
Loss Time (sec):	0 (Y+R=4.0 sec)	Average Delay (sec/veh):	30.7
Optimal Cycle:	0	Level Of Service:	D

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:		Stop Sign			Stop Sign			Stop Sign			Stop Sign	
Rights:		Include			Include			Include			Include	
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	1 0 1 0 1			1 0 1 0 1			0 1 0 0 1			0 1 0 0 1		
Volume Module:												
Base Vol:	100	470	21	14	121	58	11	11	19	12	10	54
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	100	470	21	14	121	58	11	11	19	12	10	54
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.79	0.79	0.79	0.70	0.70	0.70	0.45	0.45	0.45	0.86	0.86	0.86
PHF Volume:	126	592	26	20	173	83	25	25	43	14	12	63
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	126	592	26	20	173	83	25	25	43	14	12	63
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	126	592	26	20	173	83	25	25	43	14	12	63
Saturation Flow Module:												
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	1.00	1.00	1.00	1.00	1.00	1.00	0.50	0.50	1.00	0.55	0.45	1.00
Final Sat.:	557	614	682	485	521	579	235	235	538	256	213	537
Capacity Analysis Module:												
Vol/Sat:	0.23	0.96	0.04	0.04	0.33	0.14	0.10	0.10	0.08	0.05	0.05	0.12
Crit Moves:		****			****			****				****
Delay/Veh:	10.9	51.0	8.1	10.3	12.7	9.7	10.9	10.9	9.7	10.5	10.5	10.0
Delay Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	10.9	51.0	8.1	10.3	12.7	9.7	10.9	10.9	9.7	10.5	10.5	10.0
LOS by Move:	B	F	A	B	B	A	B	B	A	B	B	A
ApproachDel:		42.7			11.6			10.3			10.1	
Delay Adj:		1.00			1.00			1.00			1.00	
ApprAdjDel:		42.7			11.6			10.3			10.1	
LOS by Appr:		E			B			B			B	
AllWayAvgQ:	0.3	7.2	0.0	0.0	0.5	0.2	0.1	0.1	0.1	0.1	0.1	0.1

Note: Queue reported is the number of cars per lane.

```
--------------------------------------------------------------------------------
                   Glen Mor 2 Student Apartments Project
                                 Existing
                             Evening Peak Hour
--------------------------------------------------------------------------------

                   Level Of Service Computation Report
           2000 HCM 4-Way Stop Method (Base Volume Alternative)
********************************************************************************
Intersection #8 Watkins Drive (NS) / Big Springs Road (EW)
********************************************************************************
Cycle (sec):            0                Critical Vol./Cap.(X):        0.991
Loss Time (sec):        0 (Y+R=4.0 sec)  Average Delay (sec/veh):       33.2
Optimal Cycle:          0                Level Of Service:                 D
********************************************************************************
Approach:      North Bound      South Bound      East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Stop Sign        Stop Sign        Stop Sign        Stop Sign
Rights:          Include          Include          Include          Include
Min. Green:    0    0     0    0    0     0    0    0     0    0    0     0
Lanes:        1  0  1  0  1    1  0  1  0  1    0  1  0  0  1    0  1  0  0  1
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:      39  143    17    44  483    54   105   31    86    28   22    27
Growth Adj:  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Initial Bse:   39  143    17    44  483    54   105   31    86    28   22    27
User Adj:    1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:     0.82 0.82  0.82  0.89 0.89  0.89  0.78 0.78  0.78  0.80 0.80  0.80
PHF Volume:    48  175    21    49  542    61   134   40   110    35   27    34
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
Reduced Vol:   48  175    21    49  542    61   134   40   110    35   27    34
PCE Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
MLF Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
FinalVolume:   48  175    21    49  542    61   134   40   110    35   27    34
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Adjustment:  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Lanes:       1.00 1.00  1.00  1.00 1.00  1.00  0.77 0.23  1.00  0.56 0.44  1.00
Final Sat.:   442  473   519   498  547   597   360  106   542   247  194   501
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:     0.11 0.37  0.04  0.10 0.99  0.10  0.37 0.37  0.20  0.14 0.14  0.07
Crit Moves:       ****             ****             ****             ****
Delay/Veh:   11.6 14.3   9.7  10.5 61.3   9.2  14.6 14.6  10.8  11.8 11.8  10.1
Delay Adj:   1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
AdjDel/Veh:  11.6 14.3   9.7  10.5 61.3   9.2  14.6 14.6  10.8  11.8 11.8  10.1
LOS by Move:    B    B     A     B    F     A     B    B     B     B    B     B
ApproachDel:      13.4             52.7             13.1             11.2
Delay Adj:        1.00             1.00             1.00             1.00
ApprAdjDel:       13.4             52.7             13.1             11.2
LOS by Appr:         B                F                B                B
AllWayAvgQ:   0.1  0.5   0.0   0.1  7.9   0.1   0.6  0.6   0.2   0.2  0.2   0.1
********************************************************************************
Note: Queue reported is the number of cars per lane.
********************************************************************************
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Existing Plus Ambient Growth

Glen Mor 2 Student Apartments Project
Existing Plus Ambient Growth
Morning Peak Hour

Level Of Service Computation Report
2000 HCM 4-Way Stop Method (Base Volume Alternative)

Intersection #1 Aberdeen Drive (NS) / Linden Street (EW)

Cycle (sec):	0	Critical Vol./Cap.(X):	0.354
Loss Time (sec):	0 (Y+R=4.0 sec)	Average Delay (sec/veh):	9.0
Optimal Cycle:	0	Level Of Service:	A

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:		Stop Sign			Stop Sign			Stop Sign			Stop Sign	
Rights:		Include			Include			Include			Include	
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	0 0	1!	0 0	0 0	0	0 0	0 0	1	0 1	0 1	0	0 0
Volume Module:												
Base Vol:	68	0	30	0	0	0	0	57	204	30	38	0
Growth Adj:	1.05	1.05	1.05	1.05	1.05	1.05	1.05	1.05	1.05	1.05	1.05	1.05
Initial Bse:	71	0	32	0	0	0	0	60	214	32	40	0
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.61	1.00	0.61	1.00	1.00	1.00	1.00	0.74	0.74	0.68	0.68	1.00
PHF Volume:	116	0	51	0	0	0	0	81	289	46	59	0
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	116	0	51	0	0	0	0	81	289	46	59	0
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	116	0	51	0	0	0	0	81	289	46	59	0
Saturation Flow Module:												
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	0.69	0.00	0.31	0.00	0.00	0.00	0.00	1.00	1.00	0.44	0.56	0.00
Final Sat.:	489	0	216	0	0	0	0	704	817	315	399	0
Capacity Analysis Module:												
Vol/Sat:	0.24	xxxx	0.24	xxxx	xxxx	xxxx	xxxx	0.11	0.35	0.15	0.15	xxxx
Crit Moves:	****								****		****	
Delay/Veh:	9.2	0.0	9.2	0.0	0.0	0.0	0.0	8.3	9.3	8.7	8.7	0.0
Delay Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	9.2	0.0	9.2	0.0	0.0	0.0	0.0	8.3	9.3	8.7	8.7	0.0
LOS by Move:	A	*	A	*	*	*	*	A	A	A	A	*
ApproachDel:		9.2			xxxxxx			9.1			8.7	
Delay Adj:		1.00			xxxxx			1.00			1.00	
ApprAdjDel:		9.2			xxxxxx			9.1			8.7	
LOS by Appr:		A			*			A			A	
AllWayAvgQ:	0.3	0.3	0.3	0.0	0.0	0.0	0.0	0.1	0.5	0.2	0.2	0.2

Note: Queue reported is the number of cars per lane.

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------------------------------------------------------------------------------
                  Glen Mor 2 Student Apartments Project
                      Existing Plus Ambient Growth
                            Evening Peak Hour
------------------------------------------------------------------------------

                    Level Of Service Computation Report
            2000 HCM 4-Way Stop Method (Base Volume Alternative)
******************************************************************************
Intersection #1 Aberdeen Drive (NS) / Linden Street (EW)
******************************************************************************
Cycle (sec):            0             Critical Vol./Cap.(X):          0.652
Loss Time (sec):        0 (Y+R=4.0 sec) Average Delay (sec/veh):       13.5
Optimal Cycle:          0             Level Of Service:                   B
******************************************************************************
Approach:      North Bound      South Bound      East Bound       West Bound
Movement:     L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Stop Sign        Stop Sign        Stop Sign        Stop Sign
Rights:           Include          Include          Include          Include
Min. Green:    0     0     0    0     0     0    0     0     0    0     0     0
Lanes:        0  0  1! 0  0   0  0  0  0  0   0  0  1  0  1   0  1  0  0  0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:     235     0    23     0     0     0     0   127   187    21   137     0
Growth Adj:  1.05  1.05  1.05  1.05  1.05  1.05  1.05  1.05  1.05  1.05  1.05  1.05
Initial Bse:  247     0    24     0     0     0     0   133   196    22   144     0
User Adj:    1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00
PHF Adj:     0.63  1.00  0.63  1.00  1.00  1.00  1.00  0.90  0.90  0.88  0.88  1.00
PHF Volume:   390     0    38     0     0     0     0   148   218    25   164     0
Reduct Vol:     0     0     0     0     0     0     0     0     0     0     0     0
Reduced Vol:  390     0    38     0     0     0     0   148   218    25   164     0
PCE Adj:     1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00
MLF Adj:     1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00
FinalVolume:  390     0    38     0     0     0     0   148   218    25   164     0
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Adjustment:  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00
Lanes:       0.91  0.00  0.09  0.00  0.00  0.00  0.00  1.00  1.00  0.13  0.87  0.00
Final Sat.:   599     0    59     0     0     0     0   583   658    80   520     0
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:     0.65  xxxx  0.65  xxxx  xxxx  xxxx  xxxx  0.25  0.33  0.32  0.32  xxxx
Crit Moves:  ****                                            ****  ****
Delay/Veh:   17.1   0.0  17.1   0.0   0.0   0.0   0.0  10.5  10.3  11.1  11.1   0.0
Delay Adj:   1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00
AdjDel/Veh:  17.1   0.0  17.1   0.0   0.0   0.0   0.0  10.5  10.3  11.1  11.1   0.0
LOS by Move:    C     *     C     *     *     *     *     B     B     B     B     *
ApproachDel:       17.1            xxxxxx             10.4             11.1
Delay Adj:         1.00             xxxxx             1.00             1.00
ApprAdjDel:        17.1            xxxxxx             10.4             11.1
LOS by Appr:          C                 *                B                B
AllWayAvgQ:   1.6   1.6   1.6   0.0   0.0   0.0   0.0   0.3   0.4   0.4   0.4   0.4
******************************************************************************
Note: Queue reported is the number of cars per lane.
******************************************************************************
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Glen Mor 2 Student Apartments Project
Existing Plus Ambient Growth
Morning Peak Hour

Level Of Service Computation Report
2000 HCM 4-Way Stop Method (Base Volume Alternative)

Intersection #2 Aberdeen Drive (NS) / Campus Drive (EW)

Cycle (sec):	0	Critical Vol./Cap.(X):	0.296
Loss Time (sec):	0 (Y+R=4.0 sec)	Average Delay (sec/veh):	8.6
Optimal Cycle:	0	Level Of Service:	A

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:		Stop Sign			Stop Sign			Stop Sign			Stop Sign	
Rights:		Include			Include			Include			Include	
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:		0 0 0 0 0			0 0 1! 0 0			0 1 0 0 0			0 0 0 1 0	
Volume Module:												
Base Vol:	0	0	0	149	0	49	14	13	0	0	37	88
Growth Adj:	1.05	1.05	1.05	1.05	1.05	1.05	1.05	1.05	1.05	1.05	1.05	1.05
Initial Bse:	0	0	0	156	0	51	15	14	0	0	39	92
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	0.88	1.00	0.88	0.52	0.52	1.00	1.00	0.74	0.74
PHF Volume:	0	0	0	177	0	58	28	26	0	0	52	124
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	0	0	0	177	0	58	28	26	0	0	52	124
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	0	0	0	177	0	58	28	26	0	0	52	124
Saturation Flow Module:												
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	0.00	0.00	0.00	0.75	0.00	0.25	0.52	0.48	0.00	0.00	0.30	0.70
Final Sat.:	0	0	0	598	0	197	377	350	0	0	250	595
Capacity Analysis Module:												
Vol/Sat:	xxxx	xxxx	xxxx	0.30	xxxx	0.30	0.08	0.08	xxxx	xxxx	0.21	0.21
Crit Moves:						****		****			****	
Delay/Veh:	0.0	0.0	0.0	9.1	0.0	9.1	8.1	8.1	0.0	0.0	8.1	8.1
Delay Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	0.0	0.0	0.0	9.1	0.0	9.1	8.1	8.1	0.0	0.0	8.1	8.1
LOS by Move:	*	*	*	A	*	A	A	A	*	*	A	A
ApproachDel:		xxxxxx			9.1			8.1			8.1	
Delay Adj:		xxxxx			1.00			1.00			1.00	
ApprAdjDel:		xxxxxx			9.1			8.1			8.1	
LOS by Appr:		*			A			A			A	
AllWayAvgQ:	0.0	0.0	0.0	0.4	0.4	0.4	0.1	0.1	0.1	0.2	0.2	0.2

Note: Queue reported is the number of cars per lane.

Glen Mor 2 Student Apartments Project
Existing Plus Ambient Growth
Evening Peak Hour

Level Of Service Computation Report
2000 HCM 4-Way Stop Method (Base Volume Alternative)

Intersection #2 Aberdeen Drive (NS) / Campus Drive (EW)

Cycle (sec):	0	Critical Vol./Cap.(X):	0.387
Loss Time (sec):	0 (Y+R=4.0 sec)	Average Delay (sec/veh):	9.8
Optimal Cycle:	0	Level Of Service:	A

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:		Stop Sign			Stop Sign			Stop Sign			Stop Sign	
Rights:		Include			Include			Include			Include	
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	0 0	0	0 0	0 0	1!	0 0	0 1	0	0 0	0 0	0	1 0
Volume Module:												
Base Vol:	0	0	0	207	0	9	26	37	0	0	4	188
Growth Adj:	1.05	1.05	1.05	1.05	1.05	1.05	1.05	1.05	1.05	1.05	1.05	1.05
Initial Bse:	0	0	0	217	0	9	27	39	0	0	4	197
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	0.83	1.00	0.83	0.75	0.75	1.00	1.00	0.67	0.67
PHF Volume:	0	0	0	262	0	11	36	52	0	0	6	296
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	0	0	0	262	0	11	36	52	0	0	6	296
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	0	0	0	262	0	11	36	52	0	0	6	296
Saturation Flow Module:												
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	0.00	0.00	0.00	0.96	0.00	0.04	0.41	0.59	0.00	0.00	0.02	0.98
Final Sat.:	0	0	0	676	0	29	282	401	0	0	17	822
Capacity Analysis Module:												
Vol/Sat:	xxxx	xxxx	xxxx	0.39	xxxx	0.39	0.13	0.13	xxxx	xxxx	0.36	0.36
Crit Moves:						****		****				****
Delay/Veh:	0.0	0.0	0.0	10.7	0.0	10.7	8.7	8.7	0.0	0.0	9.3	9.3
Delay Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	0.0	0.0	0.0	10.7	0.0	10.7	8.7	8.7	0.0	0.0	9.3	9.3
LOS by Move:	*	*	*	B	*	B	A	A	*	*	A	A
ApproachDel:		xxxxxx			10.7			8.7			9.3	
Delay Adj:		xxxxx			1.00			1.00			1.00	
ApprAdjDel:		xxxxxx			10.7			8.7			9.3	
LOS by Appr:		*			B			A			A	
AllWayAvgQ:	0.0	0.0	0.0	0.6	0.6	0.6	0.1	0.1	0.1	0.5	0.5	0.5

Note: Queue reported is the number of cars per lane.

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-------------------------------------------------------------------------------
                    Glen Mor 2 Student Apartments Project
                        Existing Plus Ambient Growth
                             Morning Peak Hour
-------------------------------------------------------------------------------

                     Level Of Service Computation Report
               2000 HCM 4-Way Stop Method (Base Volume Alternative)
*******************************************************************************
Intersection #3 Campus Drive (NS) / Big Springs Road (EW)
*******************************************************************************
Cycle (sec):             0              Critical Vol./Cap.(X):          0.295
Loss Time (sec):         0 (Y+R=4.0 sec) Average Delay (sec/veh):         8.8
Optimal Cycle:           0              Level Of Service:                  A
*******************************************************************************
Approach:      North Bound      South Bound      East Bound       West Bound
Movement:     L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Stop Sign        Stop Sign        Stop Sign        Stop Sign
Rights:           Include          Include          Include          Include
Min. Green:     0     0     0    0     0     0    0     0     0    0     0     0
Lanes:        0  0  0  1  0   0  1  0  0  0   0  0  0  0  0   0  0  1! 0  0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:       0    85    18   66    92     0    0     0     0   62     0    55
Growth Adj:  1.05 1.05  1.05 1.05 1.05  1.05 1.05 1.05  1.05 1.05 1.05  1.05
Initial Bse:    0    89    19   69    97     0    0     0     0   65     0    58
User Adj:    1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
PHF Adj:     1.00 0.83  0.83 0.72 0.72  1.00 1.00 1.00  1.00 0.79 1.00  0.79
PHF Volume:     0   107    23   97   135     0    0     0     0   82     0    73
Reduct Vol:     0     0     0    0     0     0    0     0     0    0     0     0
Reduced Vol:    0   107    23   97   135     0    0     0     0   82     0    73
PCE Adj:     1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
MLF Adj:     1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
FinalVolume:    0   107    23   97   135     0    0     0     0   82     0    73
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Adjustment:  1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
Lanes:       0.00 0.83  0.17 0.42 0.58  0.00 0.00 0.00  0.00 0.53 0.00  0.47
Final Sat.:     0   651   138  327   456     0    0     0     0  401     0   356
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:     xxxx 0.16  0.16 0.30 0.30  xxxx xxxx xxxx  xxxx 0.21 xxxx  0.21
Crit Moves:       ****            ****                        ****
Delay/Veh:    0.0  8.2   8.2  9.3  9.3   0.0  0.0  0.0   0.0  8.6  0.0   8.6
Delay Adj:   1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
AdjDel/Veh:   0.0  8.2   8.2  9.3  9.3   0.0  0.0  0.0   0.0  8.6  0.0   8.6
LOS by Move:    *     A     A    A     A     *    *     *     *    A     *     A
ApproachDel:        8.2              9.3            xxxxxx              8.6
Delay Adj:          1.00             1.00            xxxxx              1.00
ApprAdjDel:         8.2              9.3            xxxxxx              8.6
LOS by Appr:          A                A                 *                A
AllWayAvgQ:   0.2  0.2   0.2  0.4  0.4   0.4  0.0  0.0   0.0  0.2  0.2   0.2
*******************************************************************************
Note: Queue reported is the number of cars per lane.
*******************************************************************************
```

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------------------------------------------------------------------------------
                  Glen Mor 2 Student Apartments Project
                      Existing Plus Ambient Growth
                           Evening Peak Hour
------------------------------------------------------------------------------

