Revised Environmental Assessment/ Final Environmental Impact Report for the Downtown San Bernardino Passenger Rail Project

APPENDICES E–I

State Clearinghouse No. 2011051024

Federal Transit Administration

San Bernardino Associated Governments

August 2012

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GEOTECHNICAL INVESTIGATION REPORT
DOWNTOWN SAN BERNARDINO PASSENGER RAIL
SAN BERNARDINO, CALIFORNIA

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GDC Project No. L-894
March 29, 2011

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Materials Testing & Inspection

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March 29, 2011

HDR Engineering, Inc.
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Attention: Mr. Rob Klovsky

Subject: Geotechnical Investigation Report
Downtown San Bernardino Passenger Rail
San Bernardino, California
GDC Project No.: L-894

Mr. Klovsky:

Group Delta Consultants Inc. (GDC) is pleased to submit this Geotechnical Recommendations for the proposed Downtown San Bernardino Passenger Rail Project (DSBPR). The Project's primary features include construction of a second track, rail platforms, parking lots, a pedestrian overpass at the existing Santa Fe Depot, grade crossings, railroad signalization, and roadway closures. Secondary features include drainage improvements, utility accommodations, and implementation of safety controls.

We appreciate the opportunity to provide geotechnical services for this significant project. Should you have any questions regarding this report, or if we can be of further service, please call us at 310-320-5100.

Sincerely,
GROUP DELTA CONSULTANTS, INC.

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GEOTECHNICAL INVESTIGATION REPORT
DOWNTOWN SAN BERNARDINO PASSENGER RAIL PROJECT
SAN BERNARDINO, CALIFORNIA

1.0 INTRODUCTION

This report presents GDC's Geotechnical Recommendations for the proposed Downtown San Bernardino Passenger Rail Project (DSBPR). The Project's primary features include construction of a second track, rail platforms, parking lots, a pedestrian overpass at the existing Santa Fe Depot, grade crossings, railroad signalization, and roadway closures. Secondary features include drainage improvements, utility accommodations, and implementation of safety controls.

A site vicinity map is shown on Figure 1.

1.1 Project Understanding

Our understanding of the project is based on our discussions with the project design team and the review of plans and sections of the proposed improvements provided by HDR. Based on this information, we understand that the San Bernardino Associated Governments (SANBAG), in cooperation with Southern California Regional Rail Authority (SCRRA) and BNSF Railway Company (BNSF) plan to expand Metrolink service one mile to the east on the Redlands Subdivision. The DSBPR Project, involves extending Metrolink service from the existing San Bernardino Depot to new Metrolink commuter rail platforms proposed at the southwest corner of Rialto Avenue and E Street.

The DSBPR Project includes the following components.

- Construction of a second main track between MP 0.0+/- and MP 1.0+/- on the Redlands Subdivision;

- Construction of two approximately 50-foot-high stair tower buildings connected by a pedestrian overpass over Metrolink's main tracks at the existing Santa Fe Depot;

- Construction of some low-height retaining walls proposed along the alignment near the southwest corner of Rialto and I Streets, and drainage improvements; and

- Construction of new concrete platforms, new pavements at street crossings, drainage improvements, and a new surface parking lot.

1.2 Purpose and Scope of Work

The purpose of this geotechnical investigation is to conduct a paper study and perform field exploration, laboratory testing, and engineering analysis to develop seismic, grading, and foundation recommendations for the proposed improvements.

We understand that a separate company will be responsible for performing an environmental assessment of the site, and our scope of work excludes all issues related to environmental engineering, hazardous materials, and related matters.

Our authorized scope of work included:

- Reviewing available geotechnical investigation reports pertinent to the proposed alignment;
- Reviewing pertinent geologic and seismic hazard maps for the proposed alignment;
- Drilling 13 borings along the proposed alignment at locations reviewed and approved by HDR;
- Performing laboratory testing on the soil samples recovered;
- Evaluating potential seismic ground shaking and liquefaction potentials for the proposed alignment;
- Evaluating geotechnical characteristics of the subsurface soils, ground water conditions, and soil corrosivity;
- Developing grading and foundation recommendations for the proposed improvements;
- Summarizing the results of our geotechnical investigation in this report.

This report was prepared in general accordance with the AREMA guidelines for railway engineering (AREMA Manual for Railway Engineering, 2009).

2.0 GEOTECHNICAL INVESTIGATIONS

2.1 Review of Available Geotechnical Report

For design and construction of the Rialto Avenue UC, N I-215 to 2nd Street off-ramp (Caltrans Bridge No. 54-1256S), Earth Mechanics, Inc. (2003), drilled three borings to depths ranging from approximately 55 feet to 100 feet below existing grades. Subsurface soils encountered in Earth Mechanics (2003) exploration consisted of existing embankment fill underlain by medium dense to dense silty sand interbedded with stiff to very stiff silts. Groundwater was encountered in one boring at the depth of 95.8 feet below existing surface, corresponding to El. of 972 feet. As-built LOTB from Earth Mechanics (2003) site investigation is provided in Plate 1.

2.2 Field Exploration Program

Field exploration was performed at the subject site from January 24 to January 28, 2011. The field exploration program included drilling twelve (12) hollow-stem auger borings. The borings were drilled using truck-mounted hollow-stem auger drilling equipment. Borings were drilled to depths ranging from 11 feet to 50 feet below the existing grade.

Both relatively undisturbed samples and standard penetration test (SPT) samples were taken in the borings. The explorations were performed under the continuous technical supervision of our field engineers, who maintained detailed logs of the soil encountered, visually classified the materials in accordance with Unified Soil Classification System, and collected and packed soil samples for transport to our soil laboratory. Field classifications were modified as necessary based on laboratory test results.

Field exploration locations are shown on Figure 2. Details of the field exploration program, including boring logs, are presented in Appendix A.

2.3 Laboratory Testing Program

The soil samples obtained from the borings were taken to our laboratory for further visual examination and laboratory testing. Laboratory tests were performed to assist in soil classification and to evaluate physical, engineering, and corrosivity properties of the subsurface soils. The laboratory tests included moisture content and dry density, Atterberg limits, consolidation test, direct shear, percent passing No. 200 sieve, expansion index, R-value, and soil corrosivity (pH, SO_4, Cl, minimum resistivity). Details of the laboratory testing program, including test results, are provided in Appendix B.

3.0 SUBSURFACE CONDITIONS

3.1 Subsurface Soil Condition

The project area is located in the central portion of the San Bernardino Valley just west of the former Norton Air Force Base (San Bernardino Airport) and north of the Santa Ana River. This area is characterized as being a relatively flat-lying, alluvium-filled valley overlying crystalline basement rock. The alignment is located near several perennial streams emanating from the nearby San Bernardino Mountains, including City Creek and Lytle Creek.

The subject site is underlain by very young alluvium (designated Qya1 through Qya5, Morton, 2003), and the alluvial soils are comprised primarily of sand and gravel with some local finer and coarse deposit.

The current ground surface elevation ranges from approximately El + 1,020 feet at E street, to approximately El. + 1,070 feet at Santa Fe Depot; ground elevation increases gradually from southeast to northwest.

The subsurface soils along this alignment consist predominantly of sand, silty sand, and gravelly sand, interbedded with sandy silt. The silt is in general described as stiff. The sand and silty sand are in general described as medium to very dense.

3.2 Groundwater

Groundwater was not encountered to the maximum depth of 50 feet drilled during our field exploration.

During field exploration on April 15, 2003, for the N215 to 2nd street off-ramp project by Earth Mechanics, groundwater was encountered in Borings 03-02 at a depth of 95.8 feet below existing grade (corresponding to El. +972 feet). Earth Mechanics also reported wide variations in groundwater depths in the literatures they reviewed. The groundwater map by Matti and Carson (1991) indicated groundwater at the off-ramp site at a depth of 10 feet. The Regional groundwater map by Dutcher and Garrett (1963) indicated groundwater levels at the off-ramp site at depths of zero to 12 feet in 1936, 1945, and 1951. The historical high groundwater that occurred in the late 1930s and 1940s was due to several successive years of high precipitation. According to Fife (1976), groundwater depths in the 1960s were in the range of 65 to 82 feet below existing grades.

Based on our field exploration and literature review, the current groundwater levels along the alignment are deeper than 70 feet below current grade; therefore,

groundwater is not anticipated to cause design issues for the proposed improvements.

4.0 DISCUSSION AND RECOMMENDATIONS

4.1 Potential Geologic and Seismic Hazards

Potential geologic and seismic hazards for any site include ground rupture, slope instability, lateral spreading, subsidence, liquefaction, seismic compaction, and settlement, tsunamis / flooding, and seismic shaking.

4.1.1 Regional Faults and Surface Rupture Hazard

The first mile alignment is not located within a Alquist-Priolo zone. The closest fault to this alignment is the San Jacinto Fault Zone – San Bernardino section, which is located approximately 3,000 feet southwest of the west end (S Mt Vernon Ave.) of the first mile. The San Bernardino section of the San Andreas fault is located approximately 4.5 miles northeast of the east end of the first mile (E street). Both the San Jacinto and the San Andreas faults are right-lateral strike-slip faults. The San Jacinto fault (San Bernardino section) is capable of generating moment magnitude 6.7 earthquakes; the San Andreas fault is capable of generating moment magnitude 7.8 earthquakes. A regional geology and fault map is presented in Figure 3.

In Earth Mechanics (2008) Final Foundation Report for the N215 to 2nd St. Off-Ramp, EMI states that "The locations of the San Jacinto and the San Andreas faults are fairly well-known, but several poorly defined and poorly understood faults were discovered between these faults during investigations by EMI for extension of the 210 freeway to Interstate 215." These new Holocene-aged faults discovered by EMI were located approximately 1.9 miles north of Santa Fe Depot. EMI also stated that "aerial photographs revealed lineaments extending northwest and southeast from the 210/215 interchange but urban development on the southeast and active erosion on the northwest obscure the relationships".

Based on our literature review, the San Jacinto fault and the San Andreas fault (San Bernardino section) do not impose a ground surface rupture hazard for the first mile alignments. The new Holocene-aged faults discovered by EMI were located approximately 1.9 miles north of the Santa Fe Depot and do not appear to project toward the DSBPR alignment; therefore, fault surface rupture hazard for the DSBPR project is considered as low.

4.1.2 Ground Motion Hazard

The site is located within the seismically active area of southern California. There is the potential for the site to experience strong ground shaking from local and regional faults.

The AREMA Manual for Railway Engineering, Seismic Design for Railway Structures, employs a three-level ground motions and performance criteria approach consistent with the railroad post-seismic event response procedures as follows:

TABLE 1: AREMA GROUND-MOTION LEVELS

Ground Motion Level (Railroad Response Level)	Frequency	Performance Criteria Limit State	Average Return Period (Yrs)
1 (II)	Occasional	Serviceability	50-100
2 (III)	Rare	Ultimate	200-500
3 (III)	Very Rare	Survivability	1000-2400

The peak bedrock accelerations (PBA) for the three AREMA ground motion levels were obtained using USGS 2008 Interactive Deaggregations (Beta) program. A 108 years return interval, i.e., 50% probability of exceedance in 75 years, was used for determining level 1 PBA. A 475 years return interval, i.e., 10% probability of exceedance in 50 years, was used for determining level 2 PBA. A 2475 years return interval, i.e., 2% probability of exceedance in 50 years, was used for determining level 3 PBA. PBA was calculated based on V_s of 760 m/s. Table 2 also provides seismic site coefficients in accordance with CBC 2010.

Table 2: Design Ground-Motion Parameters

Site Location	Site Coordinates		Peak Bedrock Ground Motion (g) (V_s=760 m/s)			CBC 2010 (Site Class D (F_a=1.0; F_v=1.5)	
	Latitude	Longitude	Level 1	Level 2	Level 3	S_{DS}	S_{D1}
Santa Fe Depot	34.1042	-117.3099	0.33	0.68	1.16	1.159	0.627
I-215 Under Pass	34.0999	-117.3019	0.33	0.68	1.15	1.143	0.621
E Street	34.0998	-117.2941	0.33	0.68	1.13	1.100	0.632

4.1.3 Seismic Response Coefficient

Based on AREMA Manual for Railway Engineering, Seismic Design for Railway Structures, the site coefficient (S) is determined from the following table based on the foundation soil characteristics.

TABLE 3: SITE COEFFICIENT

Soil Type	Description	Site Coefficient
1	Rock of any characteristic, either shale-like or crystalline in nature, that may be characterized by a shear wave velocity of greater than 2,500 fps, or stiff soil conditions where the soil depth is less than 200 feet and the soil types overlying the rock are stable deposits of sand, gravel, or stiff clays.	1.0
2	Deep cohesionless or stiff clay conditions where the soil depth exceeds 200 feet and the soil types overlying rock are stable deposits of sands, gravel, or stiff clays.	1.2
3	20 to 40 feet of soft to medium-stiff clays with or without intervening layers of cohesionless soils.	1.5
4	Soil containing more than 40 feet of soft clays or silts that may be characterized by a shear wave velocity of less than 500 fps	2.0

Based on subsurface conditions encountered in GDC field exploration, we recommend that a site coefficient of 1.2 be used in design.

Design seismic response spectrum developed in accordance with section 1.4.4.3 of Chapter 9 of the AREMA Manual for Railway Engineering for the Santa Fe Depot location is presented in Figure 4. Damping adjustment factor of 1 is used in the calculation. Design seismic response spectrum for any other locations along the alignment may be developed accordingly if requested. Low period reduced response may be adjusted in accordance with section 1.4.4.4. The structural engineer should evaluate the appropriate seismic criteria to be used for structural design.

4.1.4 Liquefaction Potential

Liquefaction involves the sudden loss in strength of a saturated, cohesionless soil (predominantly sand) caused by the buildup of pore water pressure during cyclic loading, such as that produced by an earthquake. This increase in pore water pressure can temporarily transform the soil into a fluid mass, resulting in vertical settlement, and can also cause lateral ground deformations. Typically, liquefaction occurs in areas where there are loose sands and the depth to groundwater is less than 50 feet from the surface. Seismic shaking can also cause soil compaction and ground settlement without liquefaction occurring, including settlement of dry sands above the water table.

Based on GDC's field exploration and EMI's (2003) field exploration for the Rialto Avenue UC, N I-215 to 2nd Street off-ramp, the groundwater at this site is deeper than 70 feet below current grade; therefore, soil liquefaction is not an issue for the subject site. The subsurface soils at this site consist predominantly of medium-dense to dense silty sand interbedded with stiff to very stiff silt; dynamic settlement is anticipated to be less than 0.5 inches.

4.1.5 Other Geologic and Seismic Hazards

The site area is in general level and not located in a landslide zone. This site is located inland and on high elevations; therefore, a tsunami is not an issue for this site.

4.2 Geotechnical Recommendations

The proposed construction will consist of constructing a double track between MP 0.0+/- and MP 1.0+/- on the Redlands Subdivision. The proposed major improvements include two approximately 50-foot-high stair tower buildings connected by a pedestrian overpass over Metrolink's main tracks at the Santa Fe Depot, concrete platforms, low-height retaining walls, new pavements, and a surface parking lot.

Based on our site investigation and engineering analysis, it is our opinion that the proposed construction is feasible from a geotechnical engineering standpoint. Geotechnical recommendations for the proposed improvements are provided below.

4.2.1 Stair Tower Buildings

Based on the 30% submittal for the Santa Fe Depot Overpass dated March 31, 2011, two stair towers connected by a pedestrian overpass will be constructed just west of the existing Santa Fe Depot building to overcross the proposed double Metrolink main tracks. The proposed stair towers are approximately 50 feet in height and 10 feet by 50 feet in plan view. The locations of the proposed stair towers are shown on Figure 5A. The elevations of proposed stair towers are shown on Figure 5B.

It should be recognized that due to site access constraints, the closest boring, i.e., B-03, was located approximately 100 feet west of the proposed south tower. Our foundation recommendations provided in this report should be considered as preliminary foundation recommendations based on limited subsurface soil information. Four borings, two within the footprint (or close proximity) for each tower, should be considered in the final design phase to verify subsurface soil conditions and to update foundation recommendations if necessary.

4.2.1.1 Shallow Foundation Footings

Up to 5 feet of old fill was encountered in B-03. Any old fill at the proposed building site should be considered uncertified fill and should be removed and replaced with structural fill. Structural fill for supporting building structures should be compacted to 95 % of its laboratory-determined maximum dry density.

To provide firm, uniform support for the proposed structure and to reduce potential total and differential settlements, as a minimum, five (5) feet (below finished grade) of subsurface soils at the building site should be removed and recompacted. All removals should extend a minimum of 5 feet outside building pads or a distance equal to the depth of excavation, whichever is greater.

Footings should be supported on minimum 3 feet of structural fill. Footings should have a minimum width of 18 inches and be embedded a minimum of 18 inches below the bottom of the floor slab. For footings supported on structural fill, we recommend an allowable bearing capacity of 3.0 ksf be used. This value has a minimum factor of safety of 3 with respect to a bearing failure.

The allowable bearing pressure can be increased by one-third for temporary loads associated with wind and seismic loading.

Settlements of the individual footings will depend on the actual column loads and footing size. This information is not available at the time of preparing of this report. Settlement calculations will be provided once column loads and footing size become available.

Static settlement will occur due to elastic compression of medium-dense sand and stiff silts, and the majority of settlement will be completed as the construction is finished.

Resistance to lateral loads can be provided by friction developed between the bottom of the footings and the supporting soil and by the passive soil pressure developed on the face of the footing. For design purposes, an allowable coefficient of friction of 0.35 may be used. The allowable passive pressure for undisturbed native soils or compacted fill may be taken as an equivalent fluid pressure of 300 pcf. Both values include a factor of safety of about 1.5, and both passive and sliding resistance may be used in combination without reduction.

4.2.1.2 Deep Foundations

Alternatively, the proposed tower buildings may be supported on deep foundations. Based on our email communications with the design team, cast-in-drilled-hole (CIDH) piles (2-foot and 4-foot diameter) and driven steel H-piles (HP 12x84) are currently under consideration. The required allowable axial pile capacity (for both tension and compression) is 50 kips.

Allowable axial pile capacities (compressive and tensile) versus depth below pile cut-off are presented on Figures 6 and 7. We recommend that piles be installed at a minimum spacing of 3 pile diameters center-to-center. Piles with this minimum spacing will not require a reduction in vertical capacity for group action.

We calculated the lateral pile capacity of the CIDH piles and the steel H-piles, using LPILE 5.0 (Ensoft, 2004). We used a p-multiplier of 0.65 to account for pile group effects. This p-multiplier is appropriate for a 3-by-3 pile group with center-to-center pile spacing of 3 diameters. Lateral pile capacity for a different sized pile group or different pile spacing will be provided if requested. The lateral pile capacities for 0.5 inches and 1.0-inch pile head deflection, under free and fixed head conditions, are calculated. To utilize a fixed-head condition, the pile and pile cap connections must be able to translate laterally without rotation and be designed for fixed-head moment. The lateral pile capacities are provided below.

Table 4A: Lateral Pile Capacity for 2-foot-Diameter CIDH Pile

Pile Head Deflection (in)	Free Head Condition			Fixed Head Condition		
	Max. Shear (kips)	Max. Moment (kip-ft)	Depth to Max. Moment (ft)	Max. Shear (kips)	Max. Moment (kip-ft)	Depth to Zero Moment (ft)
0.5	26.9	134.3	8	62	368.4	24
1.0	41.7	231.9	9	97	621.3	24

Table 4B: Lateral Pile Capacity for 4-foot-Diameter CIDH Pile

Pile Head Deflection (in)	Free Head Condition			Fixed Head Condition		
	Max. Shear (kips)	Max. Moment (kip-ft)	Depth to Max. Moment (ft)	Max. Shear (kips)	Max. Moment (kip-ft)	Depth to Zero Moment (ft)
0.5	103.9	770.8	12	225	2141	48
1.0	153.2	1264.5	15	340	3603	48

Table 4C: Lateral Pile Capacity for the HP 12x84 Strong Direction

Pile Head Deflection (in)	Free Head Condition			Fixed Head Condition		
	Max. Shear (kips)	Max. Moment (kip-ft)	Depth to Max. Moment (ft)	Max. Shear (kips)	Max. Moment (kip-ft)	Depth to Zero Moment (ft)
0.5	15	72	7.5	39.5	206	22
1.0	25	132	8	64	364	22

Table 4D: Lateral Pile Capacity for the HP 12x84 Weak Direction

Pile Head Deflection (in)	Free Head Condition			Fixed Head Condition		
	Max. Shear (Kips)	Max. Moment (kip-ft)	Depth to Max. Moment (ft)	Max. Shear (kips)	Max. Moment (kip-ft)	Depth to Zero Moment (ft)
0.5	9	35	6	24	101	17
1.0	14.5	64	6.5	38.5	180	18

Deflection and moment diagrams are provided in Appendix C.

It should be recognized that the pile lengths of the 2-foot-diameter CIDH piles and the steel H piles will likely be controlled by axial tensile capacity. The pile length of the 4-foot-diameter CIDH pile will likely be controlled by lateral pile capacity.

4.2.2 Pole Foundations

The following recommendations may be used for designing of pole foundations for light poles and signal posts, etc.

- Allowable unit skin friction for pole foundation design may be taken as 500 psf.
- If the bottom of the shaft is well cleaned and inspected, an allowable unit end bearing of 3 ksf may be used; side friction and end bearing can be combined in pole foundation design.
- For lateral resistance, a passive resistance of 300 psf per foot of depth to a maximum 3,000 psf may be used.

4.2.3 Concrete Platforms

The near surface subgrade soils at this site consist predominantly of silty sand with very low expansion potential. Concrete platforms may be placed directly on appropriately prepared subgrade. Concrete platforms shall be supported by compacted fill. As a minimum, the upper 24 inches of subgrade soil supporting the concrete platforms should be compacted to at least 95% of relative compaction (ASTM D1557-09).

4.2.4 Retaining Walls

We understand that low height (approximately 3-foot high) retaining walls are being proposed along the project alignment near the southwest corner of Rialto Avenue and I Street.

4.2.5.1 Wall Pressure

In general, cantilever retaining walls, which are free to move laterally at least one-half inch for each 10-feet in height, may be designed for an equivalent fluid pressure of 36 pcf (with level backfill) or 45 pcf (for 2:1 sloping backfill). Proper drainage shall be provided behind the walls to prevent building up of hydrostatic pressures.

Retaining wall footings should be supported on stiff/dense native soils or on compacted fill. For retaining wall footings founded on stiff/dense native soils or on compacted fill, an allowable bearing pressure of 3,000 psf may be used. The footing should be sized so the resultant of the foundation load is applied within the center one-third of the footing width.