                   Level Of Service Computation Report
           2000 HCM 4-Way Stop Method (Base Volume Alternative)
******************************************************************************
Intersection #3 Campus Drive (NS) / Big Springs Road (EW)
******************************************************************************
Cycle (sec):            0            Critical Vol./Cap.(X):          0.363
Loss Time (sec):        0 (Y+R=4.0 sec)  Average Delay (sec/veh):      9.8
Optimal Cycle:          0            Level Of Service:                  A
******************************************************************************
Approach:     North Bound      South Bound      East Bound       West Bound
Movement:    L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|----------------||----------------||----------------||----------------|
Control:       Stop Sign        Stop Sign        Stop Sign        Stop Sign
Rights:          Include          Include          Include          Include
Min. Green:    0    0    0    0    0    0    0    0    0    0    0    0
Lanes:       0  0  0  1  0   0  1  0  0  0   0  0  0  0  0   0  0  1! 0  0
------------|----------------||----------------||----------------||----------------|
Volume Module:
Base Vol:      0   67   79   118  105    0     0    0    0    56    0  119
Growth Adj:  1.05 1.05 1.05  1.05 1.05 1.05  1.05 1.05 1.05  1.05 1.05 1.05
Initial Bse:   0   70   83   124  110    0     0    0    0    59    0  125
User Adj:    1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00
PHF Adj:     1.00 0.72 0.72  0.90 0.90 1.00  1.00 1.00 1.00  0.74 1.00 0.74
PHF Volume:    0   98  116   138  123    0     0    0    0    79    0  168
Reduct Vol:    0    0    0     0    0    0     0    0    0     0    0    0
Reduced Vol:   0   98  116   138  123    0     0    0    0    79    0  168
PCE Adj:     1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00
MLF Adj:     1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00
FinalVolume:   0   98  116   138  123    0     0    0    0    79    0  168
------------|----------------||----------------||----------------||----------------|
Saturation Flow Module:
Adjustment:  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00
Lanes:       0.00 0.46 0.54  0.53 0.47 0.00  0.00 0.00 0.00  0.32 0.00 0.68
Final Sat.:    0  353  416   380  338    0     0    0    0   236    0  501
------------|----------------||----------------||----------------||----------------|
Capacity Analysis Module:
Vol/Sat:     xxxx 0.28 0.28  0.36 0.36 xxxx  xxxx xxxx xxxx  0.34 xxxx 0.34
Crit Moves:             ****        ****                     ****
Delay/Veh:    0.0  9.1  9.1  10.4 10.4  0.0   0.0  0.0  0.0   9.7  0.0  9.7
Delay Adj:   1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00
AdjDel/Veh:   0.0  9.1  9.1  10.4 10.4  0.0   0.0  0.0  0.0   9.7  0.0  9.7
LOS by Move:    *    A    A     B    B    *     *    *    *     A    *    A
ApproachDel:        9.1              10.4            xxxxxx             9.7
Delay Adj:          1.00             1.00             xxxxx            1.00
ApprAdjDel:         9.1              10.4            xxxxxx             9.7
LOS by Appr:          A                B                *                A
AllWayAvgQ:   0.3  0.3  0.3   0.5  0.5  0.5   0.0  0.0  0.0   0.4  0.4  0.4
******************************************************************************
Note: Queue reported is the number of cars per lane.
******************************************************************************
```

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-------------------------------------------------------------------------------
                    Glen Mor 2 Student Apartments Project
                       Existing Plus Ambient Growth
                            Morning Peak Hour
-------------------------------------------------------------------------------

                     Level Of Service Computation Report
          2000 HCM Unsignalized Method (Base Volume Alternative)
********************************************************************************
Intersection #4 Campus Drive (NS) / Eucalyptus Drive (EW)
********************************************************************************
Average Delay (sec/veh):      1.3      Worst Case Level Of Service: B[ 10.9]
********************************************************************************
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:    L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:      Uncontrolled     Uncontrolled      Stop Sign        Stop Sign
Rights:          Include          Include          Include          Include
Lanes:       0  1  0  0  0   0  0  0  1  0   0  0  1! 0  0   0  0  0  0  0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:       7  159    0     0   90   22    20    0    7     0    0    0
Growth Adj:  1.05 1.05 1.05  1.05 1.05 1.05  1.05 1.05 1.05  1.05 1.05 1.05
Initial Bse:    7  167    0     0   95   23    21    0    7     0    0    0
User Adj:    1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00
PHF Adj:     0.62 0.62 1.00  1.00 0.88 0.88  0.61 1.00 0.61  1.00 1.00 1.00
PHF Volume:    12  270    0     0  108   26    34    0   12     0    0    0
Reduct Vol:     0    0    0     0    0    0     0    0    0     0    0    0
FinalVolume:   12  270    0     0  108   26    34    0   12     0    0    0
------------|---------------||---------------||---------------||---------------|
Critical Gap Module:
Critical Gp:  4.1 xxxx xxxxx xxxxx xxxx xxxxx   6.4  6.5  6.2 xxxxx xxxx xxxxx
FollowUpTim:  2.2 xxxx xxxxx xxxxx xxxx xxxxx   3.5  4.0  3.3 xxxxx xxxx xxxxx
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol:  134 xxxx xxxxx  xxxx xxxx xxxxx   415  415  121  xxxx xxxx xxxxx
Potent Cap.: 1463 xxxx xxxxx  xxxx xxxx xxxxx   598  531  935  xxxx xxxx xxxxx
Move Cap.:   1463 xxxx xxxxx  xxxx xxxx xxxxx   594  527  935  xxxx xxxx xxxxx
Volume/Cap:  0.01 xxxx  xxxx  xxxx xxxx  xxxx  0.06 0.00 0.01  xxxx xxxx  xxxx
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
2Way95thQ:    0.0 xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
Control Del:  7.5 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
LOS by Move:    A    *     *     *    *     *     *    *     *     *    *     *
Movement:      LT - LTR - RT   LT - LTR - RT   LT - LTR - RT   LT - LTR - RT
Shared Cap.: xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx  656 xxxxx  xxxx xxxx xxxxx
SharedQueue:  0.0 xxxx xxxxx xxxxx xxxx xxxxx xxxxx  0.2 xxxxx xxxxx xxxx xxxxx
Shrd ConDel:  7.5 xxxx xxxxx xxxxx xxxx xxxxx xxxxx 10.9 xxxxx xxxxx xxxx xxxxx
Shared LOS:     A    *     *     *    *     *     *    B     *     *    *     *
ApproachDel:      xxxxxx           xxxxxx            10.9           xxxxxx
ApproachLOS:         *                *                B                *
********************************************************************************
Note: Queue reported is the number of cars per lane.
********************************************************************************
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-------------------------------------------------------------------------------
                    Glen Mor 2 Student Apartments Project
                        Existing Plus Ambient Growth
                             Evening Peak Hour
-------------------------------------------------------------------------------

                     Level Of Service Computation Report
           2000 HCM Unsignalized Method (Base Volume Alternative)
*******************************************************************************
Intersection #4 Campus Drive (NS) / Eucalyptus Drive (EW)
*******************************************************************************
Average Delay (sec/veh):       1.4       Worst Case Level Of Service: B[ 11.5]
*******************************************************************************
Approach:       North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:       Uncontrolled     Uncontrolled      Stop Sign        Stop Sign
Rights:           Include          Include          Include          Include
Lanes:        0  1  0  0  0    0  0  0  1  0    0  0  1! 0  0    0  0  0  0  0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:        4  136    0      0  189   23     17    0   10      0    0    0
Growth Adj:   1.05 1.05  1.05  1.05 1.05  1.05  1.05 1.05  1.05  1.05 1.05  1.05
Initial Bse:     4  143    0      0  198   24     18    0   11      0    0    0
User Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:      0.80 0.80  1.00  1.00 0.75  0.75  0.45 1.00  0.45  1.00 1.00  1.00
PHF Volume:      5  180    0      0  266   32     40    0   23      0    0    0
Reduct Vol:      0    0    0      0    0    0      0    0    0      0    0    0
FinalVolume:     5  180    0      0  266   32     40    0   23      0    0    0
------------|---------------||---------------||---------------||---------------|
Critical Gap Module:
Critical Gp:   4.1 xxxx xxxxx xxxxx xxxx xxxxx   6.4  6.5   6.2 xxxxx xxxx xxxxx
FollowUpTim:   2.2 xxxx xxxxx xxxxx xxxx xxxxx   3.5  4.0   3.3 xxxxx xxxx xxxxx
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol:  298 xxxx xxxxx   xxxx xxxx xxxxx   472  472   282   xxxx xxxx xxxxx
Potent Cap.: 1274 xxxx xxxxx   xxxx xxxx xxxxx   554  493   762   xxxx xxxx xxxxx
Move Cap.:   1274 xxxx xxxxx   xxxx xxxx xxxxx   552  491   762   xxxx xxxx xxxxx
Volume/Cap:  0.00 xxxx  xxxx   xxxx xxxx  xxxx  0.07 0.00  0.03   xxxx xxxx  xxxx
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
2WayQ95thQ:    0.0 xxxx xxxxx   xxxx xxxx xxxxx  xxxx xxxx xxxxx   xxxx xxxx xxxxx
Control Del:   7.8 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
LOS by Move:     A    *     *     *    *     *     *    *     *     *    *     *
Movement:      LT - LTR - RT    LT - LTR - RT    LT - LTR - RT    LT - LTR - RT
Shared Cap.: xxxx xxxx xxxxx   xxxx xxxx xxxxx  xxxx  615 xxxxx   xxxx xxxx xxxxx
SharedQueue:   0.0 xxxx xxxxx xxxxx xxxx xxxxx xxxxx  0.3 xxxxx xxxxx xxxx xxxxx
Shrd ConDel:   7.8 xxxx xxxxx xxxxx xxxx xxxxx xxxxx 11.5 xxxxx xxxxx xxxx xxxxx
Shared LOS:      A    *     *     *    *     *     *    B     *     *    *     *
ApproachDel:      xxxxxx           xxxxxx            11.5            xxxxxx
ApproachLOS:         *                *                B                *
*******************************************************************************
Note: Queue reported is the number of cars per lane.
*******************************************************************************
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--------------------------------------------------------------------------------
                    Glen Mor 2 Student Apartments Project
                       Existing Plus Ambient Growth
                            Morning Peak Hour
--------------------------------------------------------------------------------

                     Level Of Service Computation Report
             2000 HCM Unsignalized Method (Base Volume Alternative)
********************************************************************************
Intersection #7 Valencia Hill Drive (NS) / Big Springs Road (EW)
********************************************************************************
Average Delay (sec/veh):        0.3       Worst Case Level Of Service: A[ 10.0]
********************************************************************************
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Stop Sign        Stop Sign       Uncontrolled     Uncontrolled
Rights:          Include          Include          Include          Include
Lanes:        0  0  0  0  0   0  0  1! 0  0   0  1  0  0  0   0  0  0  1  0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:       0    0     0     2    0     2     1   43     0     0  199     2
Growth Adj:  1.05 1.05  1.05  1.05 1.05  1.05  1.05 1.05  1.05  1.05 1.05  1.05
Initial Bse:    0    0     0     2    0     2     1   45     0     0  209     2
User Adj:    1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:     1.00 1.00  1.00  0.50 1.00  0.50  0.72 0.72  1.00  1.00 0.84  0.84
PHF Volume:     0    0     0     4    0     4     1   63     0     0  249     3
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
FinalVolume:    0    0     0     4    0     4     1   63     0     0  249     3
------------|---------------||---------------||---------------||---------------|
Critical Gap Module:
Critical Gp:xxxxx xxxx xxxxx   6.4  6.5   6.2   4.1 xxxx xxxxx xxxxx xxxx xxxxx
FollowUpTim:xxxxx xxxx xxxxx   3.5  4.0   3.3   2.2 xxxx xxxxx xxxxx xxxx xxxxx
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol: xxxx xxxx xxxxx   316  316   251   252 xxxx xxxxx  xxxx xxxx xxxxx
Potent Cap.: xxxx xxxx xxxxx   681  603   793  1325 xxxx xxxxx  xxxx xxxx xxxxx
Move Cap.:   xxxx xxxx xxxxx   680  602   793  1325 xxxx xxxxx  xxxx xxxx xxxxx
Volume/Cap:  xxxx xxxx  xxxx  0.01 0.00  0.01  0.00 xxxx  xxxx  xxxx xxxx  xxxx
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
2Way95thQ:   xxxx xxxx xxxxx  xxxx xxxx xxxxx   0.0 xxxx xxxxx  xxxx xxxx xxxxx
Control Del:xxxxx xxxx xxxxx xxxxx xxxx xxxxx   7.7 xxxx xxxxx xxxxx xxxx xxxxx
LOS by Move:    *    *     *     *    *     *     A    *     *     *    *     *
Movement:     LT - LTR - RT   LT - LTR - RT   LT - LTR - RT   LT - LTR - RT
Shared Cap.: xxxx xxxx xxxxx  xxxx  732 xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
SharedQueue:xxxxx xxxx xxxxx xxxxx  0.0 xxxxx   0.0 xxxx xxxxx xxxxx xxxx xxxxx
Shrd ConDel:xxxxx xxxx xxxxx xxxxx 10.0 xxxxx   7.7 xxxx xxxxx xxxxx xxxx xxxxx
Shared LOS:     *    *     *     *    A     *     A    *     *     *    *     *
ApproachDel:     xxxxxx             10.0            xxxxxx           xxxxxx
ApproachLOS:        *                 A                *                *
********************************************************************************
Note: Queue reported is the number of cars per lane.
********************************************************************************
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-------------------------------------------------------------------------------
                  Glen Mor 2 Student Apartments Project
                      Existing Plus Ambient Growth
                            Evening Peak Hour
-------------------------------------------------------------------------------

                   Level Of Service Computation Report
         2000 HCM Unsignalized Method (Base Volume Alternative)
*******************************************************************************
Intersection #7 Valencia Hill Drive (NS) / Big Springs Road (EW)
*******************************************************************************
Average Delay (sec/veh):        0.5       Worst Case Level Of Service: B[ 10.4]
*******************************************************************************
Approach:        North Bound      South Bound       East Bound       West Bound
Movement:      L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Stop Sign        Stop Sign       Uncontrolled     Uncontrolled
Rights:           Include          Include          Include          Include
Lanes:         0  0  0  0  0    0  0  1! 0  0    0  1  0  0  0    0  0  0  1  0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:        0     0     0     4     0     4     4   226     0     0    96     2
Growth Adj:   1.05  1.05  1.05  1.05  1.05  1.05  1.05  1.05  1.05  1.05  1.05  1.05
Initial Bse:     0     0     0     4     0     4     4   237     0     0   101     2
User Adj:     1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00
PHF Adj:      1.00  1.00  1.00  0.40  1.00  0.40  0.68  0.68  1.00  1.00  0.82  0.82
PHF Volume:      0     0     0    11     0    11     6   351     0     0   123     3
Reduct Vol:      0     0     0     0     0     0     0     0     0     0     0     0
FinalVolume:     0     0     0    11     0    11     6   351     0     0   123     3
------------|---------------||---------------||---------------||---------------|
Critical Gap Module:
Critical Gp:xxxxx xxxx xxxxx   6.4  6.5   6.2   4.1 xxxx xxxxx xxxxx xxxx xxxxx
FollowUpTim:xxxxx xxxx xxxxx   3.5  4.0   3.3   2.2 xxxx xxxxx xxxxx xxxx xxxxx
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol: xxxx xxxx xxxxx   488  488   125   126 xxxx xxxxx  xxxx xxxx xxxxx
Potent Cap.: xxxx xxxx xxxxx   542  483   931  1473 xxxx xxxxx  xxxx xxxx xxxxx
Move Cap.:   xxxx xxxx xxxxx   541  481   931  1473 xxxx xxxxx  xxxx xxxx xxxxx
Volume/Cap:  xxxx xxxx  xxxx  0.02 0.00  0.01  0.00 xxxx  xxxx  xxxx xxxx  xxxx
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
2Way95thQ:   xxxx xxxx xxxxx  xxxx xxxx xxxxx   0.0 xxxx xxxxx  xxxx xxxx xxxxx
Control Del:xxxxx xxxx xxxxx xxxxx xxxx xxxxx   7.5 xxxx xxxxx xxxxx xxxx xxxxx
LOS by Move:     *    *     *     *    *     *     A    *     *     *    *     *
Movement:      LT - LTR - RT    LT - LTR - RT    LT - LTR - RT    LT - LTR - RT
Shared Cap.: xxxx xxxx xxxxx  xxxx  684 xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
SharedQueue:xxxxx xxxx xxxxx xxxxx  0.1 xxxxx   0.0 xxxx xxxxx xxxxx xxxx xxxxx
Shrd ConDel:xxxxx xxxx xxxxx xxxxx 10.4 xxxxx   7.5 xxxx xxxxx xxxxx xxxx xxxxx
Shared LOS:      *    *     *     *    B     *     A    *     *     *    *     *
ApproachDel:      xxxxxx             10.4            xxxxxx           xxxxxx
ApproachLOS:         *                 B                *                *
*******************************************************************************
Note: Queue reported is the number of cars per lane.
*******************************************************************************
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Glen Mor 2 Student Apartments Project
Existing Plus Ambient Growth
Morning Peak Hour

Level Of Service Computation Report
2000 HCM 4-Way Stop Method (Base Volume Alternative)

Intersection #8 Watkins Drive (NS) / Big Springs Road (EW)

Cycle (sec):	0		Critical Vol./Cap.(X):	1.025
Loss Time (sec):	0	(Y+R=4.0 sec)	Average Delay (sec/veh):	38.6
Optimal Cycle:	0		Level Of Service:	E

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Stop Sign			Stop Sign			Stop Sign			Stop Sign		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	1 0	1 0	1	1 0	1 0	1	0 1	0 0	1	0 1	0 0	1
Volume Module:												
Base Vol:	100	470	21	14	121	58	11	11	19	12	10	54
Growth Adj:	1.05	1.05	1.05	1.05	1.05	1.05	1.05	1.05	1.05	1.05	1.05	1.05
Initial Bse:	105	494	22	15	127	61	12	12	20	13	11	57
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.79	0.79	0.79	0.70	0.70	0.70	0.45	0.45	0.45	0.86	0.86	0.86
PHF Volume:	132	622	28	21	182	87	26	26	45	15	12	66
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	132	622	28	21	182	87	26	26	45	15	12	66
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	132	622	28	21	182	87	26	26	45	15	12	66
Saturation Flow Module:												
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	1.00	1.00	1.00	1.00	1.00	1.00	0.50	0.50	1.00	0.55	0.45	1.00
Final Sat.:	551	606	671	482	518	575	234	234	534	254	211	533
Capacity Analysis Module:												
Vol/Sat:	0.24	1.03	0.04	0.04	0.35	0.15	0.11	0.11	0.08	0.06	0.06	0.12
Crit Moves:		****			****			****				****
Delay/Veh:	11.1	66.7	8.2	10.4	13.1	9.9	11.1	11.1	9.8	10.7	10.7	10.1
Delay Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	11.1	66.7	8.2	10.4	13.1	9.9	11.1	11.1	9.8	10.7	10.7	10.1
LOS by Move:	B	F	A	B	B	A	B	B	A	B	B	B
ApproachDel:		55.2			12.0			10.5			10.3	
Delay Adj:		1.00			1.00			1.00			1.00	
ApprAdjDel:		55.2			12.0			10.5			10.3	
LOS by Appr:		F			B			B			B	
AllWayAvgQ:	0.3	9.8	0.0	0.0	0.5	0.2	0.1	0.1	0.1	0.1	0.1	0.1

Note: Queue reported is the number of cars per lane.

Glen Mor 2 Student Apartments Project
Existing Plus Ambient Growth
Evening Peak Hour

Level Of Service Computation Report
2000 HCM 4-Way Stop Method (Base Volume Alternative)

Intersection #8 Watkins Drive (NS) / Big Springs Road (EW)

Cycle (sec):	0	Critical Vol./Cap.(X):	1.058
Loss Time (sec):	0 (Y+R=4.0 sec)	Average Delay (sec/veh):	41.6
Optimal Cycle:	0	Level Of Service:	E

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Stop Sign			Stop Sign			Stop Sign			Stop Sign		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	1 0	1 0	1	1 0	1 0	1	0 1	0 0	1	0 1	0 0	1
Volume Module:												
Base Vol:	39	143	17	44	483	54	105	31	86	28	22	27
Growth Adj:	1.05	1.05	1.05	1.05	1.05	1.05	1.05	1.05	1.05	1.05	1.05	1.05
Initial Bse:	41	150	18	46	507	57	110	33	90	29	23	28
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.82	0.82	0.82	0.89	0.89	0.89	0.78	0.78	0.78	0.80	0.80	0.80
PHF Volume:	50	184	22	52	569	64	141	42	115	37	29	35
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	50	184	22	52	569	64	141	42	115	37	29	35
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	50	184	22	52	569	64	141	42	115	37	29	35
Saturation Flow Module:												
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	1.00	1.00	1.00	1.00	1.00	1.00	0.77	0.23	1.00	0.56	0.44	1.00
Final Sat.:	438	468	512	490	538	586	358	106	538	245	192	496
Capacity Analysis Module:												
Vol/Sat:	0.11	0.39	0.04	0.11	1.06	0.11	0.39	0.39	0.21	0.15	0.15	0.07
Crit Moves:		****			****			****			****	
Delay/Veh:	11.8	14.9	9.8	10.7	80.5	9.4	15.1	15.1	11.0	12.0	12.0	10.2
Delay Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	11.8	14.9	9.8	10.7	80.5	9.4	15.1	15.1	11.0	12.0	12.0	10.2
LOS by Move:	B	B	A	B	F	A	C	C	B	B	B	B
ApproachDel:		13.9			68.6			13.5			11.4	
Delay Adj:		1.00			1.00			1.00			1.00	
ApprAdjDel:		13.9			68.6			13.5			11.4	
LOS by Appr:		B			F			B			B	
AllWayAvgQ:	0.1	0.6	0.0	0.1	10.6	0.1	0.6	0.6	0.3	0.2	0.2	0.1

Note: Queue reported is the number of cars per lane.

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-------------------------------------------------------------------------------
                    Glen Mor 2 Student Apartments Project
                        Existing Plus Ambient Growth
                    Morning Peak Hour - With Improvements
-------------------------------------------------------------------------------

                     Level Of Service Computation Report
               2000 HCM Operations Method (Base Volume Alternative)
*******************************************************************************
Intersection #8 Watkins Drive (NS) / Big Springs Road (EW)
*******************************************************************************
Cycle (sec):            90               Critical Vol./Cap.(X):         0.404
Loss Time (sec):         8 (Y+R=4.0 sec) Average Delay (sec/veh):        10.1
Optimal Cycle: OPTIMIZED                 Level Of Service:                  B
*******************************************************************************
Approach:       North Bound      South Bound      East Bound       West Bound
Movement:      L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:         Permitted        Permitted        Permitted        Permitted
Rights:           Include          Include          Include          Include
Min. Green:    26    26    26   26    26    26   23    23    23   23    23    23
Lanes:         1  0  1  0  1   1  0  1  0  1   0  1  0  0  1   0  1  0  0  1
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:     100   470    21   14   121    58   11    11    19   12    10    54
Growth Adj:  1.05  1.05  1.05 1.05  1.05  1.05 1.05  1.05  1.05 1.05  1.05  1.05
Initial Bse:  105   494    22   15   127    61   12    12    20   13    11    57
User Adj:    1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00
PHF Adj:     0.79  0.79  0.79 0.70  0.70  0.70 0.45  0.45  0.45 0.86  0.86  0.86
PHF Volume:   132   622    28   21   182    87   26    26    45   15    12    66
Reduct Vol:     0     0     0    0     0     0    0     0     0    0     0     0
Reduced Vol:  132   622    28   21   182    87   26    26    45   15    12    66
PCE Adj:     1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00
MLF Adj:     1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00
FinalVolume:  132   622    28   21   182    87   26    26    45   15    12    66
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Sat/Lane:    1900  1900  1900 1900  1900  1900 1900  1900  1900 1900  1900  1900
Adjustment:  0.64  1.00  0.85 0.34  1.00  0.85 0.88  0.88  0.85 0.89  0.89  0.85
Lanes:       1.00  1.00  1.00 1.00  1.00  1.00 0.50  0.50  1.00 0.55  0.45  1.00
Final Sat.:  1208  1900  1615  638  1900  1615  839   839  1615  923   770  1615
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:     0.11  0.33  0.02 0.03  0.10  0.05 0.03  0.03  0.03 0.02  0.02  0.04
Crit Moves:        ****                                                     ****
Green/Cycle: 0.66  0.66  0.66 0.66  0.66  0.66 0.26  0.26  0.26 0.26  0.26  0.26
Volume/Cap:  0.17  0.50  0.03 0.05  0.15  0.08 0.12  0.12  0.11 0.06  0.06  0.16
Delay/Veh:    6.1   8.3   5.4  5.6   6.0   5.7 25.9  25.9  25.8 25.4  25.4  26.2
User DelAdj: 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00
AdjDel/Veh:   6.1   8.3   5.4  5.6   6.0   5.7 25.9  25.9  25.8 25.4  25.4  26.2
LOS by Move:    A     A     A    A     A     A    C     C     C    C     C     C
HCM2kAvgQ:      1     9     0    0     2     1    1     1     1    1     1     1
*******************************************************************************
Note: Queue reported is the number of cars per lane.
*******************************************************************************
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-------------------------------------------------------------------------------
                  Glen Mor 2 Student Apartments Project
                      Existing Plus Ambient Growth
                  Evening Peak Hour - With Improvements
-------------------------------------------------------------------------------

                   Level Of Service Computation Report
          2000 HCM Operations Method (Base Volume Alternative)
********************************************************************************
Intersection #8 Watkins Drive (NS) / Big Springs Road (EW)
********************************************************************************
Cycle (sec):          65               Critical Vol./Cap.(X):         0.493
Loss Time (sec):       8 (Y+R=4.0 sec) Average Delay (sec/veh):        11.6
Optimal Cycle: OPTIMIZED               Level Of Service:                  B
********************************************************************************
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Permitted        Permitted        Permitted        Permitted
Rights:          Include          Include          Include          Include
Min. Green:   26    26    26   26    26    26   23    23    23   23    23    23
Lanes:        1  0  1  0  1   1  0  1  0  1   0  1  0  0  1   0  1  0  0  1
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:      39  143    17    44  483    54   105   31    86    28   22    27
Growth Adj:  1.05 1.05  1.05  1.05 1.05  1.05  1.05 1.05  1.05  1.05 1.05  1.05
Initial Bse:   41  150    18    46  507    57   110   33    90    29   23    28
User Adj:    1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:     0.82 0.82  0.82  0.89 0.89  0.89  0.78 0.78  0.78  0.80 0.80  0.80
PHF Volume:    50  184    22    52  569    64   141   42   115    37   29    35
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
Reduced Vol:   50  184    22    52  569    64   141   42   115    37   29    35
PCE Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
MLF Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
FinalVolume:   50  184    22    52  569    64   141   42   115    37   29    35
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Sat/Lane:    1900 1900  1900  1900 1900  1900  1900 1900  1900  1900 1900  1900
Adjustment:  0.31 1.00  0.85  0.64 1.00  0.85  0.72 0.72  0.85  0.82 0.82  0.85
Lanes:       1.00 1.00  1.00  1.00 1.00  1.00  0.77 0.23  1.00  0.56 0.44  1.00
Final Sat.:   591 1900  1615  1207 1900  1615  1062  314  1615   872  686  1615
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:     0.08 0.10  0.01  0.04 0.30  0.04  0.13 0.13  0.07  0.04 0.04  0.02
Crit Moves:                        ****              ****
Green/Cycle: 0.52 0.52  0.52  0.52 0.52  0.52  0.35 0.35  0.35  0.35 0.35  0.35
Volume/Cap:  0.16 0.19  0.03  0.08 0.57  0.08  0.38 0.38  0.20  0.12 0.12  0.06
Delay/Veh:    8.3  8.3   7.5   7.8 11.4   7.7  16.1 16.1  14.8  14.3 14.3  13.9
User DelAdj: 1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
AdjDel/Veh:   8.3  8.3   7.5   7.8 11.4   7.7  16.1 16.1  14.8  14.3 14.3  13.9
LOS by Move:    A    A     A     A    B     A     B    B     B     B    B     B
HCM2kAvgQ:      1    2     0     1    8     1     3    3     2     1    1     0
********************************************************************************
Note: Queue reported is the number of cars per lane.
********************************************************************************
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Existing Plus Ambient Growth Plus Project

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--------------------------------------------------------------------------------
                   Glen Mor 2 Student Apartments Project
                 Existing Plus Ambient Growth Plus Project
                            Morning Peak Hour
--------------------------------------------------------------------------------

                    Level Of Service Computation Report
          2000 HCM 4-Way Stop Method (Future Volume Alternative)
********************************************************************************
Intersection #1 Aberdeen Drive (NS) / Linden Street (EW)
********************************************************************************
Cycle (sec):            0               Critical Vol./Cap.(X):          0.372
Loss Time (sec):        0 (Y+R=4.0 sec) Average Delay (sec/veh):          9.2
Optimal Cycle:          0               Level Of Service:                   A
********************************************************************************
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Stop Sign        Stop Sign        Stop Sign        Stop Sign
Rights:           Include          Include          Include          Include
Min. Green:    0    0    0     0    0    0     0    0    0     0    0    0
Lanes:        0  0  1! 0  0    0  0  0  0  0    0  0  1  0  1    0  1  0  0  0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:      68    0   30     0    0    0     0   57  204    30   38    0
Growth Adj:  1.05 1.05 1.05  1.05 1.05 1.05  1.05 1.05 1.05  1.05 1.05 1.05
Initial Bse:   71    0   32     0    0    0     0   60  214    32   40    0
Added Vol:     10    0    0     0    0    0     0    0    8     0    0    0
PasserByVol:    0    0    0     0    0    0     0    0    0     0    0    0
Initial Fut:   81    0   32     0    0    0     0   60  222    32   40    0
User Adj:    1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00
PHF Adj:     0.61 1.00 0.61  1.00 1.00 1.00  1.00 0.74 0.74  0.68 0.68 1.00
PHF Volume:   133    0   51     0    0    0     0   81  300    46   59    0
Reduct Vol:     0    0    0     0    0    0     0    0    0     0    0    0
Reduced Vol:  133    0   51     0    0    0     0   81  300    46   59    0
PCE Adj:     1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00
MLF Adj:     1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00
FinalVolume:  133    0   51     0    0    0     0   81  300    46   59    0
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Adjustment:  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00
Lanes:       0.72 0.00 0.28  0.00 0.00 0.00  0.00 1.00 1.00  0.44 0.56 0.00
Final Sat.:   503    0  195     0    0    0     0  698  806   311  393    0
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:     0.26 xxxx 0.26  xxxx xxxx xxxx  xxxx 0.12 0.37  0.15 0.15 xxxx
Crit Moves:  ****                                      ****        ****
Delay/Veh:    9.5  0.0  9.5   0.0  0.0  0.0   0.0  8.4  9.5   8.8  8.8  0.0
Delay Adj:   1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00
AdjDel/Veh:   9.5  0.0  9.5   0.0  0.0  0.0   0.0  8.4  9.5   8.8  8.8  0.0
LOS by Move:    A    *    A     *    *    *     *    A    A     A    A    *
ApproachDel:       9.5           xxxxxx             9.3              8.8
Delay Adj:        1.00            xxxxx            1.00             1.00
ApprAdjDel:        9.5           xxxxxx             9.3              8.8
LOS by Appr:         A                *               A                A
AllWayAvgQ:   0.3  0.3  0.3   0.0  0.0  0.0   0.0  0.1  0.5   0.2  0.2  0.2
********************************************************************************
Note: Queue reported is the number of cars per lane.
```

Glen Mor 2 Student Apartments Project
Existing Plus Ambient Growth Plus Project
Evening Peak Hour

Level Of Service Computation Report
2000 HCM 4-Way Stop Method (Future Volume Alternative)

Intersection #1 Aberdeen Drive (NS) / Linden Street (EW)

Cycle (sec):	0	Critical Vol./Cap.(X):	0.718
Loss Time (sec):	0 (Y+R=4.0 sec)	Average Delay (sec/veh):	15.1
Optimal Cycle:	0	Level Of Service:	C

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:		Stop Sign			Stop Sign			Stop Sign			Stop Sign	
Rights:		Include			Include			Include			Include	
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:		0 0 1! 0 0			0 0 0 0 0			0 0 1 0 1			0 1 0 0 0	
Volume Module:												
Base Vol:	235	0	23	0	0	0	0	127	187	21	137	0
Growth Adj:	1.05	1.05	1.05	1.05	1.05	1.05	1.05	1.05	1.05	1.05	1.05	1.05
Initial Bse:	247	0	24	0	0	0	0	133	196	22	144	0
Added Vol:	25	0	0	0	0	0	0	0	20	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	272	0	24	0	0	0	0	133	216	22	144	0
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.63	1.00	0.63	1.00	1.00	1.00	1.00	0.90	0.90	0.88	0.88	1.00
PHF Volume:	430	0	38	0	0	0	0	148	240	25	164	0
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	430	0	38	0	0	0	0	148	240	25	164	0
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	430	0	38	0	0	0	0	148	240	25	164	0
Saturation Flow Module:												
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	0.92	0.00	0.08	0.00	0.00	0.00	0.00	1.00	1.00	0.13	0.87	0.00
Final Sat.:	599	0	53	0	0	0	0	569	640	77	504	0
Capacity Analysis Module:												
Vol/Sat:	0.72	xxxx	0.72	xxxx	xxxx	xxxx	xxxx	0.26	0.37	0.33	0.33	xxxx
Crit Moves:	****								****	****		
Delay/Veh:	20.1	0.0	20.1	0.0	0.0	0.0	0.0	10.8	11.0	11.4	11.4	0.0
Delay Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	20.1	0.0	20.1	0.0	0.0	0.0	0.0	10.8	11.0	11.4	11.4	0.0
LOS by Move:	C	*	C	*	*	*	*	B	B	B	B	*
ApproachDel:		20.1			xxxxxx			10.9			11.4	
Delay Adj:		1.00			xxxxx			1.00			1.00	
ApprAdjDel:		20.1			xxxxxx			10.9			11.4	
LOS by Appr:		C			*			B			B	
AllWayAvgQ:	2.1	2.1	2.1	0.0	0.0	0.0	0.0	0.3	0.5	0.4	0.4	0.4

Note: Queue reported is the number of cars per lane.

Glen Mor 2 Student Apartments Project
Existing Plus Ambient Growth Plus Project
Morning Peak Hour

Level Of Service Computation Report
2000 HCM 4-Way Stop Method (Future Volume Alternative)

Intersection #2 Aberdeen Drive (NS) / Campus Drive (EW)

Cycle (sec):	0	Critical Vol./Cap.(X):	0.310
Loss Time (sec):	0 (Y+R=4.0 sec)	Average Delay (sec/veh):	8.7
Optimal Cycle:	0	Level Of Service:	A

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:		Stop Sign			Stop Sign			Stop Sign			Stop Sign	
Rights:		Include			Include			Include			Include	
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:		0 0 0 0 0			0 0 1! 0 0			0 1 0 0 0			0 0 0 1 0	
Volume Module:												
Base Vol:	0	0	0	149	0	49	14	13	0	0	37	88
Growth Adj:	1.05	1.05	1.05	1.05	1.05	1.05	1.05	1.05	1.05	1.05	1.05	1.05
Initial Bse:	0	0	0	156	0	51	15	14	0	0	39	92
Added Vol:	0	0	0	8	0	0	0	0	0	0	0	10
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	0	0	0	164	0	51	15	14	0	0	39	102
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	0.88	1.00	0.88	0.52	0.52	1.00	1.00	0.74	0.74
PHF Volume:	0	0	0	186	0	58	28	26	0	0	52	138
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	0	0	0	186	0	58	28	26	0	0	52	138
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	0	0	0	186	0	58	28	26	0	0	52	138
Saturation Flow Module:												
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	0.00	0.00	0.00	0.76	0.00	0.24	0.52	0.48	0.00	0.00	0.28	0.72
Final Sat.:	0	0	0	600	0	188	373	347	0	0	232	611
Capacity Analysis Module:												
Vol/Sat:	xxxx	xxxx	xxxx	0.31	xxxx	0.31	0.08	0.08	xxxx	xxxx	0.23	0.23
Crit Moves:				****				****				****
Delay/Veh:	0.0	0.0	0.0	9.3	0.0	9.3	8.1	8.1	0.0	0.0	8.2	8.2
Delay Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	0.0	0.0	0.0	9.3	0.0	9.3	8.1	8.1	0.0	0.0	8.2	8.2
LOS by Move:	*	*	*	A	*	A	A	A	*	*	A	A
ApproachDel:		xxxxxx			9.3			8.1			8.2	
Delay Adj:		xxxxx			1.00			1.00			1.00	
ApprAdjDel:		xxxxxx			9.3			8.1			8.2	
LOS by Appr:		*			A			A			A	
AllWayAvgQ:	0.0	0.0	0.0	0.4	0.4	0.4	0.1	0.1	0.1	0.3	0.3	0.3

Note: Queue reported is the number of cars per lane.

```
-------------------------------------------------------------------------------
                 Glen Mor 2 Student Apartments Project
             Existing Plus Ambient Growth Plus Project
                           Evening Peak Hour
-------------------------------------------------------------------------------

                   Level Of Service Computation Report
        2000 HCM 4-Way Stop Method (Future Volume Alternative)
*******************************************************************************
Intersection #2 Aberdeen Drive (NS) / Campus Drive (EW)
*******************************************************************************
Cycle (sec):          0                 Critical Vol./Cap.(X):        0.429
Loss Time (sec):      0 (Y+R=4.0 sec)   Average Delay (sec/veh):       10.4
Optimal Cycle:        0                 Level Of Service:                 B
*******************************************************************************
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Stop Sign        Stop Sign        Stop Sign        Stop Sign
Rights:          Include          Include          Include          Include
Min. Green:    0    0     0    0    0     0    0    0     0    0    0     0
Lanes:        0  0  0  0  0   0  0  1! 0  0   0  1  0  0  0   0  0  0  1  0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:      0    0     0  207    0     9   26   37     0    0    4   188
Growth Adj:  1.05 1.05  1.05 1.05 1.05  1.05 1.05 1.05  1.05 1.05 1.05  1.05
Initial Bse:   0    0     0  217    0     9   27   39     0    0    4   197
Added Vol:     0    0     0   20    0     0    0    0     0    0    0    25
PasserByVol:   0    0     0    0    0     0    0    0     0    0    0     0
Initial Fut:   0    0     0  237    0     9   27   39     0    0    4   222
User Adj:    1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
PHF Adj:     1.00 1.00  1.00 0.83 1.00  0.83 0.75 0.75  1.00 1.00 0.67  0.67
PHF Volume:    0    0     0  286    0    11   36   52     0    0    6   333
Reduct Vol:    0    0     0    0    0     0    0    0     0    0    0     0
Reduced Vol:   0    0     0  286    0    11   36   52     0    0    6   333
PCE Adj:     1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
MLF Adj:     1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
FinalVolume:   0    0     0  286    0    11   36   52     0    0    6   333
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Adjustment:  1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
Lanes:       0.00 0.00  0.00 0.96 0.01  0.03 0.41 0.59  0.00 0.00 0.02  0.98
Final Sat.:    0    0     0  666    0    27  274  390     0    0   15   809
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:     xxxx xxxx  xxxx 0.43 0.00  0.43 0.13 0.13  xxxx xxxx 0.41  0.41
Crit Moves:                  ****                  ****                   ****
Delay/Veh:    0.0  0.0   0.0 11.4 11.4  11.4  8.8  8.8   0.0  0.0  9.9   9.9
Delay Adj:   1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
AdjDel/Veh:   0.0  0.0   0.0 11.4 11.4  11.4  8.8  8.8   0.0  0.0  9.9   9.9
LOS by Move:    *    *     *    B    B     B    A    A     *    *    A     A
ApproachDel:     xxxxxx           11.4              8.8              9.9
Delay Adj:        xxxxx           1.00             1.00             1.00
ApprAdjDel:      xxxxxx           11.4              8.8              9.9
LOS by Appr:        *               B                A                A
AllWayAvgQ:   0.0  0.0   0.0  0.7  0.7   0.7  0.1  0.1   0.1  0.6  0.6   0.6
*******************************************************************************
Note: Queue reported is the number of cars per lane.
```