Resistance to lateral loads can be provided by friction developed between the bottom of the footings and the supporting soil and by the passive soil pressure developed on the face of the footing. For design purposes, a coefficient of friction of 0.35 may be used. The allowable passive pressure for undisturbed native soil or compacted fill may be taken as an equivalent fluid pressure of 300 pcf. Both of these values include a factor of safety of at least 1.5 and may be combined in design without reduction.

Experience has shown that retaining walls adequately designed for static loading have generally performed well during earthquake loading. However, if walls are to be designed for seismic loading, the following seismic pressure may be used:

AREMA Ground Motion	Level 1	Level 2	Level 3
Seismic Pressure (pcf)	13.2	27	46

The resultant of the seismic pressure should be applied at a height 0.6 times the wall height above the base of the wall.

4.2.5.2 Wall Backfill

We recommend that all retaining walls be backfilled with non-expansive granular soils, i.e., backfill type 1 and 2 per to AREMA manual Volume 2, Chapter 8, Part 5. An example retaining wall backfill and drainage is provided on Figure 8.

Heavy compaction equipment operating adjacent to retaining walls can cause excessively high lateral soil pressures to be exerted on the wall. Therefore, soils within 5 feet of the wall should either be compacted with hand-operated equipment or designed or shored to withstand compaction pressure from heavy equipment.

4.2.6 Concrete Culverts

Reinforced concrete culvert pipe should be designed in accordance with Volume 2, Chapter 8, Part 10 of AREMA. Design and construction of reinforced concrete box culvert should be conducted in accordance with AREMA manual Part 16.

Design loading on the culvert shall include earth load, train load, impact load, and any other surcharge load. For calculating earth load, a unit weight of 140 pcf and 120 pcf may be used for ballast and compacted fill, respectively. Design charts for vertical loading from train load are presented on Figures 9 and 10.

Concrete culverts should be supported on stiff/dense native soils or on compacted fill. For concrete culvert founded on stiff/dense native soils or on compacted fill, an allowable bearing pressure of 3,000 psf may be used.

4.3 Track Subgrade Grading

The subgrade material along the proposed track alignment varies and consists of fill, underlain by medium-dense sand. To provide firm and uniform support for the proposed railroad track, some degree of removal and recompaction should be anticipated. If uncertified fill is encountered during grading, it should be removed and recompacted. Grading operation should be observed by experienced soil technicians from Group Delta Consultants, Inc. The actual extent of removal and recompaction should be determined during the site-grading stage by the project geotechnical engineer. In general, two (2) to five (5) feet of removal and recompaction should be anticipated. Geotechnical recommendations for site preparation are provided in the following sections.

1. The grading contractor is responsible for notifying the project geotechnical engineer of a pre-grading meeting prior to the start of grading operations and anytime that the operations are resumed after an interruption.

2. Prior to the start of earthwork, any existing improvements should be demolished. Any existing utilities should be removed, relocated, or protected in place, as appropriate.

3. The project area shall be stripped and cleared of any vegetation and demolition debris. Any uncertified fill or soft, unsuitable soils should be removed and replaced with compacted fill.

4. The bottom of the excavation for any removals shall be observed by the project geotechnical engineer while it is proof-rolled with loaded equipment. Any loose or yielding soils shall be over-excavated and recompacted to the limits determined by the project geotechnical engineer.

5. The exposed bottom of excavations shall be scarified to a depth of 6 inches, moisture conditioned to within 0 to 2% of the optimum moisture content, and recompacted to at least 95% relative compaction as determined by ASTM D1557-09.

6. Structural fill for supporting of the track should be compacted to at least 95% of the maximum dry density determined by ASTM D 1557-09. Structural fill for supporting of the track should consist of predominantly sandy soils and should be free of expansive clay, rock greater than 3 inches in maximum size, debris, and other deleterious materials.

7. All fill soils shall be approved by the project geotechnical engineer, and import soils should be approved before being brought on site.

8. All earthwork and grading shall be performed under the observation of the representative of the project geotechnical engineer. Compaction testing of the fill soils shall be performed at the discretion of the project geotechnical engineer. Testing shall be performed for approximately every 2 feet in fill thickness or 500 cubic yards of fill placed, whichever occurs first. If the specified compaction is not achieved, additional compactive effort, moisture conditioning, and/or removal and recompaction of the fill soils will be required.

9. All materials used for subballast shall conform to the 2006 “Green Book,” and shall be compacted to at least 95% relative compaction.

4.4 Temporary Excavations

4.4.1 General

We understand that some cuts will be made along the proposed railroad track alignment to make room for construction of the new track, and a retaining wall (approximately 3 feet high) will be constructed.

Temporary cut slopes should be made at a slope angle no steeper than 1 (horizontal) to 1 (vertical). Any excavation should be kept at least a horizontal distance of 5 feet from the edge of any existing railroad tie.

All excavations should meet the minimum requirements of the Occupational Safety and Health Association (OSHA) Standards. Maintaining safe and stable slopes on excavations is the responsibility of the contractor and will depend on the nature of the soils and groundwater conditions encountered and his method of excavation. Excavations during construction should be carried out in such a manner that failure or ground movement will not occur. The contractor should perform any additional studies deemed necessary to supplement the information contained in this report for the purpose of planning and executing his excavation plan.

4.4.2 Shored Excavation

Where required, shoring may consist of soldier piles and lagging. Cantilever shoring can be used for excavations up to 10 to 12 feet deep. For deeper excavations, tied-back anchors or bracing may be required. Selection of the shoring system will also depend on the area to be protected and the acceptance criteria for deflection of the retained excavation and for settlement of the ground adjacent to the shoring.

The soldier piles may consist of steel H-beams placed inside a drilled and cast-in-place concrete pile. Structural concrete should be used below the bottom of excavation and lean concrete above, so the concrete can be chipped out to place the lagging. Piles should be 2 feet in diameter and installed on about 6 to 8 foot centers. Lagging will be required to support/retain the sandy soils present at the site, with slurry used behind the lagging to protect against sloughing.

For design of cantilever shoring, an active earth pressure equivalent to a fluid weighing 36 pcf should be used for level ground and 45 pcf should be used where the ground is sloping up at 2 to 1. The recommended lateral earth pressure for design of tied-back shoring is a uniform rectangular pressure of 25H, where H is the height of the excavation.

If normal traffic loading (not including Cooper Railroad live load) can occur near the top of the shoring, the design height of the shoring should be increased by 2 feet to account for the traffic surcharge. In addition, 35% of any other surcharge loads located adjacent to the shoring should be included as a uniform rectangular loading on the full height of the shoring. If an existing building footing or other concentrated load is nearby, additional lateral pressure will be applied to the shoring. The magnitude and distribution of this additional pressure can be calculated when the nature and location of such loadings are known.

The passive pressure available in the native soils below the bottom of the excavation may be taken as an equivalent fluid pressure of 300 pcf. To account for the rounded shape of the soldier piles, when calculating the passive pressure on individual piles, the equivalent fluid pressure may be multiplied by a factor of 2. The maximum value should be limited to 6,000 psf.

4.5 Imported Soils

If needed, imported soils should consist of non-expansive granular soils with a PI less than 15 and a percent passing the No. 200 sieve of less than 15%. Imported soils should be free of expansive clay, rock greater than 3 inches in maximum size, debris, and other deleterious materials.

4.6 Subballast and Ballast

The subgrade soils along the alignment consist predominantly of silty sands. In general, subballast will not be required. However, if loose/soft unsuitable soils are encountered during grading, a layer of minimum 12-inch-thick subballast should be placed on compacted subgrade. Materials and gradation used for subballast shall conform to the 2006 "Green Book," crushed miscellaneous base (CMB), and shall be compacted to at least 95% relative compaction.

A minimum of 12-inch-thick ballast should be placed under the tie and on top of the 12-inch-thick subballast and compacted subgrade soils. Ballast typically consists of crushed quarry rock, composed of hard dense particles of an angular structure providing sharp corners and cubical fragments. The material, gradation and handling of ballast shall conform to the specifications in AREMA (2006) (Volume 1, Chapter 1 – Roadway and Ballast).

If subgrade conditions encountered during the excavation differ from those assumed in the design, the geotechnical engineer should be notified immediately so an assessment regarding the impact to removal and recompaction, and the thickness of subballast and ballast can be perfomed.

4.7 Soil Corrosivity

Corrosivity testing was performed on representative soil samples and included soil pH (Caltrans CT-643), water-soluble chlorides (Caltrans CT-422), water-soluble sulfates (Caltrans CT-417) and electrical resistivity (Caltrans CT-643). The test results are summarized in Table 5 below.

TABLE 5: SUMMARY OF CORROSION TEST RESULT

BORING NUMBER	SAMPLE NUMBER	DEPTH (FT)	PH CALTRANS 643	CHLORIDE CONTENT CALTRANS 422 (ppm)	SULFATE CONTENT CALTRANS 417 (% by weight)	MINIMUM RESISTIVITY CALTRANS 532 (ohm-cm)
B-03	Bulk	0-5	9.11	15	0.5	6,725
B-12	Bulk	0-5	8.15	12.4	0	4,157

Corrosion evaluation may follow the current Caltrans Corrosion Guidelines (2003), which states that "for structural elements, the department considers a site to be corrosive if one or more of the following conditions exist for the representative soil and/or water samples taken at the site: Chloride concentration is 500 ppm or greater, sulfate concentration is 2000 ppm or greater, or the PH is 5.5 or less." Based on Caltrans criterion, the near-surface soils at this site are classified as non corrosive.

Based on minimum resistivity, the on-site soil is classified as moderately corrosive for buried metals. This potential should be considered in the design and protection of underground metal utilities.

4.8 Soil Expansion Potential

The near-surface soils encountered along the proposed alignment consist predominantly of silty sand. Laboratory testing conducted on a representative sample indicated the near-surface soil at the subject has very low expansion potential.

4.9 Pavement Design

Near-surface soils consist predominantly of silty sand. R-value tests performed on two representative soil samples collected in the upper 5 feet in borings B-1 and B-4 yielded R-values of 60 and 68. In accordance with Caltrans' practice, the subgrade R-value should be limited to 50. Therefore, we used an R-value of 50 in the pavement design. The California Division of Highways Design Method was used for design of the recommended pavement sections.

The following pavement sections are recommended for Traffic Index (TI) values of 5, 8, 10, and 12:

Traffic Index (TI)	Section Thickness (Feet) AC Over AB
5	0.25 AC/0.35 AB
8	0.40 AC/0.45 AB
10	0.50 AC/0.65 AB
12	0.60 AC/0.80 AB

TI value of 5 is recommended for car parking and non-truck driveways. TI value of 6 or higher may be used for truck areas or for the streets. The upper 12 inches of subgrade supporting pavements should be compacted to at least 95% relative compaction (ASTM D1557-09). For Portland Cement Concrete (PCC) pavements in areas of some truck traffic, we recommend a pavement section of 6 inches. PCC over 8 in. of crushed aggregate base or crushed miscellaneous (CAB or CMB). The aggregate base layer should be compacted to at least 95% of its maximum dry density. The asphalt and base should conform to the specifications of the Standard Specifications for Public Works Construction, 2006 Edition ("The Green Book").

5.0 POST INVESTIGATION SERVICES

We recommend that final project plans and specifications should be reviewed by GDC to confirm that the full intent of the recommendations presented in this report have been properly applied to the design. During construction, all earthwork should be observed and tested by GDC, including site preparation, excavations, placement of compacted fill and backfill, and installation of drainage systems.

6.0 LIMITATIONS

This investigation was performed in accordance with generally accepted geotechnical engineering principles and practice. The professional engineering work and judgments presented in this report meet the standard of care of our profession at this time. No other warranty, expressed or implied, is made. This report has been prepared for HDR and their design consultants. It may not contain sufficient information for other parties or other purposes and should not be used for other projects or other purposes without review and approval by GDC.

The recommendations for this project, to a high degree, are dependent upon proper quality control of site grading, fill and backfill placement, and piles installation. The recommendations are made contingent on the opportunity for GDC to observe the earthwork operations and piles installation. This firm should be notified of any pertinent changes in the project, or if conditions which differ from those described herein are encountered in the field. If parties other than GDC are engaged to provide such services, they must be notified that they will be required to assume complete responsibility for the geotechnical phase of the project and must either concur with the recommendations in this report or provide alternate recommendations.

7.0 REFERENCES

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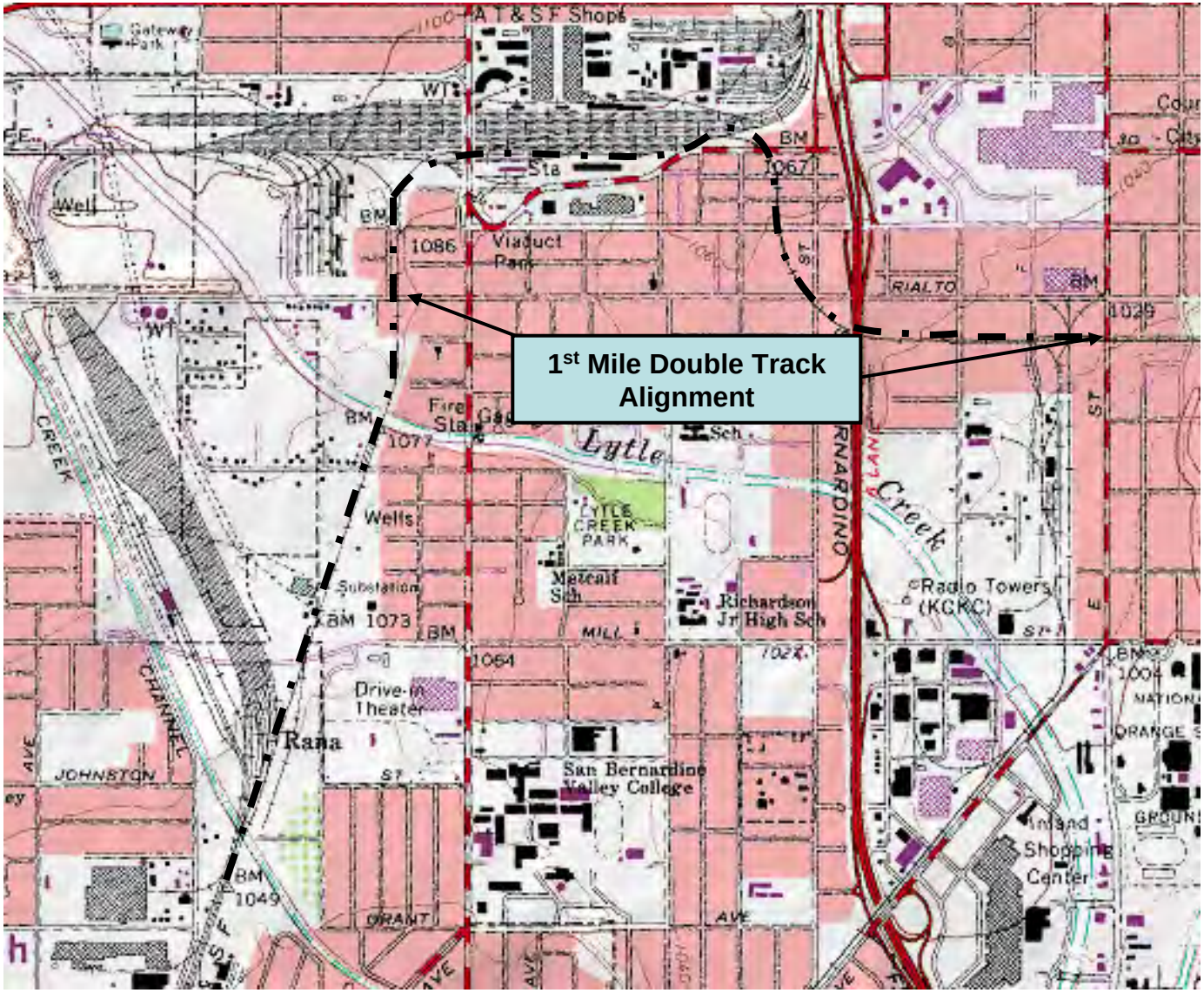
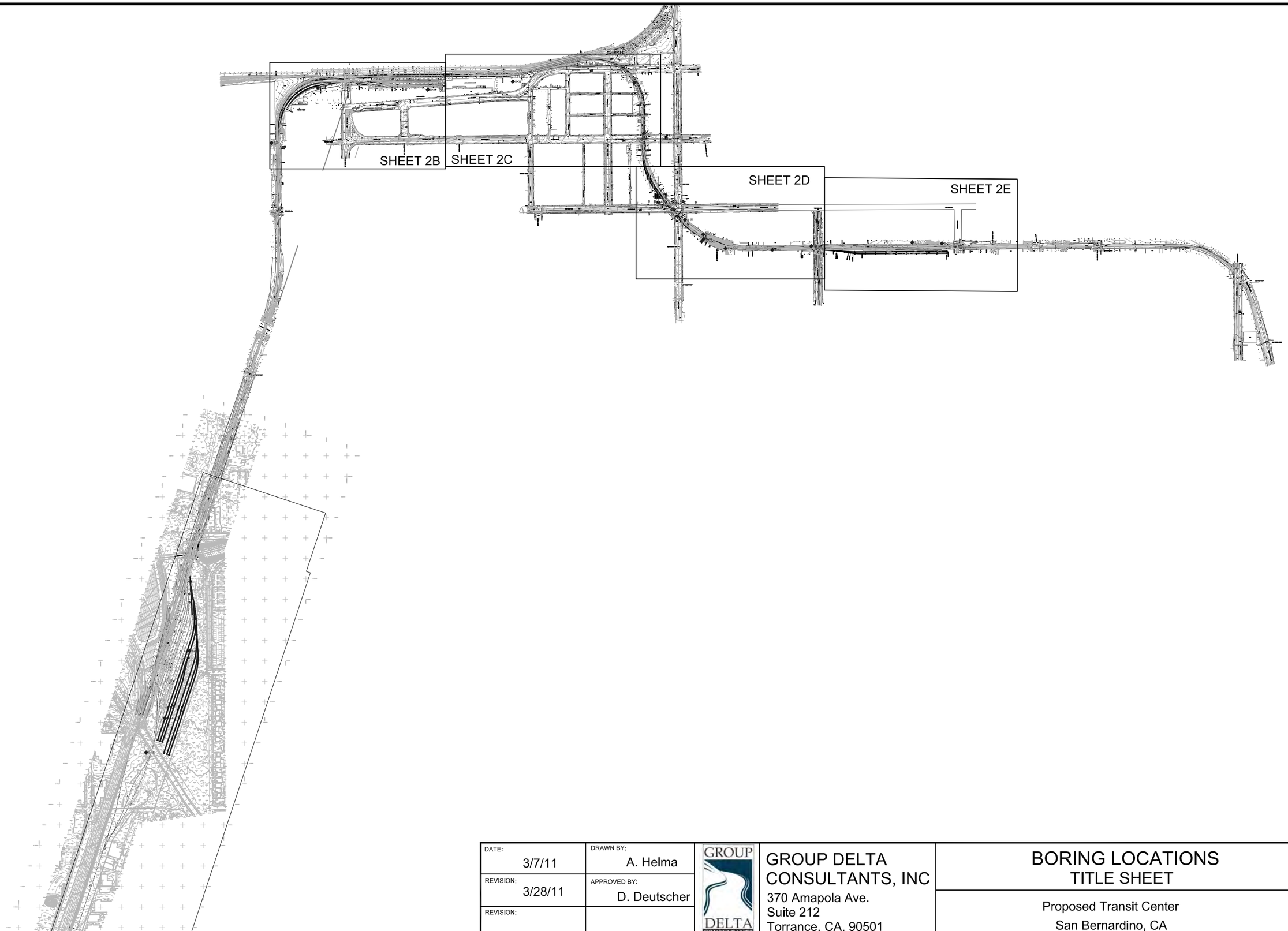
FIGURES



GROUP DELTA CONSULTANTS	GROUP DELTA CONSULTANTS, INC. ENGINEERS AND GEOLOGISTS	FIGURE NUMBER. 1
	PROJECT NAME:. Sanbag 1st Mile	PROJECT NUMBER L-894
	Vicinity Map	



DATE: 3/7/11	DRAWN BY: A. Helma	GROUP DELTA CONSULTANTS	GROUP DELTA CONSULTANTS, INC 370 Amapola Ave. Suite 212 Torrance, CA. 90501	BORING LOCATIONS TITLE SHEET Proposed Transit Center San Bernardino, CA	PROJECT NUMBER: L-894
REVISION: 3/28/11	APPROVED BY: D. Deutscher				SCALE: N. T. S.
REVISION:					FIGURE NUMBER: 2A

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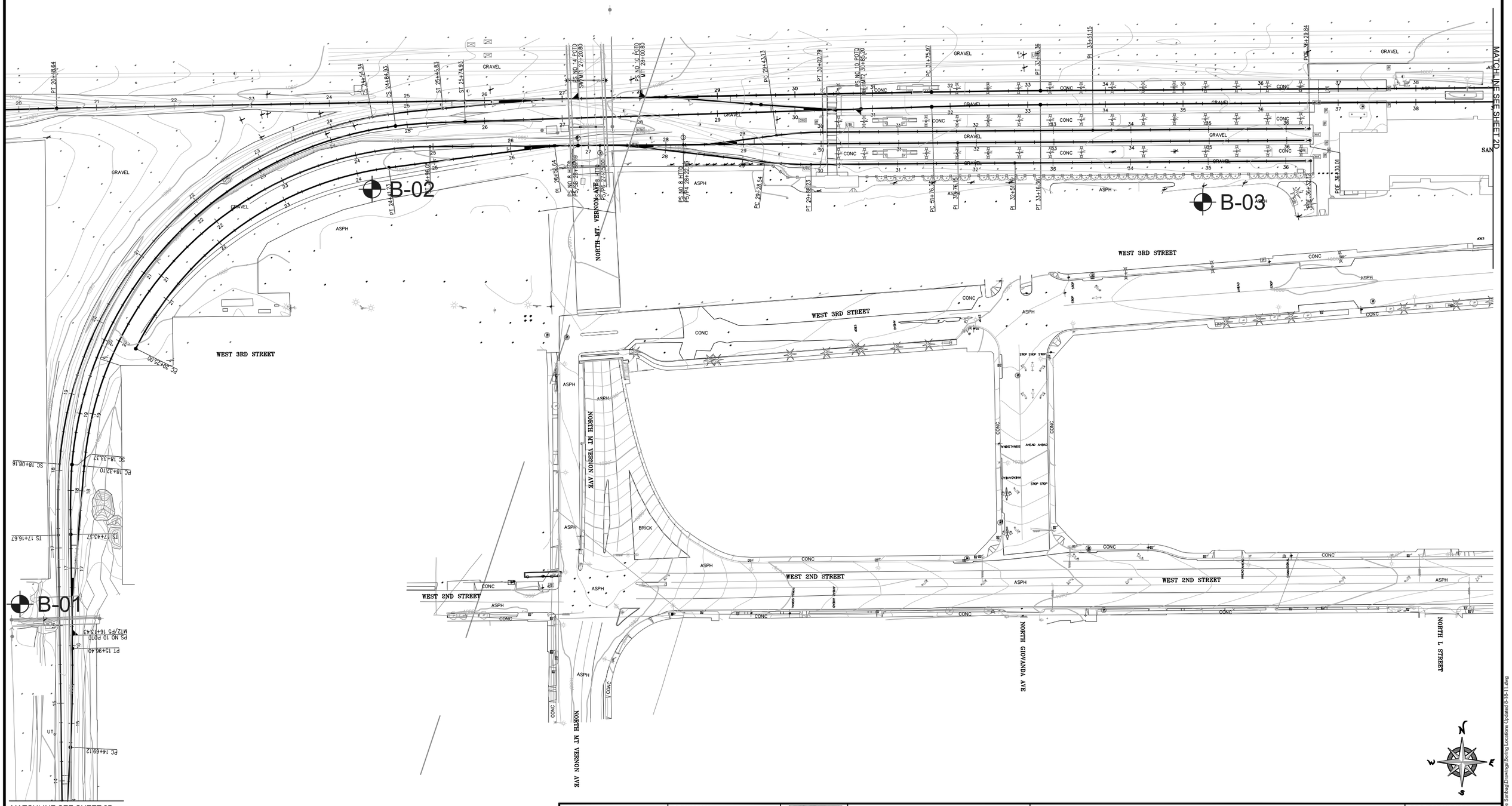