Glen Mor 2 Student Apartments Project
Existing Plus Ambient Growth Plus Project
Morning Peak Hour

Level Of Service Computation Report
2000 HCM 4-Way Stop Method (Future Volume Alternative)

Intersection #3 Campus Drive (NS) / Big Springs Road (EW)

Cycle (sec):	0	Critical Vol./Cap.(X):	0.316
Loss Time (sec):	0 (Y+R=4.0 sec)	Average Delay (sec/veh):	9.0
Optimal Cycle:	0	Level Of Service:	A

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Stop Sign			Stop Sign			Stop Sign			Stop Sign		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	0 0 0 1 0			0 1 0 0 0			0 0 0 0 0			0 0 1! 0 0		
Volume Module:												
Base Vol:	0	85	18	66	92	0	0	0	0	62	0	55
Growth Adj:	1.05	1.05	1.05	1.05	1.05	1.05	1.05	1.05	1.05	1.05	1.05	1.05
Initial Bse:	0	89	19	69	97	0	0	0	0	65	0	58
Added Vol:	0	0	8	8	0	0	0	0	0	10	0	10
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	0	89	27	77	97	0	0	0	0	75	0	68
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	0.83	0.83	0.72	0.72	1.00	1.00	1.00	1.00	0.79	1.00	0.79
PHF Volume:	0	107	32	108	135	0	0	0	0	95	0	86
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	0	107	32	108	135	0	0	0	0	95	0	86
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	0	107	32	108	135	0	0	0	0	95	0	86
Saturation Flow Module:												
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	0.00	0.77	0.23	0.44	0.56	0.00	0.00	0.00	0.00	0.53	0.00	0.47
Final Sat.:	0	598	180	341	426	0	0	0	0	393	0	355
Capacity Analysis Module:												
Vol/Sat:	xxxx	0.18	0.18	0.32	0.32	xxxx	xxxx	xxxx	xxxx	0.24	xxxx	0.24
Crit Moves:		****		****						****		
Delay/Veh:	0.0	8.4	8.4	9.6	9.6	0.0	0.0	0.0	0.0	8.9	0.0	8.9
Delay Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	0.0	8.4	8.4	9.6	9.6	0.0	0.0	0.0	0.0	8.9	0.0	8.9
LOS by Move:	*	A	A	A	A	*	*	*	*	A	*	A
ApproachDel:		8.4			9.6			xxxxxx			8.9	
Delay Adj:		1.00			1.00			xxxxx			1.00	
ApprAdjDel:		8.4			9.6			xxxxxx			8.9	
LOS by Appr:		A			A			*			A	
AllWayAvgQ:	0.2	0.2	0.2	0.4	0.4	0.4	0.0	0.0	0.0	0.3	0.3	0.3

Note: Queue reported is the number of cars per lane.

```
--------------------------------------------------------------------------------
                     Glen Mor 2 Student Apartments Project
                   Existing Plus Ambient Growth Plus Project
                               Evening Peak Hour
--------------------------------------------------------------------------------

                      Level Of Service Computation Report
            2000 HCM 4-Way Stop Method (Future Volume Alternative)
********************************************************************************
Intersection #3 Campus Drive (NS) / Big Springs Road (EW)
********************************************************************************
Cycle (sec):           0              Critical Vol./Cap.(X):         0.442
Loss Time (sec):       0 (Y+R=4.0 sec) Average Delay (sec/veh):       10.9
Optimal Cycle:         0              Level Of Service:                 B
********************************************************************************
Approach:      North Bound      South Bound      East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Stop Sign        Stop Sign        Stop Sign        Stop Sign
Rights:          Include          Include          Include          Include
Min. Green:    0    0    0     0    0    0     0    0    0     0    0    0
Lanes:        0  0  0  1  0    0  1  0  0  0    0  0  0  0  0    0  0  1! 0  0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:      0   67    79    118  105    0      0    0     0     56    0   119
Growth Adj:  1.05 1.05  1.05  1.05 1.05  1.05  1.05 1.05  1.05  1.05 1.05  1.05
Initial Bse:   0   70    83    124  110    0      0    0     0     59    0   125
Added Vol:     0    0    20     20    0    0      0    0     0     25    0    25
PasserByVol:   0    0     0      0    0    0      0    0     0      0    0     0
Initial Fut:   0   70   103    144  110    0      0    0     0     84    0   150
User Adj:    1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:     1.00 0.72  0.72  0.90 0.90  1.00  1.00 1.00  1.00  0.74 1.00  0.74
PHF Volume:    0   98   144    160  123    0      0    0     0    113    0   202
Reduct Vol:    0    0     0      0    0    0      0    0     0      0    0     0
Reduced Vol:   0   98   144    160  123    0      0    0     0    113    0   202
PCE Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
MLF Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
FinalVolume:   0   98   144    160  123    0      0    0     0    113    0   202
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Adjustment:  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Lanes:       0.00 0.41  0.59  0.57 0.43  0.00  0.00 0.00  0.00  0.35 0.01  0.64
Final Sat.:    0  296   433    385  295    0      0    0     0    256    0   457
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:     xxxx 0.33  0.33  0.42 0.42  xxxx  xxxx xxxx  xxxx  0.44 0.00  0.44
Crit Moves:       ****             ****                          ****
Delay/Veh:    0.0  9.8   9.8  11.4 11.4   0.0   0.0  0.0   0.0  11.2 11.2  11.2
Delay Adj:   1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
AdjDel/Veh:   0.0  9.8   9.8  11.4 11.4   0.0   0.0  0.0   0.0  11.2 11.2  11.2
LOS by Move:    *    A     A     B    B     *     *    *     *     B    B     B
ApproachDel:        9.8             11.4            xxxxxx            11.2
Delay Adj:         1.00             1.00             xxxxx            1.00
ApprAdjDel:         9.8             11.4            xxxxxx            11.2
LOS by Appr:          A                B                 *               B
AllWayAvgQ:   0.4  0.4   0.4   0.6  0.6   0.6   0.0  0.0   0.0   0.7  0.7   0.7
********************************************************************************
Note: Queue reported is the number of cars per lane.
```

```
--------------------------------------------------------------------------------
                   Glen Mor 2 Student Apartments Project
                 Existing Plus Ambient Growth Plus Project
                             Morning Peak Hour
--------------------------------------------------------------------------------

                    Level Of Service Computation Report
          2000 HCM Unsignalized Method (Future Volume Alternative)
********************************************************************************
Intersection #4 Campus Drive (NS) / Eucalyptus Drive (EW)
********************************************************************************
Average Delay (sec/veh):       1.2        Worst Case Level Of Service: B[ 11.1]
********************************************************************************
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:      Uncontrolled     Uncontrolled       Stop Sign        Stop Sign
Rights:          Include          Include          Include          Include
Lanes:        0  1  0  0  0   0  0  0  1  0   0  0  1! 0  0   0  0  0  0  0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:        7  159    0     0   90   22    20    0    7     0    0    0
Growth Adj:  1.05 1.05  1.05  1.05 1.05  1.05  1.05 1.05  1.05  1.05 1.05  1.05
Initial Bse:     7  167    0     0   95   23    21    0    7     0    0    0
Added Vol:       0    8    0     0   10    0     0    0    0     0    0    0
PasserByVol:     0    0    0     0    0    0     0    0    0     0    0    0
Initial Fut:     7  175    0     0  105   23    21    0    7     0    0    0
User Adj:    1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:     0.62 0.62  1.00  1.00 0.88  0.88  0.61 1.00  0.61  1.00 1.00  1.00
PHF Volume:     12  283    0     0  119   26    34    0   12     0    0    0
Reduct Vol:      0    0    0     0    0    0     0    0    0     0    0    0
FinalVolume:    12  283    0     0  119   26    34    0   12     0    0    0
------------|---------------||---------------||---------------||---------------|
Critical Gap Module:
Critical Gp:  4.1 xxxx xxxxx xxxxx xxxx xxxxx   6.4  6.5   6.2 xxxxx xxxx xxxxx
FollowUpTim:  2.2 xxxx xxxxx xxxxx xxxx xxxxx   3.5  4.0   3.3 xxxxx xxxx xxxxx
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol:  146 xxxx xxxxx  xxxx xxxx xxxxx   439  439   133  xxxx xxxx xxxxx
Potent Cap.: 1449 xxxx xxxxx  xxxx xxxx xxxxx   579  515   922  xxxx xxxx xxxxx
Move Cap.:   1449 xxxx xxxxx  xxxx xxxx xxxxx   575  511   922  xxxx xxxx xxxxx
Volume/Cap:  0.01 xxxx  xxxx  xxxx xxxx  xxxx  0.06 0.00  0.01  xxxx xxxx  xxxx
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
2Way95thQ:    0.0 xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
Control Del:  7.5 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
LOS by Move:    A    *     *     *    *     *     *    *     *     *    *     *
Movement:     LT - LTR - RT   LT - LTR - RT   LT - LTR - RT   LT - LTR - RT
Shared Cap.: xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx  637 xxxxx  xxxx xxxx xxxxx
SharedQueue:  0.0 xxxx xxxxx xxxxx xxxx xxxxx xxxxx  0.2 xxxxx xxxxx xxxx xxxxx
Shrd ConDel:  7.5 xxxx xxxxx xxxxx xxxx xxxxx xxxxx 11.1 xxxxx xxxxx xxxx xxxxx
Shared LOS:     A    *     *     *    *     *     *    B     *     *    *     *
ApproachDel:     xxxxxx           xxxxxx             11.1            xxxxxx
ApproachLOS:        *                *                 B                *
********************************************************************************
Note: Queue reported is the number of cars per lane.
********************************************************************************
```

```
--------------------------------------------------------------------------------
                    Glen Mor 2 Student Apartments Project
                  Existing Plus Ambient Growth Plus Project
                              Evening Peak Hour
--------------------------------------------------------------------------------

                     Level Of Service Computation Report
          2000 HCM Unsignalized Method (Future Volume Alternative)
********************************************************************************
Intersection #4 Campus Drive (NS) / Eucalyptus Drive (EW)
********************************************************************************
Average Delay (sec/veh):      1.3       Worst Case Level Of Service: B[ 12.0]
********************************************************************************
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:      Uncontrolled     Uncontrolled       Stop Sign        Stop Sign
Rights:          Include          Include          Include          Include
Lanes:        0  1  0  0  0   0  0  0  1  0   0  0  1! 0  0   0  0  0  0  0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:       4  136    0     0  189   23    17    0   10     0    0    0
Growth Adj:  1.05 1.05  1.05  1.05 1.05  1.05  1.05 1.05  1.05  1.05 1.05  1.05
Initial Bse:    4  143    0     0  198   24    18    0   11     0    0    0
Added Vol:      0   20    0     0   25    0     0    0    0     0    0    0
PasserByVol:    0    0    0     0    0    0     0    0    0     0    0    0
Initial Fut:    4  163    0     0  223   24    18    0   11     0    0    0
User Adj:    1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:     0.80 0.80  1.00  1.00 0.75  0.75  0.45 1.00  0.45  1.00 1.00  1.00
PHF Volume:     5  205    0     0  300   32    40    0   23     0    0    0
Reduct Vol:     0    0    0     0    0    0     0    0    0     0    0    0
FinalVolume:    5  205    0     0  300   32    40    0   23     0    0    0
------------|---------------||---------------||---------------||---------------|
Critical Gap Module:
Critical Gp:  4.1 xxxx xxxxx xxxxx xxxx xxxxx   6.4  6.5   6.2 xxxxx xxxx xxxxx
FollowUpTim:  2.2 xxxx xxxxx xxxxx xxxx xxxxx   3.5  4.0   3.3 xxxxx xxxx xxxxx
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol:  332 xxxx xxxxx  xxxx xxxx xxxxx   531  531   316  xxxx xxxx xxxxx
Potent Cap.: 1239 xxxx xxxxx  xxxx xxxx xxxxx   512  457   729  xxxx xxxx xxxxx
Move Cap.:   1239 xxxx xxxxx  xxxx xxxx xxxxx   511  455   729  xxxx xxxx xxxxx
Volume/Cap:  0.00 xxxx  xxxx  xxxx xxxx  xxxx  0.08 0.00  0.03  xxxx xxxx  xxxx
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
2Way95thQ:    0.0 xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
Control Del:  7.9 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
LOS by Move:    A    *     *     *    *     *     *    *     *     *    *     *
Movement:     LT - LTR - RT   LT - LTR - RT   LT - LTR - RT   LT - LTR - RT
Shared Cap.: xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx  574 xxxxx  xxxx xxxx xxxxx
SharedQueue:  0.0 xxxx xxxxx xxxxx xxxx xxxxx xxxxx  0.4 xxxxx xxxxx xxxx xxxxx
Shrd ConDel:  7.9 xxxx xxxxx xxxxx xxxx xxxxx xxxxx 12.0 xxxxx xxxxx xxxx xxxxx
Shared LOS:     A    *     *     *    *     *     *    B     *     *    *     *
ApproachDel:     xxxxxx           xxxxxx            12.0            xxxxxx
ApproachLOS:        *                *                B                *
********************************************************************************
Note: Queue reported is the number of cars per lane.
********************************************************************************
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--------------------------------------------------------------------------------
                      Glen Mor 2 Student Apartments Project
                    Existing Plus Ambient Growth Plus Project
                                Morning Peak Hour
--------------------------------------------------------------------------------

                       Level Of Service Computation Report
           2000 HCM Unsignalized Method (Future Volume Alternative)
********************************************************************************
Intersection #5 Project West Driveway (NS) / Big Springs Road (EW)
********************************************************************************
Average Delay (sec/veh):       1.4       Worst Case Level Of Service: B[ 10.3]
********************************************************************************
Approach:      North Bound       South Bound        East Bound        West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:       Stop Sign         Stop Sign        Uncontrolled      Uncontrolled
Rights:          Include           Include           Include           Include
Lanes:        0  0  0  0  0    0  0  1! 0  0    0  1  0  0  0    0  0  0  1  0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:       0    0     0     0    0     0     0   43     0     0  201     0
Growth Adj:  1.05 1.05  1.05  1.05 1.05  1.05  1.05 1.05  1.05  1.05 1.05  1.05
Initial Bse:    0    0     0     0    0     0     0   45     0     0  211     0
Added Vol:      0    0     0    20    0    10    16    0     0     0   10     8
PasserByVol:    0    0     0     0    0     0     0    0     0     0    0     0
Initial Fut:    0    0     0    20    0    10    16   45     0     0  221     8
User Adj:    1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:     0.95 0.95  0.95  0.95 0.95  0.95  0.95 0.95  0.95  0.95 0.95  0.95
PHF Volume:     0    0     0    21    0    11    17   48     0     0  233     8
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
FinalVolume:    0    0     0    21    0    11    17   48     0     0  233     8
------------|---------------||---------------||---------------||---------------|
Critical Gap Module:
Critical Gp:xxxxx xxxx xxxxx   6.4  6.5   6.2   4.1 xxxx xxxxx xxxxx xxxx xxxxx
FollowUpTim:xxxxx xxxx xxxxx   3.5  4.0   3.3   2.2 xxxx xxxxx xxxxx xxxx xxxxx
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol: xxxx xxxx xxxxx   318  318   237   241 xxxx xxxxx  xxxx xxxx xxxxx
Potent Cap.: xxxx xxxx xxxxx   679  602   807  1337 xxxx xxxxx  xxxx xxxx xxxxx
Move Cap.:   xxxx xxxx xxxxx   673  594   807  1337 xxxx xxxxx  xxxx xxxx xxxxx
Volume/Cap:  xxxx xxxx  xxxx  0.03 0.00  0.01  0.01 xxxx  xxxx  xxxx xxxx  xxxx
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
2Way95thQ:   xxxx xxxx xxxxx  xxxx xxxx xxxxx   0.0 xxxx xxxxx  xxxx xxxx xxxxx
Control Del:xxxxx xxxx xxxxx xxxxx xxxx xxxxx   7.7 xxxx xxxxx xxxxx xxxx xxxxx
LOS by Move:    *    *     *     *    *     *     A    *     *     *    *     *
Movement:     LT - LTR - RT    LT - LTR - RT    LT - LTR - RT    LT - LTR - RT
Shared Cap.: xxxx xxxx xxxxx  xxxx  712 xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
SharedQueue:xxxxx xxxx xxxxx xxxxx  0.1 xxxxx   0.0 xxxx xxxxx xxxxx xxxx xxxxx
Shrd ConDel:xxxxx xxxx xxxxx xxxxx 10.3 xxxxx   7.7 xxxx xxxxx xxxxx xxxx xxxxx
Shared LOS:     *    *     *     *    B     *     A    *     *     *    *     *
ApproachDel:      xxxxxx             10.3             xxxxxx            xxxxxx
ApproachLOS:         *                 B                 *                 *
********************************************************************************
Note: Queue reported is the number of cars per lane.
********************************************************************************
```

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--------------------------------------------------------------------------------
                   Glen Mor 2 Student Apartments Project
                 Existing Plus Ambient Growth Plus Project
                            Evening Peak Hour
--------------------------------------------------------------------------------

                    Level Of Service Computation Report
          2000 HCM Unsignalized Method (Future Volume Alternative)
********************************************************************************
Intersection #5 Project West Driveway (NS) / Big Springs Road (EW)
********************************************************************************
Average Delay (sec/veh):       2.4       Worst Case Level Of Service: B[ 11.7]
********************************************************************************
Approach:      North Bound      South Bound       East Bound        West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Stop Sign        Stop Sign       Uncontrolled      Uncontrolled
Rights:           Include          Include          Include           Include
Lanes:        0  0  0  0  0    0  0  1! 0  0    0  1  0  0  0    0  0  0  1  0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:        0    0     0     0    0     0     0  230     0     0  100     0
Growth Adj:   1.05 1.05  1.05  1.05 1.05  1.05  1.05 1.05  1.05  1.05 1.05  1.05
Initial Bse:     0    0     0     0    0     0     0  242     0     0  105     0
Added Vol:       0    0     0    51    0    25    40    0     0     0   25    20
PasserByVol:     0    0     0     0    0     0     0    0     0     0    0     0
Initial Fut:     0    0     0    51    0    25    40  242     0     0  130    20
User Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:      0.95 0.95  0.95  0.95 0.95  0.95  0.95 0.95  0.95  0.95 0.95  0.95
PHF Volume:      0    0     0    54    0    26    42  254     0     0  137    21
Reduct Vol:      0    0     0     0    0     0     0    0     0     0    0     0
FinalVolume:     0    0     0    54    0    26    42  254     0     0  137    21
------------|---------------||---------------||---------------||---------------|
Critical Gap Module:
Critical Gp:xxxxx xxxx xxxxx   6.4  6.5   6.2   4.1 xxxx xxxxx xxxxx xxxx xxxxx
FollowUpTim:xxxxx xxxx xxxxx   3.5  4.0   3.3   2.2 xxxx xxxxx xxxxx xxxx xxxxx
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol: xxxx xxxx xxxxx   486  486   147   158 xxxx xxxxx  xxxx xxxx xxxxx
Potent Cap.: xxxx xxxx xxxxx   544  484   905  1434 xxxx xxxxx  xxxx xxxx xxxxx
Move Cap.:   xxxx xxxx xxxxx   532  470   905  1434 xxxx xxxxx  xxxx xxxx xxxxx
Volume/Cap:  xxxx xxxx  xxxx  0.10 0.00  0.03  0.03 xxxx  xxxx  xxxx xxxx  xxxx
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
2Way95thQ:   xxxx xxxx xxxxx  xxxx xxxx xxxxx   0.1 xxxx xxxxx  xxxx xxxx xxxxx
Control Del:xxxxx xxxx xxxxx xxxxx xxxx xxxxx   7.6 xxxx xxxxx xxxxx xxxx xxxxx
LOS by Move:     *    *     *     *    *     *     A    *     *     *    *     *
Movement:      LT - LTR - RT    LT - LTR - RT    LT - LTR - RT    LT - LTR - RT
Shared Cap.: xxxx xxxx xxxxx  xxxx  615 xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
SharedQueue:xxxxx xxxx xxxxx xxxxx  0.4 xxxxx   0.1 xxxx xxxxx xxxxx xxxx xxxxx
Shrd ConDel:xxxxx xxxx xxxxx xxxxx 11.7 xxxxx   7.6 xxxx xxxxx xxxxx xxxx xxxxx
Shared LOS:      *    *     *     *    B     *     A    *     *     *    *     *
ApproachDel:      xxxxxx             11.7             xxxxxx            xxxxxx
ApproachLOS:         *                B                 *                 *
********************************************************************************
Note: Queue reported is the number of cars per lane.
********************************************************************************
```

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-------------------------------------------------------------------------------
                    Glen Mor 2 Student Apartments Project
                  Existing Plus Ambient Growth Plus Project
                             Morning Peak Hour
-------------------------------------------------------------------------------
                      Level Of Service Computation Report
          2000 HCM Unsignalized Method (Future Volume Alternative)
********************************************************************************
Intersection #6 Project East Driveway (NS) / Big Springs Road (EW)
********************************************************************************
Average Delay (sec/veh):        0.3      Worst Case Level Of Service: A[  9.5]
********************************************************************************
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Stop Sign        Stop Sign       Uncontrolled     Uncontrolled
Rights:          Include          Include          Include          Include
Lanes:        0  0  0  0  0    0  0  0  0  1    0  0  1  0  0    0  0  0  1  0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:        0    0     0     0    0     0     0   43     0     0  201     0
Growth Adj:   1.05 1.05  1.05  1.05 1.05  1.05  1.05 1.05  1.05  1.05 1.05  1.05
Initial Bse:     0    0     0     0    0     0     0   45     0     0  211     0
Added Vol:       0    0     0     0    0    10     0   20     0     0    8     8
PasserByVol:     0    0     0     0    0     0     0    0     0     0    0     0
Initial Fut:     0    0     0     0    0    10     0   65     0     0  219     8
User Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:      0.95 0.95  0.95  0.95 0.95  0.95  0.95 0.95  0.95  0.95 0.95  0.95
PHF Volume:      0    0     0     0    0    11     0   69     0     0  231     8
Reduct Vol:      0    0     0     0    0     0     0    0     0     0    0     0
FinalVolume:     0    0     0     0    0    11     0   69     0     0  231     8
------------|---------------||---------------||---------------||---------------|
Critical Gap Module:
Critical Gp:xxxxx xxxx xxxxx xxxxx xxxx   6.2 xxxxx xxxx xxxxx xxxxx xxxx xxxxx
FollowUpTim:xxxxx xxxx xxxxx xxxxx xxxx   3.3 xxxxx xxxx xxxxx xxxxx xxxx xxxxx
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol: xxxx xxxx xxxxx  xxxx xxxx   235  xxxx xxxx xxxxx  xxxx xxxx xxxxx
Potent Cap.: xxxx xxxx xxxxx  xxxx xxxx   809  xxxx xxxx xxxxx  xxxx xxxx xxxxx
Move Cap.:   xxxx xxxx xxxxx  xxxx xxxx   809  xxxx xxxx xxxxx  xxxx xxxx xxxxx
Volume/Cap:  xxxx xxxx  xxxx  xxxx xxxx  0.01  xxxx xxxx  xxxx  xxxx xxxx  xxxx
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
2Way95thQ:   xxxx xxxx xxxxx  xxxx xxxx   0.0  xxxx xxxx xxxxx  xxxx xxxx xxxxx
Control Del:xxxxx xxxx xxxxx xxxxx xxxx   9.5 xxxxx xxxx xxxxx xxxxx xxxx xxxxx
LOS by Move:     *    *     *     *    *     A     *    *     *     *    *     *
Movement:     LT - LTR - RT    LT - LTR - RT    LT - LTR - RT    LT - LTR - RT
Shared Cap.: xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
SharedQueue:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Shrd ConDel:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Shared LOS:      *    *     *     *    *     *     *    *     *     *    *     *
ApproachDel:      xxxxxx             9.5             xxxxxx           xxxxxx
ApproachLOS:         *                A                 *                *
********************************************************************************
Note: Queue reported is the number of cars per lane.
********************************************************************************
```

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-------------------------------------------------------------------------------
                    Glen Mor 2 Student Apartments Project
                  Existing Plus Ambient Growth Plus Project
                             Evening Peak Hour
-------------------------------------------------------------------------------
                     Level Of Service Computation Report
          2000 HCM Unsignalized Method (Future Volume Alternative)
*******************************************************************************
Intersection #6 Project East Driveway (NS) / Big Springs Road (EW)
*******************************************************************************
Average Delay (sec/veh):       0.5       Worst Case Level Of Service: A[  9.1]
*******************************************************************************
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Stop Sign        Stop Sign       Uncontrolled     Uncontrolled
Rights:          Include          Include          Include          Include
Lanes:        0  0  0  0  0    0  0  0  0  1    0  0  1  0  0    0  0  0  1  0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:       0    0     0     0    0     0     0  230     0     0  100     0
Growth Adj:  1.05 1.05  1.05  1.05 1.05  1.05  1.05 1.05  1.05  1.05 1.05  1.05
Initial Bse:    0    0     0     0    0     0     0  242     0     0  105     0
Added Vol:      0    0     0     0    0    25     0   51     0     0   20    20
PasserByVol:    0    0     0     0    0     0     0    0     0     0    0     0
Initial Fut:    0    0     0     0    0    25     0  293     0     0  125    20
User Adj:    1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:     0.95 0.95  0.95  0.95 0.95  0.95  0.95 0.95  0.95  0.95 0.95  0.95
PHF Volume:     0    0     0     0    0    26     0  308     0     0  132    21
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
FinalVolume:    0    0     0     0    0    26     0  308     0     0  132    21
------------|---------------||---------------||---------------||---------------|
Critical Gap Module:
Critical Gp:xxxxx xxxx xxxxx xxxxx xxxx   6.2 xxxxx xxxx xxxxx xxxxx xxxx xxxxx
FollowUpTim:xxxxx xxxx xxxxx xxxxx xxxx   3.3 xxxxx xxxx xxxxx xxxxx xxxx xxxxx
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol: xxxx xxxx xxxxx  xxxx xxxx   142  xxxx xxxx xxxxx  xxxx xxxx xxxxx
Potent Cap.: xxxx xxxx xxxxx  xxxx xxxx   911  xxxx xxxx xxxxx  xxxx xxxx xxxxx
Move Cap.:   xxxx xxxx xxxxx  xxxx xxxx   911  xxxx xxxx xxxxx  xxxx xxxx xxxxx
Volume/Cap:  xxxx xxxx  xxxx  xxxx xxxx  0.03  xxxx xxxx  xxxx  xxxx xxxx  xxxx
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
2Way95thQ:   xxxx xxxx xxxxx  xxxx xxxx   0.1  xxxx xxxx xxxxx  xxxx xxxx xxxxx
Control Del:xxxxx xxxx xxxxx xxxxx xxxx   9.1 xxxxx xxxx xxxxx xxxxx xxxx xxxxx
LOS by Move:    *    *     *     *    *     A     *    *     *     *    *     *
Movement:     LT - LTR - RT    LT - LTR - RT    LT - LTR - RT    LT - LTR - RT
Shared Cap.: xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
SharedQueue:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Shrd ConDel:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Shared LOS:     *    *     *     *    *     *     *    *     *     *    *     *
ApproachDel:     xxxxxx              9.1             xxxxxx           xxxxxx
ApproachLOS:        *                 A                *                *
*******************************************************************************
Note: Queue reported is the number of cars per lane.
*******************************************************************************
```

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--------------------------------------------------------------------------------
                    Glen Mor 2 Student Apartments Project
                  Existing Plus Ambient Growth Plus Project
                             Morning Peak Hour
--------------------------------------------------------------------------------

                    Level Of Service Computation Report
          2000 HCM Unsignalized Method (Future Volume Alternative)
********************************************************************************
Intersection #7 Valencia Hill Drive (NS) / Big Springs Road (EW)
********************************************************************************
Average Delay (sec/veh):       0.3       Worst Case Level Of Service: B[ 10.2]
********************************************************************************
Approach:      North Bound      South Bound      East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Stop Sign        Stop Sign      Uncontrolled     Uncontrolled
Rights:          Include          Include          Include          Include
Lanes:        0  0  0  0  0    0  0  1! 0  0    0  1  0  0  0    0  0  0  1  0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:        0    0     0     2    0     2     1   43     0     0  199     2
Growth Adj:   1.05 1.05  1.05  1.05 1.05  1.05  1.05 1.05  1.05  1.05 1.05  1.05
Initial Bse:     0    0     0     2    0     2     1   45     0     0  209     2
Added Vol:       0    0     0     0    0     0     0   20     0     0   16     0
PasserByVol:     0    0     0     0    0     0     0    0     0     0    0     0
Initial Fut:     0    0     0     2    0     2     1   65     0     0  225     2
User Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:      1.00 1.00  1.00  0.50 1.00  0.50  0.72 0.72  1.00  1.00 0.84  0.84
PHF Volume:      0    0     0     4    0     4     1   91     0     0  268     3
Reduct Vol:      0    0     0     0    0     0     0    0     0     0    0     0
FinalVolume:     0    0     0     4    0     4     1   91     0     0  268     3
------------|---------------||---------------||---------------||---------------|
Critical Gap Module:
Critical Gp:xxxxx xxxx xxxxx   6.4  6.5   6.2   4.1 xxxx xxxxx xxxxx xxxx xxxxx
FollowUpTim:xxxxx xxxx xxxxx   3.5  4.0   3.3   2.2 xxxx xxxxx xxxxx xxxx xxxxx
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol: xxxx xxxx xxxxx   363  363   270   271 xxxx xxxxx  xxxx xxxx xxxxx
Potent Cap.: xxxx xxxx xxxxx   640  568   774  1304 xxxx xxxxx  xxxx xxxx xxxxx
Move Cap.:   xxxx xxxx xxxxx   639  567   774  1304 xxxx xxxxx  xxxx xxxx xxxxx
Volume/Cap:  xxxx xxxx  xxxx  0.01 0.00  0.01  0.00 xxxx  xxxx  xxxx xxxx  xxxx
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
2Way95thQ:   xxxx xxxx xxxxx  xxxx xxxx xxxxx   0.0 xxxx xxxxx  xxxx xxxx xxxxx
Control Del:xxxxx xxxx xxxxx xxxxx xxxx xxxxx   7.8 xxxx xxxxx xxxxx xxxx xxxxx
LOS by Move:    *    *     *     *    *     *     A    *     *     *    *     *
Movement:     LT - LTR - RT    LT - LTR - RT    LT - LTR - RT    LT - LTR - RT
Shared Cap.: xxxx xxxx xxxxx  xxxx  700 xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
SharedQueue:xxxxx xxxx xxxxx xxxxx  0.0 xxxxx   0.0 xxxx xxxxx xxxxx xxxx xxxxx
Shrd ConDel:xxxxx xxxx xxxxx xxxxx 10.2 xxxxx   7.8 xxxx xxxxx xxxxx xxxx xxxxx
Shared LOS:     *    *     *     *    B     *     A    *     *     *    *     *
ApproachDel:     xxxxxx             10.2            xxxxxx           xxxxxx
ApproachLOS:        *                 B                *                *
********************************************************************************
Note: Queue reported is the number of cars per lane.
********************************************************************************
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--------------------------------------------------------------------------------
                     Glen Mor 2 Student Apartments Project
                   Existing Plus Ambient Growth Plus Project
                               Evening Peak Hour
--------------------------------------------------------------------------------

                      Level Of Service Computation Report
          2000 HCM Unsignalized Method (Future Volume Alternative)
********************************************************************************
Intersection #7 Valencia Hill Drive (NS) / Big Springs Road (EW)
********************************************************************************
Average Delay (sec/veh):      0.4      Worst Case Level Of Service: B[ 11.2]
********************************************************************************
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Stop Sign        Stop Sign      Uncontrolled     Uncontrolled
Rights:          Include          Include          Include          Include
Lanes:        0  0  0  0  0    0  0  1! 0  0    0  1  0  0  0    0  0  0  1  0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:       0    0     0     4    0     4     4  226     0     0   96     2
Growth Adj:  1.05 1.05  1.05  1.05 1.05  1.05  1.05 1.05  1.05  1.05 1.05  1.05
Initial Bse:    0    0     0     4    0     4     4  237     0     0  101     2
Added Vol:      0    0     0     0    0     0     0   51     0     0   40     0
PasserByVol:    0    0     0     0    0     0     0    0     0     0    0     0
Initial Fut:    0    0     0     4    0     4     4  288     0     0  141     2
User Adj:    1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:     1.00 1.00  1.00  0.40 1.00  0.40  0.68 0.68  1.00  1.00 0.82  0.82
PHF Volume:     0    0     0    11    0    11     6  426     0     0  172     3
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
FinalVolume:    0    0     0    11    0    11     6  426     0     0  172     3
------------|---------------||---------------||---------------||---------------|
Critical Gap Module:
Critical Gp:xxxxx xxxx xxxxx   6.4  6.5   6.2   4.1 xxxx xxxxx xxxxx xxxx xxxxx
FollowUpTim:xxxxx xxxx xxxxx   3.5  4.0   3.3   2.2 xxxx xxxxx xxxxx xxxx xxxxx
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol: xxxx xxxx xxxxx   613  613   174   175 xxxx xxxxx  xxxx xxxx xxxxx
Potent Cap.: xxxx xxxx xxxxx   459  411   875  1414 xxxx xxxxx  xxxx xxxx xxxxx
Move Cap.:   xxxx xxxx xxxxx   458  409   875  1414 xxxx xxxxx  xxxx xxxx xxxxx
Volume/Cap:  xxxx xxxx  xxxx  0.02 0.00  0.01  0.00 xxxx  xxxx  xxxx xxxx  xxxx
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
2Way95thQ:   xxxx xxxx xxxxx  xxxx xxxx xxxxx   0.0 xxxx xxxxx  xxxx xxxx xxxxx
Control Del:xxxxx xxxx xxxxx xxxxx xxxx xxxxx   7.6 xxxx xxxxx xxxxx xxxx xxxxx
LOS by Move:    *    *     *     *    *     *     A    *     *     *    *     *
Movement:     LT - LTR - RT    LT - LTR - RT    LT - LTR - RT    LT - LTR - RT
Shared Cap.: xxxx xxxx xxxxx  xxxx  601 xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
SharedQueue:xxxxx xxxx xxxxx xxxxx  0.1 xxxxx   0.0 xxxx xxxxx xxxxx xxxx xxxxx
Shrd ConDel:xxxxx xxxx xxxxx xxxxx 11.2 xxxxx   7.6 xxxx xxxxx xxxxx xxxx xxxxx
Shared LOS:     *    *     *     *    B     *     A    *     *     *    *     *
ApproachDel:     xxxxxx             11.2            xxxxxx           xxxxxx
ApproachLOS:        *                 B                *                *
********************************************************************************
Note: Queue reported is the number of cars per lane.
********************************************************************************
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--------------------------------------------------------------------------------
                 Glen Mor 2 Student Apartments Project
               Existing Plus Ambient Growth Plus Project
                           Morning Peak Hour
--------------------------------------------------------------------------------

                   Level Of Service Computation Report
       2000 HCM 4-Way Stop Method (Future Volume Alternative)
********************************************************************************
Intersection #8 Watkins Drive (NS) / Big Springs Road (EW)
********************************************************************************
Cycle (sec):           0               Critical Vol./Cap.(X):         1.061
Loss Time (sec):       0 (Y+R=4.0 sec) Average Delay (sec/veh):        42.8
Optimal Cycle:         0               Level Of Service:                  E
********************************************************************************
Approach:     North Bound      South Bound      East Bound       West Bound
Movement:    L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:      Stop Sign        Stop Sign        Stop Sign        Stop Sign
Rights:         Include          Include          Include          Include
Min. Green:    0    0    0    0    0    0    0    0    0    0    0    0
Lanes:       1  0  1  0  1   1  0  1  0  1   0  1  0  0  1   0  1  0  0  1
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:     100  470   21   14  121   58   11   11   19   12   10   54
Growth Adj:  1.05 1.05 1.05 1.05 1.05 1.05 1.05 1.05 1.05 1.05 1.05 1.05
Initial Bse:  105  494   22   15  127   61   12   12   20   13   11   57
Added Vol:      8    0    0    0    0    6    8    2   10    0    2    0
PasserByVol:    0    0    0    0    0    0    0    0    0    0    0    0
Initial Fut:  113  494   22   15  127   67   20   14   30   13   13   57
User Adj:    1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00
PHF Adj:     0.79 0.79 0.79 0.70 0.70 0.70 0.45 0.45 0.45 0.86 0.86 0.86
PHF Volume:   142  622   28   21  182   96   44   30   67   15   14   66
Reduct Vol:     0    0    0    0    0    0    0    0    0    0    0    0
Reduced Vol:  142  622   28   21  182   96   44   30   67   15   14   66
PCE Adj:     1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00
MLF Adj:     1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00
FinalVolume:  142  622   28   21  182   96   44   30   67   15   14   66
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Adjustment:  1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00
Lanes:       1.00 1.00 1.00 1.00 1.00 1.00 0.59 0.41 1.00 0.50 0.50 1.00
Final Sat.:   533  586  644  469  503  556  273  189  530  229  227  520
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:     0.27 1.06 0.04 0.04 0.36 0.17 0.16 0.16 0.13 0.06 0.06 0.13
Crit Moves:       ****           ****           ****                     ****
Delay/Veh:   11.7 78.3  8.4 10.6 13.6 10.3 11.7 11.7 10.2 10.9 10.9 10.3
Delay Adj:   1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00
AdjDel/Veh:  11.7 78.3  8.4 10.6 13.6 10.3 11.7 11.7 10.2 10.9 10.9 10.3
LOS by Move:    B    F    A    B    B    B    B    B    B    B    B    B
ApproachDel:      63.9             12.3             11.0             10.5
Delay Adj:        1.00             1.00             1.00             1.00
ApprAdjDel:       63.9             12.3             11.0             10.5
LOS by Appr:         F                B                B                B
AllWayAvgQ:    0.3 11.3  0.0  0.0  0.5  0.2  0.2  0.2  0.1  0.1  0.1  0.1
********************************************************************************
Note: Queue reported is the number of cars per lane.
```

Glen Mor 2 Student Apartments Project
Existing Plus Ambient Growth Plus Project
Evening Peak Hour

Level Of Service Computation Report
2000 HCM 4-Way Stop Method (Future Volume Alternative)

Intersection #8 Watkins Drive (NS) / Big Springs Road (EW)

Cycle (sec):	0		Critical Vol./Cap.(X):	1.109
Loss Time (sec):	0	(Y+R=4.0 sec)	Average Delay (sec/veh):	46.9
Optimal Cycle:	0		Level Of Service:	E

Approach:	North Bound	South Bound	East Bound	West Bound
Movement:	L - T - R	L - T - R	L - T - R	L - T - R
Control:	Stop Sign	Stop Sign	Stop Sign	Stop Sign
Rights:	Include	Include	Include	Include
Lanes:	1 0 1 0 1	1 0 1 0 1	0 1 0 0 1	0 1 0 0 1

Movement:	NB L	NB T	NB R	SB L	SB T	SB R	EB L	EB T	EB R	WB L	WB T	WB R
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Volume Module:												
Base Vol:	39	143	17	44	483	54	105	31	86	28	22	27
Growth Adj:	1.05	1.05	1.05	1.05	1.05	1.05	1.05	1.05	1.05	1.05	1.05	1.05
Initial Bse:	41	150	18	46	507	57	110	33	90	29	23	28
Added Vol:	20	0	0	0	0	16	20	5	25	0	4	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	61	150	18	46	507	73	130	38	115	29	27	28
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.82	0.82	0.82	0.89	0.89	0.89	0.78	0.78	0.78	0.80	0.80	0.80
PHF Volume:	75	184	22	52	569	82	167	48	147	37	34	35
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	75	184	22	52	569	82	167	48	147	37	34	35
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	75	184	22	52	569	82	167	48	147	37	34	35
Saturation Flow Module:												
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	1.00	1.00	1.00	1.00	1.00	1.00	0.78	0.22	1.00	0.52	0.48	1.00
Final Sat.:	424	452	492	468	513	556	356	103	531	221	204	478
Capacity Analysis Module:												
Vol/Sat:	0.18	0.41	0.04	0.11	1.11	0.15	0.47	0.47	0.28	0.17	0.17	0.07
Crit Moves:		****			****			****			****	
Delay/Veh:	12.7	15.6	10.1	11.1	98.3	10.1	16.9	16.9	11.9	12.4	12.4	10.5
Delay Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	12.7	15.6	10.1	11.1	98.3	10.1	16.9	16.9	11.9	12.4	12.4	10.5
LOS by Move:	B	C	B	B	F	B	C	C	B	B	B	B
ApproachDel:		14.4			81.6			14.9			11.8	
Delay Adj:		1.00			1.00			1.00			1.00	
ApprAdjDel:		14.4			81.6			14.9			11.8	
LOS by Appr:		B			F			B			B	
AllWayAvgQ:	0.2	0.6	0.0	0.1	12.6	0.2	0.8	0.8	0.4	0.2	0.2	0.1

Note: Queue reported is the number of cars per lane.

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-------------------------------------------------------------------------------
                    Glen Mor 2 Student Apartments Project
                  Existing Plus Ambient Growth Plus Project
                    Morning Peak Hour - With Improvements
-------------------------------------------------------------------------------

                     Level Of Service Computation Report
           2000 HCM Operations Method (Future Volume Alternative)
*******************************************************************************
Intersection #8 Watkins Drive (NS) / Big Springs Road (EW)
*******************************************************************************
Cycle (sec):           85              Critical Vol./Cap.(X):          0.412
Loss Time (sec):        8 (Y+R=4.0 sec) Average Delay (sec/veh):        10.6
Optimal Cycle: OPTIMIZED               Level Of Service:                  B
*******************************************************************************
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Permitted        Permitted        Permitted        Permitted
Rights:          Include          Include          Include          Include
Min. Green:    26   26    26   26   26    26   23   23    23   23   23    23
Lanes:        1  0  1  0  1   1  0  1  0  1   0  1  0  0  1   0  1  0  0  1
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:     100  470    21   14  121    58   11   11    19   12   10    54
Growth Adj:  1.05 1.05  1.05 1.05 1.05  1.05 1.05 1.05  1.05 1.05 1.05  1.05
Initial Bse:  105  494    22   15  127    61   12   12    20   13   11    57
Added Vol:      8    0     0    0    0     6    8    2    10    0    2     0
PasserByVol:    0    0     0    0    0     0    0    0     0    0    0     0
Initial Fut:  113  494    22   15  127    67   20   14    30   13   13    57
User Adj:    1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
PHF Adj:     0.79 0.79  0.79 0.70 0.70  0.70 0.45 0.45  0.45 0.86 0.86  0.86
PHF Volume:   142  622    28   21  182    96   44   30    67   15   14    66
Reduct Vol:     0    0     0    0    0     0    0    0     0    0    0     0
Reduced Vol:  142  622    28   21  182    96   44   30    67   15   14    66
PCE Adj:     1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
MLF Adj:     1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
FinalVolume:  142  622    28   21  182    96   44   30    67   15   14    66
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Sat/Lane:    1900 1900  1900 1900 1900  1900 1900 1900  1900 1900 1900  1900
Adjustment:  0.64 1.00  0.85 0.33 1.00  0.85 0.84 0.84  0.85 0.90 0.90  0.85
Lanes:       1.00 1.00  1.00 1.00 1.00  1.00 0.59 0.41  1.00 0.50 0.50  1.00
Final Sat.:  1208 1900  1615  621 1900  1615  943  653  1615  855  848  1615
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:     0.12 0.33  0.02 0.03 0.10  0.06 0.05 0.05  0.04 0.02 0.02  0.04
Crit Moves:       ****                            ****
Green/Cycle: 0.64 0.64  0.64 0.64 0.64  0.64 0.27 0.27  0.27 0.27 0.27  0.27
Volume/Cap:  0.19 0.51  0.03 0.05 0.15  0.09 0.17 0.17  0.15 0.06 0.06  0.15
Delay/Veh:    6.5  8.8   5.8  5.9  6.3   6.0 23.9 23.9  23.8 23.1 23.1  23.7
User DelAdj: 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
AdjDel/Veh:   6.5  8.8   5.8  5.9  6.3   6.0 23.9 23.9  23.8 23.1 23.1  23.7
LOS by Move:    A    A     A    A    A     A    C    C     C    C    C     C
HCM2kAvgQ:      2    9     0    0    2     1    2    2     1    1    1     1
*******************************************************************************
Note: Queue reported is the number of cars per lane.
*******************************************************************************
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Glen Mor 2 Student Apartments Project
Existing Plus Ambient Growth Plus Project
Evening Peak Hour - With Improvements

Level Of Service Computation Report
2000 HCM Operations Method (Future Volume Alternative)

Intersection #8 Watkins Drive (NS) / Big Springs Road (EW)

Cycle (sec):	60	Critical Vol./Cap.(X):	0.527
Loss Time (sec):	8 (Y+R=4.0 sec)	Average Delay (sec/veh):	11.8
Optimal Cycle:	OPTIMIZED	Level Of Service:	B

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Permitted			Permitted			Permitted			Permitted		
Rights:	Include			Include			Include			Include		
Min. Green:	26	26	26	26	26	26	23	23	23	23	23	23
Lanes:	1 0	1 0	1	1 0	1 0	1	0 1	0 0	1	0 1	0 0	1
Volume Module:												
Base Vol:	39	143	17	44	483	54	105	31	86	28	22	27
Growth Adj:	1.05	1.05	1.05	1.05	1.05	1.05	1.05	1.05	1.05	1.05	1.05	1.05
Initial Bse:	41	150	18	46	507	57	110	33	90	29	23	28
Added Vol:	20	0	0	0	0	16	20	5	25	0	4	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	61	150	18	46	507	73	130	38	115	29	27	28
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.82	0.82	0.82	0.89	0.89	0.89	0.78	0.78	0.78	0.80	0.80	0.80
PHF Volume:	75	184	22	52	569	82	167	48	147	37	34	35
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	75	184	22	52	569	82	167	48	147	37	34	35
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	75	184	22	52	569	82	167	48	147	37	34	35
Saturation Flow Module:												
Sat/Lane:	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Adjustment:	0.29	1.00	0.85	0.64	1.00	0.85	0.72	0.72	0.85	0.83	0.83	0.85
Lanes:	1.00	1.00	1.00	1.00	1.00	1.00	0.78	0.22	1.00	0.52	0.48	1.00
Final Sat.:	547	1900	1615	1207	1900	1615	1057	305	1615	816	752	1615
Capacity Analysis Module:												
Vol/Sat:	0.14	0.10	0.01	0.04	0.30	0.05	0.16	0.16	0.09	0.04	0.04	0.02
Crit Moves:					****			****				
Green/Cycle:	0.48	0.48	0.48	0.48	0.48	0.48	0.38	0.38	0.38	0.38	0.38	0.38
Volume/Cap:	0.28	0.20	0.03	0.09	0.62	0.10	0.41	0.41	0.24	0.12	0.12	0.06
Delay/Veh:	9.9	9.0	8.1	8.4	12.7	8.5	14.1	14.1	12.8	12.0	12.0	11.7
User DelAdj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	9.9	9.0	8.1	8.4	12.7	8.5	14.1	14.1	12.8	12.0	12.0	11.7
LOS by Move:	A	A	A	A	B	A	B	B	B	B	B	B
HCM2kAvgQ:	1	2	0	1	9	1	3	3	2	1	1	0

Note: Queue reported is the number of cars per lane.

Year 2015 Without Project

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--------------------------------------------------------------------------------
                   Glen Mor 2 Student Apartments Project
                       Year 2015 Without Project
                          Morning Peak Hour
--------------------------------------------------------------------------------

                    Level Of Service Computation Report
          2000 HCM 4-Way Stop Method (Future Volume Alternative)
********************************************************************************
Intersection #1 Aberdeen Drive (NS) / Linden Street (EW)
********************************************************************************
Cycle (sec):           0                Critical Vol./Cap.(X):         0.524
Loss Time (sec):       0 (Y+R=4.0 sec)  Average Delay (sec/veh):        11.7
Optimal Cycle:         0                Level Of Service:                  B
********************************************************************************
Approach:      North Bound      South Bound      East Bound       West Bound
Movement:     L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Stop Sign        Stop Sign        Stop Sign        Stop Sign
Rights:          Include          Include          Include          Include
Min. Green:     0    0    0    0    0    0    0    0    0    0    0    0
Lanes:        0  0  1! 0  0   0  0  0  0  0   0  0  1  0  1   0  1  0  0  0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:      267    0   34     0    0    0     0   51  375    55   45    0
Growth Adj:   1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00
Initial Bse:   267    0   34     0    0    0     0   51  375    55   45    0
Added Vol:     -10    0    0     0    0    0     0    0   -8     0    0    0
PasserByVol:     0    0    0     0    0    0     0    0    0     0    0    0
Initial Fut:   257    0   34     0    0    0     0   51  367    55   45    0
User Adj:     1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00
PHF Adj:      0.95 0.95 0.95  0.95 0.95 0.95  0.95 0.95 0.95  0.95 0.95 0.95
PHF Volume:    271    0   36     0    0    0     0   54  386    58   47    0
Reduct Vol:      0    0    0     0    0    0     0    0    0     0    0    0
Reduced Vol:   271    0   36     0    0    0     0   54  386    58   47    0
PCE Adj:      1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00
MLF Adj:      1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00
FinalVolume:   271    0   36     0    0    0     0   54  386    58   47    0
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Adjustment:   1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00
Lanes:        0.88 0.00 0.12  0.00 0.00 0.00  0.00 1.00 1.00  0.55 0.45 0.00
Final Sat.:    582    0   77     0    0    0     0  645  738   345  282    0
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:      0.46 xxxx 0.46  xxxx xxxx xxxx  xxxx 0.08 0.52  0.17 0.17 xxxx
Crit Moves:   ****                                      ****       ****
Delay/Veh:    12.3  0.0 12.3   0.0  0.0  0.0   0.0  8.6 12.2   9.5  9.5  0.0
Delay Adj:    1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00
AdjDel/Veh:   12.3  0.0 12.3   0.0  0.0  0.0   0.0  8.6 12.2   9.5  9.5  0.0
LOS by Move:     B    *    B     *    *    *     *    A    B     A    A    *
ApproachDel:       12.3           xxxxxx             11.8              9.5
Delay Adj:         1.00            xxxxx             1.00             1.00
ApprAdjDel:        12.3           xxxxxx             11.8              9.5
LOS by Appr:         B               *                 B                 A
AllWayAvgQ:    0.8  0.8  0.8   0.0  0.0  0.0   0.0  0.1  1.0   0.2  0.2  0.2
********************************************************************************
Note: Queue reported is the number of cars per lane.
```

Glen Mor 2 Student Apartments Project
Year 2015 Without Project
Evening Peak Hour

Level Of Service Computation Report
2000 HCM 4-Way Stop Method (Future Volume Alternative)

Intersection #1 Aberdeen Drive (NS) / Linden Street (EW)

Cycle (sec):	0	Critical Vol./Cap.(X):	0.878
Loss Time (sec):	0 (Y+R=4.0 sec)	Average Delay (sec/veh):	24.9
Optimal Cycle:	0	Level Of Service:	C

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Stop Sign			Stop Sign			Stop Sign			Stop Sign		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	0 0	1!	0 0	0 0	0	0 0	0 0	1	0 1	0 1	0	0 0
Volume Module:												
Base Vol:	547	0	22	0	0	0	0	53	408	20	61	0
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	547	0	22	0	0	0	0	53	408	20	61	0
Added Vol:	-25	0	0	0	0	0	0	0	-20	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	522	0	22	0	0	0	0	53	388	20	61	0
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
PHF Volume:	549	0	23	0	0	0	0	56	408	21	64	0
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	549	0	23	0	0	0	0	56	408	21	64	0
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	549	0	23	0	0	0	0	56	408	21	64	0
Saturation Flow Module:												
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	0.96	0.00	0.04	0.00	0.00	0.00	0.00	1.00	1.00	0.25	0.75	0.00
Final Sat.:	626	0	26	0	0	0	0	558	626	131	401	0
Capacity Analysis Module:												
Vol/Sat:	0.88	xxxx	0.88	xxxx	xxxx	xxxx	xxxx	0.10	0.65	0.16	0.16	xxxx
Crit Moves:	****								****		****	
Delay/Veh:	33.8	0.0	33.8	0.0	0.0	0.0	0.0	9.6	17.3	10.5	10.5	0.0
Delay Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	33.8	0.0	33.8	0.0	0.0	0.0	0.0	9.6	17.3	10.5	10.5	0.0
LOS by Move:	D	*	D	*	*	*	*	A	C	B	B	*
ApproachDel:		33.8			xxxxxx			16.3			10.5	
Delay Adj:		1.00			xxxxx			1.00			1.00	
ApprAdjDel:		33.8			xxxxxx			16.3			10.5	
LOS by Appr:		D			*			C			B	
AllWayAvgQ:	4.6	4.6	4.6	0.0	0.0	0.0	0.0	0.1	1.6	0.2	0.2	0.2

Note: Queue reported is the number of cars per lane.

```
--------------------------------------------------------------------------------
                   Glen Mor 2 Student Apartments Project
                        Year 2015 Without Project
                            Morning Peak Hour
--------------------------------------------------------------------------------

                   Level Of Service Computation Report
          2000 HCM 4-Way Stop Method (Future Volume Alternative)
********************************************************************************
Intersection #2 Aberdeen Drive (NS) / Campus Drive (EW)
********************************************************************************
Cycle (sec):            0              Critical Vol./Cap.(X):         0.602
Loss Time (sec):        0 (Y+R=4.0 sec) Average Delay (sec/veh):       12.2
Optimal Cycle:          0              Level Of Service:                  B
********************************************************************************
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Stop Sign        Stop Sign        Stop Sign        Stop Sign
Rights:          Include          Include          Include          Include
Min. Green:    0     0     0    0     0     0    0     0     0    0     0     0
Lanes:       0  0  0  0  0    0  0  1! 0  0    0  1  0  0  0    0  0  0  1  0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:      0     0     0  378     0    64   17    22     0    0    20   224
Growth Adj: 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00
Initial Bse:   0     0     0  378     0    64   17    22     0    0    20   224
Added Vol:     0     0     0   -8     0     0    0     0     0    0     0   -10
PasserByVol:   0     0     0    0     0     0    0     0     0    0     0     0
Initial Fut:   0     0     0  370     0    64   17    22     0    0    20   214
User Adj:   1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00
PHF Adj:    0.95  0.95  0.95 0.95  0.95  0.95 0.95  0.95  0.95 0.95  0.95  0.95
PHF Volume:    0     0     0  389     0    67   18    23     0    0    21   225
Reduct Vol:    0     0     0    0     0     0    0     0     0    0     0     0
Reduced Vol:   0     0     0  389     0    67   18    23     0    0    21   225
PCE Adj:    1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00
MLF Adj:    1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00
FinalVolume:   0     0     0  389     0    67   18    23     0    0    21   225
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Adjustment: 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00
Lanes:      0.00  0.00  0.00 0.85  0.01  0.14 0.44  0.56  0.00 0.00  0.09  0.91
Final Sat.:    0     0     0  648     0   112  268   347     0    0    64   686
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:    xxxx  xxxx  xxxx 0.60  0.00  0.60 0.07  0.07  xxxx xxxx  0.33  0.33
Crit Moves:                              ****       ****                    ****
Delay/Veh:   0.0   0.0   0.0 14.0  14.0  14.0  8.7   8.7   0.0  0.0   9.5   9.5
Delay Adj:  1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00
AdjDel/Veh:  0.0   0.0   0.0 14.0  14.0  14.0  8.7   8.7   0.0  0.0   9.5   9.5
LOS by Move:   *     *     *    B     B     B    A     A     *    *     A     A
ApproachDel:     xxxxxx           14.0              8.7              9.5
Delay Adj:        xxxxx           1.00             1.00             1.00
ApprAdjDel:      xxxxxx           14.0              8.7              9.5
LOS by Appr:        *               B                A                A
AllWayAvgQ:  0.0   0.0   0.0  1.3   1.3   1.3  0.1   0.1   0.1  0.4   0.4   0.4
********************************************************************************
Note: Queue reported is the number of cars per lane.
```

Glen Mor 2 Student Apartments Project
Year 2015 Without Project
Evening Peak Hour

Level Of Service Computation Report
2000 HCM 4-Way Stop Method (Future Volume Alternative)

Intersection #2 Aberdeen Drive (NS) / Campus Drive (EW)

Cycle (sec):	0	Critical Vol./Cap.(X):	0.729
Loss Time (sec):	0 (Y+R=4.0 sec)	Average Delay (sec/veh):	17.0
Optimal Cycle:	0	Level Of Service:	C

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:		Stop Sign			Stop Sign			Stop Sign			Stop Sign	
Rights:		Include			Include			Include			Include	
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	0 0 0 0 0			0 0 1! 0 0			0 1 0 0 0			0 0 0 1 0		
Volume Module:												
Base Vol:	0	0	0	343	0	68	64	40	0	0	30	516
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	0	0	0	343	0	68	64	40	0	0	30	516
Added Vol:	0	0	0	-20	0	0	0	0	0	0	0	-25
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	0	0	0	323	0	68	64	40	0	0	30	491
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
PHF Volume:	0	0	0	340	0	72	67	42	0	0	32	517
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	0	0	0	340	0	72	67	42	0	0	32	517
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	0	0	0	340	0	72	67	42	0	0	32	517
Saturation Flow Module:												
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	0.00	0.00	0.00	0.83	0.00	0.17	0.62	0.38	0.00	0.00	0.06	0.94
Final Sat.:	0	0	0	523	0	110	350	219	0	0	43	709
Capacity Analysis Module:												
Vol/Sat:	xxxx	xxxx	xxxx	0.65	xxxx	0.65	0.19	0.19	xxxx	xxxx	0.73	0.73
Crit Moves:				****			****				****	
Delay/Veh:	0.0	0.0	0.0	17.1	0.0	17.1	10.2	10.2	0.0	0.0	18.3	18.3
Delay Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	0.0	0.0	0.0	17.1	0.0	17.1	10.2	10.2	0.0	0.0	18.3	18.3
LOS by Move:	*	*	*	C	*	C	B	B	*	*	C	C
ApproachDel:		xxxxxx			17.1			10.2			18.3	
Delay Adj:		xxxxx			1.00			1.00			1.00	
ApprAdjDel:		xxxxxx			17.1			10.2			18.3	
LOS by Appr:		*			C			B			C	
AllWayAvgQ:	0.0	0.0	0.0	1.5	1.5	1.5	0.2	0.2	0.2	2.2	2.2	2.2

Note: Queue reported is the number of cars per lane.