LEGEND

B-11 Boring location

DATE: 3/7/11	DRAWN BY: A. Helma	GROUP DELTA CONSULTANTS, INC 370 Amapola Ave. Suite 212 Torrance, CA. 90501	BORING LOCATIONS
REVISION: 3/28/11	APPROVED BY: D. Deutscher		HDR 1ST MILE SANBAG San Bernardino, CA
REVISION:			

PROJECT NUMBER: L-894

SCALE: 1" ≅ 12'

FIGURE NUMBER: 2B

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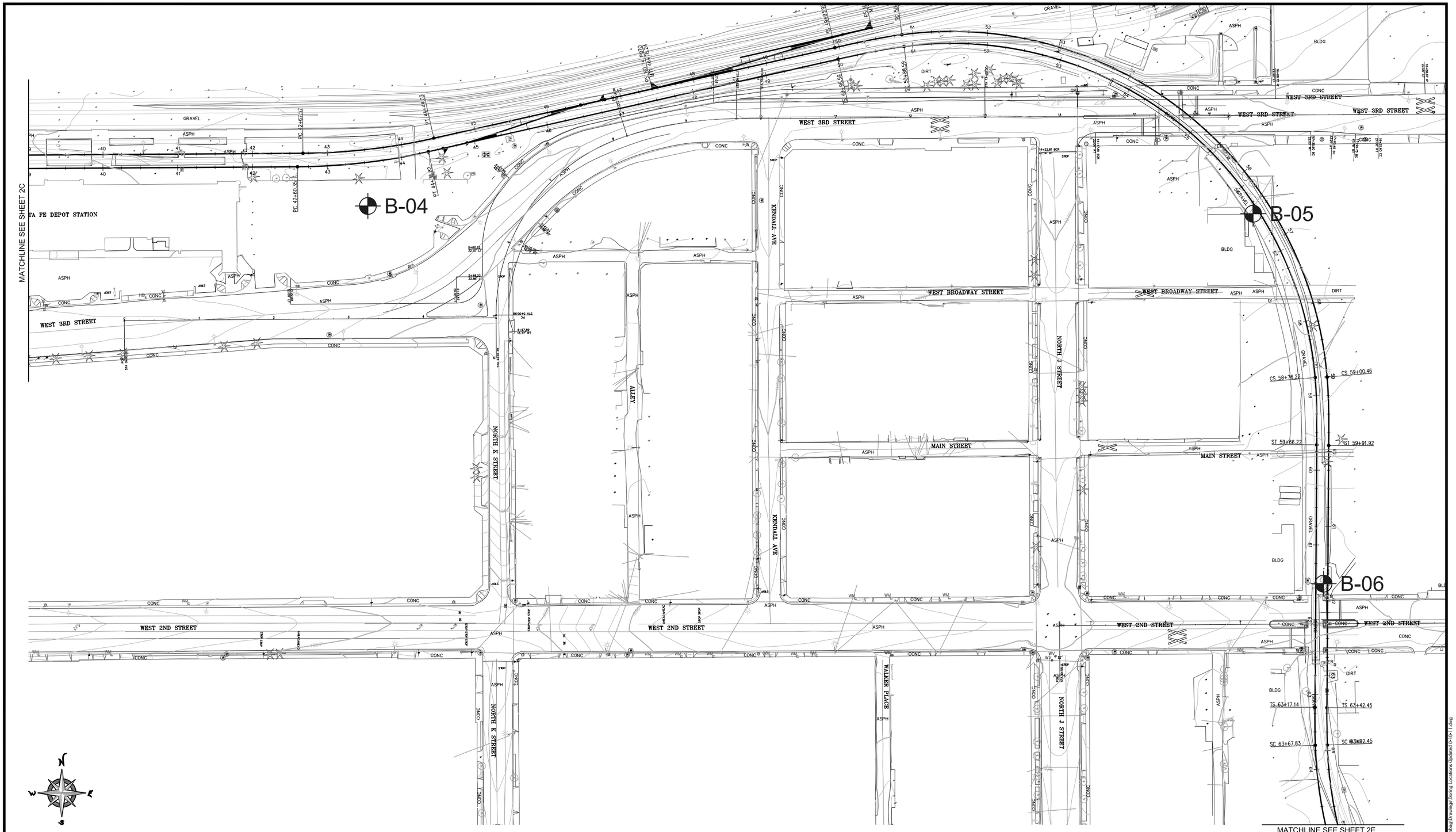

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B-11 Boring location

DATE: 3/7/11	DRAWN BY: A. Helma	GROUP DELTA CONSULTANTS, INC 370 Amapola Ave. Suite 212 Torrance, CA. 90501	BORING LOCATIONS
REVISION:	APPROVED BY: D. Deutscher		HDR 1ST MILE SANBAG San Bernardino, CA
REVISION:			

PROJECT NUMBER: L-894

SCALE: 1" ≅ 12'

FIGURE NUMBER: 2C

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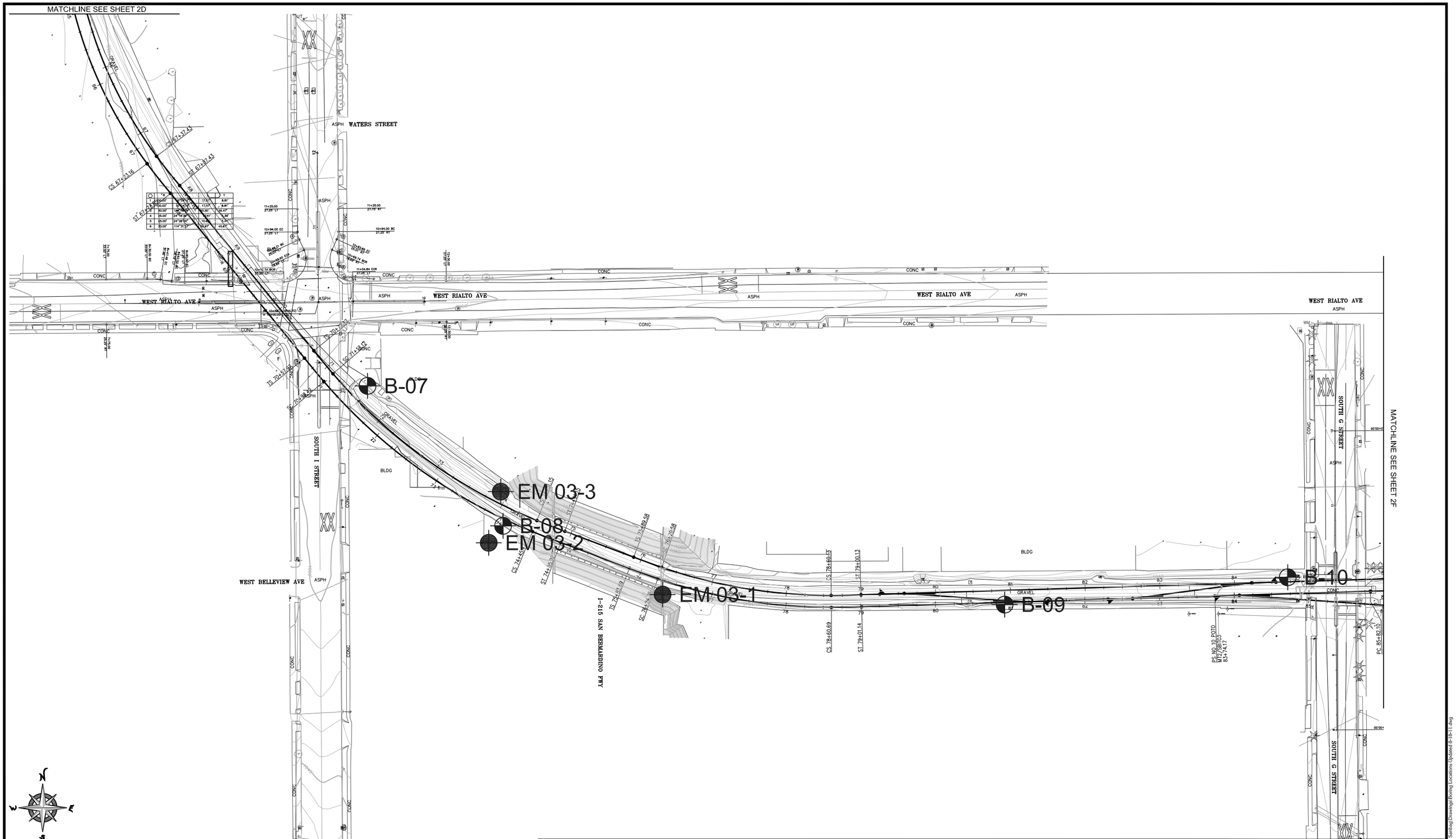

LEGEND

- B-11 Boring Locations
- EM 03-1 Earth Mechanics Boring Locations

DATE: 3/7/11	DRAWN BY: A. Helma	GROUP DELTA CONSULTANTS, INC 370 Amapola Ave. Suite 212 Torrance, CA. 90501	BORING LOCATIONS
REVISION: 3/28/11	APPROVED BY: D. Deutscher		HDR 1ST MILE SANBAG San Bernardino, CA
REVISION:			

PROJECT NUMBER: L-894

SCALE: 1" ≅ 12'

FIGURE NUMBER: 2D

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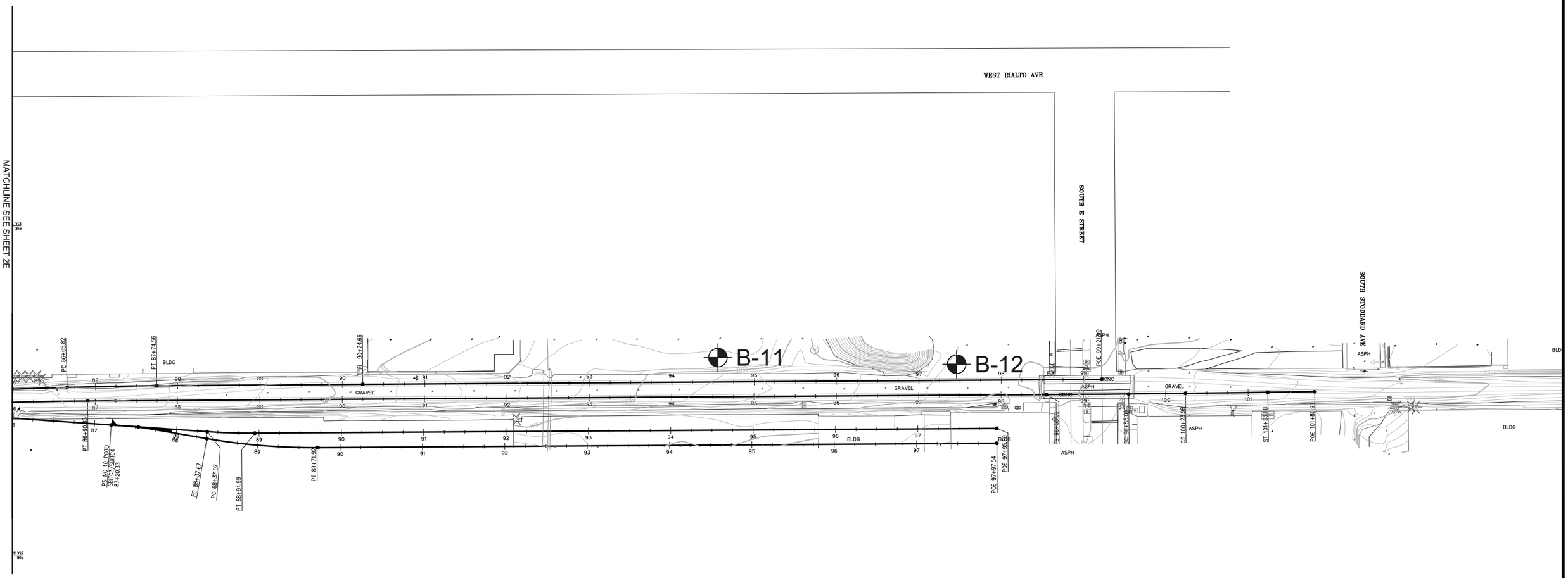

LEGEND

B-11 Boring location

DATE: 3/7/11	DRAWN BY: A. Helma	GROUP DELTA CONSULTANTS, INC 370 Amapola Ave. Suite 212 Torrance, CA. 90501	BORING LOCATIONS
REVISION: 3/28/11	APPROVED BY: D. Deutscher		HDR 1ST MILE SANBAG San Bernardino, CA
REVISION:			

PROJECT NUMBER: L-894

SCALE: 1" ≅ 12'

FIGURE NUMBER: 2E

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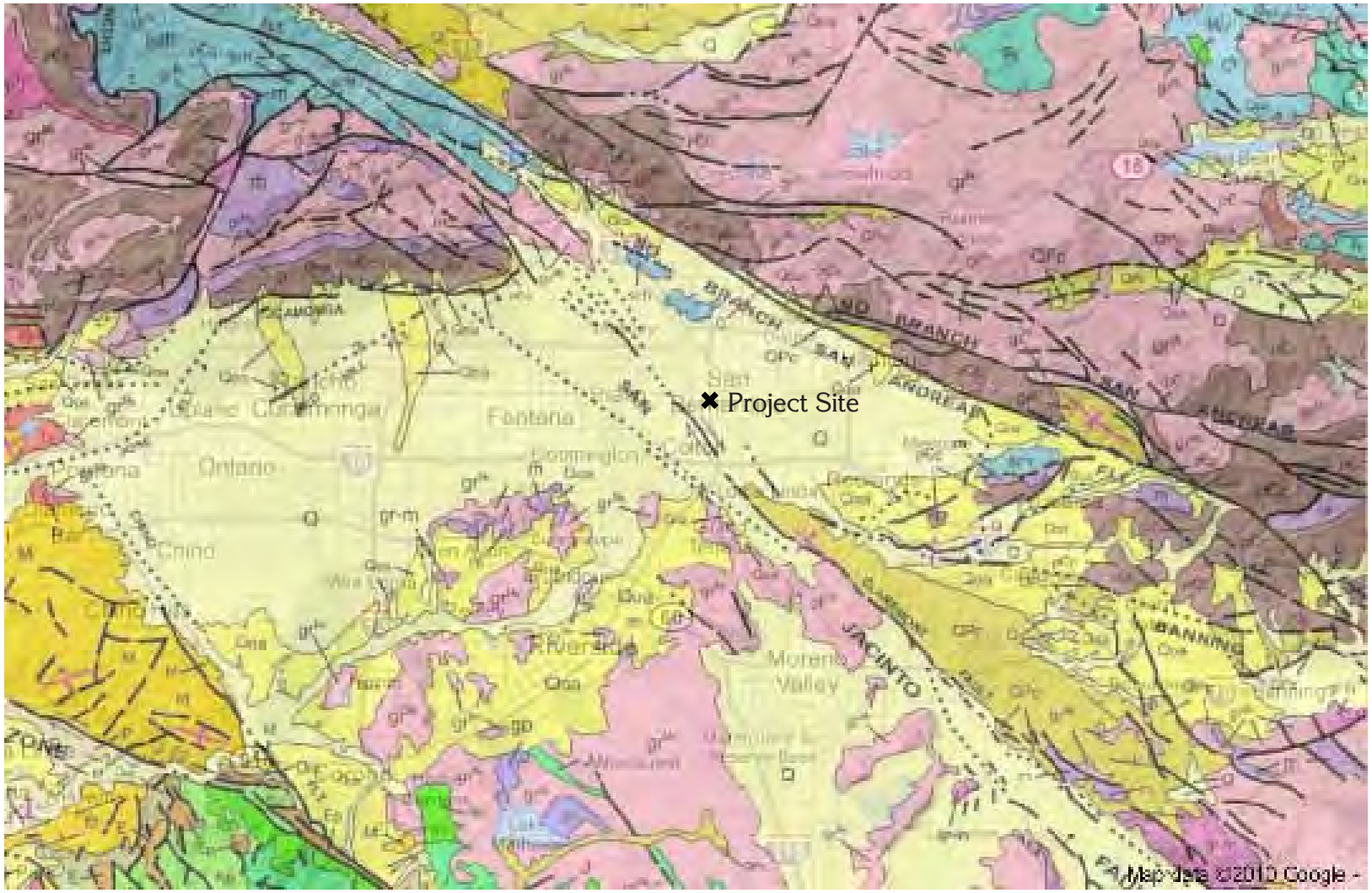
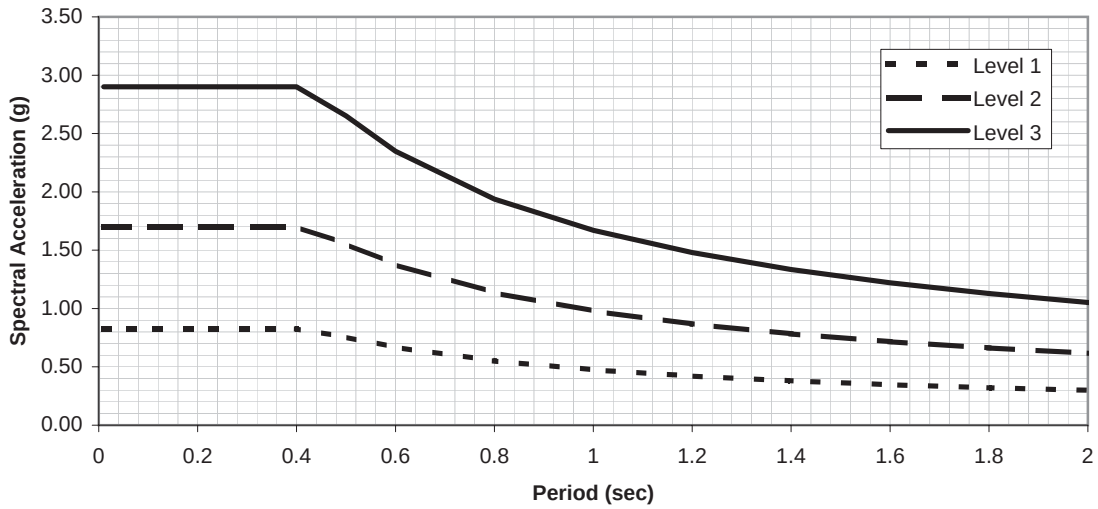


N

GROUP DELTA CONSULTANTS	**Regional Geology and Fault Map**	Project Number: L-894 Date: 7/1/10
	Group Delta Consultants. INC. 370 Amapola Ave. Torrance, Ca 90501	Sanbag – First Mile	Figure 3



Ref: AREMA Volume 2 Structures - Seismic Design for Railway Structures Section 1.4.4.3

$$C_m = \frac{1.2ASD}{T_m^{2/3}} \leq 2.5AD$$

$$D = \left(\frac{1.5}{0.4\xi + 1} + 0.5\right)$$

Input:	Level 1	level 2	Level 3
A	0.33	0.68	1.16
S	1.2		
D	1		
Calc:			
2.5AD	0.825	1.7	2.9

Period (sec)	Spectral Acceleration (g) Level 1	Level 2	Level 3
0.01	0.83	1.70	2.90
0.03	0.83	1.70	2.90
0.1	0.83	1.70	2.90
0.2	0.83	1.70	2.90
0.3	0.83	1.70	2.90
0.4	0.83	1.70	2.90
0.5	0.75	1.55	2.65
0.6	0.67	1.38	2.35
0.8	0.55	1.14	1.94
1	0.48	0.98	1.67
1.2	0.42	0.87	1.48
1.4	0.38	0.78	1.33
1.6	0.35	0.72	1.22
1.8	0.32	0.66	1.13
2	0.30	0.62	1.05
2.5	0.26	0.53	0.91
3	0.23	0.47	0.80
4	0.19	0.39	0.66

GROUP DELTA CONSULTANTS

AREMA Design Seismic Response Spectrum

Figure 4

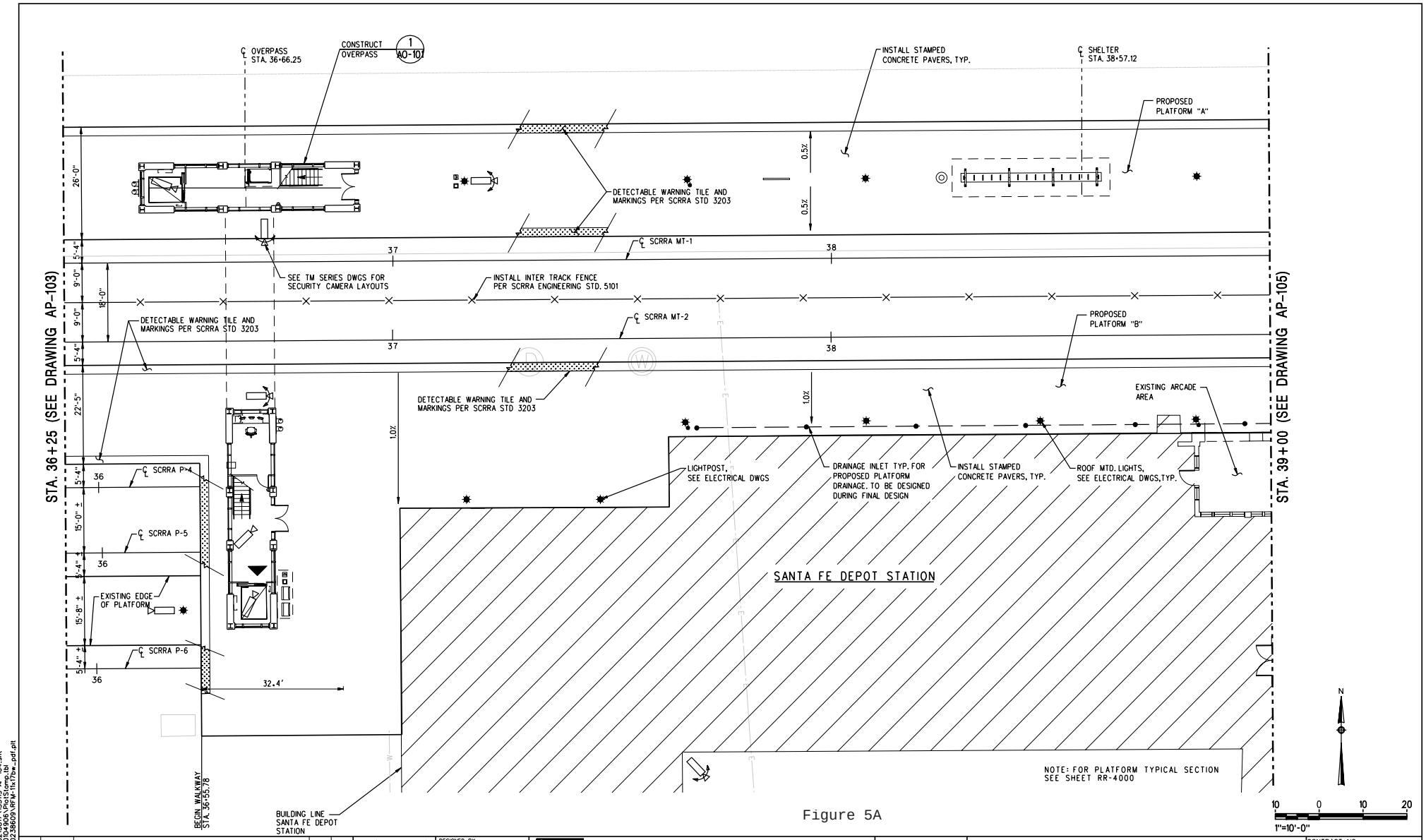


Figure 5A

REV.	DATE	BY	SUB.	APP.

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DRAWN BY W. STEBOK
CHECKED BY J. MCCONNELL
APPROVED BY R. KLOVSKY
DATE 3-31-11

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SUBMITTED: _____ PROJECT MANAGER
APPROVED: _____

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SANBAG REDLANDS FIRST MILE RAIL IMPROVEMENT PROJECT

SANTA FE DEPOT

PLATFORM CONSTRUCTION PLAN SHEET 4 OF 6

CONTRACT NO.
DRAWING NO. AP-104
REVISION
SHEET NO. OF
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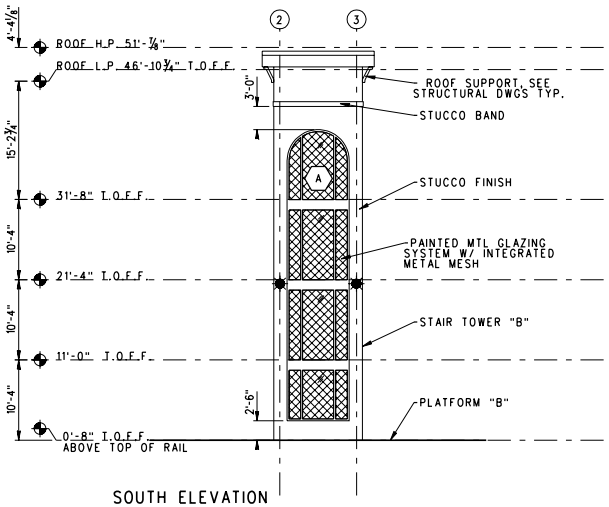
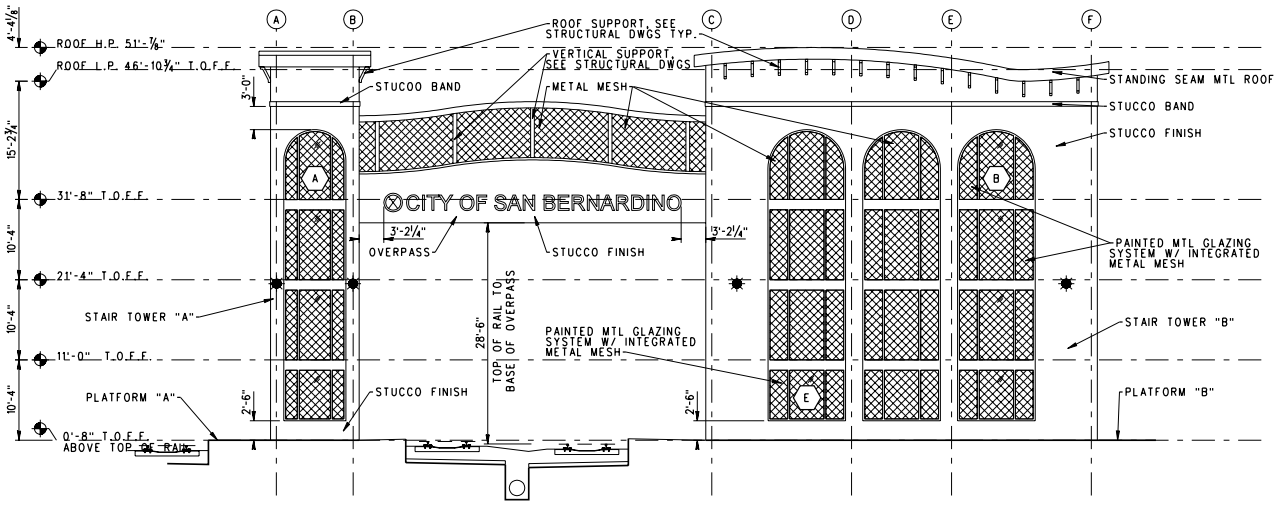


SOUTH ELEVATION AT STAIR TOWER "B"

1/8"=1'-0"

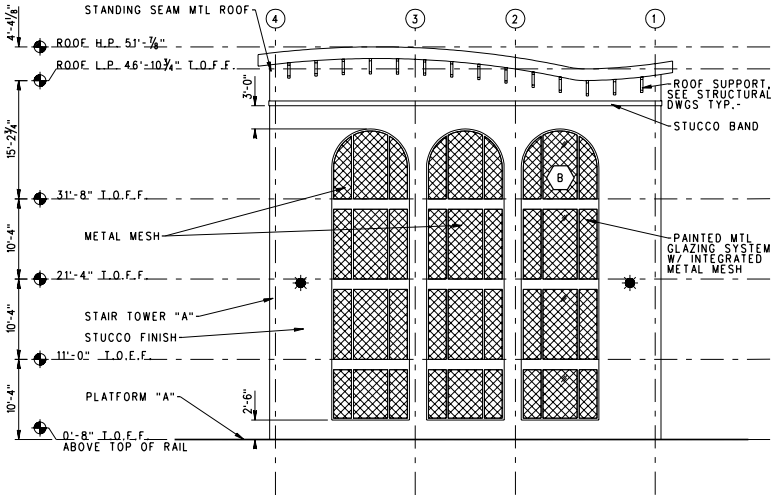
A AO-105



WEST ELEVATION

1/8"=1'-0"

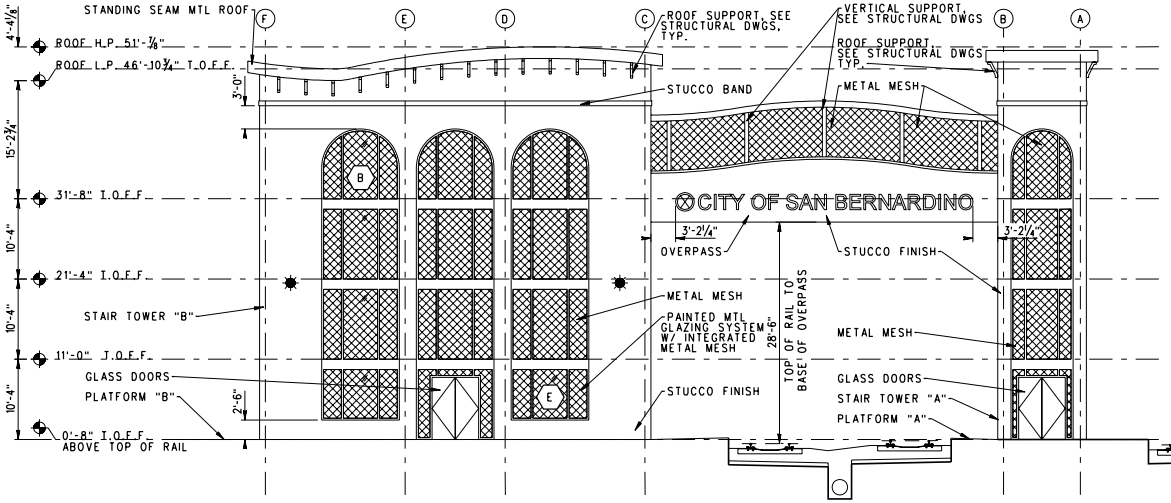
B AO-105



NORTH ELEVATION AT STAIR TOWER "A"

1/8"=1'-0"

C AO-105



EAST ELEVATION

1/8"=1'-0"

D AO-105

Figure 5B

8 0 8 16

1/8"=1'-0

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DRAWN BY B. BRANDLE
CHECKED BY J. MCCONNELL
APPROVED BY R. KLOVSKY
DATE 3-31-11

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SANBAG REDLANDS FIRST MILE RAIL IMPROVEMENT PROJECT

SANTA FE DEPOT

OVERPASS ELEVATIONS

CONTRACT NO.
DRAWING NO. A0-105
REVISION
SHEET NO. OF
SCALE 1/8"=1'-0"

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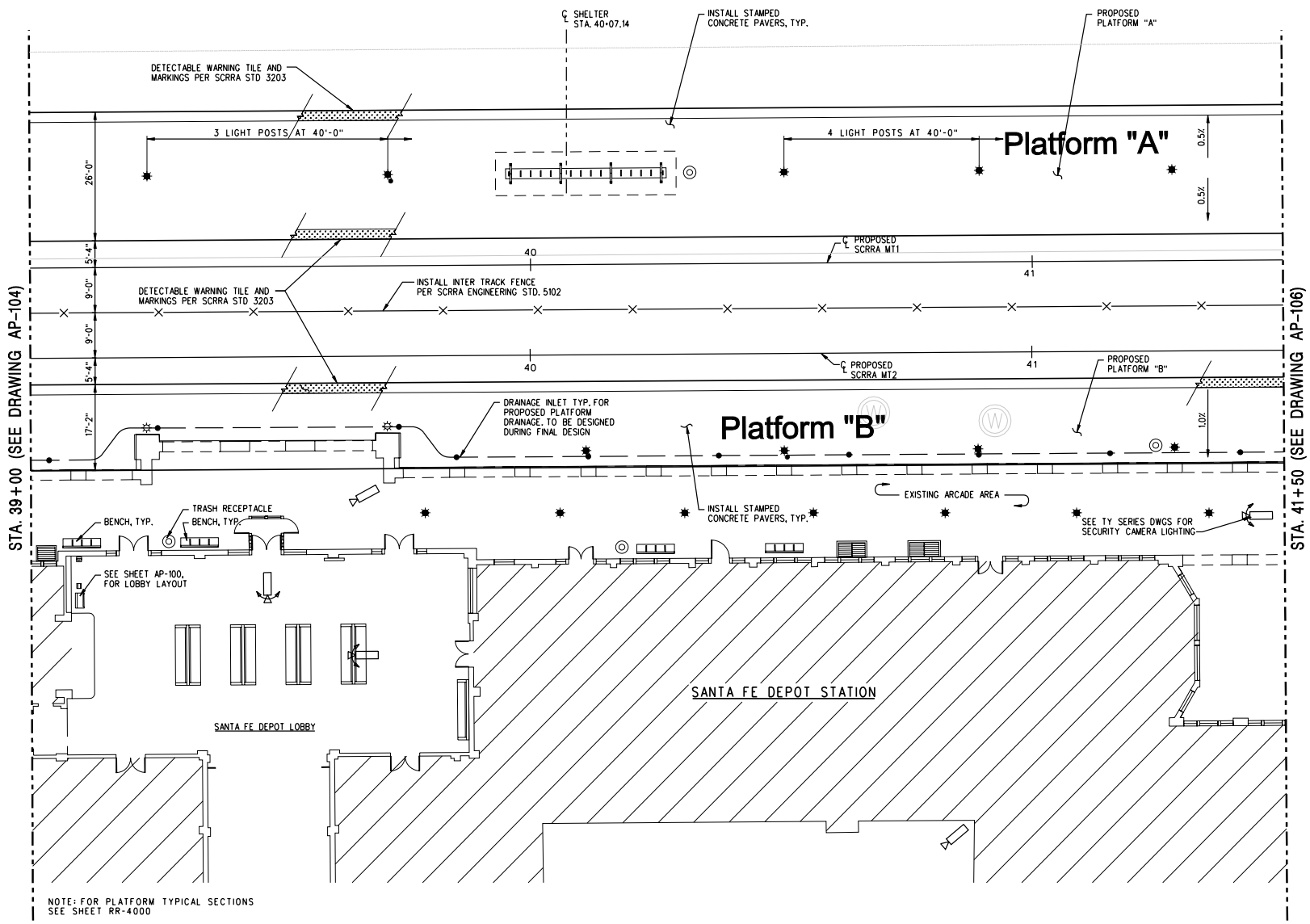

Figure 5C

REV.	DATE		BY	SUB.	APP.			

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DESIGNED BY S. HERZBERG
DRAWN BY W. STEBOK
CHECKED BY J. MCCONNELL
APPROVED BY R. KLOVSKY
DATE 3-31-11

SAN BERNARDINO ASSOCIATED GOVERNMENTS

HDR Engineering, Inc.
ONE COMPANY Many Solutions
2280 Market Street
Suite 100
Riverside, Ca 92501-2110

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APPROVED: _____

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SANBAG REDLANDS FIRST MILE RAIL IMPROVEMENT PROJECT

SANTA FE DEPOT

PLATFORM CONSTRUCTION PLAN SHEET 5 OF 6

CONTRACT NO.
DRAWING NO. AP-105
REVISION
SHEET NO. OF
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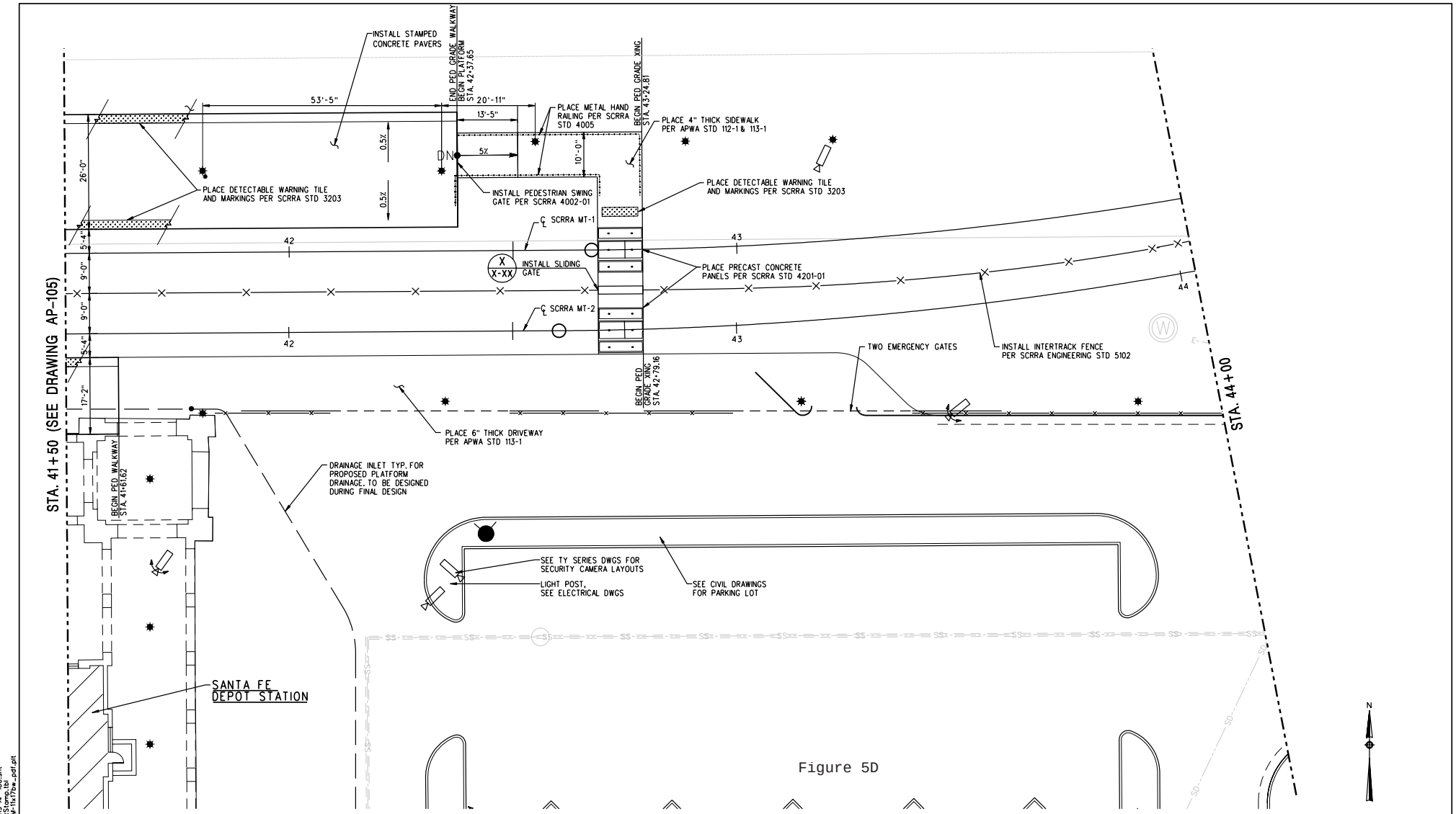

Figure 5D

NOTE: FOR PLATFORM TYPICAL SECTIONS SEE SHEET RR-4000

REV.	DATE	BY	SUB.	APP.

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DATE 3-31-11

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SUBMITTED: _____ PROJECT MANAGER

APPROVED: _____

30% SUBMITTAL
NOT FOR CONSTRUCTION

SANBAG REDLANDS FIRST MILE RAIL IMPROVEMENT PROJECT

SANTA FE DEPOT

PLATFORM CONSTRUCTION PLAN SHEET 6 OF 6

CONTRACT NO.
DRAWING NO. AP-106
REVISION
SHEET NO. OF
SCALE 1"=10'-0"