```
--------------------------------------------------------------------------------
                  Glen Mor 2 Student Apartments Project
                        Year 2015 Without Project
                            Morning Peak Hour
--------------------------------------------------------------------------------
                   Level Of Service Computation Report
          2000 HCM 4-Way Stop Method (Future Volume Alternative)
********************************************************************************
Intersection #3 Campus Drive (NS) / Big Springs Road (EW)
********************************************************************************
Cycle (sec):             0              Critical Vol./Cap.(X):         0.402
Loss Time (sec):         0 (Y+R=4.0 sec) Average Delay (sec/veh):        9.9
Optimal Cycle:           0              Level Of Service:                  A
********************************************************************************
Approach:      North Bound       South Bound        East Bound        West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Stop Sign         Stop Sign         Stop Sign         Stop Sign
Rights:           Include           Include           Include           Include
Min. Green:     0     0     0    0     0     0    0     0     0    0     0     0
Lanes:        0  0  0  1  0    0  1  0  0  0    0  0  0  0  0    0  0  1! 0  0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:       0   147    65   100   193     0     0     0     0   106     0    99
Growth Adj:  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00
Initial Bse:    0   147    65   100   193     0     0     0     0   106     0    99
Added Vol:      0     0    -8    -8     0     0     0     0     0   -10     0   -10
PasserByVol:    0     0     0     0     0     0     0     0     0     0     0     0
Initial Fut:    0   147    57    92   193     0     0     0     0    96     0    89
User Adj:    1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00
PHF Adj:     0.95  0.95  0.95  0.95  0.95  0.95  0.95  0.95  0.95  0.95  0.95  0.95
PHF Volume:     0   155    60    97   203     0     0     0     0   101     0    94
Reduct Vol:     0     0     0     0     0     0     0     0     0     0     0     0
Reduced Vol:    0   155    60    97   203     0     0     0     0   101     0    94
PCE Adj:     1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00
MLF Adj:     1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00
FinalVolume:    0   155    60    97   203     0     0     0     0   101     0    94
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Adjustment:  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00
Lanes:       0.00  0.72  0.28  0.32  0.68  0.00  0.00  0.00  0.00  0.52  0.00  0.48
Final Sat.:     0   548   212   241   506     0     0     0     0   361     0   335
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:     xxxx  0.28  0.28  0.40  0.40  xxxx  xxxx  xxxx  xxxx  0.28  xxxx  0.28
Crit Moves:        ****        ****                                ****
Delay/Veh:    0.0   9.2   9.2  10.6  10.6   0.0   0.0   0.0   0.0   9.5   0.0   9.5
Delay Adj:   1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00
AdjDel/Veh:   0.0   9.2   9.2  10.6  10.6   0.0   0.0   0.0   0.0   9.5   0.0   9.5
LOS by Move:    *     A     A     B     B     *     *     *     *     A     *     A
ApproachDel:        9.2              10.6            xxxxxx              9.5
Delay Adj:         1.00              1.00             xxxxx             1.00
ApprAdjDel:         9.2              10.6            xxxxxx              9.5
LOS by Appr:          A                 B                 *                A
AllWayAvgQ:   0.4   0.4   0.4   0.6   0.6   0.6   0.0   0.0   0.0   0.3   0.3   0.3
********************************************************************************
Note: Queue reported is the number of cars per lane.
```

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                  Glen Mor 2 Student Apartments Project
                        Year 2015 Without Project
                            Evening Peak Hour
------------------------------------------------------------------------------

                   Level Of Service Computation Report
         2000 HCM 4-Way Stop Method (Future Volume Alternative)
*******************************************************************************
Intersection #3 Campus Drive (NS) / Big Springs Road (EW)
*******************************************************************************
Cycle (sec):           0               Critical Vol./Cap.(X):         0.725
Loss Time (sec):       0 (Y+R=4.0 sec) Average Delay (sec/veh):        16.9
Optimal Cycle:         0               Level Of Service:                  C
*******************************************************************************
Approach:     North Bound      South Bound      East Bound       West Bound
Movement:    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|----------------||----------------||----------------||----------------|
Control:       Stop Sign         Stop Sign         Stop Sign         Stop Sign
Rights:          Include           Include           Include           Include
Min. Green:    0    0     0    0    0     0    0    0     0    0    0     0
Lanes:       0  0  0  1  0    0  1  0  0  0    0  0  0  0  0    0  0  1! 0  0
------------|----------------||----------------||----------------||----------------|
Volume Module:
Base Vol:      0  317   179   138  247     0     0    0     0   135    0   196
Growth Adj: 1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Initial Bse:   0  317   179   138  247     0     0    0     0   135    0   196
Added Vol:     0    0   -20   -20    0     0     0    0     0   -25    0   -25
PasserByVol:   0    0     0     0    0     0     0    0     0     0    0     0
Initial Fut:   0  317   159   118  247     0     0    0     0   110    0   171
User Adj:   1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:    0.95 0.95  0.95  0.95 0.95  0.95  0.95 0.95  0.95  0.95 0.95  0.95
PHF Volume:    0  334   167   124  260     0     0    0     0   116    0   180
Reduct Vol:    0    0     0     0    0     0     0    0     0     0    0     0
Reduced Vol:   0  334   167   124  260     0     0    0     0   116    0   180
PCE Adj:    1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
MLF Adj:    1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
FinalVolume:   0  334   167   124  260     0     0    0     0   116    0   180
------------|----------------||----------------||----------------||----------------|
Saturation Flow Module:
Adjustment: 1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Lanes:      0.00 0.67  0.33  0.32 0.68  0.00  0.00 0.00  0.00  0.39 0.00  0.61
Final Sat.:    0  460   231   206  431     0     0    0     0   234    0   363
------------|----------------||----------------||----------------||----------------|
Capacity Analysis Module:
Vol/Sat:    xxxx 0.72  0.72  0.60 0.60  xxxx  xxxx xxxx  xxxx  0.50 xxxx  0.50
Crit Moves:      ****        ****                               ****
Delay/Veh:   0.0 19.6  19.6  15.9 15.9   0.0   0.0  0.0   0.0  13.4  0.0  13.4
Delay Adj:  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
AdjDel/Veh:  0.0 19.6  19.6  15.9 15.9   0.0   0.0  0.0   0.0  13.4  0.0  13.4
LOS by Move:   *    C     C     C    C     *     *    *     *     B    *     B
ApproachDel:     19.6             15.9            xxxxxx            13.4
Delay Adj:       1.00             1.00             xxxxx            1.00
ApprAdjDel:      19.6             15.9            xxxxxx            13.4
LOS by Appr:        C                C                 *               B
AllWayAvgQ:  2.2  2.2   2.2   1.3  1.3   1.3   0.0  0.0   0.0   0.8  0.8   0.8
*******************************************************************************
Note: Queue reported is the number of cars per lane.
```

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--------------------------------------------------------------------------------
                    Glen Mor 2 Student Apartments Project
                        Year 2015 Without Project
                            Morning Peak Hour
--------------------------------------------------------------------------------
                     Level Of Service Computation Report
         2000 HCM Unsignalized Method (Future Volume Alternative)
********************************************************************************
Intersection #4 Campus Drive (NS) / Eucalyptus Drive (EW)
********************************************************************************
Average Delay (sec/veh):       0.6       Worst Case Level Of Service: B[ 12.0]
********************************************************************************
Approach:     North Bound      South Bound      East Bound       West Bound
Movement:    L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:     Uncontrolled     Uncontrolled      Stop Sign        Stop Sign
Rights:          Include          Include          Include          Include
Lanes:       0  1  0  0  0   0  0  0  1  0   0  0  1! 0  0   0  0  0  0  0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:        4  278     0     0  220    35    20     0     3     0     0     0
Growth Adj:   1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Initial Bse:     4  278     0     0  220    35    20     0     3     0     0     0
Added Vol:       0   -8     0     0  -10     0     0     0     0     0     0     0
PasserByVol:     0    0     0     0    0     0     0     0     0     0     0     0
Initial Fut:     4  270     0     0  210    35    20     0     3     0     0     0
User Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:      0.95 0.95  0.95  0.95 0.95  0.95  0.95 0.95  0.95  0.95 0.95  0.95
PHF Volume:      4  284     0     0  221    37    21     0     3     0     0     0
Reduct Vol:      0    0     0     0    0     0     0     0     0     0     0     0
FinalVolume:     4  284     0     0  221    37    21     0     3     0     0     0
------------|---------------||---------------||---------------||---------------|
Critical Gap Module:
Critical Gp:   4.1 xxxx xxxxx xxxxx xxxx xxxxx   6.4  6.5   6.2 xxxxx xxxx xxxxx
FollowUpTim:   2.2 xxxx xxxxx xxxxx xxxx xxxxx   3.5  4.0   3.3 xxxxx xxxx xxxxx
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol:   258 xxxx xxxxx  xxxx xxxx xxxxx   532  532   239  xxxx xxxx xxxxx
Potent Cap.:  1319 xxxx xxxxx  xxxx xxxx xxxxx   512  456   804  xxxx xxxx xxxxx
Move Cap.:    1319 xxxx xxxxx  xxxx xxxx xxxxx   510  455   804  xxxx xxxx xxxxx
Volume/Cap:   0.00 xxxx  xxxx  xxxx xxxx  xxxx  0.04 0.00  0.00  xxxx xxxx  xxxx
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
2Way95thQ:     0.0 xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
Control Del:   7.7 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
LOS by Move:     A    *     *     *    *     *     *    *     *     *    *     *
Movement:     LT - LTR - RT   LT - LTR - RT   LT - LTR - RT   LT - LTR - RT
Shared Cap.: xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx  536 xxxxx  xxxx xxxx xxxxx
SharedQueue:   0.0 xxxx xxxxx xxxxx xxxx xxxxx xxxxx  0.1 xxxxx xxxxx xxxx xxxxx
Shrd ConDel:   7.7 xxxx xxxxx xxxxx xxxx xxxxx xxxxx 12.0 xxxxx xxxxx xxxx xxxxx
Shared LOS:      A    *     *     *    *     *     *    B     *     *    *     *
ApproachDel:      xxxxxx           xxxxxx            12.0            xxxxxx
ApproachLOS:         *                *                B                *
********************************************************************************
Note: Queue reported is the number of cars per lane.
********************************************************************************
```

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--------------------------------------------------------------------------------
                     Glen Mor 2 Student Apartments Project
                         Year 2015 Without Project
                            Evening Peak Hour
--------------------------------------------------------------------------------
                      Level Of Service Computation Report
          2000 HCM Unsignalized Method (Future Volume Alternative)
********************************************************************************
Intersection #4 Campus Drive (NS) / Eucalyptus Drive (EW)
********************************************************************************
Average Delay (sec/veh):       0.5       Worst Case Level Of Service: C[ 16.5]
********************************************************************************
Approach:       North Bound      South Bound       East Bound       West Bound
Movement:      L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:       Uncontrolled     Uncontrolled      Stop Sign        Stop Sign
Rights:           Include          Include         Include          Include
Lanes:         0  1  0  0  0   0  0  0  1  0   0  0  1! 0  0   0  0  0  0  0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:        2  394     0     0  492    28    21    0     5     0    0     0
Growth Adj:   1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Initial Bse:     2  394     0     0  492    28    21    0     5     0    0     0
Added Vol:       0  -20     0     0  -25     0     0    0     0     0    0     0
PasserByVol:     0    0     0     0    0     0     0    0     0     0    0     0
Initial Fut:     2  374     0     0  467    28    21    0     5     0    0     0
User Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:      0.95 0.95  0.95  0.95 0.95  0.95  0.95 0.95  0.95  0.95 0.95  0.95
PHF Volume:      2  394     0     0  492    29    22    0     5     0    0     0
Reduct Vol:      0    0     0     0    0     0     0    0     0     0    0     0
FinalVolume:     2  394     0     0  492    29    22    0     5     0    0     0
------------|---------------||---------------||---------------||---------------|
Critical Gap Module:
Critical Gp:   4.1 xxxx xxxxx xxxxx xxxx xxxxx   6.4  6.5   6.2 xxxxx xxxx xxxxx
FollowUpTim:   2.2 xxxx xxxxx xxxxx xxxx xxxxx   3.5  4.0   3.3 xxxxx xxxx xxxxx
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol:   521 xxxx xxxxx  xxxx xxxx xxxxx   904  904   506  xxxx xxxx xxxxx
Potent Cap.:  1056 xxxx xxxxx  xxxx xxxx xxxxx   310  279   570  xxxx xxxx xxxxx
Move Cap.:    1056 xxxx xxxxx  xxxx xxxx xxxxx   309  278   570  xxxx xxxx xxxxx
Volume/Cap:   0.00 xxxx  xxxx  xxxx xxxx  xxxx  0.07 0.00  0.01  xxxx xxxx  xxxx
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
2Way95thQ:     0.0 xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
Control Del:   8.4 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
LOS by Move:     A    *     *     *    *     *     *    *     *     *    *     *
Movement:      LT - LTR - RT   LT - LTR - RT   LT - LTR - RT   LT - LTR - RT
Shared Cap.:  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx  339 xxxxx  xxxx xxxx xxxxx
SharedQueue:   0.0 xxxx xxxxx xxxxx xxxx xxxxx xxxxx  0.3 xxxxx xxxxx xxxx xxxxx
Shrd ConDel:   8.4 xxxx xxxxx xxxxx xxxx xxxxx xxxxx 16.5 xxxxx xxxxx xxxx xxxxx
Shared LOS:      A    *     *     *    *     *     *    C     *     *    *     *
ApproachDel:        xxxxxx           xxxxxx            16.5            xxxxxx
ApproachLOS:           *                *                C                *
********************************************************************************
Note: Queue reported is the number of cars per lane.
********************************************************************************
```

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------------------------------------------------------------------------------
                  Glen Mor 2 Student Apartments Project
                        Year 2015 Without Project
                            Morning Peak Hour
------------------------------------------------------------------------------
                     Level Of Service Computation Report
          2000 HCM Unsignalized Method (Future Volume Alternative)
******************************************************************************
Intersection #7 Valencia Hill Drive (NS) / Big Springs Road (EW)
******************************************************************************
Average Delay (sec/veh):       0.1      Worst Case Level Of Service: B[ 10.9]
******************************************************************************
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Stop Sign        Stop Sign       Uncontrolled     Uncontrolled
Rights:          Include          Include          Include          Include
Lanes:        0  0  0  0  0   0  0  1! 0  0   0  1  0  0  0   0  0  0  1  0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:       0    0     0     2    0     2     1   97     0     0  372     2
Growth Adj:  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Initial Bse:    0    0     0     2    0     2     1   97     0     0  372     2
Added Vol:      0    0     0     0    0     0     0  -20     0     0  -16     0
PasserByVol:    0    0     0     0    0     0     0    0     0     0    0     0
Initial Fut:    0    0     0     2    0     2     1   77     0     0  356     2
User Adj:    1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:     0.95 0.95  0.95  0.95 0.95  0.95  0.95 0.95  0.95  0.95 0.95  0.95
PHF Volume:     0    0     0     2    0     2     1   81     0     0  375     2
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
FinalVolume:    0    0     0     2    0     2     1   81     0     0  375     2
------------|---------------||---------------||---------------||---------------|
Critical Gap Module:
Critical Gp:xxxxx xxxx xxxxx   6.4  6.5   6.2   4.1 xxxx xxxxx xxxxx xxxx xxxxx
FollowUpTim:xxxxx xxxx xxxxx   3.5  4.0   3.3   2.2 xxxx xxxxx xxxxx xxxx xxxxx
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol: xxxx xxxx xxxxx   459  459   376   377 xxxx xxxxx  xxxx xxxx xxxxx
Potent Cap.: xxxx xxxx xxxxx   564  502   675  1193 xxxx xxxxx  xxxx xxxx xxxxx
Move Cap.:   xxxx xxxx xxxxx   563  501   675  1193 xxxx xxxxx  xxxx xxxx xxxxx
Volume/Cap:  xxxx xxxx  xxxx  0.00 0.00  0.00  0.00 xxxx  xxxx  xxxx xxxx  xxxx
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
2Way95thQ:   xxxx xxxx xxxxx  xxxx xxxx xxxxx   0.0 xxxx xxxxx  xxxx xxxx xxxxx
Control Del:xxxxx xxxx xxxxx xxxxx xxxx xxxxx   8.0 xxxx xxxxx xxxxx xxxx xxxxx
LOS by Move:     *    *     *     *    *     *     A    *     *     *    *     *
Movement:     LT - LTR - RT   LT - LTR - RT   LT - LTR - RT   LT - LTR - RT
Shared Cap.: xxxx xxxx xxxxx  xxxx  614 xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
SharedQueue:xxxxx xxxx xxxxx xxxxx  0.0 xxxxx   0.0 xxxx xxxxx xxxxx xxxx xxxxx
Shrd ConDel:xxxxx xxxx xxxxx xxxxx 10.9 xxxxx   8.0 xxxx xxxxx xxxxx xxxx xxxxx
Shared LOS:      *    *     *     *    B     *     A    *     *     *    *     *
ApproachDel:      xxxxxx            10.9            xxxxxx           xxxxxx
ApproachLOS:        *                 B                *                *
******************************************************************************
Note: Queue reported is the number of cars per lane.
******************************************************************************
```

Glen Mor 2 Student Apartments Project
Year 2015 Without Project
Evening Peak Hour

Level Of Service Computation Report
2000 HCM Unsignalized Method (Future Volume Alternative)

Intersection #7 Valencia Hill Drive (NS) / Big Springs Road (EW)

Average Delay (sec/veh): 0.2 Worst Case Level Of Service: B[11.4]

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Stop Sign			Stop Sign			Uncontrolled			Uncontrolled		
Rights:	Include			Include			Include			Include		
Lanes:	0 0 0 0 0			0 0 1! 0 0			0 1 0 0 0			0 0 0 1 0		
Volume Module:												
Base Vol:	0	0	0	4	0	4	4	520	0	0	204	2
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	0	0	0	4	0	4	4	520	0	0	204	2
Added Vol:	0	0	0	0	0	0	0	-51	0	0	-40	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	0	0	0	4	0	4	4	469	0	0	164	2
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
PHF Volume:	0	0	0	4	0	4	4	494	0	0	173	2
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
FinalVolume:	0	0	0	4	0	4	4	494	0	0	173	2
Critical Gap Module:												
Critical Gp:	xxxxx	xxxx	xxxxx	6.4	6.5	6.2	4.1	xxxx	xxxxx	xxxxx	xxxx	xxxxx
FollowUpTim:	xxxxx	xxxx	xxxxx	3.5	4.0	3.3	2.2	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Capacity Module:												
Cnflict Vol:	xxxx	xxxx	xxxxx	676	676	174	175	xxxx	xxxxx	xxxx	xxxx	xxxxx
Potent Cap.:	xxxx	xxxx	xxxxx	422	378	875	1414	xxxx	xxxxx	xxxx	xxxx	xxxxx
Move Cap.:	xxxx	xxxx	xxxxx	421	377	875	1414	xxxx	xxxxx	xxxx	xxxx	xxxxx
Volume/Cap:	xxxx	xxxx	xxxx	0.01	0.00	0.00	0.00	xxxx	xxxx	xxxx	xxxx	xxxx
Level Of Service Module:												
2Way95thQ:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	0.0	xxxx	xxxxx	xxxx	xxxx	xxxxx
Control Del:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	7.6	xxxx	xxxxx	xxxxx	xxxx	xxxxx
LOS by Move:	*	*	*	*	*	*	A	*	*	*	*	*
Movement:	LT	LTR	RT	LT	LTR	RT	LT	LTR	RT	LT	LTR	RT
Shared Cap.:	xxxx	xxxx	xxxxx	xxxx	569	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx
SharedQueue:	xxxxx	xxxx	xxxxx	xxxxx	0.0	xxxxx	0.0	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Shrd ConDel:	xxxxx	xxxx	xxxxx	xxxxx	11.4	xxxxx	7.6	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Shared LOS:	*	*	*	*	B	*	A	*	*	*	*	*
ApproachDel:	xxxxxx			11.4			xxxxxx			xxxxxx		
ApproachLOS:	*			B			*			*		

Note: Queue reported is the number of cars per lane.

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------------------------------------------------------------------------------
                   Glen Mor 2 Student Apartments Project
                         Year 2015 Without Project
                            Morning Peak Hour
------------------------------------------------------------------------------

                    Level Of Service Computation Report
          2000 HCM 4-Way Stop Method (Future Volume Alternative)
******************************************************************************
Intersection #8 Watkins Drive (NS) / Big Springs Road (EW)
******************************************************************************
Cycle (sec):            0                Critical Vol./Cap.(X):         1.213
Loss Time (sec):        0 (Y+R=4.0 sec)  Average Delay (sec/veh):        61.6
Optimal Cycle:          0                Level Of Service:                  F
******************************************************************************
Approach:       North Bound      South Bound       East Bound       West Bound
Movement:      L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Stop Sign        Stop Sign         Stop Sign        Stop Sign
Rights:           Include          Include           Include          Include
Min. Green:     0     0     0    0     0     0    0     0     0    0     0     0
Lanes:         1  0  1  0  1    1  0  1  0  1    0  1  0  0  1    0  1  0  0  1
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:     213   609    38    52   248   115    40    16    43    44    46   126
Growth Adj:  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00
Initial Bse:  213   609    38    52   248   115    40    16    43    44    46   126
Added Vol:     -8     0     0     0     0    -6    -8    -2   -10     0    -2     0
PasserByVol:    0     0     0     0     0     0     0     0     0     0     0     0
Initial Fut:  205   609    38    52   248   109    32    14    33    44    44   126
User Adj:    1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00
PHF Adj:     0.95  0.95  0.95  0.95  0.95  0.95  0.95  0.95  0.95  0.95  0.95  0.95
PHF Volume:   216   641    40    55   261   115    34    15    35    46    46   133
Reduct Vol:     0     0     0     0     0     0     0     0     0     0     0     0
Reduced Vol:  216   641    40    55   261   115    34    15    35    46    46   133
PCE Adj:     1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00
MLF Adj:     1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00
FinalVolume:  216   641    40    55   261   115    34    15    35    46    46   133
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Adjustment:  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00
Lanes:       1.00  1.00  1.00  1.00  1.00  1.00  0.70  0.30  1.00  0.50  0.50  1.00
Final Sat.:   485   529   571   442   475   520   289   126   472   222   222   503
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:     0.45  1.21  0.07  0.12  0.55  0.22  0.12  0.12  0.07  0.21  0.21  0.26
Crit Moves:        ****              ****        ****                          ****
Delay/Veh:   15.6   135   9.3  11.8  18.7  11.4  12.1  12.1  10.5  12.6  12.6  12.0
Delay Adj:   1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00
AdjDel/Veh:  15.6   135   9.3  11.8  18.7  11.4  12.1  12.1  10.5  12.6  12.6  12.0
LOS by Move:    C     F     A     B     C     B     B     B     B     B     B     B
ApproachDel:      100.6             15.9              11.4              12.3
Delay Adj:         1.00             1.00              1.00              1.00
ApprAdjDel:       100.6             15.9              11.4              12.3
LOS by Appr:          F                C                 B                 B
AllWayAvgQ:   0.8  18.4   0.1   0.1   1.1   0.3   0.1   0.1   0.1   0.2   0.2   0.3
******************************************************************************
Note: Queue reported is the number of cars per lane.
```

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Glen Mor 2 Student Apartments Project
Year 2015 Without Project
Evening Peak Hour

Level Of Service Computation Report
2000 HCM 4-Way Stop Method (Future Volume Alternative)

Intersection #8 Watkins Drive (NS) / Big Springs Road (EW)

Cycle (sec):	0	Critical Vol./Cap.(X):	1.927
Loss Time (sec):	0 (Y+R=4.0 sec)	Average Delay (sec/veh):	174.7
Optimal Cycle:	0	Level Of Service:	F

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Stop Sign			Stop Sign			Stop Sign			Stop Sign		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	1 0	1 0	1	1 0	1 0	1	0 1	0 0	1	0 1	0 0	1
Volume Module:												
Base Vol:	90	363	24	116	711	89	165	47	312	180	27	78
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	90	363	24	116	711	89	165	47	312	180	27	78
Added Vol:	-20	0	0	0	0	-16	-20	-5	-25	0	-4	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	70	363	24	116	711	73	145	42	287	180	23	78
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
PHF Volume:	74	382	25	122	748	77	153	44	302	189	24	82
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	74	382	25	122	748	77	153	44	302	189	24	82
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	74	382	25	122	748	77	153	44	302	189	24	82
Saturation Flow Module:												
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	1.00	1.00	1.00	1.00	1.00	1.00	0.78	0.22	1.00	0.89	0.11	1.00
Final Sat.:	355	380	400	365	388	413	302	87	442	328	42	418
Capacity Analysis Module:												
Vol/Sat:	0.21	1.01	0.06	0.33	1.93	0.19	0.51	0.51	0.68	0.58	0.58	0.20
Crit Moves:		****			****				****	****		
Delay/Veh:	15.2	79.1	12.1	17.2	448	13.2	20.8	20.8	26.4	24.4	24.4	13.2
Delay Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	15.2	79.1	12.1	17.2	448	13.2	20.8	20.8	26.4	24.4	24.4	13.2
LOS by Move:	C	F	B	C	F	B	C	C	D	C	C	B
ApproachDel:		65.8			357.0			24.2			21.3	
Delay Adj:		1.00			1.00			1.00			1.00	
ApprAdjDel:		65.8			357.0			24.2			21.3	
LOS by Appr:		F			F			C			C	
AllWayAvgQ:	0.3	7.1	0.1	0.5	47.0	0.2	1.0	1.0	1.9	1.2	1.2	0.2

Note: Queue reported is the number of cars per lane.

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                   Glen Mor 2 Student Apartments Project
                        Year 2015 Without Project
                   Morning Peak Hour - With Improvements
--------------------------------------------------------------------------------
                    Level Of Service Computation Report
          2000 HCM Operations Method (Future Volume Alternative)
********************************************************************************
Intersection #8 Watkins Drive (NS) / Big Springs Road (EW)
********************************************************************************
Cycle (sec):           80               Critical Vol./Cap.(X):          0.466
Loss Time (sec):        8 (Y+R=4.0 sec) Average Delay (sec/veh):         10.9
Optimal Cycle: OPTIMIZED                Level Of Service:                   B
********************************************************************************
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:    L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Permitted        Permitted        Permitted        Permitted
Rights:          Include          Include          Include          Include
Min. Green:   26   26    26   26   26    26   23   23    23   23   23    23
Lanes:        1  0  1  0  1   1  0  1  0  1   0  1  0  0  1   0  1  0  0  1
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:     213  609    38   52  248   115   40   16    43   44   46   126
Growth Adj:  1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
Initial Bse:  213  609    38   52  248   115   40   16    43   44   46   126
Added Vol:     -8    0     0    0    0    -6   -8   -2   -10    0   -2     0
PasserByVol:    0    0     0    0    0     0    0    0     0    0    0     0
Initial Fut:  205  609    38   52  248   109   32   14    33   44   44   126
User Adj:    1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
PHF Adj:     0.95 0.95  0.95 0.95 0.95  0.95 0.95 0.95  0.95 0.95 0.95  0.95
PHF Volume:   216  641    40   55  261   115   34   15    35   46   46   133
Reduct Vol:     0    0     0    0    0     0    0    0     0    0    0     0
Reduced Vol:  216  641    40   55  261   115   34   15    35   46   46   133
PCE Adj:     1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
MLF Adj:     1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
FinalVolume:  216  641    40   55  261   115   34   15    35   46   46   133
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Sat/Lane:    1900 1900  1900 1900 1900  1900 1900 1900  1900 1900 1900  1900
Adjustment:  0.58 1.00  0.85 0.31 1.00  0.85 0.81 0.81  0.85 0.85 0.85  0.85
Lanes:       1.00 1.00  1.00 1.00 1.00  1.00 0.70 0.30  1.00 0.50 0.50  1.00
Final Sat.:  1094 1900  1615  580 1900  1615 1073  470  1615  810  810  1615
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:     0.20 0.34  0.02 0.09 0.14  0.07 0.03 0.03  0.02 0.06 0.06  0.08
Crit Moves:       ****                                                    ****
Green/Cycle: 0.61 0.61  0.61 0.61 0.61  0.61 0.29 0.29  0.29 0.29 0.29  0.29
Volume/Cap:  0.32 0.55  0.04 0.15 0.22  0.12 0.11 0.11  0.07 0.20 0.20  0.29
Delay/Veh:    7.8  9.6   6.2  6.8  7.1   6.5 21.1 21.1  20.8 21.7 21.7  22.5
User DelAdj: 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
AdjDel/Veh:   7.8  9.6   6.2  6.8  7.1   6.5 21.1 21.1  20.8 21.7 21.7  22.5
LOS by Move:    A    A     A    A    A     A    C    C     C    C    C     C
HCM2kAvgQ:      3   10     0    1    3     1    1    1     1    2    2     3
********************************************************************************
Note: Queue reported is the number of cars per lane.
********************************************************************************
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Glen Mor 2 Student Apartments Project
Year 2015 Without Project
Evening Peak Hour - With Improvements

Level Of Service Computation Report
2000 HCM Operations Method (Future Volume Alternative)

Intersection #8 Watkins Drive (NS) / Big Springs Road (EW)

Cycle (sec):	65	Critical Vol./Cap.(X):	0.668
Loss Time (sec):	8 (Y+R=4.0 sec)	Average Delay (sec/veh):	14.3
Optimal Cycle:	OPTIMIZED	Level Of Service:	B

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Permitted			Permitted			Permitted			Permitted		
Rights:	Include			Include			Include			Include		
Min. Green:	26	26	26	26	26	26	23	23	23	23	23	23
Lanes:	1 0	1 0	1	1 0	1 0	1	0 1	0 0	1	0 1	0 0	1
Volume Module:												
Base Vol:	90	363	24	116	711	89	165	47	312	180	27	78
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	90	363	24	116	711	89	165	47	312	180	27	78
Added Vol:	-20	0	0	0	0	-16	-20	-5	-25	0	-4	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	70	363	24	116	711	73	145	42	287	180	23	78
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
PHF Volume:	74	382	25	122	748	77	153	44	302	189	24	82
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	74	382	25	122	748	77	153	44	302	189	24	82
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	74	382	25	122	748	77	153	44	302	189	24	82
Saturation Flow Module:												
Sat/Lane:	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Adjustment:	0.18	1.00	0.85	0.47	1.00	0.85	0.59	0.59	0.85	0.59	0.59	0.85
Lanes:	1.00	1.00	1.00	1.00	1.00	1.00	0.78	0.22	1.00	0.89	0.11	1.00
Final Sat.:	334	1900	1615	885	1900	1615	872	253	1615	989	126	1615
Capacity Analysis Module:												
Vol/Sat:	0.22	0.20	0.02	0.14	0.39	0.05	0.18	0.18	0.19	0.19	0.19	0.05
Crit Moves:					****						****	
Green/Cycle:	0.52	0.52	0.52	0.52	0.52	0.52	0.35	0.35	0.35	0.35	0.35	0.35
Volume/Cap:	0.42	0.38	0.03	0.26	0.75	0.09	0.49	0.49	0.53	0.54	0.54	0.14
Delay/Veh:	11.1	9.5	7.5	8.9	15.5	7.8	17.4	17.4	17.6	18.3	18.3	14.4
User DelAdj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	11.1	9.5	7.5	8.9	15.5	7.8	17.4	17.4	17.6	18.3	18.3	14.4
LOS by Move:	B	A	A	A	B	A	B	B	B	B	B	B
HCM2kAvgQ:	2	5	0	2	13	1	4	4	5	4	4	1

Note: Queue reported is the number of cars per lane.