03\03\11 4:33:28 PM USER = bbrandie
c:\pwworking\sac\d0123817\135119-AP-106.sht
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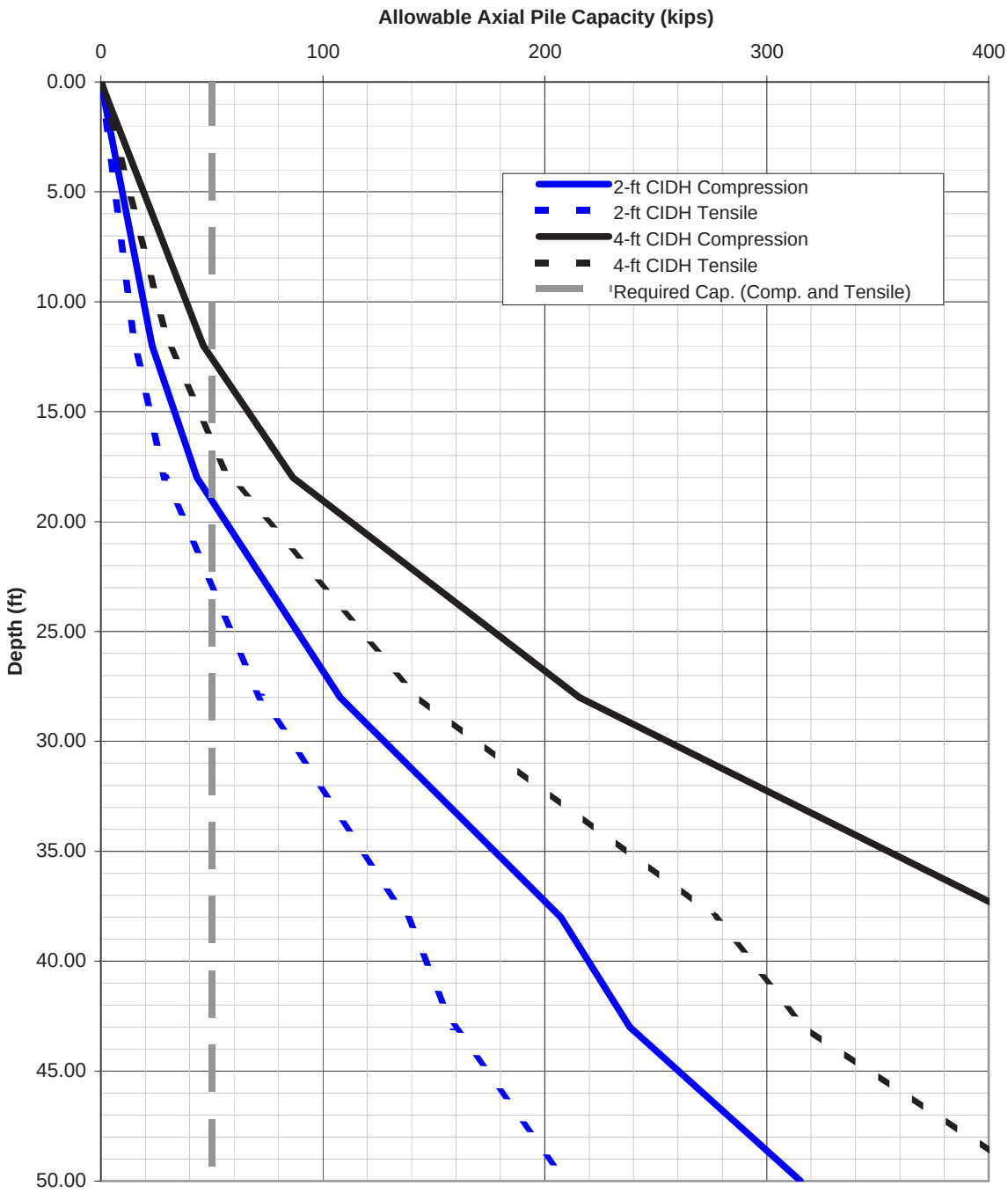
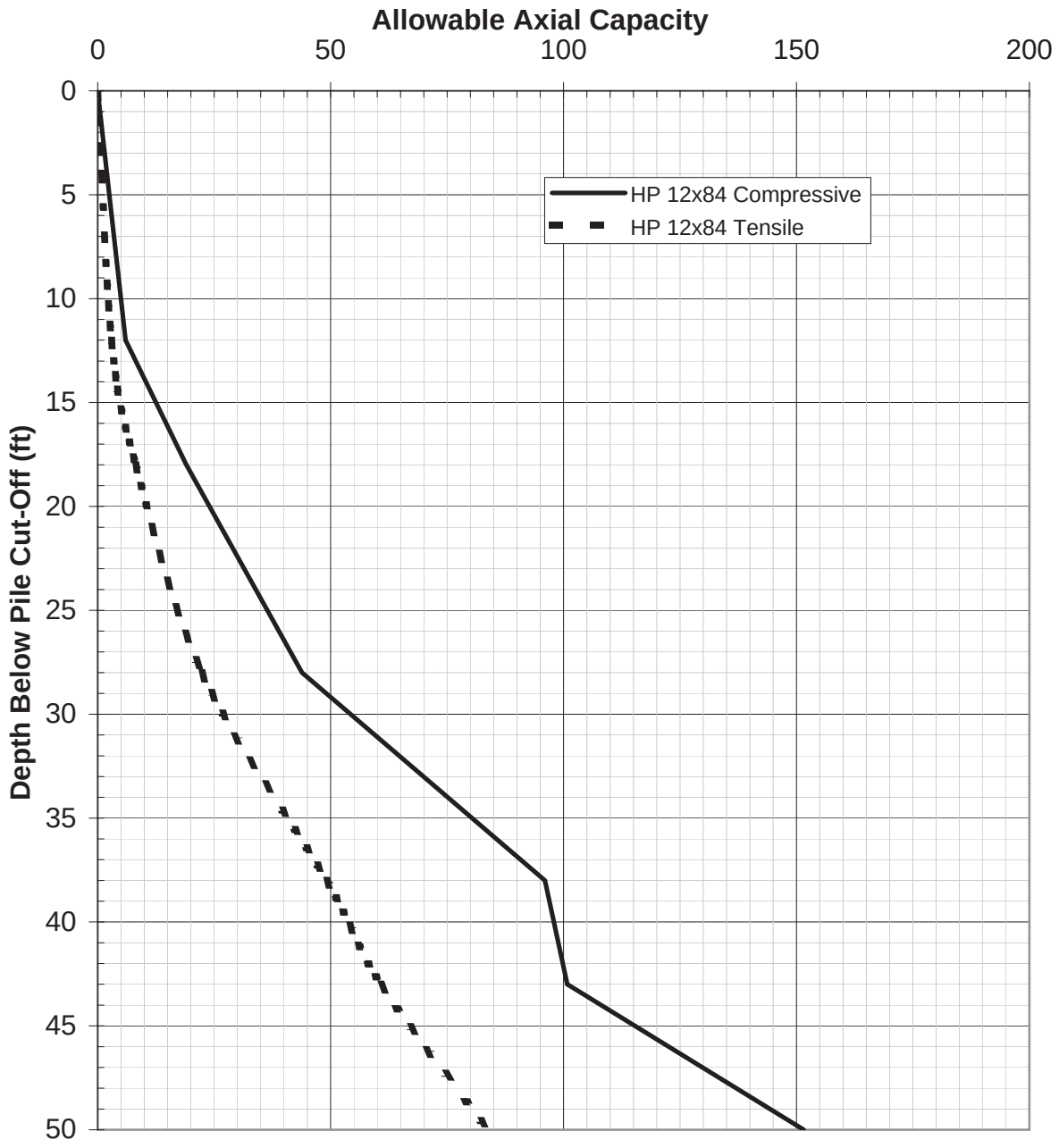


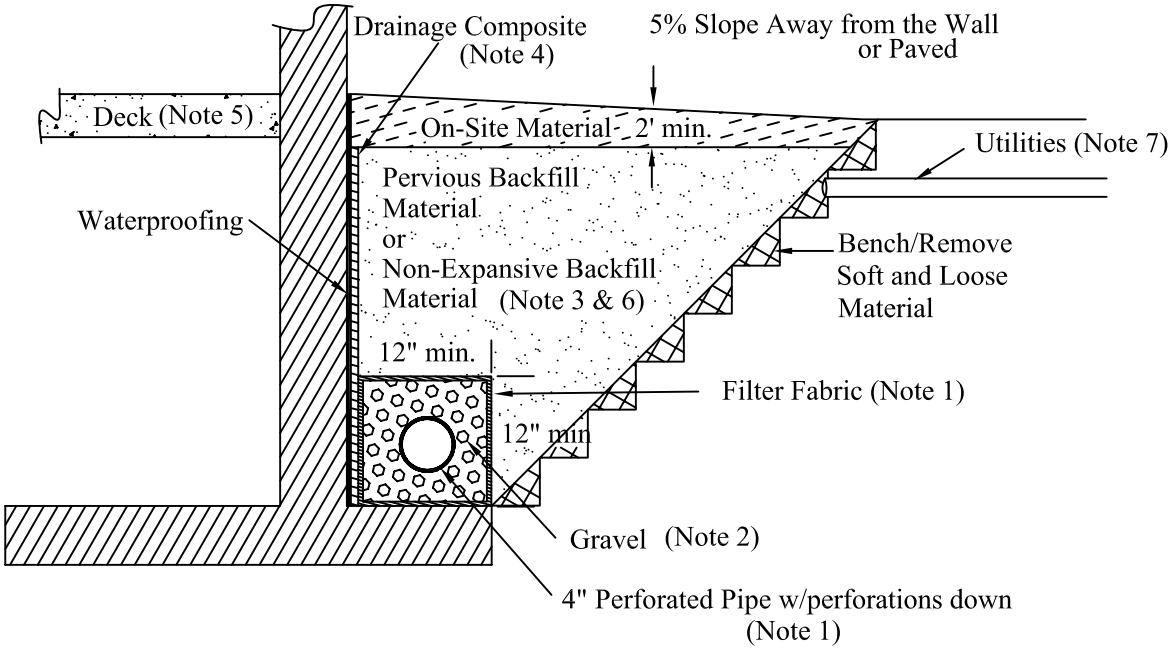
L-894 SANBAG 1st Mile
Allowable Axial Pile Capacity for 2- and 4-foot Dia. CIDH

Figure 6



GROUP DELTA CONSULTANTS	Project	Redlands 1st Mile
	Bridge	N.A.
	Pile Type	HP 12x 84

Figure 7



NOTES

1) Perforated pipe should be an ASTM standard Acrylonitrile Butadiene Styrene (ABS), Polyvinyl Chloride (PVC), or Polyethylene (PE) with a 0.25% slope for drainage and wrapped with a filter fabric (Mirafi 140 or equivalent).

2) Gravel - 3/8" or 3/4" gravel

3) If no drainage composite is used, Pervious Backfill material should be used above the gravel zone. Pervious Material should be meet Public Works Standard (Greenbook 2000, 3.0.0-3.5.2) as follows:

100% passing 3/4"
80-100% passing 3/8"
0-8% passing -100 sieve
0-3% passing -200 sieve

4) If a drainage composite is used, non expansive backfill material may be used above the gravel zone. Drainage Composite Material should be MiraDrain 6000 material or equivalent. Backfill should have an EI<20 and conform to Group Delta Grading and Backfill Recommendations.

5) If the wall is supported by the deck, no backfill shall be placed before the deck is constructed and a structural engineer's approval is given.

6) No heavy equipment or compaction equipment should be used above the perforated pipe, or within 8 feet of the wall. Only hand compaction equipment should be used above adjacent to the walls.

7) Utility Laterals - Remove loose material and hand compact backfill or use 2-sack sand/cement slurry.

Retaining Wall Backfill

Redlands 1st Mile		PROJECT NUMBER:	L-894
		DATE:	03/17/11
SCALE: Not To Scale	DRAWN BY: Y Liu	REVISED:	
	APPROVED BY: Y Liu	FIGURE:	8

GROUP DELTA CONSULTANTS, INC.

N:\Projects\800-899\L-894 HDR 1st Mile Sanbag\Drawings\L-862 Fig 8 wall_backfill.dwg

(3) Negative Projecting Embankment Condition:

$$W_E = 1.00 \times B_d \times H \times w$$

d. Track Loading to be supported by the pipe is shown in Figure 8-10-1 of these specifications. The indicated loading includes a variable Impact Load of 40% at 0 feet, and 0% at 10 feet.

e. Any surface surcharges, other than track load, shall be converted to additional height of fill to determine their loading on the pipe.

f. Loading on a carrier pipe, that is within a casing pipe, shall be taken as the full Dead + Live + Impact Load without consideration of the presence of the casing, unless the casing pipe is permanently protected from corrosion using such means as providing extra pipe thickness or a resistant coating.

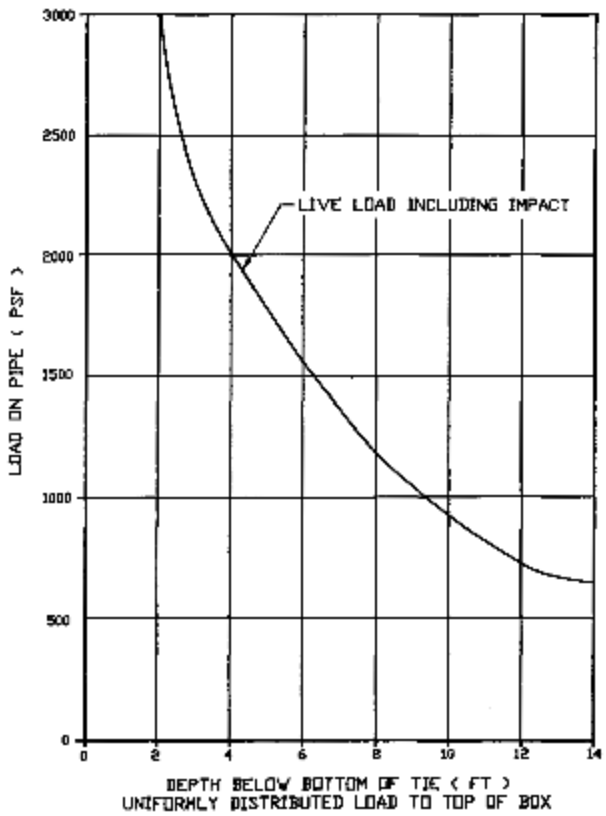


Figure 8-10-1. Track Loading

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L-894 Redlands 1st Mile Project
Figure 9

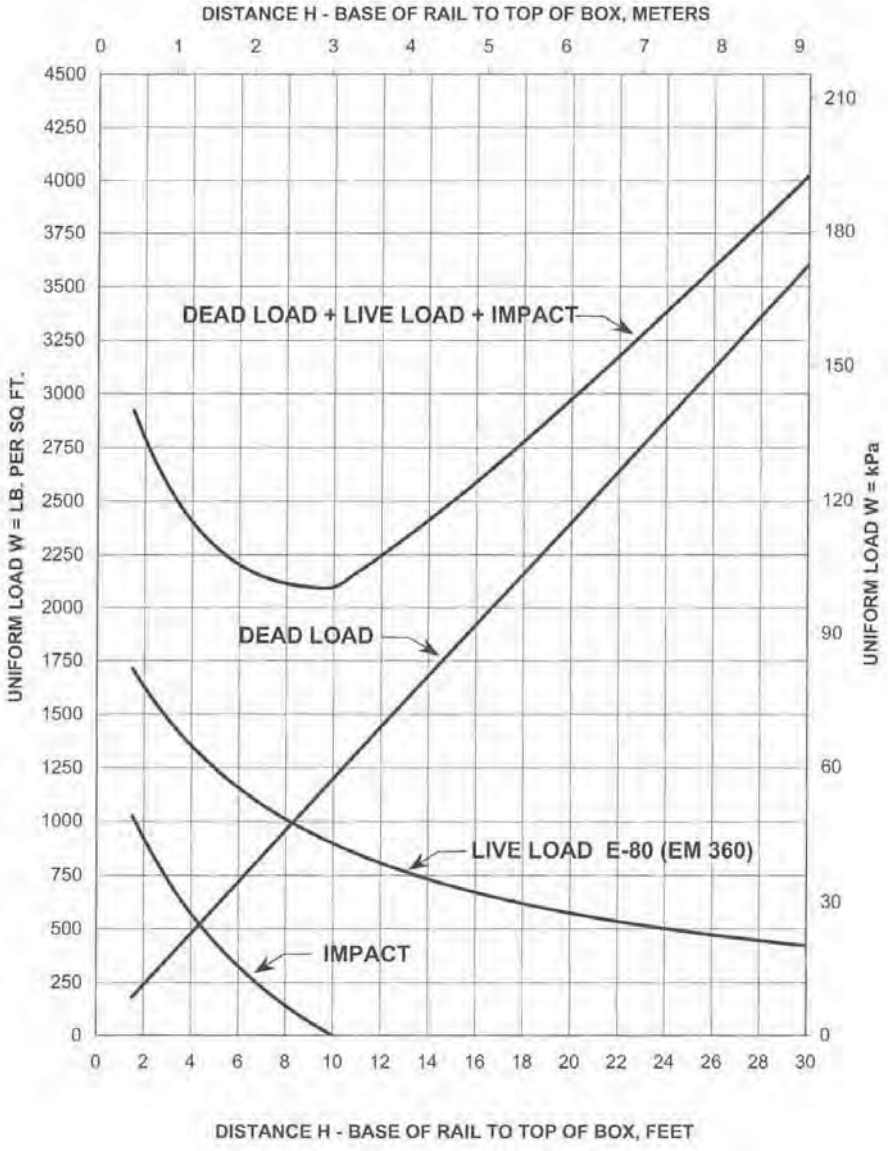

Figure 8-16-1. Uniformly Distributed Load to Top of Box

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L-894 Redlands 1st Mile Profile
Figure 10

PLATES

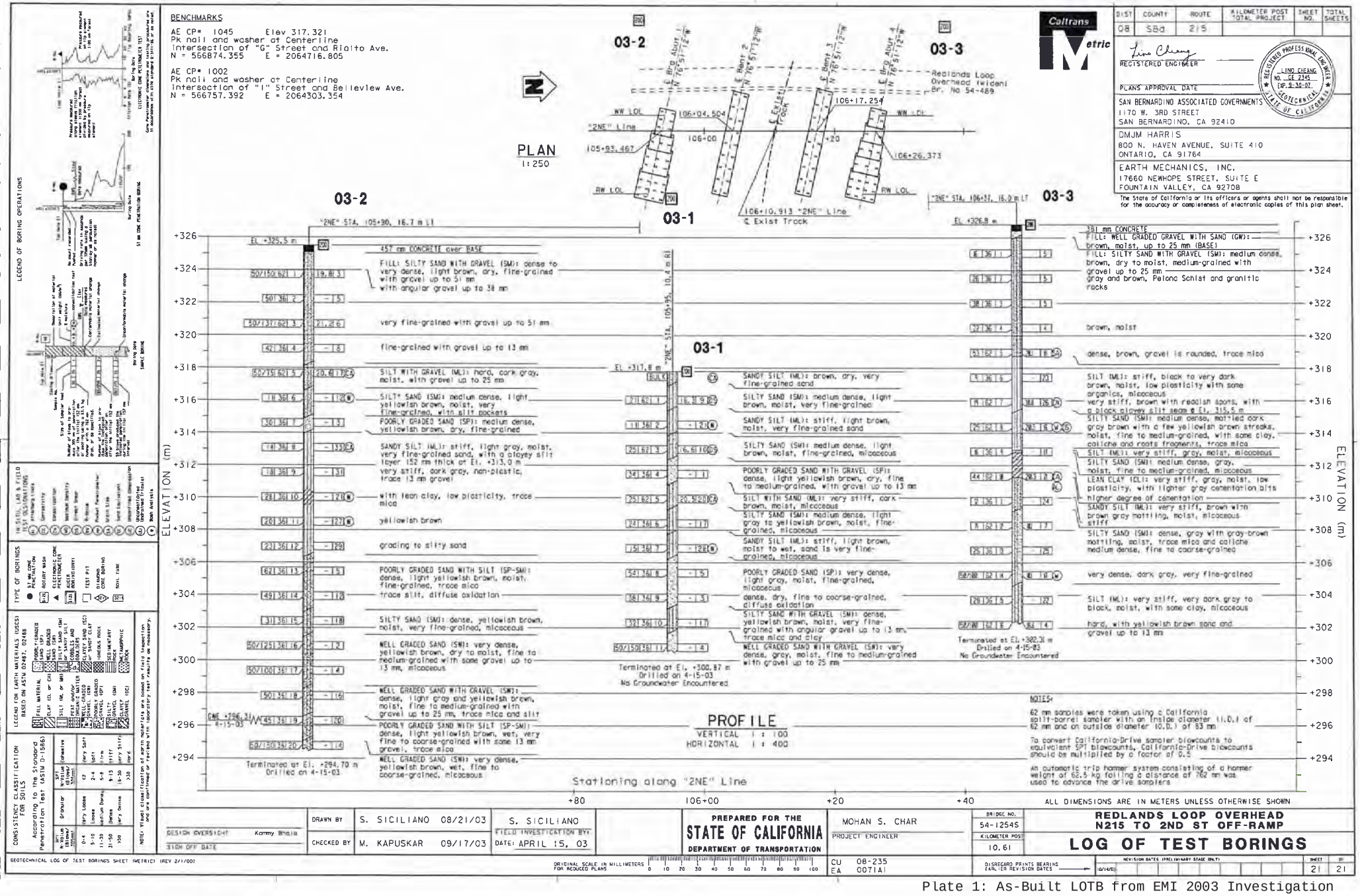

Plate 1: As-Built LOTB from EMI 2003 Investigation

APPENDIX A FIELD EXPLORATION

APPENDIX A - FIELD EXPLORATION

Group Delta Consultants Inc. (GDC) performed a field exploration program at the subject site on January 24 to January 28, 2011. The field exploration program included drilling twelve (12) hollow stem auger borings. The borings were drilled using truck-mounted hollow stem auger drilling equipment. The locations of explorations are shown on Figure 2 of the main report.

The geotechnical borings were drilled to depths ranging from 11 to 51.5 feet below the existing grade. The explorations were performed under the continuous technical supervision of our field engineer, who also maintained detailed logs of the soils encountered, classified the materials, and assisted in obtaining soil samples. Subsurface materials encountered in the borings were visually classified and logged in accordance with the Unified Soil Classification System (USCS).

Relatively undisturbed modified California ring samples and Standard Penetration Tests (SPT) samples were taken in the borings at depth intervals of 2.5 and 5.0 feet. In addition, bulk samples were taken within the upper 5 feet in selected borings. The locations of sampling are indicated on the logs. The driven samples were obtained with a 3-inch O.D. split-barrel sampler lined with 1-inch high brass rings. The sampler was driven into the soil using a 140-pound hammer falling a distance of 30 inches. The number of blows required to drive the sampler 12 inches into the soil is recorded on the boring logs.

The Standard Penetration Tests (SPT) was conducted in accordance with ASTM D 1586, using a standard 2-inch outside diameter, 1.375-inch inside diameter, split-spoon sampler. The SPT sampler was driven into the soil using a 140-pound hammer free-falling 30 inches. The SPT blow counts are shown directly on the boring logs.

All samples were sealed to prevent moisture loss and returned to our laboratory for additional visual examination and laboratory testing. A discussion of the laboratory testing program, including test results, is provided in Appendix B.