<u>Year 2015 With Project</u>

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-------------------------------------------------------------------------------
                   Glen Mor 2 Student Apartments Project
                        Year 2015 With Project
                          Morning Peak Hour
-------------------------------------------------------------------------------

                    Level Of Service Computation Report
            2000 HCM 4-Way Stop Method (Base Volume Alternative)
********************************************************************************
Intersection #1 Aberdeen Drive (NS) / Linden Street (EW)
********************************************************************************
Cycle (sec):            0               Critical Vol./Cap.(X):          0.540
Loss Time (sec):        0 (Y+R=4.0 sec) Average Delay (sec/veh):         12.0
Optimal Cycle:          0               Level Of Service:                   B
********************************************************************************
Approach:       North Bound      South Bound      East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Stop Sign        Stop Sign        Stop Sign        Stop Sign
Rights:          Include          Include          Include          Include
Min. Green:    0     0     0    0     0     0    0     0     0    0     0     0
Lanes:        0  0  1! 0  0    0  0  0  0  0    0  0  1  0  1    0  1  0  0  0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:     267     0    34     0     0     0     0    51   375    55    45     0
Growth Adj:  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00
Initial Bse:  267     0    34     0     0     0     0    51   375    55    45     0
User Adj:    1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00
PHF Adj:     0.95  0.95  0.95  0.95  0.95  0.95  0.95  0.95  0.95  0.95  0.95  0.95
PHF Volume:   281     0    36     0     0     0     0    54   395    58    47     0
Reduct Vol:     0     0     0     0     0     0     0     0     0     0     0     0
Reduced Vol:  281     0    36     0     0     0     0    54   395    58    47     0
PCE Adj:     1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00
MLF Adj:     1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00
FinalVolume:  281     0    36     0     0     0     0    54   395    58    47     0
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Adjustment:  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00
Lanes:       0.89  0.00  0.11  0.00  0.00  0.00  0.00  1.00  1.00  0.55  0.45  0.00
Final Sat.:   582     0    74     0     0     0     0   641   731   341   279     0
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:     0.48  xxxx  0.48  xxxx  xxxx  xxxx  xxxx  0.08  0.54  0.17  0.17  xxxx
Crit Moves:  ****                                            ****  ****
Delay/Veh:   12.7   0.0  12.7   0.0   0.0   0.0   0.0   8.7  12.6   9.5   9.5   0.0
Delay Adj:   1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00
AdjDel/Veh:  12.7   0.0  12.7   0.0   0.0   0.0   0.0   8.7  12.6   9.5   9.5   0.0
LOS by Move:    B     *     B     *     *     *     *     A     B     A     A     *
ApproachDel:       12.7           xxxxxx             12.1              9.5
Delay Adj:         1.00            xxxxx             1.00             1.00
ApprAdjDel:        12.7           xxxxxx             12.1              9.5
LOS by Appr:          B                *                B                A
AllWayAvgQ:   0.8   0.8   0.8   0.0   0.0   0.0   0.0   0.1   1.0   0.2   0.2   0.2
********************************************************************************
Note: Queue reported is the number of cars per lane.
********************************************************************************
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------------------------------------------------------------------------------
                  Glen Mor 2 Student Apartments Project
                         Year 2015 With Project
                           Evening Peak Hour
------------------------------------------------------------------------------

                   Level Of Service Computation Report
           2000 HCM 4-Way Stop Method (Base Volume Alternative)
******************************************************************************
Intersection #1 Aberdeen Drive (NS) / Linden Street (EW)
******************************************************************************
Cycle (sec):           0              Critical Vol./Cap.(X):        0.927
Loss Time (sec):       0 (Y+R=4.0 sec) Average Delay (sec/veh):      29.8
Optimal Cycle:         0              Level Of Service:                 D
******************************************************************************
Approach:      North Bound      South Bound      East Bound       West Bound
Movement:     L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Stop Sign        Stop Sign        Stop Sign        Stop Sign
Rights:          Include          Include          Include          Include
Min. Green:    0    0     0    0    0     0    0    0     0    0    0     0
Lanes:        0  0  1! 0  0   0  0  0  0  0   0  0  1  0  1   0  1  0  0  0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:     547    0    22     0    0     0     0   53   408    20   61     0
Growth Adj:  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Initial Bse:  547    0    22     0    0     0     0   53   408    20   61     0
User Adj:    1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:     0.95 0.95  0.95  0.95 0.95  0.95  0.95 0.95  0.95  0.95 0.95  0.95
PHF Volume:   576    0    23     0    0     0     0   56   429    21   64     0
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
Reduced Vol:  576    0    23     0    0     0     0   56   429    21   64     0
PCE Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
MLF Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
FinalVolume:  576    0    23     0    0     0     0   56   429    21   64     0
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Adjustment:  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Lanes:       0.96 0.00  0.04  0.00 0.00  0.00  0.00 1.00  1.00  0.25 0.75  0.00
Final Sat.:   621    0    25     0    0     0     0  552   618   131  398     0
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:     0.93 xxxx  0.93  xxxx xxxx  xxxx  xxxx 0.10  0.70  0.16 0.16  xxxx
Crit Moves:  ****                                         ****       ****
Delay/Veh:   42.0  0.0  42.0   0.0  0.0   0.0   0.0  9.8  19.3  10.7 10.7   0.0
Delay Adj:   1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
AdjDel/Veh:  42.0  0.0  42.0   0.0  0.0   0.0   0.0  9.8  19.3  10.7 10.7   0.0
LOS by Move:    E    *     E     *    *     *     *    A     C     B    B     *
ApproachDel:      42.0            xxxxxx             18.2             10.7
Delay Adj:        1.00             xxxxx             1.00             1.00
ApprAdjDel:       42.0            xxxxxx             18.2             10.7
LOS by Appr:         E                 *                C                B
AllWayAvgQ:    6.0  6.0   6.0   0.0  0.0   0.0   0.0  0.1   1.9   0.2  0.2   0.2
******************************************************************************
Note: Queue reported is the number of cars per lane.
******************************************************************************
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                 Glen Mor 2 Student Apartments Project
                       Year 2015 With Project
                          Morning Peak Hour
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                  Level Of Service Computation Report
         2000 HCM 4-Way Stop Method (Base Volume Alternative)
********************************************************************************
Intersection #2 Aberdeen Drive (NS) / Campus Drive (EW)
********************************************************************************
Cycle (sec):            0             Critical Vol./Cap.(X):        0.616
Loss Time (sec):        0 (Y+R=4.0 sec) Average Delay (sec/veh):     12.5
Optimal Cycle:          0             Level Of Service:                 B
********************************************************************************
Approach:     North Bound      South Bound       East Bound       West Bound
Movement:    L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:       Stop Sign        Stop Sign        Stop Sign        Stop Sign
Rights:          Include          Include          Include          Include
Min. Green:    0    0    0    0    0    0    0    0    0    0    0    0
Lanes:       0  0  0  0  0   0  0  1! 0  0   0  1  0  0  0   0  0  0  1  0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:      0    0    0  378    0   64   17   22    0    0   20  224
Growth Adj: 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00
Initial Bse:   0    0    0  378    0   64   17   22    0    0   20  224
User Adj:   1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00
PHF Adj:    0.95 0.95 0.95 0.95 0.95 0.95 0.95 0.95 0.95 0.95 0.95 0.95
PHF Volume:    0    0    0  398    0   67   18   23    0    0   21  236
Reduct Vol:    0    0    0    0    0    0    0    0    0    0    0    0
Reduced Vol:   0    0    0  398    0   67   18   23    0    0   21  236
PCE Adj:    1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00
MLF Adj:    1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00
FinalVolume:   0    0    0  398    0   67   18   23    0    0   21  236
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Adjustment: 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00
Lanes:      0.00 0.00 0.00 0.86 0.00 0.14 0.44 0.56 0.00 0.00 0.08 0.92
Final Sat.:    0    0    0  646    0  109  265  343    0    0   61  685
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:    xxxx xxxx xxxx 0.62 xxxx 0.62 0.07 0.07 xxxx xxxx 0.34 0.34
Crit Moves:                          ****      ****                     ****
Delay/Veh:   0.0  0.0  0.0 14.5  0.0 14.5  8.8  8.8  0.0  0.0  9.7  9.7
Delay Adj:  1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00
AdjDel/Veh:  0.0  0.0  0.0 14.5  0.0 14.5  8.8  8.8  0.0  0.0  9.7  9.7
LOS by Move:   *    *    *    B    *    B    A    A    *    *    A    A
ApproachDel:     xxxxxx          14.5              8.8              9.7
Delay Adj:        xxxxx          1.00             1.00             1.00
ApprAdjDel:      xxxxxx          14.5              8.8              9.7
LOS by Appr:        *               B                A                A
AllWayAvgQ:  0.0  0.0  0.0  1.4  1.4  1.4  0.1  0.1  0.1  0.4  0.4  0.4
********************************************************************************
Note: Queue reported is the number of cars per lane.
********************************************************************************
```

Glen Mor 2 Student Apartments Project
Year 2015 With Project
Evening Peak Hour

Level Of Service Computation Report
2000 HCM 4-Way Stop Method (Base Volume Alternative)

Intersection #2 Aberdeen Drive (NS) / Campus Drive (EW)

Cycle (sec):	0	Critical Vol./Cap.(X):	0.775
Loss Time (sec):	0 (Y+R=4.0 sec)	Average Delay (sec/veh):	19.2
Optimal Cycle:	0	Level Of Service:	C

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Stop Sign			Stop Sign			Stop Sign			Stop Sign		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	0 0	0	0 0	0 0	1!	0 0	0 1	0	0 0	0 0	0	1 0
Volume Module:												
Base Vol:	0	0	0	343	0	68	64	40	0	0	30	516
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	0	0	0	343	0	68	64	40	0	0	30	516
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
PHF Volume:	0	0	0	361	0	72	67	42	0	0	32	543
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	0	0	0	361	0	72	67	42	0	0	32	543
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	0	0	0	361	0	72	67	42	0	0	32	543
Saturation Flow Module:												
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	0.00	0.00	0.00	0.83	0.00	0.17	0.62	0.38	0.00	0.00	0.05	0.95
Final Sat.:	0	0	0	521	0	103	341	213	0	0	41	701
Capacity Analysis Module:												
Vol/Sat:	xxxx	xxxx	xxxx	0.69	xxxx	0.69	0.20	0.20	xxxx	xxxx	0.77	0.77
Crit Moves:						****	****				****	
Delay/Veh:	0.0	0.0	0.0	19.0	0.0	19.0	10.4	10.4	0.0	0.0	21.0	21.0
Delay Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	0.0	0.0	0.0	19.0	0.0	19.0	10.4	10.4	0.0	0.0	21.0	21.0
LOS by Move:	*	*	*	C	*	C	B	B	*	*	C	C
ApproachDel:	xxxxxx			19.0			10.4			21.0		
Delay Adj:	xxxxx			1.00			1.00			1.00		
ApprAdjDel:	xxxxxx			19.0			10.4			21.0		
LOS by Appr:	*			C			B			C		
AllWayAvgQ:	0.0	0.0	0.0	1.8	1.8	1.8	0.2	0.2	0.2	2.7	2.7	2.7

Note: Queue reported is the number of cars per lane.

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-------------------------------------------------------------------------------
                 Glen Mor 2 Student Apartments Project
                        Year 2015 With Project
                          Morning Peak Hour
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                   Level Of Service Computation Report
           2000 HCM 4-Way Stop Method (Base Volume Alternative)
*******************************************************************************
Intersection #3 Campus Drive (NS) / Big Springs Road (EW)
*******************************************************************************
Cycle (sec):            0                Critical Vol./Cap.(X):         0.421
Loss Time (sec):        0 (Y+R=4.0 sec)  Average Delay (sec/veh):        10.2
Optimal Cycle:          0                Level Of Service:                  B
*******************************************************************************
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Stop Sign        Stop Sign        Stop Sign        Stop Sign
Rights:          Include          Include          Include          Include
Min. Green:    0    0    0    0    0    0    0    0    0    0    0    0
Lanes:        0  0  0  1  0    0  1  0  0  0    0  0  0  0  0    0  0  1! 0  0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:      0  147   65   100  193    0     0    0    0   106    0   99
Growth Adj:  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00
Initial Bse:   0  147   65   100  193    0     0    0    0   106    0   99
User Adj:    1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00
PHF Adj:     0.95 0.95 0.95  0.95 0.95 0.95  0.95 0.95 0.95  0.95 0.95 0.95
PHF Volume:    0  155   68   105  203    0     0    0    0   112    0  104
Reduct Vol:    0    0    0     0    0    0     0    0    0     0    0    0
Reduced Vol:   0  155   68   105  203    0     0    0    0   112    0  104
PCE Adj:     1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00
MLF Adj:     1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00
FinalVolume:   0  155   68   105  203    0     0    0    0   112    0  104
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Adjustment:  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00
Lanes:       0.00 0.69 0.31  0.34 0.66 0.00  0.00 0.00 0.00  0.52 0.00 0.48
Final Sat.:    0  519  229   250  483    0     0    0    0   357    0  334
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:     xxxx 0.30 0.30  0.42 0.42 xxxx  xxxx xxxx xxxx  0.31 xxxx 0.31
Crit Moves:            ****  ****                            ****
Delay/Veh:    0.0  9.5  9.5  11.0 11.0  0.0   0.0  0.0  0.0   9.9  0.0  9.9
Delay Adj:   1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00
AdjDel/Veh:   0.0  9.5  9.5  11.0 11.0  0.0   0.0  0.0  0.0   9.9  0.0  9.9
LOS by Move:    *    A    A     B    B    *     *    *    *     A    *    A
ApproachDel:         9.5             11.0            xxxxxx            9.9
Delay Adj:          1.00             1.00             xxxxx           1.00
ApprAdjDel:          9.5             11.0            xxxxxx            9.9
LOS by Appr:           A                B                 *              A
AllWayAvgQ:   0.4  0.4  0.4   0.7  0.7  0.7   0.0  0.0  0.0   0.4  0.4  0.4
*******************************************************************************
Note: Queue reported is the number of cars per lane.
*******************************************************************************
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-----------------------------------------------------------------------------
                Glen Mor 2 Student Apartments Project
                       Year 2015 With Project
                         Evening Peak Hour
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                  Level Of Service Computation Report
         2000 HCM 4-Way Stop Method (Base Volume Alternative)
*****************************************************************************
Intersection #3 Campus Drive (NS) / Big Springs Road (EW)
*****************************************************************************
Cycle (sec):          0                Critical Vol./Cap.(X):        0.790
Loss Time (sec):      0 (Y+R=4.0 sec)  Average Delay (sec/veh):       20.3
Optimal Cycle:        0                Level Of Service:                 C
*****************************************************************************
Approach:     North Bound      South Bound      East Bound       West Bound
Movement:    L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:       Stop Sign        Stop Sign        Stop Sign        Stop Sign
Rights:         Include          Include          Include          Include
Min. Green:    0     0     0    0     0     0    0     0     0    0     0     0
Lanes:       0  0  0  1  0   0  1  0  0  0   0  0  0  0  0   0  0  1! 0  0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:      0   317   179   138   247     0     0     0     0   135     0   196
Growth Adj: 1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00
Initial Bse:   0   317   179   138   247     0     0     0     0   135     0   196
User Adj:   1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00
PHF Adj:    0.95  0.95  0.95  0.95  0.95  0.95  0.95  0.95  0.95  0.95  0.95  0.95
PHF Volume:    0   334   188   145   260     0     0     0     0   142     0   206
Reduct Vol:    0     0     0     0     0     0     0     0     0     0     0     0
Reduced Vol:   0   334   188   145   260     0     0     0     0   142     0   206
PCE Adj:    1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00
MLF Adj:    1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00
FinalVolume:   0   334   188   145   260     0     0     0     0   142     0   206
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Adjustment: 1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00
Lanes:      0.00  0.64  0.36  0.36  0.64  0.00  0.00  0.00  0.00  0.41  0.00  0.59
Final Sat.:    0   423   239   218   390     0     0     0     0   239     0   347
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:    xxxx  0.79  0.79  0.67  0.67  xxxx  xxxx  xxxx  xxxx  0.59  xxxx  0.59
Crit Moves:             ****        ****                          ****
Delay/Veh:   0.0  24.3  24.3  18.8  18.8   0.0   0.0   0.0   0.0  16.1   0.0  16.1
Delay Adj:  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00
AdjDel/Veh:  0.0  24.3  24.3  18.8  18.8   0.0   0.0   0.0   0.0  16.1   0.0  16.1
LOS by Move:   *     C     C     C     C     *     *     *     *     C     *     C
ApproachDel:      24.3              18.8             xxxxxx             16.1
Delay Adj:        1.00              1.00              xxxxx             1.00
ApprAdjDel:       24.3              18.8             xxxxxx             16.1
LOS by Appr:         C                 C                 *                C
AllWayAvgQ:  2.9   2.9   2.9   1.7   1.7   1.7   0.0   0.0   0.0   1.2   1.2   1.2
*****************************************************************************
Note: Queue reported is the number of cars per lane.
*****************************************************************************
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-------------------------------------------------------------------------------
                     Glen Mor 2 Student Apartments Project
                            Year 2015 With Project
                              Morning Peak Hour
-------------------------------------------------------------------------------

                      Level Of Service Computation Report
            2000 HCM Unsignalized Method (Base Volume Alternative)
********************************************************************************
Intersection #4 Campus Drive (NS) / Eucalyptus Drive (EW)
********************************************************************************
Average Delay (sec/veh):        0.6       Worst Case Level Of Service: B[ 12.2]
********************************************************************************
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R   L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:      Uncontrolled     Uncontrolled      Stop Sign        Stop Sign
Rights:          Include          Include          Include          Include
Lanes:       0  1  0  0  0   0  0  0  1  0    0  0  1! 0  0    0  0  0  0  0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:       4  278     0     0  220    35    20     0     3     0     0     0
Growth Adj:  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Initial Bse:    4  278     0     0  220    35    20     0     3     0     0     0
User Adj:    1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:     0.95 0.95  0.95  0.95 0.95  0.95  0.95 0.95  0.95  0.95 0.95  0.95
PHF Volume:     4  293     0     0  232    37    21     0     3     0     0     0
Reduct Vol:     0    0     0     0    0     0     0     0     0     0     0     0
FinalVolume:    4  293     0     0  232    37    21     0     3     0     0     0
------------|---------------||---------------||---------------||---------------|
Critical Gap Module:
Critical Gp:  4.1 xxxx xxxxx xxxxx xxxx xxxxx   6.4  6.5   6.2 xxxxx xxxx xxxxx
FollowUpTim:  2.2 xxxx xxxxx xxxxx xxxx xxxxx   3.5  4.0   3.3 xxxxx xxxx xxxxx
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol:  268 xxxx xxxxx  xxxx xxxx xxxxx   551  551   250  xxxx xxxx xxxxx
Potent Cap.: 1307 xxxx xxxxx  xxxx xxxx xxxxx   499  445   794  xxxx xxxx xxxxx
Move Cap.:   1307 xxxx xxxxx  xxxx xxxx xxxxx   498  444   794  xxxx xxxx xxxxx
Volume/Cap:  0.00 xxxx  xxxx  xxxx xxxx  xxxx  0.04 0.00  0.00  xxxx xxxx  xxxx
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
2Way95thQ:    0.0 xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
Control Del:  7.8 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
LOS by Move:    A    *     *     *    *     *     *    *     *     *    *     *
Movement:     LT - LTR - RT   LT - LTR - RT    LT - LTR - RT    LT - LTR - RT
Shared Cap.: xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx  523 xxxxx  xxxx xxxx xxxxx
SharedQueue:  0.0 xxxx xxxxx xxxxx xxxx xxxxx xxxxx  0.1 xxxxx xxxxx xxxx xxxxx
Shrd ConDel:  7.8 xxxx xxxxx xxxxx xxxx xxxxx xxxxx 12.2 xxxxx xxxxx xxxx xxxxx
Shared LOS:     A    *     *     *    *     *     *    B     *     *    *     *
ApproachDel:      xxxxxx           xxxxxx             12.2            xxxxxx
ApproachLOS:         *                *                 B                *
********************************************************************************
Note: Queue reported is the number of cars per lane.
********************************************************************************
```

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                     Glen Mor 2 Student Apartments Project
                          Year 2015 With Project
                             Evening Peak Hour
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                     Level Of Service Computation Report
          2000 HCM Unsignalized Method (Base Volume Alternative)
********************************************************************************
Intersection #4 Campus Drive (NS) / Eucalyptus Drive (EW)
********************************************************************************
Average Delay (sec/veh):        0.5        Worst Case Level Of Service: C[ 17.3]
********************************************************************************
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:      Uncontrolled     Uncontrolled      Stop Sign        Stop Sign
Rights:          Include          Include          Include          Include
Lanes:        0  1  0  0  0   0  0  0  1  0   0  0  1! 0  0   0  0  0  0  0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:        2  394     0     0  492    28    21     0     5     0     0     0
Growth Adj:   1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Initial Bse:     2  394     0     0  492    28    21     0     5     0     0     0
User Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:      0.95 0.95  0.95  0.95 0.95  0.95  0.95 0.95  0.95  0.95 0.95  0.95
PHF Volume:      2  415     0     0  518    29    22     0     5     0     0     0
Reduct Vol:      0    0     0     0    0     0     0     0     0     0     0     0
FinalVolume:     2  415     0     0  518    29    22     0     5     0     0     0
------------|---------------||---------------||---------------||---------------|
Critical Gap Module:
Critical Gp:  4.1 xxxx xxxxx xxxxx xxxx xxxxx   6.4  6.5   6.2 xxxxx xxxx xxxxx
FollowUpTim:  2.2 xxxx xxxxx xxxxx xxxx xxxxx   3.5  4.0   3.3 xxxxx xxxx xxxxx
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol:  547 xxxx xxxxx  xxxx xxxx xxxxx   952  952   533  xxxx xxxx xxxxx
Potent Cap.: 1032 xxxx xxxxx  xxxx xxxx xxxxx   290  262   551  xxxx xxxx xxxxx
Move Cap.:   1032 xxxx xxxxx  xxxx xxxx xxxxx   290  261   551  xxxx xxxx xxxxx
Volume/Cap:  0.00 xxxx  xxxx  xxxx xxxx  xxxx  0.08 0.00  0.01  xxxx xxxx  xxxx
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
2Way95thQ:    0.0 xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
Control Del:  8.5 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
LOS by Move:    A    *     *     *    *     *     *    *     *     *    *     *
Movement:     LT - LTR - RT   LT - LTR - RT   LT - LTR - RT   LT - LTR - RT
Shared Cap.: xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx  319 xxxxx  xxxx xxxx xxxxx
SharedQueue:  0.0 xxxx xxxxx xxxxx xxxx xxxxx xxxxx  0.3 xxxxx xxxxx xxxx xxxxx
Shrd ConDel:  8.5 xxxx xxxxx xxxxx xxxx xxxxx xxxxx 17.3 xxxxx xxxxx xxxx xxxxx
Shared LOS:     A    *     *     *    *     *     *    C     *     *    *     *
ApproachDel:     xxxxxx           xxxxxx            17.3            xxxxxx
ApproachLOS:        *                *                C                *
********************************************************************************
Note: Queue reported is the number of cars per lane.
********************************************************************************
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------------------------------------------------------------------------------------
                    Glen Mor 2 Student Apartments Project
                           Year 2015 With Project
                             Morning Peak Hour
------------------------------------------------------------------------------------

                      Level Of Service Computation Report
         2000 HCM Unsignalized Method (Base Volume Alternative)
************************************************************************************
Intersection #5 Project West Driveway (NS) / Big Springs Road (EW)
************************************************************************************
Average Delay (sec/veh):       1.0       Worst Case Level Of Service: B[ 11.8]
************************************************************************************
Approach:      North Bound      South Bound      East Bound       West Bound
Movement:     L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:       Stop Sign        Stop Sign       Uncontrolled     Uncontrolled
Rights:         Include          Include          Include          Include
Lanes:        0  0  0  0  0   0  0  1! 0  0   0  1  0  0  0   0  0  0  1  0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:       0    0     0   20    0    10   16   78     0     0  368     8
Growth Adj:  1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00  1.00 1.00  1.00
Initial Bse:    0    0     0   20    0    10   16   78     0     0  368     8
User Adj:    1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:     0.95 0.95  0.95 0.95 0.95  0.95 0.95 0.95  0.95  0.95 0.95  0.95
PHF Volume:     0    0     0   21    0    11   17   82     0     0  387     8
Reduct Vol:     0    0     0    0    0     0    0    0     0     0    0     0
FinalVolume:    0    0     0   21    0    11   17   82     0     0  387     8
------------|---------------||---------------||---------------||---------------|
Critical Gap Module:
Critical Gp:xxxxx xxxx xxxxx   6.4  6.5   6.2   4.1 xxxx xxxxx xxxxx xxxx xxxxx
FollowUpTim:xxxxx xxxx xxxxx   3.5  4.0   3.3   2.2 xxxx xxxxx xxxxx xxxx xxxxx
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol: xxxx xxxx xxxxx   507  507   392   396 xxxx xxxxx  xxxx xxxx xxxxx
Potent Cap.: xxxx xxxx xxxxx   529  471   661  1174 xxxx xxxxx  xxxx xxxx xxxxx
Move Cap.:   xxxx xxxx xxxxx   523  464   661  1174 xxxx xxxxx  xxxx xxxx xxxxx
Volume/Cap:  xxxx xxxx  xxxx  0.04 0.00  0.02  0.01 xxxx  xxxx  xxxx xxxx  xxxx
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
2Way95thQ:   xxxx xxxx xxxxx  xxxx xxxx xxxxx   0.0 xxxx xxxxx  xxxx xxxx xxxxx
Control Del:xxxxx xxxx xxxxx xxxxx xxxx xxxxx   8.1 xxxx xxxxx xxxxx xxxx xxxxx
LOS by Move:    *    *     *     *    *     *     A    *     *     *    *     *
Movement:     LT - LTR - RT   LT - LTR - RT   LT - LTR - RT   LT - LTR - RT
Shared Cap.: xxxx xxxx xxxxx  xxxx  562 xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
SharedQueue:xxxxx xxxx xxxxx xxxxx  0.2 xxxxx   0.0 xxxx xxxxx xxxxx xxxx xxxxx
Shrd ConDel:xxxxx xxxx xxxxx xxxxx 11.8 xxxxx   8.1 xxxx xxxxx xxxxx xxxx xxxxx
Shared LOS:     *    *     *     *    B     *     A    *     *     *    *     *
ApproachDel:     xxxxxx              11.8            xxxxxx           xxxxxx
ApproachLOS:        *                  B                *                *
************************************************************************************
Note: Queue reported is the number of cars per lane.
************************************************************************************
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-------------------------------------------------------------------------------
                 Glen Mor 2 Student Apartments Project
                       Year 2015 With Project
                          Evening Peak Hour
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                  Level Of Service Computation Report
        2000 HCM Unsignalized Method (Base Volume Alternative)
*******************************************************************************
Intersection #5 Project West Driveway (NS) / Big Springs Road (EW)
*******************************************************************************
Average Delay (sec/veh):       1.8      Worst Case Level Of Service: C[ 15.2]
*******************************************************************************
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Stop Sign        Stop Sign       Uncontrolled     Uncontrolled
Rights:          Include          Include          Include          Include
Lanes:        0  0  0  0  0   0  0  1! 0  0   0  1  0  0  0   0  0  0  1  0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:       0    0     0    51    0    25    40  473     0     0  193    20
Growth Adj:  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Initial Bse:    0    0     0    51    0    25    40  473     0     0  193    20
User Adj:    1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:     0.95 0.95  0.95  0.95 0.95  0.95  0.95 0.95  0.95  0.95 0.95  0.95
PHF Volume:     0    0     0    54    0    26    42  498     0     0  203    21
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
FinalVolume:    0    0     0    54    0    26    42  498     0     0  203    21
------------|---------------||---------------||---------------||---------------|
Critical Gap Module:
Critical Gp:xxxxx xxxx xxxxx   6.4  6.5   6.2   4.1 xxxx xxxxx xxxxx xxxx xxxxx
FollowUpTim:xxxxx xxxx xxxxx   3.5  4.0   3.3   2.2 xxxx xxxxx xxxxx xxxx xxxxx
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol: xxxx xxxx xxxxx   796  796   214   224 xxxx xxxxx  xxxx xxxx xxxxx
Potent Cap.: xxxx xxxx xxxxx   359  322   831  1356 xxxx xxxxx  xxxx xxxx xxxxx
Move Cap.:   xxxx xxxx xxxxx   350  312   831  1356 xxxx xxxxx  xxxx xxxx xxxxx
Volume/Cap:  xxxx xxxx  xxxx  0.15 0.00  0.03  0.03 xxxx  xxxx  xxxx xxxx  xxxx
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
2Way95thQ:   xxxx xxxx xxxxx  xxxx xxxx xxxxx   0.1 xxxx xxxxx  xxxx xxxx xxxxx
Control Del:xxxxx xxxx xxxxx xxxxx xxxx xxxxx   7.7 xxxx xxxxx xxxxx xxxx xxxxx
LOS by Move:    *    *     *     *    *     *     A    *     *     *    *     *
Movement:     LT - LTR - RT   LT - LTR - RT   LT - LTR - RT   LT - LTR - RT
Shared Cap.: xxxx xxxx xxxxx  xxxx  433 xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
SharedQueue:xxxxx xxxx xxxxx xxxxx  0.7 xxxxx   0.1 xxxx xxxxx xxxxx xxxx xxxxx
Shrd ConDel:xxxxx xxxx xxxxx xxxxx 15.2 xxxxx   7.7 xxxx xxxxx xxxxx xxxx xxxxx
Shared LOS:     *    *     *     *    C     *     A    *     *     *    *     *
ApproachDel:      xxxxxx            15.2            xxxxxx           xxxxxx
ApproachLOS:        *                 C                *                *
*******************************************************************************
Note: Queue reported is the number of cars per lane.
*******************************************************************************
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-------------------------------------------------------------------------------
                   Glen Mor 2 Student Apartments Project
                          Year 2015 With Project
                             Morning Peak Hour
-------------------------------------------------------------------------------