The following are attached and complete this appendix:

Table A-1:	Summary of Field Exploration
Figure A-0	Key for Soil Classification
Figure A-1	Legend for Log of Test Borings
Figures A-2 and A-13	Log of Borings

Table A-1: Summary of Field Exploration

Exploration No.	Date Performed (m/d/y)	Ground Surface Elevation (feet)	Total Depth (feet)	Exploration Type
B-01	1/28/2011	1086	11.5	Hollow Stem Auger
B-02	1/28/2011	1085	11.5	Hollow Stem Auger
B-03	1/28/2011	1078	51.5	Hollow Stem Auger
B-04	1/28/2011	1076	11.5	Hollow Stem Auger
B-05	1/24/2011	1067	11.5	Hollow Stem Auger
B-06	1/24/2011	1061	11.5	Hollow Stem Auger
B-07	1/24/2011	1050	11.5	Hollow Stem Auger
B-08	1/24/2011	1046	11.5	Hollow Stem Auger
B-09	1/24/2011	1041	11.5	Hollow Stem Auger
B-10	1/24/2011	1038	11.5	Hollow Stem Auger
B-11	1/24/2011	1035	11.5	Hollow Stem Auger
B-12	1/24/2011	1026	51.2	Hollow Stem Auger

LOG OF TEST BORING

PROJECT NAME	PROJECT NUMBER	BORING **LEGEND**

SITE LOCATION	START	FINISH	SHEET NO.
			1 of 1

DRILLING COMPANY	DRILLING METHOD	LOGGED BY	CHECKED BY

DRILLING EQUIPMENT	BORING DIA. (in)	TOTAL DEPTH (ft)	GROUND ELEV (ft)	DEPTH/*ELEV.* GROUND WATER (ft)
		0		▼ / *na*

SAMPLING METHOD	NOTES

DEPTH (feet)	ELEVATION (feet)	SAMPLE TYPE	SAMPLE NO.	PENETRATION RESISTANCE (BLOWS / 6 IN)	DRY DENSITY (pcf)	MOISTURE (%)	OTHER TESTS	% PASSING #200	ATTERBERG LIMITS LL:PL:PI	POCKET PEN (tsf)	GRAPHIC LOG	DESCRIPTION AND CLASSIFICATION
												BULK, CAL, SPT-Refers to the sampling method as described below
5												**BULK**-Refers to collecting sample by method of placing disturbed soil into a large plastic bag
10												**CAL (CALIFORNIA MODIFIED)**-A 3.0" o.d. split tube sampler lined with 2.42" i.d. metal sample rings generally driven into the soil by a 400 lbs hammer free falling 24 inches.
15												**SPT (STANDARD PENETRATION TEST)**-A 2.0" o.d. split spoon sampler with a 1.375"i.d. driven into the soil with a 140 lbs hammer free falling a height of 30 inches
20												

ABBREVIATION FOR OTHER TESTS

AL=Atterberg Limits	GS=Grain Size Analyses
CN=Consolidation	PP=Pocket Pen
CO=Corrosivity	RV=R-Value
CP=Laboratory Compaction	WA=Wash on #200 Sieve
DS=Direct Shear	EI=Expansion Index
LL=Liquid Limit	TV=Torvane
ES=Environmental Sample	

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FIGURE A-1

LOG OF TEST BORING

PROJECT NAME	PROJECT NUMBER	BORING
Redlands 1st Mile Project	L-894	**B-01**

SITE LOCATION	START	FINISH	SHEET NO.
San Bernardnio, CA	1/28/2011	1/28/2011	1 of 1

DRILLING COMPANY	DRILLING METHOD	LOGGED BY	CHECKED BY
Choice	Hollow Stem Auger	DMD	Ying

DRILLING EQUIPMENT	BORING DIA. (in)	TOTAL DEPTH (ft)	GROUND ELEV (ft)	DEPTH/*ELEV.* GROUND WATER (ft)
B-61 HBX	8"	11.5	1086	▼ NE / *na*

SAMPLING METHOD: Hammer: 140 lbs., Drop: 30 in. (Automatic)

NOTES:

DEPTH (feet)	ELEVATION (feet)	SAMPLE TYPE	SAMPLE NO.	PENETRATION RESISTANCE (BLOWS / 6 IN)	BLOW/FT "N" / RECOVERY (%)	N_{60} / RQD (%)	MOISTURE (%)	DRY DENSITY (pcf)	OTHER TESTS	% PASSING #200	GRAPHIC LOG	DESCRIPTION AND CLASSIFICATION
	1085		B-1						RV			Asphalt Concrete (AC) = 3 inches Poorly graded SAND with SILT (SP-SM); light brown; moist; mostly fine SAND; little fines; (FILL).
5	1080		R-5	12 15 20	35		2.7	112	WA	4		Poorly graded SAND with GRAVEL (SP); grayish orange; moist; dense; mostly SAND, from fine to coarse; some angular 0.5 inch GRAVEL; trace fines; (ALLUVIUM, Qa). 54% SAND; 42% GRAVEL; 4% fines Hard drilling.
10	1075		S-10	7 9 11	20		5.9					Poorly graded SAND (SP); grayish orange; moist; medium dense; mostly SAND, from fine to coarse; interbedded 2 inch CLAY layer.
15	1070											Total depth 11.5 feet. Groundwater not encountered. Fill approximately 5 feet. Boring backfilled with soil cuttings, bentonite and tamped Asphaltic Concrete.
20	1065											

GDC_LOG_BORING_MMX L-894.GPJ GDCLOG.GDT 3/7/11

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FIGURE

A-2

LOG OF TEST BORING

PROJECT NAME	PROJECT NUMBER	BORING
Redlands 1st Mile Project	L-894	**B-02**

SITE LOCATION	START	FINISH	SHEET NO.
San Bernardnio, CA	1/28/2011	1/28/2011	1 of 1

DRILLING COMPANY	DRILLING METHOD	LOGGED BY	CHECKED BY
Choice	Hollow Stem Auger	DMD	Ying

DRILLING EQUIPMENT	BORING DIA. (in)	TOTAL DEPTH (ft)	GROUND ELEV (ft)	DEPTH/*ELEV.* GROUND WATER (ft)
B-61 HBX	8"	11.5	1085	▼ NE / *na*

SAMPLING METHOD: Hammer: 140 lbs., Drop: 30 in. (Automatic)

NOTES:

DEPTH (feet)	ELEVATION (feet)	SAMPLE TYPE	SAMPLE NO.	PENETRATION RESISTANCE (BLOWS / 6 IN)	BLOW/FT "N" / RECOVERY (%)	N_{60} / RQD (%)	MOISTURE (%)	DRY DENSITY (pcf)	OTHER TESTS	% PASSING #200	GRAPHIC LOG	DESCRIPTION AND CLASSIFICATION
												Asphalt Concrete (AC) = 2.5 inches Base = 8 inches
			B-1									SILTY SAND (SM); moderate yellowish brown; moist; moslty fine SAND; (FILL).
5	1080		R-5	7 7 12	19		20.6	115	WA	49		CLAYEY SAND (SC); moderate reddish brown; moist; medium stiff; mostly fine sand; mostly fines; interbedded oxidized SAND layers; (ALLUVIUM, Qa) 52% SAND; 49% fines Hard drilling.
10	1075		S-10	7 9 5	14		8.5					Poorly graded SAND (SP); grayish orange; moist; medium dense; mostly SAND, from fine to coarse; interbedded 2 inch CLAY layer.
												Total depth 11.5 feet. Groundwater not encountered. Fill approximately 5 feet. Boring backfilled with soil cuttings, bentonite and tamped Asphaltic Concrete.
15	1070											
20	1065											

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FIGURE

A-3

LOG OF TEST BORING

PROJECT NAME	PROJECT NUMBER	BORING
Redlands 1st Mile Project	L-894	**B-03**

SITE LOCATION	START	FINISH	SHEET NO.
San Bernardnio, CA	1/28/2011	1/28/2011	1 of 3

DRILLING COMPANY	DRILLING METHOD	LOGGED BY	CHECKED BY
Choice	Hollow Stem Auger	DMD	Ying

DRILLING EQUIPMENT	BORING DIA. (in)	TOTAL DEPTH (ft)	GROUND ELEV (ft)	DEPTH/*ELEV.* GROUND WATER (ft)
B-61 HBX	8"	51.5	1078	▼ NE / *na*

SAMPLING METHOD: Hammer: 140 lbs., Drop: 30 in. (Automatic)

NOTES:

DEPTH (feet)	ELEVATION (feet)	SAMPLE TYPE	SAMPLE NO.	PENETRATION RESISTANCE (BLOWS / 6 IN)	BLOW/FT "N" / RECOVERY (%)	N_{60} / RQD (%)	MOISTURE (%)	DRY DENSITY (pcf)	OTHER TESTS	% PASSING #200	GRAPHIC LOG	DESCRIPTION AND CLASSIFICATION
												Asphalt Concrete (AC) = 2.5 inches Base = 8 inches
	1075		B-1						CO WA	29		SILTY SAND (SM); dark brown; moist; mostly fine SAND; some fines; few GRAVEL; (FILL). 66% SAND; 29% fines; 6% GRAVEL
5			R-5	12 15 20	35		11.1	98	DS			Poorly graded SAND with SILT (SP-SM); medium dense; yellowish gray; moist; mostly fine SAND; few fines.
	1070											
10			S-10	5 5 4	9		21.9					CLAYEY SAND (SC); loose; light olive brown; moist; mostly fine SAND; little fines; micaceous.
	1065											
15			R-15	7 9 15	24		29.9	87	AL CN			Elastic SILT (MH); stiff; interbedded dark brown and yellowish brown; moist; mostly fines; trace fine SAND; nonplastic; some roots; PP = 1.0 tsf. LL = 51; PL = 37; PI = 14
	1060											
20			S-20	8 12 16	28		6.8					Poorly graded SAND (SP); medium dense; light gray; moist; mostly SAND, from fine to medium; interbedded 3 inch Elastic SILT (MH) layer.
	1055											

GDC_LOG_BORING_MMX L-894.GPJ GDCLOG.GDT 3/7/11

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FIGURE

A-4 a

LOG OF TEST BORING

PROJECT NAME	PROJECT NUMBER	BORING
Redlands 1st Mile Project	L-894	**B-03**

SITE LOCATION	START	FINISH	SHEET NO.
San Bernardnio, CA	1/28/2011	1/28/2011	2 of 3

DRILLING COMPANY	DRILLING METHOD	LOGGED BY	CHECKED BY
Choice	Hollow Stem Auger	DMD	Ying

DRILLING EQUIPMENT	BORING DIA. (in)	TOTAL DEPTH (ft)	GROUND ELEV (ft)	DEPTH/*ELEV.* GROUND WATER (ft)
B-61 HBX	8"	51.5	1078	▼ NE / *na*

SAMPLING METHOD: Hammer: 140 lbs., Drop: 30 in. (Automatic)

NOTES:

DEPTH (feet)	ELEVATION (feet)	SAMPLE TYPE	SAMPLE NO.	PENETRATION RESISTANCE (BLOWS / 6 IN)	BLOW/FT "N" / RECOVERY (%)	N_{60} / RQD (%)	MOISTURE (%)	DRY DENSITY (pcf)	OTHER TESTS	% PASSING #200	GRAPHIC LOG	DESCRIPTION AND CLASSIFICATION
			R-25	30 50/6"	50/6"		7.0	110				Poorly graded SAND with GRAVEL (SP); very dense; grayish orange; moist; mostly SAND, from fine to coarse; little angular GRAVEL; interbedded CLAY layer.
	1050											
30			S-30	18 20 25	45		12.8					SILT with SAND (ML); hard; greenish gray; from moist to wet; mostly fines; little fine SAND: interbedded inorganic elastic SILT (MH), well decomposed, oxidation; nonplastic.
	1045											
35			R-35	20 26 35	61		16.6	117				SILTY SAND (SM); dense; moderate reddish brown; moist; mostly SAND, from fine to medium; little fines; nonplastic.
	1040											
40			S-40	8 8 9	17		23.7		AL			SILT (ML); very stiff; moderate brown; moist; mostly fines; few SAND, from frine to medium; nonplastic.
	1035											
45			R-45	20 26 30	56		14.6	119				Hard; greenish gray; few fine SAND; low plasticity; PP >= 4.5 tsf.
	1030											

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FIGURE

A-4 b

LOG OF TEST BORING

PROJECT NAME	PROJECT NUMBER	BORING
Redlands 1st Mile Project	L-894	**B-03**

SITE LOCATION	START	FINISH	SHEET NO.
San Bernardnio, CA	1/28/2011	1/28/2011	3 of 3

DRILLING COMPANY	DRILLING METHOD	LOGGED BY	CHECKED BY
Choice	Hollow Stem Auger	DMD	Ying

DRILLING EQUIPMENT	BORING DIA. (in)	TOTAL DEPTH (ft)	GROUND ELEV (ft)	DEPTH/*ELEV.* GROUND WATER (ft)
B-61 HBX	8"	51.5	1078	▼ NE / *na*

SAMPLING METHOD
Hammer: 140 lbs., Drop: 30 in. (Automatic)

NOTES

DEPTH (feet)	ELEVATION (feet)	SAMPLE TYPE	SAMPLE NO.	PENETRATION RESISTANCE (BLOWS / 6 IN)	BLOW/FT "N" / RECOVERY (%)	N_{60} / RQD (%)	MOISTURE (%)	DRY DENSITY (pcf)	OTHER TESTS	% PASSING #200	GRAPHIC LOG	DESCRIPTION AND CLASSIFICATION
		X	S-50	10 15 18	33		15.0					SILTY SAND (SM); dense; light olive gray; mostly fine SAND; little fines; nonplastic.
												Total depth 51.5 feet. Groundwater not encountered. Fill approximately 5 feet. Boring backfilled with soil cuttings, bentonite and tamped Asphaltic Concrete.
	1025											
55												
	1020											
60												
	1015											
65												
	1010											
70												
	1005											

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FIGURE
A-4 c

LOG OF TEST BORING

PROJECT NAME	PROJECT NUMBER	BORING
Redlands 1st Mile Project	L-894	**B-04**

SITE LOCATION	START	FINISH	SHEET NO.
San Bernardnio, CA	1/28/2011	1/28/2011	1 of 1

DRILLING COMPANY	DRILLING METHOD	LOGGED BY	CHECKED BY
Choice	Hollow Stem Auger	DMD	Ying

DRILLING EQUIPMENT	BORING DIA. (in)	TOTAL DEPTH (ft)	GROUND ELEV (ft)	DEPTH/*ELEV.* GROUND WATER (ft)
B-61 HBX	8"	11.5	1076	▼ NE / *na*

SAMPLING METHOD: Hammer: 140 lbs., Drop: 30 in. (Automatic)

NOTES:

DEPTH (feet)	ELEVATION (feet)	SAMPLE TYPE	SAMPLE NO.	PENETRATION RESISTANCE (BLOWS / 6 IN)	BLOW/FT "N" / RECOVERY (%)	N_{60} / RQD (%)	MOISTURE (%)	DRY DENSITY (pcf)	OTHER TESTS	% PASSING #200	GRAPHIC LOG	DESCRIPTION AND CLASSIFICATION
												Asphalt Concrete (AC) = 2 inches Concrete = 5 inches Base = 2 inches
	1075		B-1						RV WA EI	49		SILTY CLAYEY SAND (SC-SM); moderate brown; moist; mostly fines; mostly fine SAND; trace coarse GRAVEL; trace concrete; (FILL). 49% SAND; 49% fines; 2% GRAVEL
5	1070		R-5	8 12 12			29.8	123				SILTY CLAYEY SAND (SC-SM); medium dense; moderate gray; moist; mostly fine SAND; mostly fines; trace roots; oxidation; PP= 2.25 tsf; (ALLUVIUM, Qa).
10	1065		S-10	3 5 6			29.1					SITLY SAND (SM); medium dense; moderate brown; moist; mostly fine SAND; little fines; trace CLAY (CL).
												Total depth 11.5 feet. Groundwater not encountered. Fill approximately 5 feet. Boring backfilled with soil cuttings, bentonite and tamped Asphaltic Concrete.
15	1060											
20	1055											

GDC_LOG_BORING_MMX L-894.GPJ GDCLOG.GDT 3/7/11

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FIGURE

A-5

LOG OF TEST BORING

PROJECT NAME	PROJECT NUMBER	BORING
Redlands 1st Mile Project	L-894	**B-05**

SITE LOCATION	START	FINISH	SHEET NO.
San Bernardnio, CA	1/24/2011	1/24/2011	1 of 1

DRILLING COMPANY	DRILLING METHOD	LOGGED BY	CHECKED BY
Choice	Hollow Stem Auger	DMD	Ying

DRILLING EQUIPMENT	BORING DIA. (in)	TOTAL DEPTH (ft)	GROUND ELEV (ft)	DEPTH/*ELEV.* GROUND WATER (ft)
LAR CME 75	8"	11.5	1067	▼ NE / *na*

SAMPLING METHOD: Hammer: 140 lbs., Drop: 30 in. (Automatic)

NOTES:

DEPTH (feet)	ELEVATION (feet)	SAMPLE TYPE	SAMPLE NO.	PENETRATION RESISTANCE (BLOWS / 6 IN)	BLOW/FT "N" / RECOVERY (%)	N_{60} / RQD (%)	MOISTURE (%)	DRY DENSITY (pcf)	OTHER TESTS	% PASSING #200	GRAPHIC LOG	DESCRIPTION AND CLASSIFICATION
												GRAVEL upto 3 inches.
	1065		B-1									SILT and poorly graded SAND (ML/SP); drak brown; moist; mostly fines; mostly SAND, from fine to coarse; few 3 inch GRAVEL; (FILL).
5			R-5	7 12 16	28		18.2	106	WA	50		Medium dense; light brown; moist; mostly SAND, from medium to coarse; mostly fines; nonplastic. 50% fines; 50% SAND
	1060		S-7.5	3 4 6	10		20.5					Poorly graded SAND (SP); loose; light gray brown; moist; mostly SAND, from fine to coarse; interbedded 3 inch CLAY (CL) layer; (ALLUVIUM, Qa).
10			R-10	7 11 14	25		7.4	103				No layers.
	1055											Total depth 11.5 feet. Groundwater not encountered. Fill approximately 5 feet. Boring backfilled with soil cuttings and bentonite.
15												
	1050											
20												
	1045											

GDC_LOG_BORING_MMX L-894.GPJ GDCLOG.GDT 3/7/11

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370 Amapola Ave., Suite 212
Torrance, CA 90501

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FIGURE A-6

LOG OF TEST BORING

PROJECT NAME	PROJECT NUMBER	BORING
Redlands 1st Mile Project	L-894	**B-06**

SITE LOCATION	START	FINISH	SHEET NO.
San Bernardnio, CA	1/24/2011	1/24/2011	1 of 1

DRILLING COMPANY	DRILLING METHOD	LOGGED BY	CHECKED BY
Choice	Hollow Stem Auger	DMD	Ying

DRILLING EQUIPMENT	BORING DIA. (in)	TOTAL DEPTH (ft)	GROUND ELEV (ft)	DEPTH/*ELEV.* GROUND WATER (ft)
LAR CME 75	8"	11.5	1061	▼ NE / *na*

SAMPLING METHOD: Hammer: 140 lbs., Drop: 30 in. (Automatic)

NOTES

DEPTH (feet)	ELEVATION (feet)	SAMPLE TYPE	SAMPLE NO.	PENETRATION RESISTANCE (BLOWS / 6 IN)	BLOW/FT "N" / RECOVERY (%)	N_{60} / RQD (%)	MOISTURE (%)	DRY DENSITY (pcf)	OTHER TESTS	% PASSING #200	GRAPHIC LOG	DESCRIPTION AND CLASSIFICATION
	1060											SILTY SAND (SM); dark brown; moist; mostly fine SAND; little fines; trace 3 inch GRAVEL; (FILL).
			B-1 R-2.5	5 7 10	17		20.1	98				medium dense; trace roots; (adjacent trees and shrubs).
5	1055		S-5	2 3 5	8		23.0		WA	69		SANDY lean CLAY (CL); medium stiff; moderate light brown; moist; mostly fines; some fine SAND; oxidation. 69% fines; 31% SAND
10	1050		R-10	6 8 12	20		12.7	98				Poorly graded SAND with SILT (SP-SM); medium dense; grayish orange; moist; mostly SAND, from fine to coarse; few fines; interbedded 0.25 inch CLAY (CL) layer.
												Total depth 11.5 feet. Groundwater not encountered. Fill approximately 5 feet. Boring backfilled with soil cuttings and bentonite.
15	1045											
20	1040											

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FIGURE A-7

LOG OF TEST BORING

PROJECT NAME	PROJECT NUMBER	BORING
Redlands 1st Mile Project	L-894	**B-07**

SITE LOCATION	START	FINISH	SHEET NO.
San Bernardnio, CA	1/24/2011	1/24/2011	1 of 1

DRILLING COMPANY	DRILLING METHOD	LOGGED BY	CHECKED BY
Choice	Hollow Stem Auger	DMD	Ying

DRILLING EQUIPMENT	BORING DIA. (in)	TOTAL DEPTH (ft)	GROUND ELEV (ft)	DEPTH/*ELEV.* GROUND WATER (ft)
LAR CME 75	8"	11.5	1050	▼ NE / *na*

SAMPLING METHOD: Hammer: 140 lbs., Drop: 30 in. (Automatic)

NOTES

DEPTH (feet)	ELEVATION (feet)	SAMPLE TYPE	SAMPLE NO.	PENETRATION RESISTANCE (BLOWS / 6 IN)	BLOW/FT "N" / RECOVERY (%)	N_{60} / RQD (%)	MOISTURE (%)	DRY DENSITY (pcf)	OTHER TESTS	% PASSING #200	GRAPHIC LOG	DESCRIPTION AND CLASSIFICATION
												SILTY SAND with GRAVEL (SM); light brown; moist; mostly fine SAND; little fines; trace 3 inch GRAVEL; (FILL).
		X	R-2.5	4 6 10	16		12.2	107				SANDY lean CLAY (CL); stiff; moderate light brown; moist; mostly fines; some fine SAND; (ALLUVIUM, Qa).
5	1045	X	S-5	4 7 8	15		18.0		WA	57		Orangish brown; slight oxidation. 57% fines; 42% SAND; 1% GRAVEL
10	1040	X	R-10	11 17 25	42		7.7	106				Poorly graded SAND with SILT (SP-SM); medium dense; light brown; moist; mostly SAND, from fine to medium; few fines; slight oxidation.
												Total depth 11.5 feet. Groundwater not encountered. Fill approximately 2.5 feet. Boring backfilled with soil cuttings and bentonite.
15	1035											
20	1030											

GDC_LOG_BORING_MMX L-894.GPJ GDCLOG.GDT 3/7/11

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FIGURE

A-8

LOG OF TEST BORING

PROJECT NAME	PROJECT NUMBER	BORING
Redlands 1st Mile Project	L-894	**B-08**

SITE LOCATION	START	FINISH	SHEET NO.
San Bernardnio, CA	1/24/2011	1/24/2011	1 of 1

DRILLING COMPANY	DRILLING METHOD	LOGGED BY	CHECKED BY
Choice	Hollow Stem Auger	DMD	Ying

DRILLING EQUIPMENT	BORING DIA. (in)	TOTAL DEPTH (ft)	GROUND ELEV (ft)	DEPTH/*ELEV.* GROUND WATER (ft)
LAR CME 75	8"	11.5	1046	▼ NE / *na*

SAMPLING METHOD: Hammer: 140 lbs., Drop: 30 in. (Automatic)

NOTES:

DEPTH (feet)	ELEVATION (feet)	SAMPLE TYPE	SAMPLE NO.	PENETRATION RESISTANCE (BLOWS / 6 IN)	BLOW/FT "N" / RECOVERY (%)	N_{60} / RQD (%)	MOISTURE (%)	DRY DENSITY (pcf)	OTHER TESTS	% PASSING #200	GRAPHIC LOG	DESCRIPTION AND CLASSIFICATION
	1045											SILTY SAND with GRAVEL (SM); light brown; moist; mostly fine SAND; little fines; little 4 inch GRAVEL; (FILL).
			R-2.5	7 12 15	27		8.5	113				Medium dense; dark brown; mostly SAND, from fine to medium; little 3 inch GRAVEL.
5	1040		S-5	2 5 7	12		6.9		WA	19		67% SAND; 19% fines; 14% GRAVEL
10	1035		R-10	9 10 11	21		16.5	103	DS			Poorly graded SAND (SP); medium dense; light brown; moist; mostly SAND, from fine to medium; trace fines; (ALLUVIUM, Qa).
												Total depth 11.5 feet. Groundwater not encountered. Fill approximately 9 feet. Boring backfilled with soil cuttings and bentonite.
15	1030											
20	1025											

GDC_LOG_BORING_MMX L-894.GPJ GDCLOG.GDT 3/7/11

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FIGURE

A-9

LOG OF TEST BORING

PROJECT NAME Redlands 1st Mile Project		**PROJECT NUMBER** L-894	**BORING** **B-09**
SITE LOCATION San Bernardnio, CA	**START** 1/24/2011	**FINISH** 1/24/2011	**SHEET NO.** 1 of 1
DRILLING COMPANY Choice	**DRILLING METHOD** Hollow Stem Auger	**LOGGED BY** DMD	**CHECKED BY** Ying
DRILLING EQUIPMENT LAR CME 75	**BORING DIA. (in)** 8"	**TOTAL DEPTH (ft)** 11.5	**GROUND ELEV (ft)** 1041
DEPTH/*ELEV.* GROUND WATER (ft) ▼ NE / *na*			
SAMPLING METHOD Hammer: 140 lbs., Drop: 30 in. (Automatic)	**NOTES**		

DEPTH (feet)	ELEVATION (feet)	SAMPLE TYPE	SAMPLE NO.	PENETRATION RESISTANCE (BLOWS / 6 IN)	BLOW/FT "N" / RECOVERY (%)	N_{60} / RQD (%)	MOISTURE (%)	DRY DENSITY (pcf)	OTHER TESTS	% PASSING #200	GRAPHIC LOG	DESCRIPTION AND CLASSIFICATION
	1040		B-1									SILTY SAND with GRAVEL (SM); light brown; moist; mostly SAND, from fine to medium; little fines; little 3 inch GRAVEL; (FILL).
5	1035		S-5	5 6 7			23.3	102	WA	73		Lean CLAY with SAND (CL); stiff; from light to dark brown; moist; mostly fines; little fine SAND; nonplastic; PP = 1.5 tsf; (ALLUVIUM, Qa). 73% fines; 26% SAND; 1% GRAVEL
10	1030		R-10	3 4 5			15.8					SILTY SAND (SM); loose; light brown; moist; mostly fine SAND; little fines; nonplastic.
												Total depth 11.5 feet. Groundwater not encountered. Fill approximately 5 feet. Boring backfilled with soil cuttings and bentonite.
15	1025											
20	1020											

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FIGURE A-10

LOG OF TEST BORING

PROJECT NAME	PROJECT NUMBER	BORING
Redlands 1st Mile Project	L-894	**B-10**

SITE LOCATION	START	FINISH	SHEET NO.
San Bernardnio, CA	1/24/2011	1/24/2011	1 of 1

DRILLING COMPANY	DRILLING METHOD	LOGGED BY	CHECKED BY
Choice	Hollow Stem Auger	DMD	Ying

DRILLING EQUIPMENT	BORING DIA. (in)	TOTAL DEPTH (ft)	GROUND ELEV (ft)	DEPTH/*ELEV.* GROUND WATER (ft)
LAR CME 75	8"	11.5	1038	▼ NE / *na*

SAMPLING METHOD: Hammer: 140 lbs., Drop: 30 in. (Automatic)

NOTES

DEPTH (feet)	ELEVATION (feet)	SAMPLE TYPE	SAMPLE NO.	PENETRATION RESISTANCE (BLOWS / 6 IN)	BLOW/FT "N" / RECOVERY (%)	N_{60} / RQD (%)	MOISTURE (%)	DRY DENSITY (pcf)	OTHER TESTS	% PASSING #200	GRAPHIC LOG	DESCRIPTION AND CLASSIFICATION
												SILTY SAND with GRAVEL (SM); dark brown; moist; mostly SAND, from fine to coarse; little fines; little 3 inch GRAVEL; (FILL).
	1035		B-1 R-2.5	7 10 14	24		20.8	105	WA	73		Fat CLAY with SAND (CH); very stiff; light brown; moist; mostly fines; little fine SAND; medium plastic; PP = 3.5 tsf; (ALLUVIUM, Qa). 73% fines; 24% SAND; 3% GRAVEL
5			S-5	3 5 7	12		22.2					Stiff.
	1030											
10			R-10	6 8 11	19		23.0	96	AL			PP = 2.5 tsf. LL = 57; PL = 29; PI = 28
	1025											Total depth 11.5 feet. Groundwater not encountered. Fill approximately 2.5 feet. Boring backfilled with soil cuttings and bentonite.
15												
	1020											
20												
	1015											

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FIGURE A-11

LOG OF TEST BORING

PROJECT NAME	PROJECT NUMBER	BORING
Redlands 1st Mile Project	L-894	**B-11**

SITE LOCATION	START	FINISH	SHEET NO.
San Bernardnio, CA	1/24/2011	1/24/2011	1 of 1

DRILLING COMPANY	DRILLING METHOD	LOGGED BY	CHECKED BY
Choice	Hollow Stem Auger	DMD	Ying

DRILLING EQUIPMENT	BORING DIA. (in)	TOTAL DEPTH (ft)	GROUND ELEV (ft)	DEPTH/*ELEV.* GROUND WATER (ft)
LAR CME 75	8"	11.5	1035	▼ NE / *na*

SAMPLING METHOD: Hammer: 140 lbs., Drop: 30 in. (Automatic)

NOTES

DEPTH (feet)	ELEVATION (feet)	SAMPLE TYPE	SAMPLE NO.	PENETRATION RESISTANCE (BLOWS / 6 IN)	BLOW/FT "N" / RECOVERY (%)	N_{60} / RQD (%)	MOISTURE (%)	DRY DENSITY (pcf)	OTHER TESTS	% PASSING #200	GRAPHIC LOG	DESCRIPTION AND CLASSIFICATION
												SANDY SILT (ML); dark brown; moist; mostly fines; some SAND, from fine to coarse; trace 3 inch GRAVEL; low plasticity; (FILL).
			R-2.5	9 13 15	28		13.4	113	WA	59		Very stiff; some fine SAND. 59% fines; 38% SAND; 4% GRAVEL
5	1030		S-5	5 3 3	6		17.3					Poorly graded SAND with SILT (SP-SM); loose; light brown; moist; mostly SAND, from fine to medium; few fines; trace GRAVEL; (ALLUVIUM, Qa).
10	1025		R-10	8 12 16	28		19.2	102				SILTY CLAYEY SAND (SC-SM); medium dense; light brown; moist; mostly SAND, from fine to coarse; little fines; trace GRAVEL.
												Total depth 11.5 feet. Groundwater not encountered. Fill approximately 5.0 feet. Boring backfilled with soil cuttings and bentonite.
15	1020											
20	1015											

GDC_LOG_BORING_MMX L-894.GPJ GDCLOG.GDT 3/7/11

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FIGURE

A-12

LOG OF TEST BORING

PROJECT NAME	PROJECT NUMBER	BORING
Redlands 1st Mile Project	L-894	**B-12**

SITE LOCATION	START	FINISH	SHEET NO.
San Bernardnio, CA	1/24/2011	1/24/2011	1 of 3

DRILLING COMPANY	DRILLING METHOD	LOGGED BY	CHECKED BY
Choice	Hollow Stem Auger	DMD	Ying

DRILLING EQUIPMENT	BORING DIA. (in)	TOTAL DEPTH (ft)	GROUND ELEV (ft)	DEPTH/*ELEV.* GROUND WATER (ft)
B-61 HBX	8"	51.17	1026	▼ NE / *na*

SAMPLING METHOD: Hammer: 140 lbs., Drop: 30 in. (Automatic)

NOTES:

DEPTH (feet)	ELEVATION (feet)	SAMPLE TYPE	SAMPLE NO.	PENETRATION RESISTANCE (BLOWS / 6 IN)	BLOW/FT "N" / RECOVERY (%)	N_{60} / RQD (%)	MOISTURE (%)	DRY DENSITY (pcf)	OTHER TESTS	% PASSING #200	GRAPHIC LOG	DESCRIPTION AND CLASSIFICATION
	1025											Poorly graded SAND with SILT (SP); light brown; moist; mostly SAND, from fine to coarse; few fines; trace GRAVEL; (FILL).
			B-1						CO			
			R-2.5	4 5 7	12		20.8	105	DS			CLAYEY SAND (SC); loose; light brown; moist; mostly SAND, from fine to medium; little fines; nonplastic; (ALLUVIUM, Qa).
5												
	1020		S-5	2 4 7	11		23.0					Lean CLAY with SAND (CL); stiff; light brown; moist; mostly fines; little fine SAND; medium plastic.
10												
	1015		R-10	7 9 14	23		25.2	99	CN			Few fine SAND; low plasticity; PP = 1.75 tsf.
15												
	1010		S-15	7 9 11	20		15.2					SILTY SAND (SM); medium dense; light olive gray; moist; mostly fine SAND; some fines; oxidation; micaceous.
20												
	1005		R-20	11 22 23	45		27.0	99				

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FIGURE

A-13 a

LOG OF TEST BORING

PROJECT NAME	PROJECT NUMBER	BORING
Redlands 1st Mile Project	L-894	**B-12**

SITE LOCATION	START	FINISH	SHEET NO.
San Bernardnio, CA	1/24/2011	1/24/2011	2 of 3

DRILLING COMPANY	DRILLING METHOD	LOGGED BY	CHECKED BY
Choice	Hollow Stem Auger	DMD	Ying

DRILLING EQUIPMENT	BORING DIA. (in)	TOTAL DEPTH (ft)	GROUND ELEV (ft)	DEPTH/*ELEV.* GROUND WATER (ft)
B-61 HBX	8"	51.17	1026	▼ NE / *na*

SAMPLING METHOD: Hammer: 140 lbs., Drop: 30 in. (Automatic)

NOTES

DEPTH (feet)	ELEVATION (feet)	SAMPLE TYPE	SAMPLE NO.	PENETRATION RESISTANCE (BLOWS / 6 IN)	BLOW/FT "N" / RECOVERY (%)	N_{60} / RQD (%)	MOISTURE (%)	DRY DENSITY (pcf)	OTHER TESTS	% PASSING #200	GRAPHIC LOG	DESCRIPTION AND CLASSIFICATION
	1000		S-25	10 12 14	26		7.1					SILTY SAND (SM); medium dense; light olive gray; moist; mostly fine SAND; some fines; oxidation; micaceous.
30	995		R-30	8 11 14	25		40.7	82				
35	990		S-35	5 5 7	12		16.8		WA	38		Interbedded CLAYEY SAND (SC); dark brown; moist; nonplastic; oxidation. 62% SAND; 38% fines
40	985		R-40	35 50/6"	50/6"		14.9	103				Very dense.
45	980		S-45	11 15 27	42		21.6		WA	70		SANDY SILT (ML); hard; light gray; mostly fines; some fine SAND; low plasticity. 70% fines; 30% SAND

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FIGURE

A-13 b

LOG OF TEST BORING

PROJECT NAME	PROJECT NUMBER	BORING
Redlands 1st Mile Project	L-894	**B-12**

SITE LOCATION	START	FINISH	SHEET NO.
San Bernardnio, CA	1/24/2011	1/24/2011	3 of 3

DRILLING COMPANY	DRILLING METHOD	LOGGED BY	CHECKED BY
Choice	Hollow Stem Auger	DMD	Ying

DRILLING EQUIPMENT	BORING DIA. (in)	TOTAL DEPTH (ft)	GROUND ELEV (ft)	DEPTH/*ELEV.* GROUND WATER (ft)
B-61 HBX	8"	51.17	1026	▼ NE / *na*

SAMPLING METHOD: Hammer: 140 lbs., Drop: 30 in. (Automatic)

NOTES

DEPTH (feet)	ELEVATION (feet)	SAMPLE TYPE	SAMPLE NO.	PENETRATION RESISTANCE (BLOWS / 6 IN)	BLOW/FT "N" / RECOVERY (%)	N_{60} / RQD (%)	MOISTURE (%)	DRY DENSITY (pcf)	OTHER TESTS	% PASSING #200	GRAPHIC LOG	DESCRIPTION AND CLASSIFICATION
	975		R-50	40 47 50/2"	97/8"		13.1	93				Poorly graded SAND (SP); very dense; moderate orange; moist; mostly SAND, from fine to medium; trace fines; oxidation.
												Total depth 51.17 feet. Groundwater not encountered. Fill approximately 2.5 feet. Boring backfilled with soil cuttings and bentonite.
55												
	970											
60												
	965											
65												
	960											
70												
	955											

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FIGURE

A-13 c

APPENDIX B LABORATORY TEST

APPENDIX B - LABORATORY TESTING

B.1 General

Laboratory testing was performed to aid in the classification of soils encountered in the borings and to evaluate their physical properties and engineering characteristics. The laboratory tests included dry unit weight, moisture content, direct shear test, consolidation, soil corrosivity, percent passing #200, expansion index and a R-value test. Descriptions of the laboratory tests are provided below.

B.2 Soil Classification

The subsurface materials were classified visually in the field using the Unified Soil Classification System (USCS), in accordance with ASTM Test Methods D-2487 and D 2488. Soil classifications were modified as necessary based on further inspection and testing in the laboratory. The soil classifications are presented on the key for soil classification and on the boring logs in Appendix A.

B.3 Moisture Content and Dry Unit Weight

The field moisture and dry unit weight of each relatively undisturbed sample were determined in general accordance with ASTM D-2216 and ASTM D-2937. Results of these tests are presented on the boring logs in Appendix A.

B.4 Direct Shear Tests

Direct shear tests were performed on selected samples in accordance with ASTM D-3080. After the initial weight and volume measurements were made, the sample was placed in a calibrated shear machine and a selected normal load was applied. Each sample was then saturated and allowed to consolidate, and then were sheared under a constant strain to failure. Shear stress and sample deformations were monitored throughout the test. The test results are presented in Figures B-1 to B-3.

B.5 Consolidation

The consolidation characteristics of the subgrade soils were evaluated by performing one-dimensional consolidation in general accordance with ASTM Test Method D2435-90, using a floating ring consolidometer and dead weight system. The consolidation data provides evaluation of the soil pre-consolidation pressure and compression indices for evaluating post-development settlements. Results of the tests are presented in Figures B-4 to B-5.

B.6 Soil Corrosivity

Corrosivity testing was performed on a representative sample of the near surface material, and included soil pH (Caltrans CT-643), water-soluble chlorides (Caltrans CT-422), water-soluble sulfates (Caltrans CT-417) and electrical resistivity (Caltrans CT-643). The test results are summarized in Table B-1 below.

Table B-1
SUMMARY OF CORROSION TEST RESULTS

BORING NUMBER	SAMPLE NUMBER	DEPTH (FT)	PH CALTRANS 643	CHLORIDE CONTENT CALTRANS 422 (ppm)	SULFATE CONTENT CALTRANS 417 (ppm)	MINIMUM RESISTIVITY CALTRANS 532 (ohm-cm)
B-03	Bulk	0-5	7.93	15.0	0.5	6,725
B-12	Bulk	0-5	8.73	12.4	0	4,157

B.7 No. 200 Sieve Wash

To assist in classification, representative samples of subsurface materials excavated from the borings were evaluated for their percentage of fines (silt and/or clay fraction). Representative samples taken from pertinent borings were dried, weighed, soaked in water until individual soil particles were separated, and then washed through the No. 200 sieve. The results of these tests are summarized in Table B-2 below.

Table B-2:
PERCENT PASSING NO. 200 SIEVE

Location	Depth (feet)	Percent Passing No. 200 Sieve
B-01	5-6.5	4
B-02	5-6.5	49
B-03	0-5	29
B-04	0-5	49
B-05	5-6.5	50
B-06	5-6.5	69
B-07	5-6.5	57
B-08	5-6.5	19
B-09	5-6.5	73
B-10	2.5-4	24
B-11	2.5-4	59
B-12	35-36.5	38
B-12	45-46.5	70

B.8 Expansion Index Test

This test method provides an index to the expansion potential of compacted soils when submerged under water. The test was conducted in general accordance with ASTM D-4829. The result of this test is presented in Table 3 Below.

Table B-3
SUMMARY OF EXPANSION INDEX RESULT

Boring No.	Depth (ft)	Expansion Index	Expansion Potential
B-04	0 - 5	17	Very Low

B.9 R-value Test

R-Value of the subgrade soils is determined in general accordance with California Test Method 301. The R-Value of the subgrade soils collected is Table B-4.

Table B-4
SUMMARY OF R-values

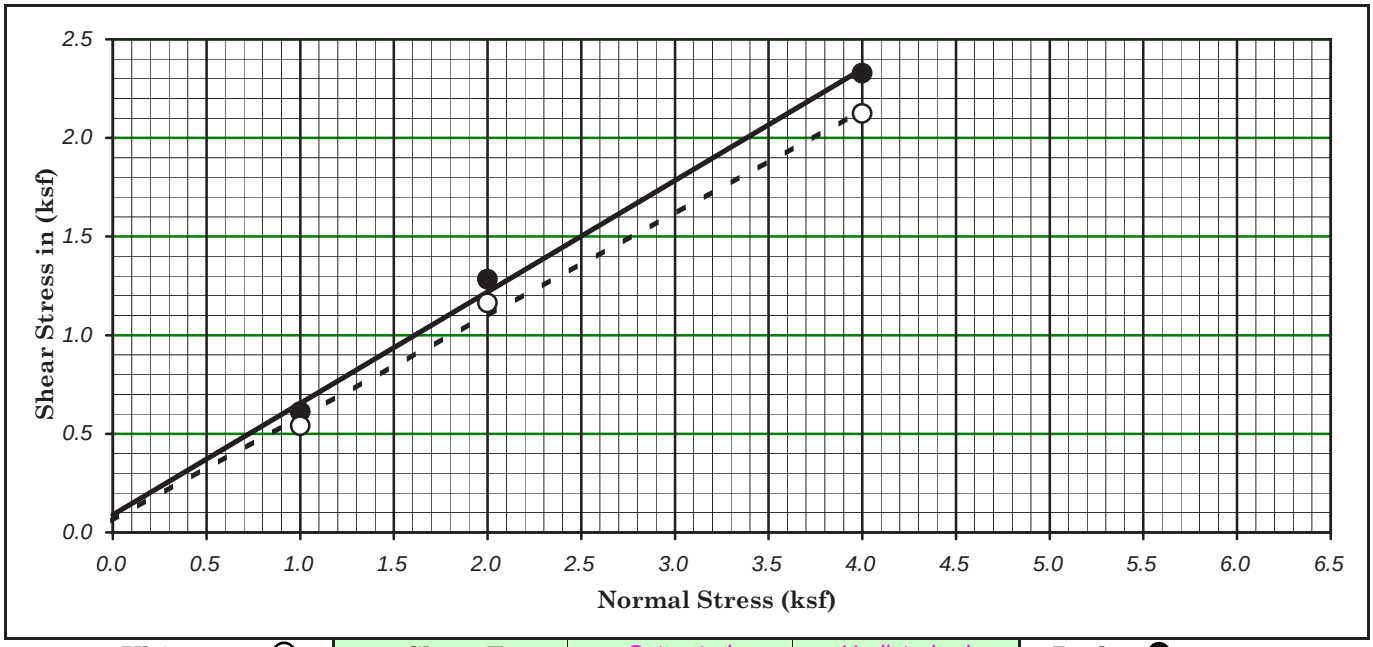
Boring No.	Depth (ft)	R-Value
B-01	0-5	68
B-04	0-5	60

B.10 Atterberg Limits

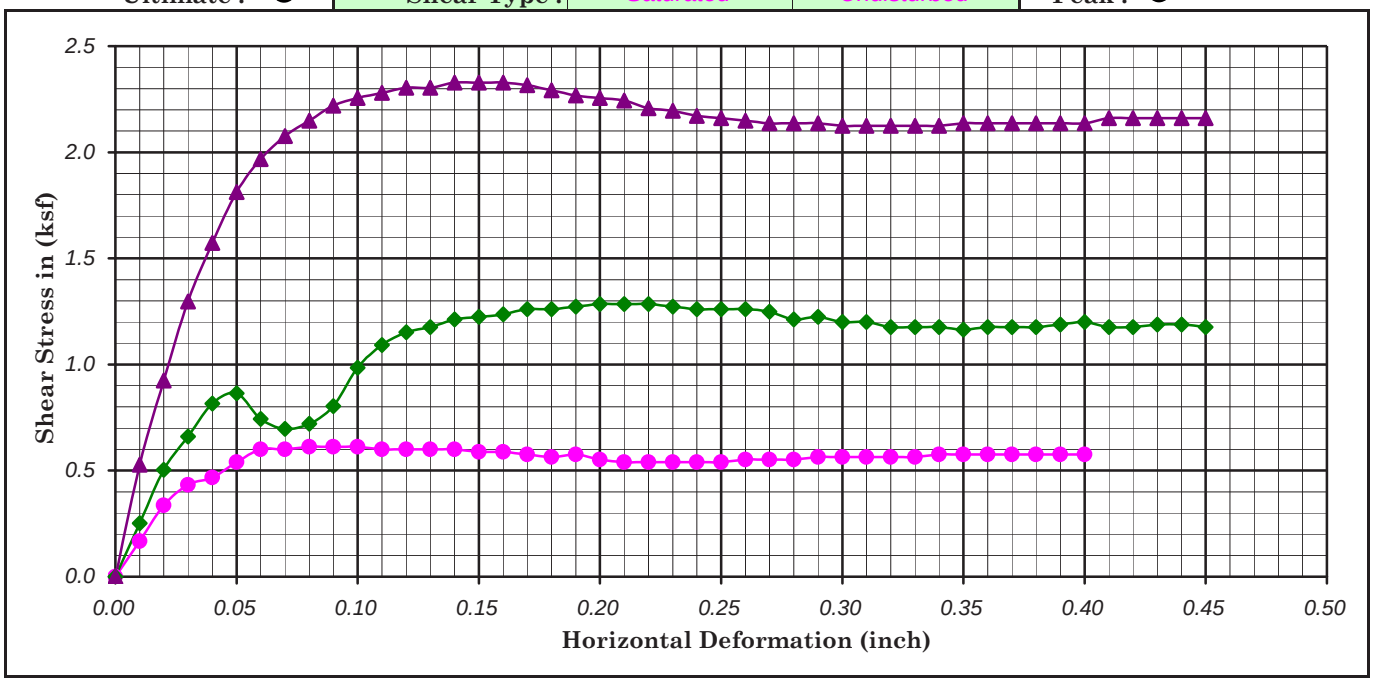
Characterization of the fine-grained fractions of the encountered soils was evaluated using the Atterberg Limits. This test includes Liquid Limit and Plastic Limit tests to determine the Plasticity Index in accordance with ASTM D-4318. Results of these tests are presented on the boring logs in Appendix A and in Figure B 6 of this Appendix.