                    Level Of Service Computation Report
           2000 HCM Unsignalized Method (Base Volume Alternative)
*******************************************************************************
Intersection #6 Project East Driveway (NS) / Big Springs Road (EW)
*******************************************************************************
Average Delay (sec/veh):       0.2       Worst Case Level Of Service: B[ 10.5]
*******************************************************************************
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Stop Sign        Stop Sign       Uncontrolled     Uncontrolled
Rights:          Include          Include          Include          Include
Lanes:       0  0  0  0  0    0  0  0  0  1    0  0  1  0  0    0  0  0  1  0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:       0    0     0     0    0    10     0   98     0     0  366     8
Growth Adj:  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Initial Bse:    0    0     0     0    0    10     0   98     0     0  366     8
User Adj:    1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:     0.95 0.95  0.95  0.95 0.95  0.95  0.95 0.95  0.95  0.95 0.95  0.95
PHF Volume:     0    0     0     0    0    11     0  103     0     0  385     8
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
FinalVolume:    0    0     0     0    0    11     0  103     0     0  385     8
------------|---------------||---------------||---------------||---------------|
Critical Gap Module:
Critical Gp:xxxxx xxxx xxxxx xxxxx xxxx   6.2 xxxxx xxxx xxxxx xxxxx xxxx xxxxx
FollowUpTim:xxxxx xxxx xxxxx xxxxx xxxx   3.3 xxxxx xxxx xxxxx xxxxx xxxx xxxxx
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol: xxxx xxxx xxxxx  xxxx xxxx   389  xxxx xxxx xxxxx  xxxx xxxx xxxxx
Potent Cap.: xxxx xxxx xxxxx  xxxx xxxx   663  xxxx xxxx xxxxx  xxxx xxxx xxxxx
Move Cap.:   xxxx xxxx xxxxx  xxxx xxxx   663  xxxx xxxx xxxxx  xxxx xxxx xxxxx
Volume/Cap:  xxxx xxxx  xxxx  xxxx xxxx  0.02  xxxx xxxx  xxxx  xxxx xxxx  xxxx
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
2Way95thQ:   xxxx xxxx xxxxx  xxxx xxxx   0.0  xxxx xxxx xxxxx  xxxx xxxx xxxxx
Control Del:xxxxx xxxx xxxxx xxxxx xxxx  10.5 xxxxx xxxx xxxxx xxxxx xxxx xxxxx
LOS by Move:    *    *     *     *    *     B     *    *     *     *    *     *
Movement:     LT - LTR - RT   LT - LTR - RT   LT - LTR - RT   LT - LTR - RT
Shared Cap.: xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
SharedQueue:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Shrd ConDel:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Shared LOS:     *    *     *     *    *     *     *    *     *     *    *     *
ApproachDel:      xxxxxx             10.5           xxxxxx           xxxxxx
ApproachLOS:        *                 B                *                *
*******************************************************************************
Note: Queue reported is the number of cars per lane.
*******************************************************************************
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------------------------------------------------------------------------------
                  Glen Mor 2 Student Apartments Project
                         Year 2015 With Project
                            Evening Peak Hour
------------------------------------------------------------------------------
                    Level Of Service Computation Report
          2000 HCM Unsignalized Method (Base Volume Alternative)
******************************************************************************
Intersection #6 Project East Driveway (NS) / Big Springs Road (EW)
******************************************************************************
Average Delay (sec/veh):       0.3       Worst Case Level Of Service: A[  9.4]
******************************************************************************
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Stop Sign        Stop Sign       Uncontrolled     Uncontrolled
Rights:          Include          Include          Include          Include
Lanes:        0  0  0  0  0   0  0  0  0  1   0  0  1  0  0   0  0  0  1  0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:       0    0     0     0    0    25     0  524     0     0  188    20
Growth Adj:  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Initial Bse:    0    0     0     0    0    25     0  524     0     0  188    20
User Adj:    1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:     0.95 0.95  0.95  0.95 0.95  0.95  0.95 0.95  0.95  0.95 0.95  0.95
PHF Volume:     0    0     0     0    0    26     0  552     0     0  198    21
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
FinalVolume:    0    0     0     0    0    26     0  552     0     0  198    21
------------|---------------||---------------||---------------||---------------|
Critical Gap Module:
Critical Gp:xxxxx xxxx xxxxx xxxxx xxxx   6.2 xxxxx xxxx xxxxx xxxxx xxxx xxxxx
FollowUpTim:xxxxx xxxx xxxxx xxxxx xxxx   3.3 xxxxx xxxx xxxxx xxxxx xxxx xxxxx
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol: xxxx xxxx xxxxx  xxxx xxxx   208  xxxx xxxx xxxxx  xxxx xxxx xxxxx
Potent Cap.: xxxx xxxx xxxxx  xxxx xxxx   837  xxxx xxxx xxxxx  xxxx xxxx xxxxx
Move Cap.:   xxxx xxxx xxxxx  xxxx xxxx   837  xxxx xxxx xxxxx  xxxx xxxx xxxxx
Volume/Cap:  xxxx xxxx  xxxx  xxxx xxxx  0.03  xxxx xxxx  xxxx  xxxx xxxx  xxxx
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
2Way95thQ:   xxxx xxxx xxxxx  xxxx xxxx   0.1  xxxx xxxx xxxxx  xxxx xxxx xxxxx
Control Del:xxxxx xxxx xxxxx xxxxx xxxx   9.4 xxxxx xxxx xxxxx xxxxx xxxx xxxxx
LOS by Move:    *    *     *     *    *     A     *    *     *     *    *     *
Movement:     LT - LTR - RT   LT - LTR - RT   LT - LTR - RT   LT - LTR - RT
Shared Cap.: xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
SharedQueue:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Shrd ConDel:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Shared LOS:     *    *     *     *    *     *     *    *     *     *    *     *
ApproachDel:     xxxxxx             9.4            xxxxxx           xxxxxx
ApproachLOS:        *                A                *                *
******************************************************************************
Note: Queue reported is the number of cars per lane.
******************************************************************************
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                    Glen Mor 2 Student Apartments Project
                          Year 2015 With Project
                            Morning Peak Hour
--------------------------------------------------------------------------------
                      Level Of Service Computation Report
           2000 HCM Unsignalized Method (Base Volume Alternative)
********************************************************************************
Intersection #7 Valencia Hill Drive (NS) / Big Springs Road (EW)
********************************************************************************
Average Delay (sec/veh):       0.1       Worst Case Level Of Service: B[ 11.1]
********************************************************************************
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Stop Sign        Stop Sign      Uncontrolled     Uncontrolled
Rights:           Include          Include          Include          Include
Lanes:        0  0  0  0  0   0  0  1! 0  0   0  1  0  0  0   0  0  0  1  0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:       0    0     0    2    0     2    1   97     0    0  372     2
Growth Adj:  1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
Initial Bse:    0    0     0    2    0     2    1   97     0    0  372     2
User Adj:    1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
PHF Adj:     0.95 0.95  0.95 0.95 0.95  0.95 0.95 0.95  0.95 0.95 0.95  0.95
PHF Volume:     0    0     0    2    0     2    1  102     0    0  392     2
Reduct Vol:     0    0     0    0    0     0    0    0     0    0    0     0
FinalVolume:    0    0     0    2    0     2    1  102     0    0  392     2
------------|---------------||---------------||---------------||---------------|
Critical Gap Module:
Critical Gp:xxxxx xxxx xxxxx   6.4  6.5   6.2   4.1 xxxx xxxxx xxxxx xxxx xxxxx
FollowUpTim:xxxxx xxxx xxxxx   3.5  4.0   3.3   2.2 xxxx xxxxx xxxxx xxxx xxxxx
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol: xxxx xxxx xxxxx   497  497   393   394 xxxx xxxxx  xxxx xxxx xxxxx
Potent Cap.: xxxx xxxx xxxxx   536  478   661  1176 xxxx xxxxx  xxxx xxxx xxxxx
Move Cap.:   xxxx xxxx xxxxx   536  477   661  1176 xxxx xxxxx  xxxx xxxx xxxxx
Volume/Cap:  xxxx xxxx  xxxx  0.00 0.00  0.00  0.00 xxxx  xxxx  xxxx xxxx  xxxx
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
2Way95thQ:   xxxx xxxx xxxxx  xxxx xxxx xxxxx   0.0 xxxx xxxxx  xxxx xxxx xxxxx
Control Del:xxxxx xxxx xxxxx xxxxx xxxx xxxxx   8.1 xxxx xxxxx xxxxx xxxx xxxxx
LOS by Move:    *    *     *     *    *     *     A    *     *     *    *     *
Movement:     LT - LTR - RT   LT - LTR - RT   LT - LTR - RT   LT - LTR - RT
Shared Cap.: xxxx xxxx xxxxx  xxxx  592 xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
SharedQueue:xxxxx xxxx xxxxx xxxxx  0.0 xxxxx   0.0 xxxx xxxxx xxxxx xxxx xxxxx
Shrd ConDel:xxxxx xxxx xxxxx xxxxx 11.1 xxxxx   8.1 xxxx xxxxx xxxxx xxxx xxxxx
Shared LOS:     *    *     *     *    B     *     A    *     *     *    *     *
ApproachDel:     xxxxxx            11.1            xxxxxx           xxxxxx
ApproachLOS:        *                B                *                *
********************************************************************************
Note: Queue reported is the number of cars per lane.
********************************************************************************
```

```
------------------------------------------------------------------------------
                  Glen Mor 2 Student Apartments Project
                         Year 2015 With Project
                           Evening Peak Hour
------------------------------------------------------------------------------
                   Level Of Service Computation Report
         2000 HCM Unsignalized Method (Base Volume Alternative)
******************************************************************************
Intersection #7 Valencia Hill Drive (NS) / Big Springs Road (EW)
******************************************************************************
Average Delay (sec/veh):       0.2      Worst Case Level Of Service: B[ 12.2]
******************************************************************************
Approach:     North Bound      South Bound       East Bound       West Bound
Movement:    L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Stop Sign        Stop Sign      Uncontrolled     Uncontrolled
Rights:          Include          Include          Include          Include
Lanes:       0  0  0  0  0   0  0  1! 0  0   0  1  0  0  0   0  0  0  1  0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:       0    0     0     4    0     4     4  520     0     0  204     2
Growth Adj:  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Initial Bse:    0    0     0     4    0     4     4  520     0     0  204     2
User Adj:    1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:     0.95 0.95  0.95  0.95 0.95  0.95  0.95 0.95  0.95  0.95 0.95  0.95
PHF Volume:     0    0     0     4    0     4     4  547     0     0  215     2
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
FinalVolume:    0    0     0     4    0     4     4  547     0     0  215     2
------------|---------------||---------------||---------------||---------------|
Critical Gap Module:
Critical Gp:xxxxx xxxx xxxxx   6.4  6.5   6.2   4.1 xxxx xxxxx xxxxx xxxx xxxxx
FollowUpTim:xxxxx xxxx xxxxx   3.5  4.0   3.3   2.2 xxxx xxxxx xxxxx xxxx xxxxx
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol: xxxx xxxx xxxxx   772  772   216   217 xxxx xxxxx  xxxx xxxx xxxxx
Potent Cap.: xxxx xxxx xxxxx   371  333   829  1365 xxxx xxxxx  xxxx xxxx xxxxx
Move Cap.:   xxxx xxxx xxxxx   370  332   829  1365 xxxx xxxxx  xxxx xxxx xxxxx
Volume/Cap:  xxxx xxxx  xxxx  0.01 0.00  0.01  0.00 xxxx  xxxx  xxxx xxxx  xxxx
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
2Way95thQ:   xxxx xxxx xxxxx  xxxx xxxx xxxxx   0.0 xxxx xxxxx  xxxx xxxx xxxxx
Control Del:xxxxx xxxx xxxxx xxxxx xxxx xxxxx   7.6 xxxx xxxxx xxxxx xxxx xxxxx
LOS by Move:     *    *     *     *    *     *     A    *     *     *    *     *
Movement:     LT - LTR - RT   LT - LTR - RT   LT - LTR - RT   LT - LTR - RT
Shared Cap.: xxxx xxxx xxxxx  xxxx  512 xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
SharedQueue:xxxxx xxxx xxxxx xxxxx  0.1 xxxxx   0.0 xxxx xxxxx xxxxx xxxx xxxxx
Shrd ConDel:xxxxx xxxx xxxxx xxxxx 12.2 xxxxx   7.6 xxxx xxxxx xxxxx xxxx xxxxx
Shared LOS:      *    *     *     *    B     *     A    *     *     *    *     *
ApproachDel:     xxxxxx            12.2             xxxxxx           xxxxxx
ApproachLOS:        *                B                 *                *
******************************************************************************
Note: Queue reported is the number of cars per lane.
******************************************************************************
```

Glen Mor 2 Student Apartments Project
Year 2015 With Project
Morning Peak Hour

Level Of Service Computation Report
2000 HCM 4-Way Stop Method (Base Volume Alternative)

Intersection #8 Watkins Drive (NS) / Big Springs Road (EW)

Cycle (sec): 0 Critical Vol./Cap.(X): 1.235
Loss Time (sec): 0 (Y+R=4.0 sec) Average Delay (sec/veh): 64.2
Optimal Cycle: 0 Level Of Service: F

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:		Stop Sign			Stop Sign			Stop Sign			Stop Sign	
Rights:		Include			Include			Include			Include	
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	1 0	1 0	1	1 0	1 0	1	0 1	0 0	1	0 1	0 0	1
Volume Module:												
Base Vol:	213	609	38	52	248	115	40	16	43	44	46	126
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	213	609	38	52	248	115	40	16	43	44	46	126
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
PHF Volume:	224	641	40	55	261	121	42	17	45	46	48	133
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	224	641	40	55	261	121	42	17	45	46	48	133
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	224	641	40	55	261	121	42	17	45	46	48	133
Saturation Flow Module:												
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	1.00	1.00	1.00	1.00	1.00	1.00	0.71	0.29	1.00	0.49	0.51	1.00
Final Sat.:	477	519	559	435	467	510	295	118	469	214	224	496
Capacity Analysis Module:												
Vol/Sat:	0.47	1.23	0.07	0.13	0.56	0.24	0.14	0.14	0.10	0.22	0.22	0.27
Crit Moves:		****			****		****					****
Delay/Veh:	16.4	144	9.4	11.9	19.3	11.7	12.4	12.4	10.8	12.8	12.8	12.2
Delay Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	16.4	144	9.4	11.9	19.3	11.7	12.4	12.4	10.8	12.8	12.8	12.2
LOS by Move:	C	F	A	B	C	B	B	B	B	B	B	B
ApproachDel:		106.5			16.3			11.7			12.4	
Delay Adj:		1.00			1.00			1.00			1.00	
ApprAdjDel:		106.5			16.3			11.7			12.4	
LOS by Appr:		F			C			B			B	
AllWayAvgQ:	0.8	19.4	0.1	0.1	1.2	0.3	0.2	0.2	0.1	0.3	0.3	0.3

Note: Queue reported is the number of cars per lane.

```
------------------------------------------------------------------------------
                  Glen Mor 2 Student Apartments Project
                        Year 2015 With Project
                           Evening Peak Hour
------------------------------------------------------------------------------
                   Level Of Service Computation Report
          2000 HCM 4-Way Stop Method (Base Volume Alternative)
******************************************************************************
Intersection #8 Watkins Drive (NS) / Big Springs Road (EW)
******************************************************************************
Cycle (sec):           0                Critical Vol./Cap.(X):        1.981
Loss Time (sec):       0 (Y+R=4.0 sec)  Average Delay (sec/veh):      178.8
Optimal Cycle:         0                Level Of Service:                 F
******************************************************************************
Approach:      North Bound      South Bound      East Bound       West Bound
Movement:     L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:       Stop Sign        Stop Sign        Stop Sign        Stop Sign
Rights:         Include          Include          Include          Include
Min. Green:    0    0    0    0    0    0    0    0    0    0    0    0
Lanes:        1  0  1  0  1   1  0  1  0  1   0  1  0  0  1   0  1  0  0  1
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:      90  363   24   116  711   89   165   47  312   180   27   78
Growth Adj:  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00
Initial Bse:   90  363   24   116  711   89   165   47  312   180   27   78
User Adj:    1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00
PHF Adj:     0.95 0.95 0.95  0.95 0.95 0.95  0.95 0.95 0.95  0.95 0.95 0.95
PHF Volume:    95  382   25   122  748   94   174   49  328   189   28   82
Reduct Vol:     0    0    0     0    0    0     0    0    0     0    0    0
Reduced Vol:   95  382   25   122  748   94   174   49  328   189   28   82
PCE Adj:     1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00
MLF Adj:     1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00
FinalVolume:   95  382   25   122  748   94   174   49  328   189   28   82
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Adjustment:  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00
Lanes:       1.00 1.00 1.00  1.00 1.00 1.00  0.78 0.22 1.00  0.87 0.13 1.00
Final Sat.:   346  370  388   354  378  400   300   85  438   316   47  408
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:     0.27 1.03 0.07  0.34 1.98 0.23  0.58 0.58 0.75  0.60 0.60 0.20
Crit Moves:       ****            ****                  ****        ****
Delay/Veh:   16.7 87.7 12.3  17.8  472 14.1  23.8 23.8 31.4  25.8 25.8 13.5
Delay Adj:   1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00
AdjDel/Veh:  16.7 87.7 12.3  17.8  472 14.1  23.8 23.8 31.4  25.8 25.8 13.5
LOS by Move:    C    F    B     C    F    B     C    C    D     D    D    B
ApproachDel:      70.5            370.0             28.4             22.4
Delay Adj:        1.00             1.00             1.00             1.00
ApprAdjDel:       70.5            370.0             28.4             22.4
LOS by Appr:         F                F                D                C
AllWayAvgQ:   0.4  7.7  0.1   0.5 48.3  0.3   1.3  1.3  2.5   1.3  1.3  0.2
******************************************************************************
Note: Queue reported is the number of cars per lane.
******************************************************************************
```

```
--------------------------------------------------------------------------------
                  Glen Mor 2 Student Apartments Project
                         Year 2015 With Project
                  Morning Peak Hour - With Improvements
--------------------------------------------------------------------------------
                   Level Of Service Computation Report
          2000 HCM Operations Method (Base Volume Alternative)
********************************************************************************
Intersection #8 Watkins Drive (NS) / Big Springs Road (EW)
********************************************************************************
Cycle (sec):          80               Critical Vol./Cap.(X):         0.466
Loss Time (sec):       8 (Y+R=4.0 sec) Average Delay (sec/veh):        11.0
Optimal Cycle: OPTIMIZED               Level Of Service:                  B
********************************************************************************
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R   L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|----------------||----------------||----------------||----------------|
Control:        Permitted        Permitted        Permitted        Permitted
Rights:          Include          Include          Include          Include
Min. Green:   26   26    26   26   26    26   23   23    23   23   23    23
Lanes:        1  0  1  0  1   1  0  1  0  1   0  1  0  0  1   0  1  0  0  1
------------|----------------||----------------||----------------||----------------|
Volume Module:
Base Vol:     213  609    38   52  248   115   40   16    43   44   46   126
Growth Adj:  1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
Initial Bse:  213  609    38   52  248   115   40   16    43   44   46   126
User Adj:    1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
PHF Adj:     0.95 0.95  0.95 0.95 0.95  0.95 0.95 0.95  0.95 0.95 0.95  0.95
PHF Volume:   224  641    40   55  261   121   42   17    45   46   48   133
Reduct Vol:     0    0     0    0    0     0    0    0     0    0    0     0
Reduced Vol:  224  641    40   55  261   121   42   17    45   46   48   133
PCE Adj:     1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
MLF Adj:     1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
FinalVolume:  224  641    40   55  261   121   42   17    45   46   48   133
------------|----------------||----------------||----------------||----------------|
Saturation Flow Module:
Sat/Lane:    1900 1900  1900 1900 1900  1900 1900 1900  1900 1900 1900  1900
Adjustment:  0.58 1.00  0.85 0.31 1.00  0.85 0.79 0.79  0.85 0.85 0.85  0.85
Lanes:       1.00 1.00  1.00 1.00 1.00  1.00 0.71 0.29  1.00 0.49 0.51  1.00
Final Sat.:  1094 1900  1615  580 1900  1615 1078  431  1615  791  827  1615
------------|----------------||----------------||----------------||----------------|
Capacity Analysis Module:
Vol/Sat:     0.20 0.34  0.02 0.09 0.14  0.07 0.04 0.04  0.03 0.06 0.06  0.08
Crit Moves:       ****                                                    ****
Green/Cycle: 0.61 0.61  0.61 0.61 0.61  0.61 0.29 0.29  0.29 0.29 0.29  0.29
Volume/Cap:  0.33 0.55  0.04 0.15 0.22  0.12 0.14 0.14  0.10 0.20 0.20  0.29
Delay/Veh:    7.9  9.6   6.2  6.8  7.1   6.5 21.3 21.3  21.0 21.8 21.8  22.5
User DelAdj: 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
AdjDel/Veh:   7.9  9.6   6.2  6.8  7.1   6.5 21.3 21.3  21.0 21.8 21.8  22.5
LOS by Move:    A    A     A    A    A     A    C    C     C    C    C     C
HCM2kAvgQ:      3   10     0    1    3     1    1    1     1    2    2     3
********************************************************************************
Note: Queue reported is the number of cars per lane.
********************************************************************************
```

```
--------------------------------------------------------------------------------
                   Glen Mor 2 Student Apartments Project
                          Year 2015 With Project
                   Evening Peak Hour - With Improvements
--------------------------------------------------------------------------------

                    Level Of Service Computation Report
            2000 HCM Operations Method (Base Volume Alternative)
********************************************************************************
Intersection #8 Watkins Drive (NS) / Big Springs Road (EW)
********************************************************************************
Cycle (sec):            65               Critical Vol./Cap.(X):          0.685
Loss Time (sec):         8 (Y+R=4.0 sec) Average Delay (sec/veh):         14.8
Optimal Cycle: OPTIMIZED                 Level Of Service:                   B
********************************************************************************
Approach:       North Bound      South Bound       East Bound       West Bound
Movement:      L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|----------------||----------------||----------------||----------------|
Control:         Permitted        Permitted         Permitted        Permitted
Rights:           Include           Include          Include          Include
Min. Green:    26   26    26    26   26    26    23   23    23    23   23    23
Lanes:         1  0  1  0  1    1  0  1  0  1    0  1  0  0  1    0  1  0  0  1
------------|----------------||----------------||----------------||----------------|
Volume Module:
Base Vol:      90  363    24   116  711    89   165   47   312   180   27    78
Growth Adj:  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Initial Bse:   90  363    24   116  711    89   165   47   312   180   27    78
User Adj:    1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:     0.95 0.95  0.95  0.95 0.95  0.95  0.95 0.95  0.95  0.95 0.95  0.95
PHF Volume:    95  382    25   122  748    94   174   49   328   189   28    82
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
Reduced Vol:   95  382    25   122  748    94   174   49   328   189   28    82
PCE Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
MLF Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
FinalVolume:   95  382    25   122  748    94   174   49   328   189   28    82
------------|----------------||----------------||----------------||----------------|
Saturation Flow Module:
Sat/Lane:    1900 1900  1900  1900 1900  1900  1900 1900  1900  1900 1900  1900
Adjustment:  0.18 1.00  0.85  0.47 1.00  0.85  0.59 0.59  0.85  0.56 0.56  0.85
Lanes:       1.00 1.00  1.00  1.00 1.00  1.00  0.78 0.22  1.00  0.87 0.13  1.00
Final Sat.:   334 1900  1615   885 1900  1615   867  247  1615   917  138  1615
------------|----------------||----------------||----------------||----------------|
Capacity Analysis Module:
Vol/Sat:     0.28 0.20  0.02  0.14 0.39  0.06  0.20 0.20  0.20  0.21 0.21  0.05
Crit Moves:                        ****                              ****
Green/Cycle: 0.52 0.52  0.52  0.52 0.52  0.52  0.35 0.35  0.35  0.35 0.35  0.35
Volume/Cap:  0.54 0.38  0.03  0.26 0.75  0.11  0.57 0.57  0.57  0.58 0.58  0.14
Delay/Veh:   13.7  9.5   7.5   8.9 15.5   7.9  18.9 18.9  18.5  19.5 19.5  14.4
User DelAdj: 1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
AdjDel/Veh:  13.7  9.5   7.5   8.9 15.5   7.9  18.9 18.9  18.5  19.5 19.5  14.4
LOS by Move:    B    A     A     A    B     A     B    B     B     B    B     B
HCM2kAvgQ:      2    5     0     2   13     1     4    4     6     5    5     1
********************************************************************************
Note: Queue reported is the number of cars per lane.
********************************************************************************
```

APPENDIX D

Traffic Signal Warrant Worksheet

WARRANT 3, PEAK HOUR
(Urban Areas)

Traffic Conditions = **Existing Plus Ambient Growth Plus Project**

Major Street Name = **Watkins Drive**

Total of Both Approaches (VPH) = **839**

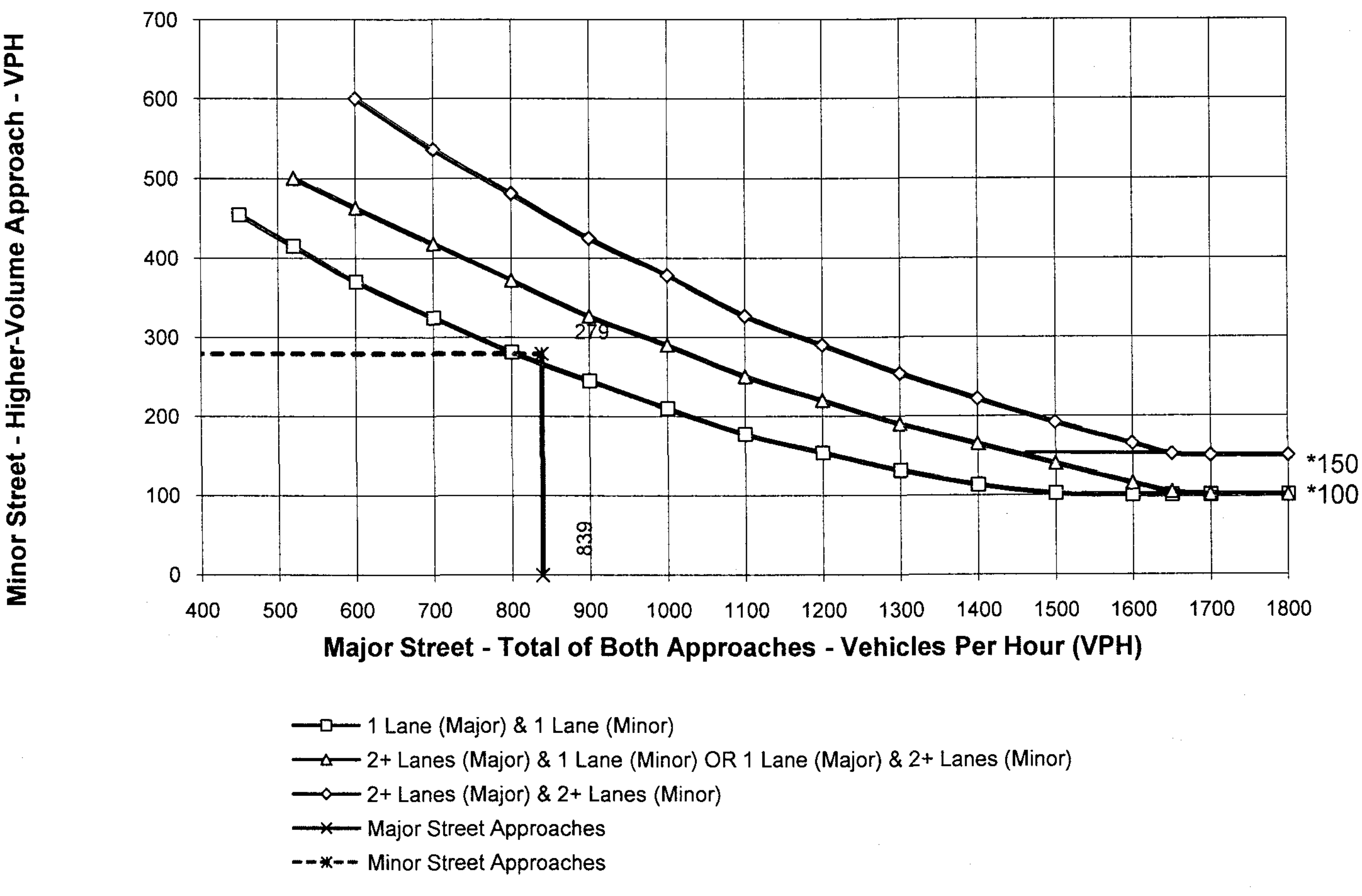
Number of Approach Lanes on Major Street = **1**

Minor Street Name = **Big Springs Road**

High Volume Approach (VPH) = **279**

Number of Approach Lanes On Minor Street = **1**

WARRANTED FOR A SIGNAL



* Note: 150 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 100 vph applies as the lower threshold volume for a minor-street approach with one lane.

APPENDIX E

Sight Distance Requirements

CHAPTER 200 GEOMETRIC DESIGN AND STRUCTURE STANDARDS

Topic 201 - Sight Distance

Index 201.1 - General

Sight distance is the continuous length of highway ahead visible to the driver. Four types of sight distance are considered here: passing, stopping, decision, and corner. Passing sight distance is used where use of an opposing lane can provide passing opportunities (see Index 201.2). Stopping sight distance is the minimum sight distance to be provided on multilane highways and on 2-lane roads when passing sight distance is not economically obtainable. Stopping sight distance also is to be provided for all elements of interchanges and intersections at grade, including private road connections (see Topic 504, Index 405.1, & Figure 405.7). Decision sight distance is used at major decision points (see Indexes 201.7 and 504.2). Corner sight distance is used at intersections (see Index 405.1, Figure 405.7, and Figure 504.3J).

Table 201.1 shows the standards for stopping sight distance related to design speed, and these shall be the minimum values used in design. Also shown are the values for use in providing passing sight distance.

Chapter 3 of "A Policy on Geometric Design of Highways and Streets," AASHTO, contains a thorough discussion of the derivation of stopping sight distance.

201.2 Passing Sight Distance

Passing sight distance is the minimum sight distance required for the driver of one vehicle to pass another vehicle safely and comfortably. Passing must be accomplished assuming an oncoming vehicle comes into view and maintains the design speed, without reduction, after the overtaking maneuver is started.

Table 201.1
Sight Distance Standards

Design Speed[(1)] (mph)	Stopping[(2)] (ft)	Passing (ft)
20	125	800
25	150	950
30	200	1,100
35	250	1,300
40	300	1,500
45	360	1,650
50	430	1,800
55	500	1,950
60	580	2,100
65	660	2,300
70	750	2,500
75	840	2,600
80	930	2,700

(1) See Topic 101 for selection of design speed.
(2) For sustained downgrades, refer to advisory standard in Index 201.3

The sight distance available for passing at any place is the longest distance at which a driver whose eyes are 3 ½ feet above the pavement surface can see the top of an object 4 ¼ feet high on the road. See Table 201.1 for the calculated values that are associated with various design speeds.

In general, 2-lane highways should be designed to provide for passing where possible, especially those routes with high volumes of trucks or recreational vehicles. Passing should be done on tangent horizontal alignments with constant grades or a slight sag vertical curve. Not only are drivers reluctant to pass on a long crest vertical curve, but it is impracticable to design crest vertical curves to provide for passing sight distance because of high cost where crest cuts are involved. Passing sight distance for crest vertical curves is 7 to 17 times longer than the stopping sight distance.

Ordinarily, passing sight distance is provided at locations where combinations of alignment and profile do not require the use of crest vertical curves.

Passing sight distance is considered only on 2-lane roads. At critical locations, a stretch of 3- or 4-lane passing section with stopping sight distance is sometimes more economical than two lanes with passing sight distance.

Passing on sag vertical curves can be accomplished both day and night because headlights can be seen through the entire curve.

See Part 3 of the Manual on Uniform Traffic Control Devices (MUTCD) for criteria relating to the placement of barrier striping for no-passing zones. Note, that the passing sight distances shown in the MUTCD are based on traffic operational criteria. Traffic operational criteria are different from the design characteristics used to develop the values provided in Table 201.1 and Chapter 3 of AASHTO, A Policy on Geometric Design of Highways and Streets. The aforementioned table and AASHTO reference are also used to design the vertical profile and horizontal alignment of the highway. Consult the Headquarters (HQ) Traffic Liaison when using the MUTCD criteria for traffic operating-control needs.

Other means for providing passing opportunities, such as climbing lanes or turnouts, are discussed in Index 204.5. Chapter 3 of AASHTO, A Policy on Geometric Design of Highways and Streets, contains a thorough discussion of the derivation of passing sight distance.

201.3 Stopping Sight Distance

The minimum stopping sight distance is the distance required by the driver of a vehicle, traveling at a given speed, to bring the vehicle to a stop after an object on the road becomes visible. Stopping sight distance is measured from the driver's eyes, which are assumed to be 3 ½ feet above the pavement surface, to an object ½-foot high on the road. See Index 1003.1(9) for bicycle stopping sight distance guidance.

The stopping sight distances in Table 201.1 should be increased by 20 percent on sustained downgrades steeper than 3 percent and longer than one mile.

201.4 Stopping Sight Distance at Grade Crests

Figure 201.4 shows graphically the relationships between length of crest vertical curve, design speed, and algebraic difference in grades. Any one factor can be determined when the other two are known.

201.5 Stopping Sight Distance at Grade Sags

From the curves in Figure 201.5, the minimum length of vertical curve which provides headlight sight distance in grade sags for a given design speed can be obtained.

If headlight sight distance is not obtainable at grade sags, lighting may be considered. The Design Coordinator and the HQ Traffic Liaison shall be contacted to review proposed grade sag lighting to determine if such use is appropriate.

201.6 Stopping Sight Distance on Horizontal Curves

Where an object off the pavement such as a bridge pier, building, cut slope, or natural growth restricts sight distance, the minimum radius of curvature is determined by the stopping sight distance.

Available stopping sight distance on horizontal curves is obtained from Figure 201.6. It is assumed that the driver's eye is 3 ½ feet above the center of the inside lane (inside with respect to curve) and the object is ½-foot high. The line of sight is assumed to intercept the view obstruction at the midpoint of the sight line and 2 feet above the center of the inside lane when the road profile is flat (i.e. no vertical curve). Crest vertical curves can cause additional reductions in sight distance. The clear distance (m) is measured from the center of the inside lane to the obstruction.

The design objective is to determine the required clear distance from centerline of inside lane to a retaining wall, bridge pier, abutment, cut slope, or other obstruction for a given design speed. Using radius of curvature and minimum sight distance for that design speed, Figure 201.6 gives the clear distance (m) from centerline of inside lane to the obstruction.

When the radius of curvature and the clear distance to a fixed obstruction are known, Figure 201.6 also gives the sight distance for these conditions.

See Index 101.1 for technical reductions in design speed caused by partial or momentary horizontal sight distance restrictions. See Index 203.2 for additional comments on glare screens.

Cuts may be widened where vegetation restricting horizontal sight distance is expected to grow on finished slopes. Widening is an economic trade-off that must be evaluated along with other options. See Index 902.2 for sight distance requirements on landscape projects.

201.7 Decision Sight Distance

At certain locations, sight distance greater than stopping sight distance is desirable to allow drivers time for decisions without making last minute erratic maneuvers (see Chapter III of AASHTO, A Policy on Geometric Design of Highways and Streets, for a thorough discussion of the derivation of decision sight distance.)

On freeways and expressways the decision sight distance values in Table 201.7 should be used at lane drops and at off-ramp noses to interchanges, branch connections, roadside rests, vista points, and inspection stations. When determining decision sight distance on horizontal and vertical curves, Figures 201.4, 201.5, and 201.6 can be used. Figure 201.7 is an expanded version of Figure 201.4 and gives the relationship among length of crest vertical curve design speed, and algebraic difference in grades for much longer vertical curves than Figure 201.4.

Decision sight distance is measured using the 3 ½-foot eye height and ½-foot object height. See Index 504.2 for sight distance at secondary exits on a collector-distributor road.

Table 201.7
Decision Sight Distance

Design Speed (mph)	Decision Sight Distance (ft)
30	450
35	525
40	600
45	675
50	750
55	865
60	990
65	1,050
70	1,105
75	1,180
80	1,260

Topic 202 - Superelevation

202.1 Basic Criteria

According to the laws of mechanics, when a vehicle travels on a curve it is forced outward by centrifugal force.

On a superelevated highway, this force is resisted by the vehicle weight component parallel to the superelevated surface and side friction between the tires and pavement. It is impractical to balance centrifugal force by superelevation alone, because for any given curve radius a certain superelevation rate is exactly correct for only one driving speed. At all other speeds there will be a side thrust either outward or inward, relative to the curve center, which must be offset by side friction.

If the vehicle is not skidding, these forces are in equilibrium as represented by the following equation, which is used to design a curve for a comfortable operation at a particular speed:

$$\text{Centriugal Factor} = e + f = \frac{0.067V^2}{R} = \frac{V^2}{15R}$$

Where:

e	=	Superelevation slope in feet per foot
e_{max}	=	Maximum superelevation rate for a given condition
f	=	Side friction factor
R	=	Curve radius in feet
V	=	Velocity in miles per hour

Standard superelevation rates are designed to hold the portion of the centrifugal force that must be taken up by tire friction within allowable limits. Friction factors as related to speed are shown on Figure 202.2. The factors apply equally to portland cement concrete and bituminous pavements.

202.2 Standards for Superelevation

Maximum superelevation rates for various highway conditions are shown on Table 202.2.

Based on an e_{max} selected by the designer for one of the conditions, superelevation rates from Table 202.2 shall be used within the given range of curve radii. If less than standard superelevation rates are approved (see Index 82.1), Figure 202.2 shall be used to determine superelevation based on the curve radius and maximum comfortable speed.

Maximum comfortable speed is determined by the formula given on Figure 202.2. It represents the speed on a curve where discomfort caused by centrifugal force is evident to a driver. Side friction factors tabulated on Figure 202.2 are recommended by AASHTO for design purposes. AASHTO, A Policy on Geometric Design of Highways and Streets, states, "In general, studies show that the maximum side friction factors developed between new tires and wet concrete pavements range from about 0.5 at 20 mph to approximately 0.35 at 60 mph." The design side friction factors are, therefore, about one-third the values that occur when side skidding is imminent.

To use Figure 202.2, the designer must decide on the relative importance among three variables. Normally, when a nonstandard superelevation rate is approved, Figure 202.2 will be entered with the rate and a desired curve radius. It must then be determined whether the resulting maximum comfortable speed is adequate for the conditions or whether further adjustments to radius and superelevation may be needed.

Except for short radius curves, the standard superelevation rate results in very little side thrust at speeds less than 45 miles per hour. This provides maximum comfort for most drivers.

Superelevation for horizontal curves with radii of 10,000 feet and greater may be deleted in those situations where the combination of a flat grade and a superelevation transition would create undesirable drainage conditions on the pavement.

Superelevated cross slopes on curves extend the full width of the traveled way and shoulders, except that the shoulder slope on the low side should be not less than the minimum shoulder slope used on the tangents (see Index 304.3 for cross slopes under cut widening conditions).

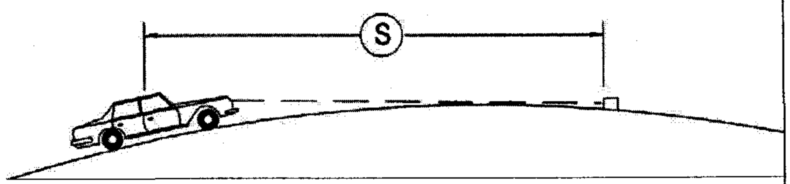
<u>On rural 2-lane roads, superelevation should be on the same plane for the full width of traveled way and shoulders, except on transitions (see Index 304.3 for cut widening conditions).</u>

202.3 Restrictive Conditions

Lower superelevation rates than those given in either Table 202.2 or Figure 202.2 may be necessary in areas where restricted speed zones or ramp/street intersections are controlling factors. Other typical locations are short radius curves on ramps near the local road juncture, either at an intersection or where a loop connects with an overcrossing structure. Often, established street grades, curbs, or drainage may prove difficult to alter and/or superelevation transition lengths would be undesirably short.

Such conditions may justify a reduction in the superelevation rate, different rates for each half of the roadbed, or both. In any case, the superelevation rate provided should be appropriate for the conditions allowing for a smooth transition while providing the maximum level of comfort to the driver. Where standard superelevation rates cannot be attained, discussions should be held with the Design Reviewer and/or the Design Coordinator to determine the proper solution and the necessity of preparing a design exception fact sheet. In warping street or ramp surface areas for

Figure 201.4
Stopping Sight Distance on Crest Vertical Curves



Drivers eye height is 3 feet ½ inch.
Object height is ½-foot.

L = Curve Length (feet)

A = Algebraic Grade Difference (%)

S = Sight Distance (feet)

V = Design Speed for "S" in mph

K = Distance in feet required to achieve a 1% change in grade. K value as shown on graph is valid when S < L.

Notes:

- Before using this figure for intersections, branch connections and exits, see Indexes 201.7 and 405.1, and Topic 504.
- See Figure 204.4 for vertical curve formulas.
- See Index 204.4 for minimum length of vertical curve

When S > L	When S < L
$L = 2S - 1329/A$	$L = AS^2/1329$

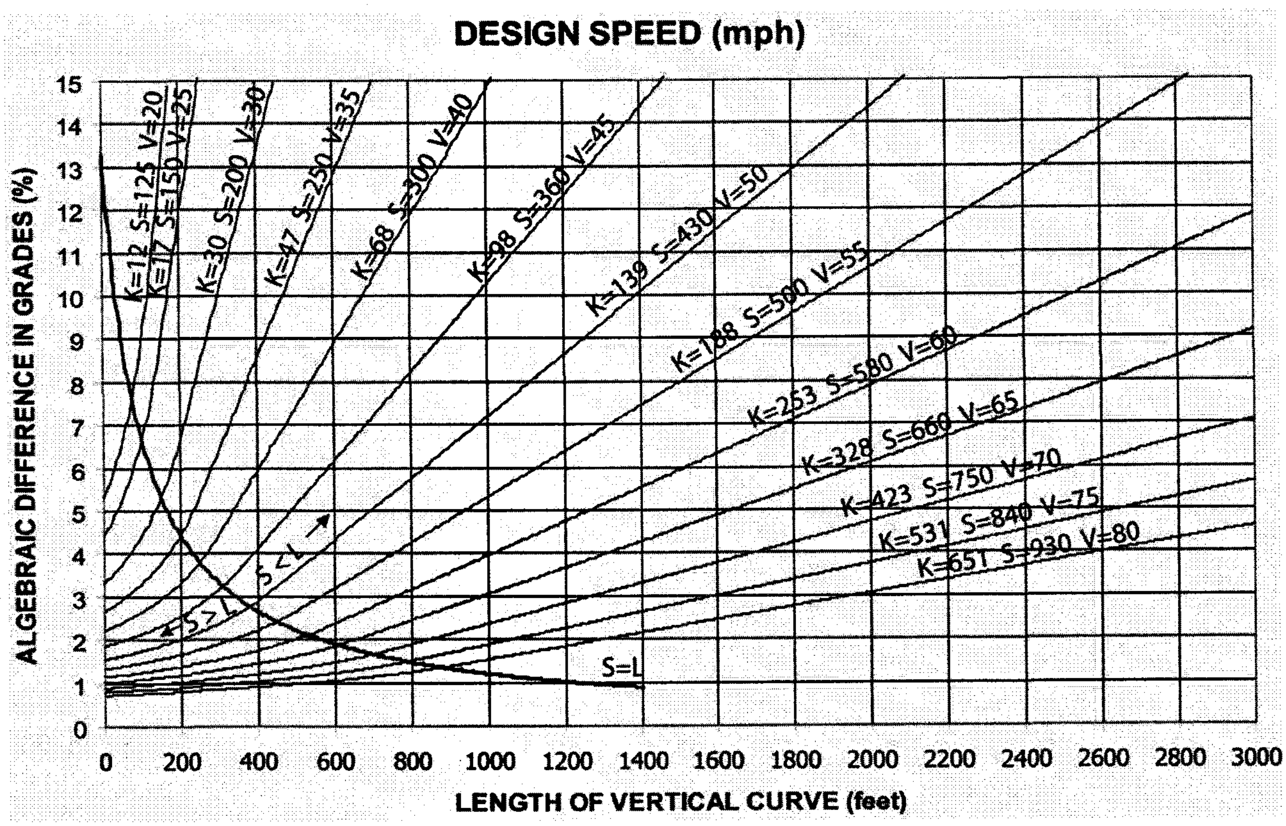
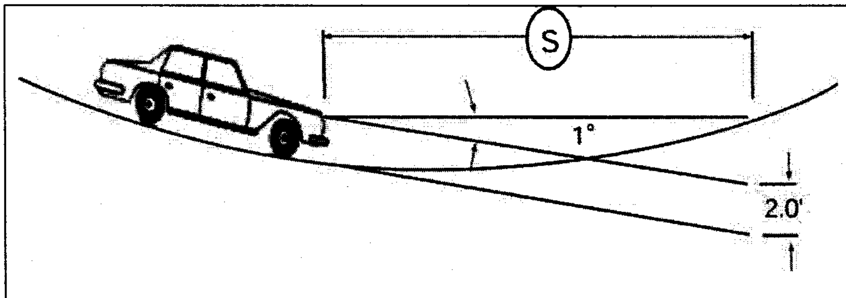


Figure 201.5
Stopping Sight Distance on Sag Vertical Curves



L = Curve Length (feet)
A = Algebraic Grade Difference (%)
S = Sight Distance (feet)
V = Design Speed for "S" in mph
K = Distance in feet required to achieve a 1% change in grade. K value as shown on graph is valid when S < L.

Notes:

- For sustained downgrades, see Index 201.3.
- Before using this figure for intersections, branch connections and exits, see Indexes 201.7 and 405.1, and Topic 504.
- See Figure 204.4 for vertical curve formulas.
- See Index 204.4 for minimum length of vertical curve.

When S > L	When S < L
$L = 2S - (400 + 3.5S)/A$	$L = AS^2/(400 + 3.5S)$

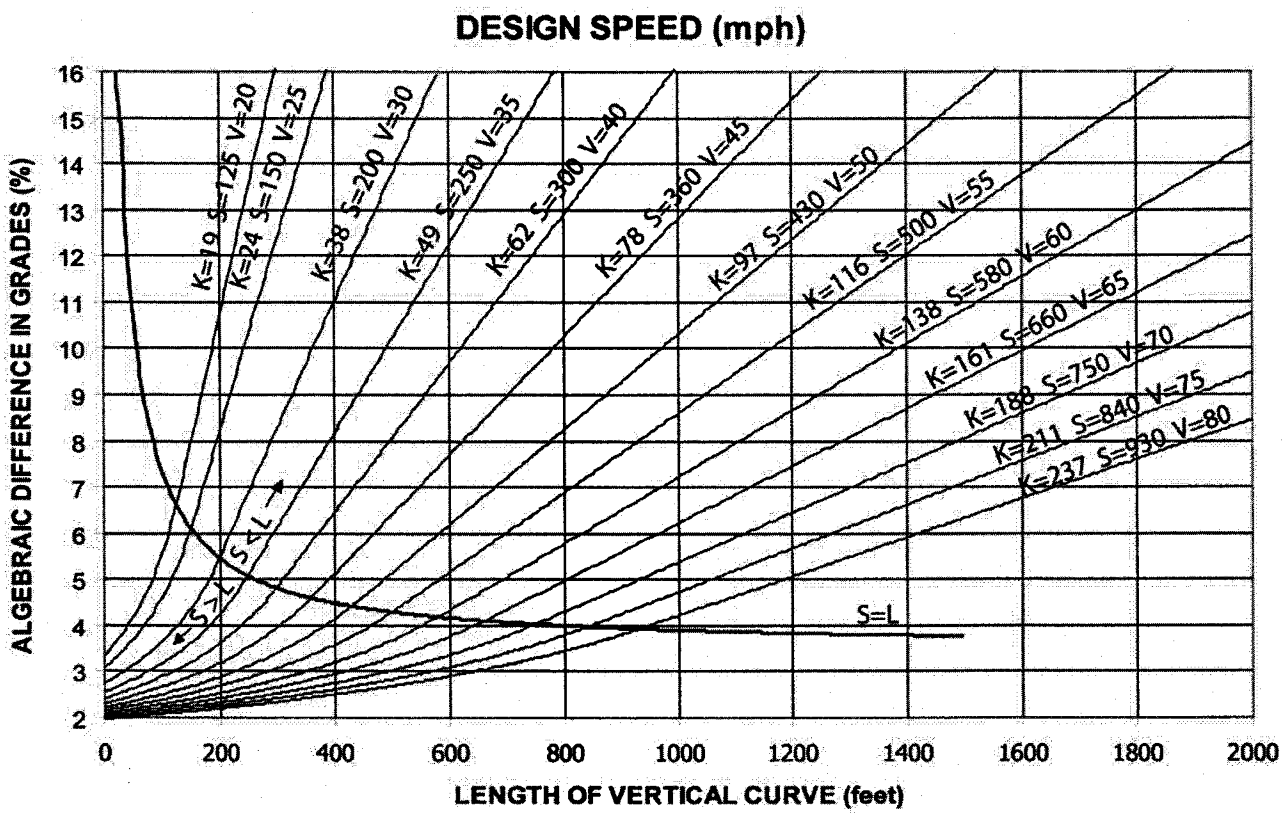
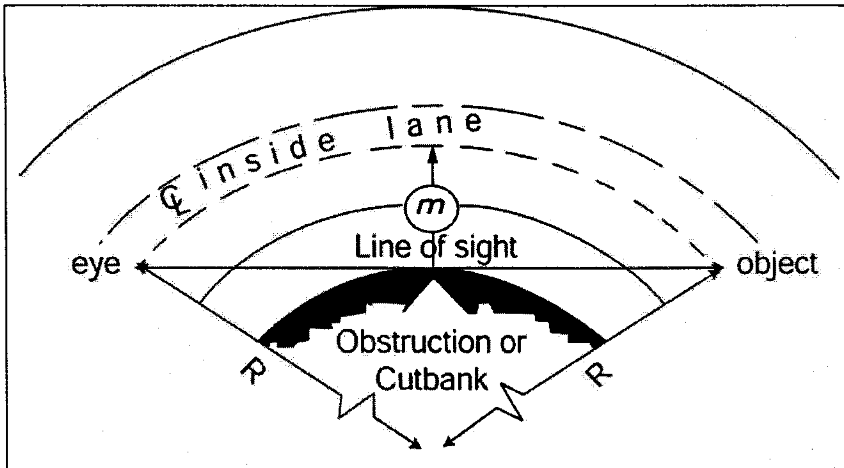


Figure 201.6
Stopping Sight Distance on Horizontal Curves



Line of sight is 2.0 feet above the centerline inside lane at point of obstruction.

R = Radius of the centerline of the lane nearest the obstruction (feet).

S = Sight Distance (feet)

V = Design Speed for "S" in mph

m = Distance from centerline of the lane nearest the obstruction (feet).

Notes:

- For sustained downgrades, see Index 201.3.
- Formulas apply only when "S" is equal to or less than length of curve.
- Angles in formulas are expressed in degrees.

$$m = R\left[1 - \cos\left(\frac{28.65S}{R}\right)\right]$$

$$S = \frac{R}{28.65}\left[\cos^{-1}\left(\frac{R - m}{R}\right)\right]$$

DESIGN SPEED (mph)

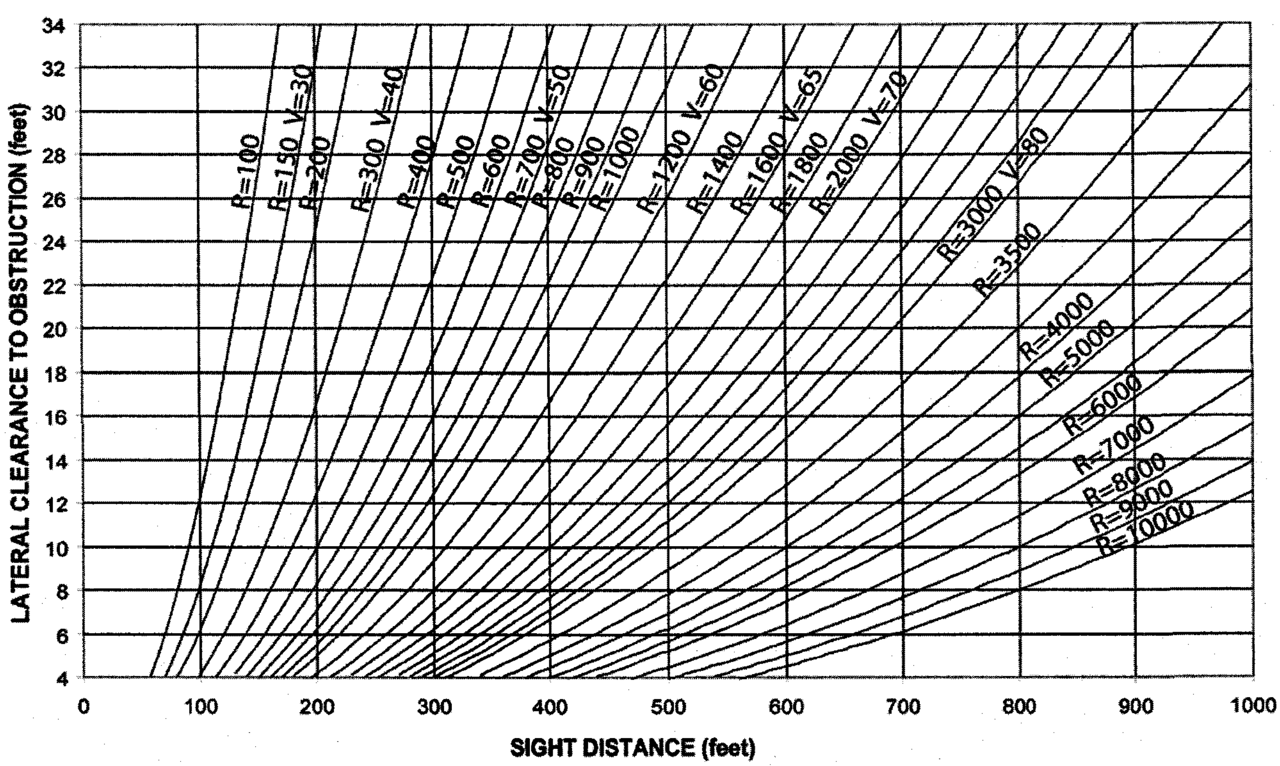
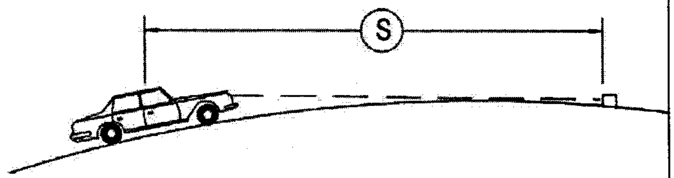


Figure 201.7
Decision Sight Distance on Crest Vertical Curves



Drivers eye height is 3 ½ feet.
Object height is ½-foot.

L = Curve Length (feet)

A = Algebraic Grade Difference (%)

S = Sight Distance (feet)

V = Design Speed for "S" in mph

K = Distance in feet required to achieve a 1% change in grade. K value as shown on graph is valid when S < L.

Notes:

- Before using this figure for intersections, branch connections and exits, see Indexes 201.7 and 405.1, and Topic 504.
- See Figure 204.4 for vertical curve formulas.
- See Index 204.4 for minimum length of vertical curve.

When S > L	When S < L
$L = 2S - 1329/A$	$L = AS^2/1329$