The following figures are attached and complete this appendix:

Figures	B-1 to B-3	Direct Shear Test Results
Figures	B-4 to B-5	Consolidation Test Results
Figure	B-6	Atterberg Limits



Ultimate : ○ | Shear Type : Saturated | Undisturbed | Peak : ●



Boring No. : B-03		Strength Intercept (C) :	0.09	(ksf)	Peak	0.06	(ksf)	Ultimate
Sample No. : R			4.31	(kPa)		2.87	(kPa)	
Depth (ft/m) : 5.0	1.53	Friction Angle (ϕ) :	29.46	Degree		27.53	Degree	
Description : Yellowish Brown Sand (SP)					Shear Rate (inch/minute) :	0.02		

SYMBOL	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	DRY DENSITY (kN/m^3)	VOID RATIO	NORMAL STRESS (ksf)	NORMAL STRESS (kPa)	PEAK STRESS (ksf)	PEAK STRESS (kPa)	ULTIMATE STRESS (ksf)	ULTIMATE STRESS (kPa)
●	21.37	99.43	15.65	0.70	1.00	47.88	0.61	29.30	0.54	25.86
◆	19.99	100.91	15.88	0.67	2.00	95.76	1.28	61.48	1.16	55.73
▲	23.14	98.95	15.57	0.70	4.00	191.52	2.33	111.46	2.12	101.70

GROUP DELTA CONSULTANTS

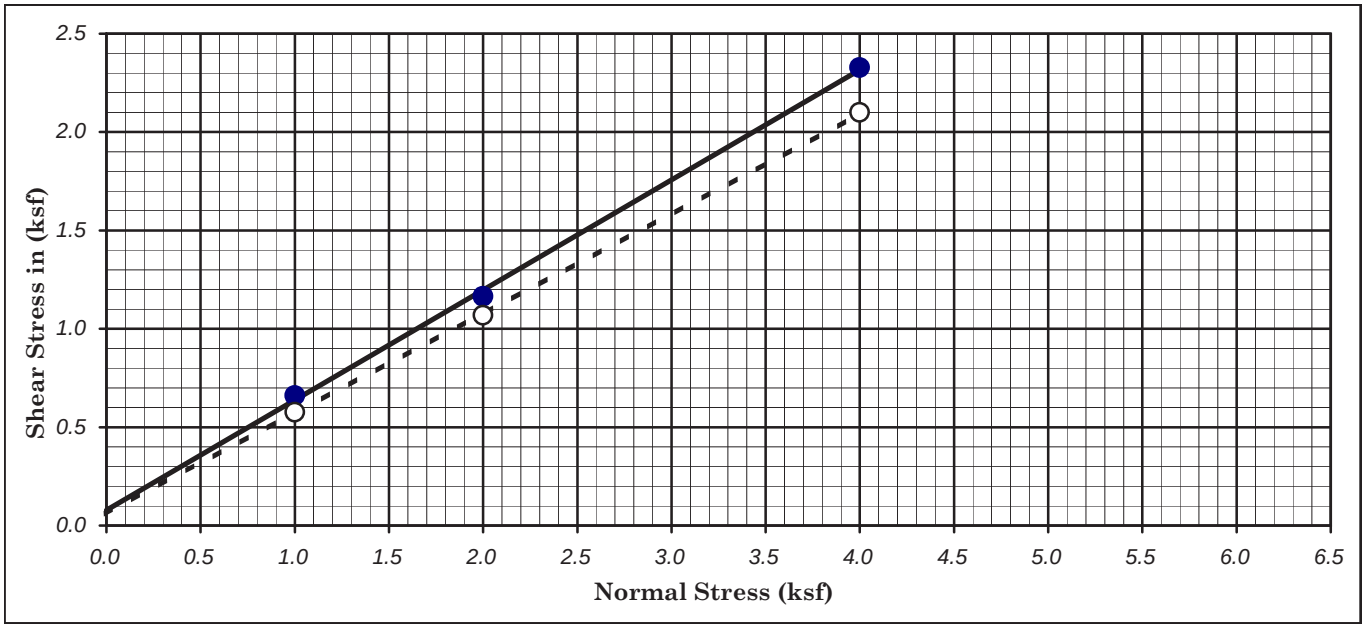
HDR 1st. Mile

Project No. : L-894

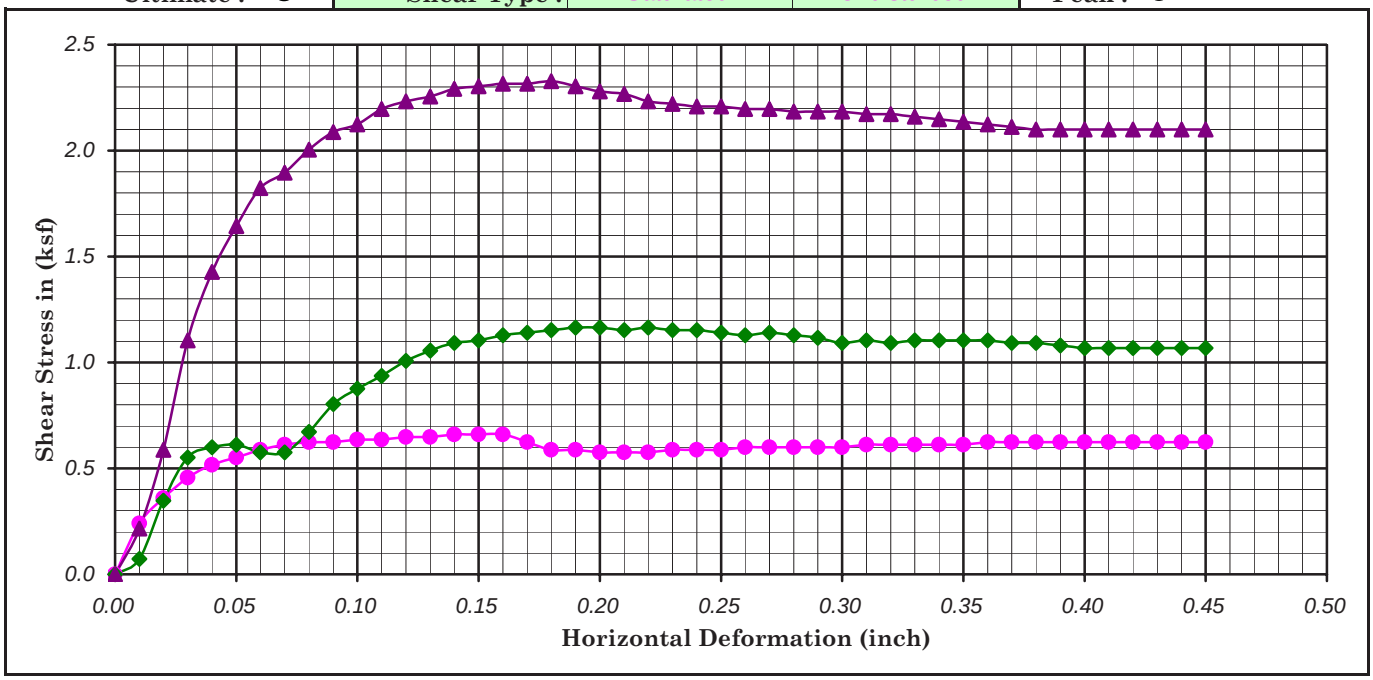
Date : 02/16/11

DIRECT SHEAR TEST
(ASTM D -3080)

Figure No. : B-1



Ultimate : ○ | Shear Type : Saturated | Undisturbed | Peak : ●



Boring No. : B-08		Strength Intercept (C) :	0.08	(ksf)	Peak	0.06	(ksf)	Ultimate
Sample No. : R			3.73	(kPa)		2.87	(kPa)	
Depth (ft/m) : 10.0	3.05	Friction Angle (ϕ) :	29.24	Degree		26.98	Degree	
Description : Olive Brown Silty Sand (SM)						Shear Rate (inch/minute) :	0.005	

SYMBOL	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	DRY DENSITY (kN/m^3)	VOID RATIO	NORMAL STRESS (ksf)	NORMAL STRESS (kPa)	PEAK STRESS (ksf)	PEAK STRESS (kPa)	ULTIMATE STRESS (ksf)	ULTIMATE STRESS (kPa)
●	29.29	96.47	15.18	0.75	1.00	47.88	0.66	31.60	0.58	27.58
◆	36.16	89.36	14.06	0.89	2.00	95.76	1.16	55.73	1.07	51.14
▲	30.87	95.13	14.97	0.77	4.00	191.52	2.33	111.46	2.10	100.55

GROUP DELTA CONSULTANTS

HDR 1st. Mile

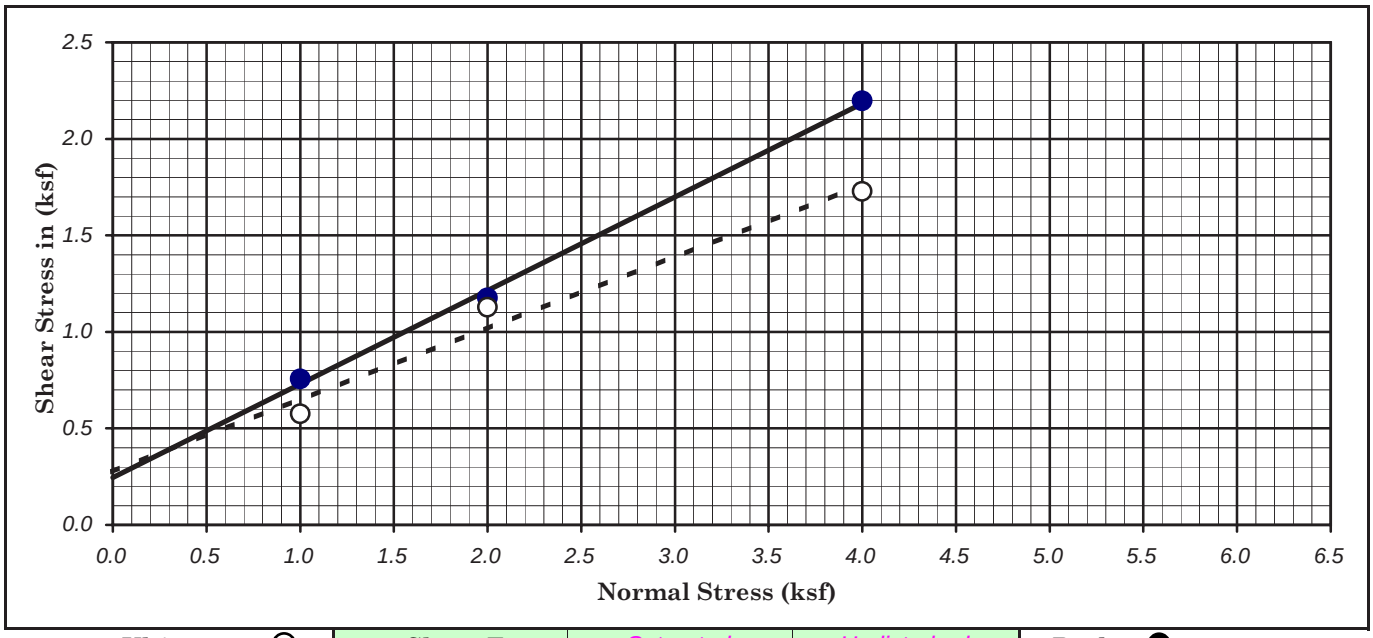
Project No. : L-894

Date : 02/18/11

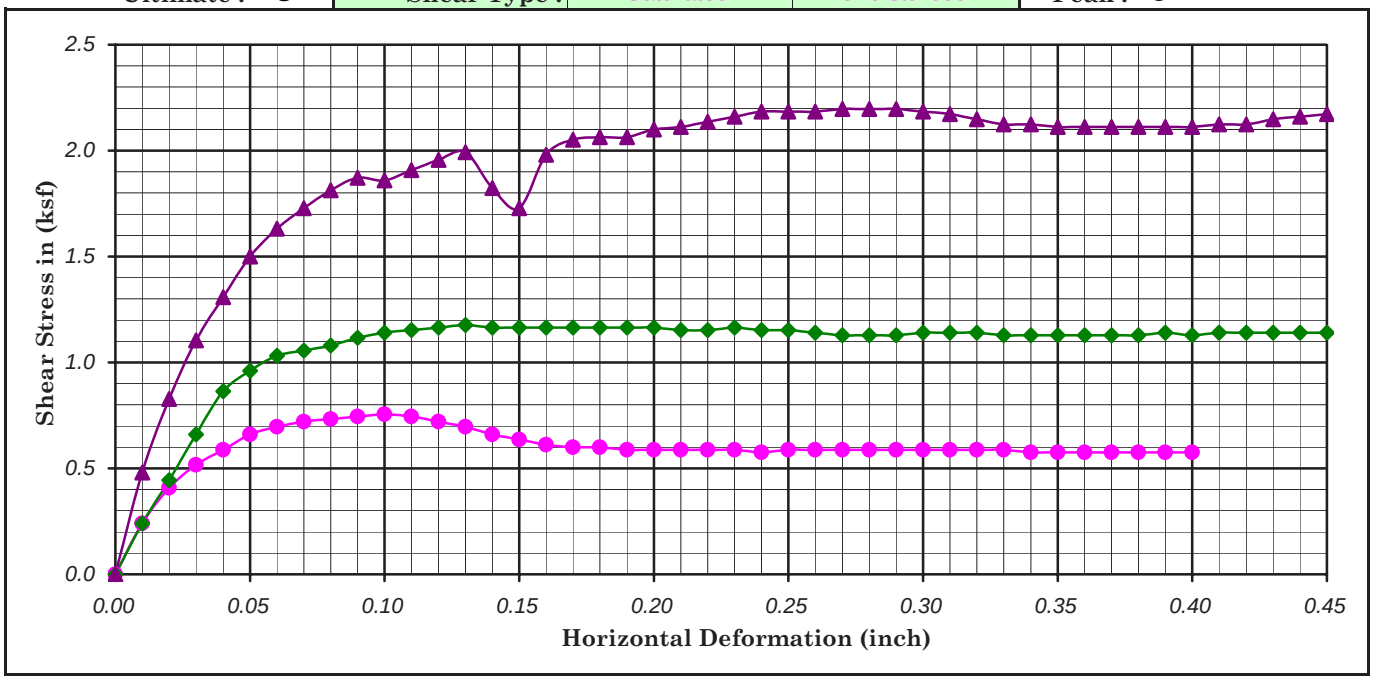
DIRECT SHEAR TEST

(ASTM D -3080)

Figure No. : B-2



Ultimate : ○	Shear Type :	Saturated	Undisturbed	Peak : ●



Boring No. : B-12		Strength Intercept (C) :	0.25	(ksf)	Peak	0.28	(ksf)	Ultimate
Sample No. : R			11.78	(kPa)		13.21	(kPa)	
Depth (ft/m) : 2.5	0.76	Friction Angle (ϕ) :	25.84	Degree		20.41	Degree	
Description : Dark Yellowish Brown Sandy Clay (CL)						Shear Rate (inch/minute) :	0.005	

SYMBOL	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	DRY DENSITY (kN/m^3)	VOID RATIO	NORMAL STRESS (ksf)	NORMAL STRESS (kPa)	PEAK STRESS (ksf)	PEAK STRESS (kPa)	ULTIMATE STRESS (ksf)	ULTIMATE STRESS (kPa)
●	22.41	107.42	16.91	0.57	1.00	47.88	0.76	36.20	0.58	27.58
◆	22.13	109.22	17.19	0.54	2.00	95.76	1.18	56.31	1.13	54.01
▲	20.59	111.34	17.53	0.51	4.00	191.52	2.20	105.14	1.73	82.74

GROUP DELTA CONSULTANTS

HDR 1st. Mile

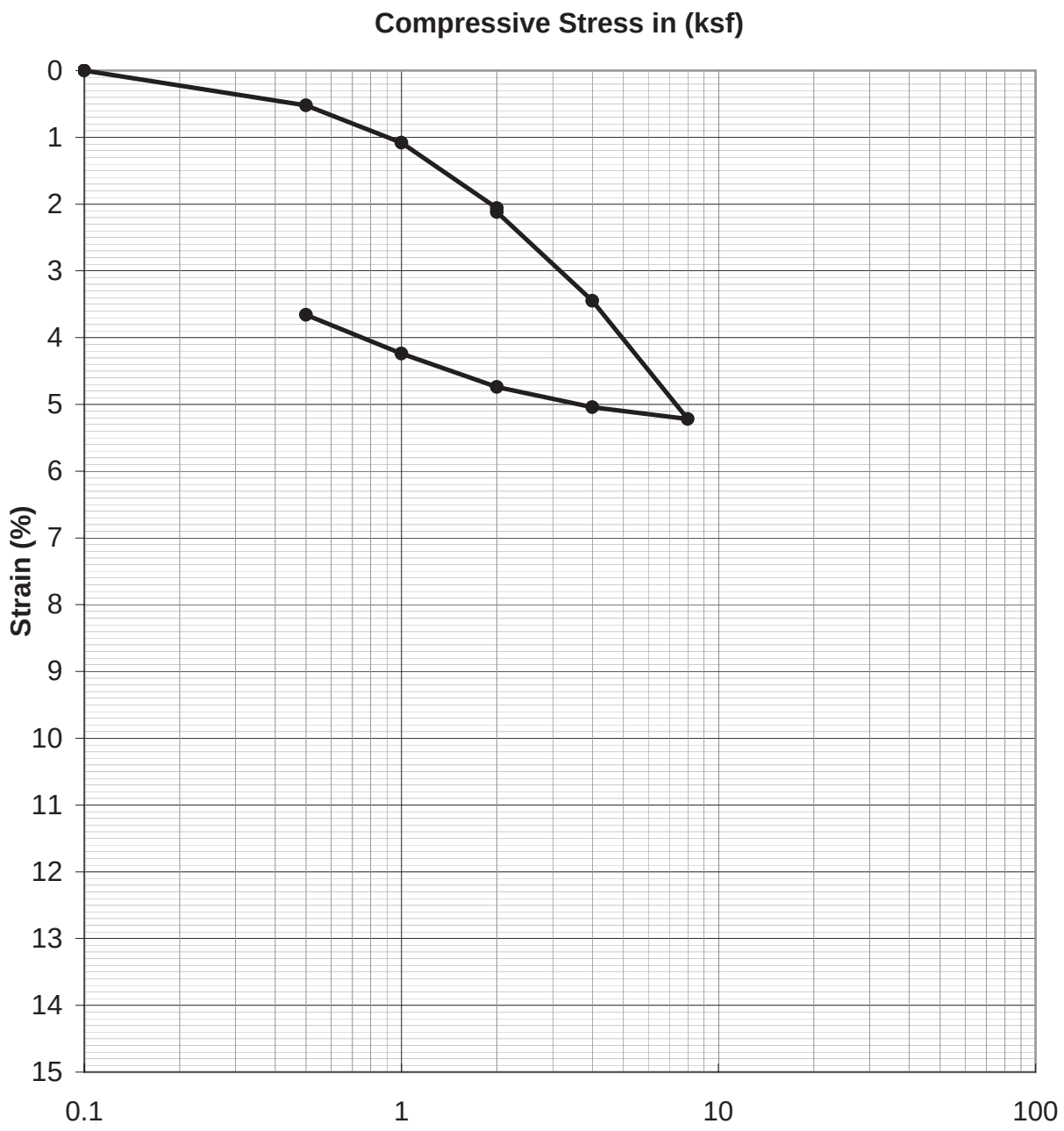
Project No. : L-894

Date : 02/18/11

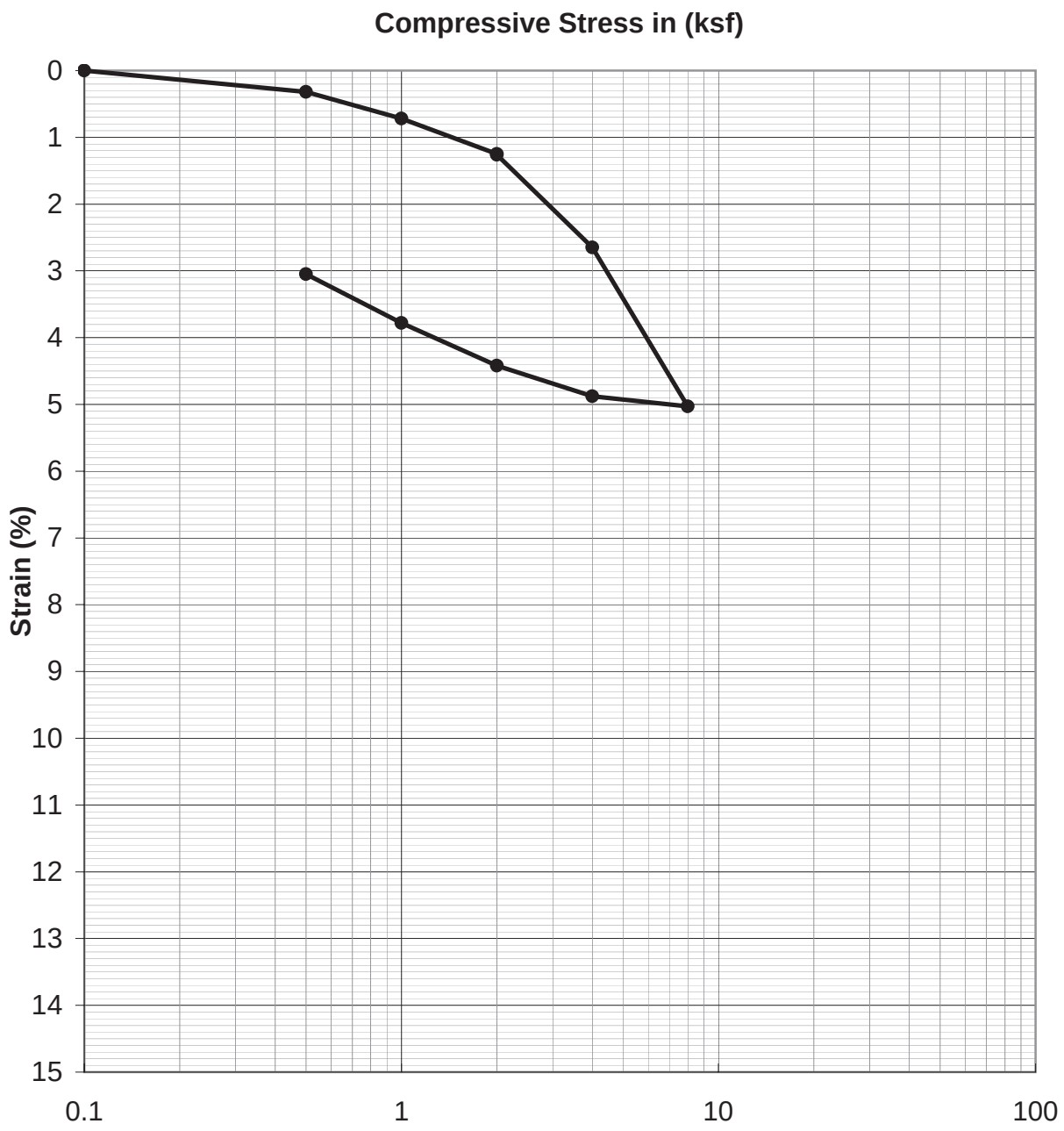
DIRECT SHEAR TEST

(ASTM D -3080)

Figure No. : B-3

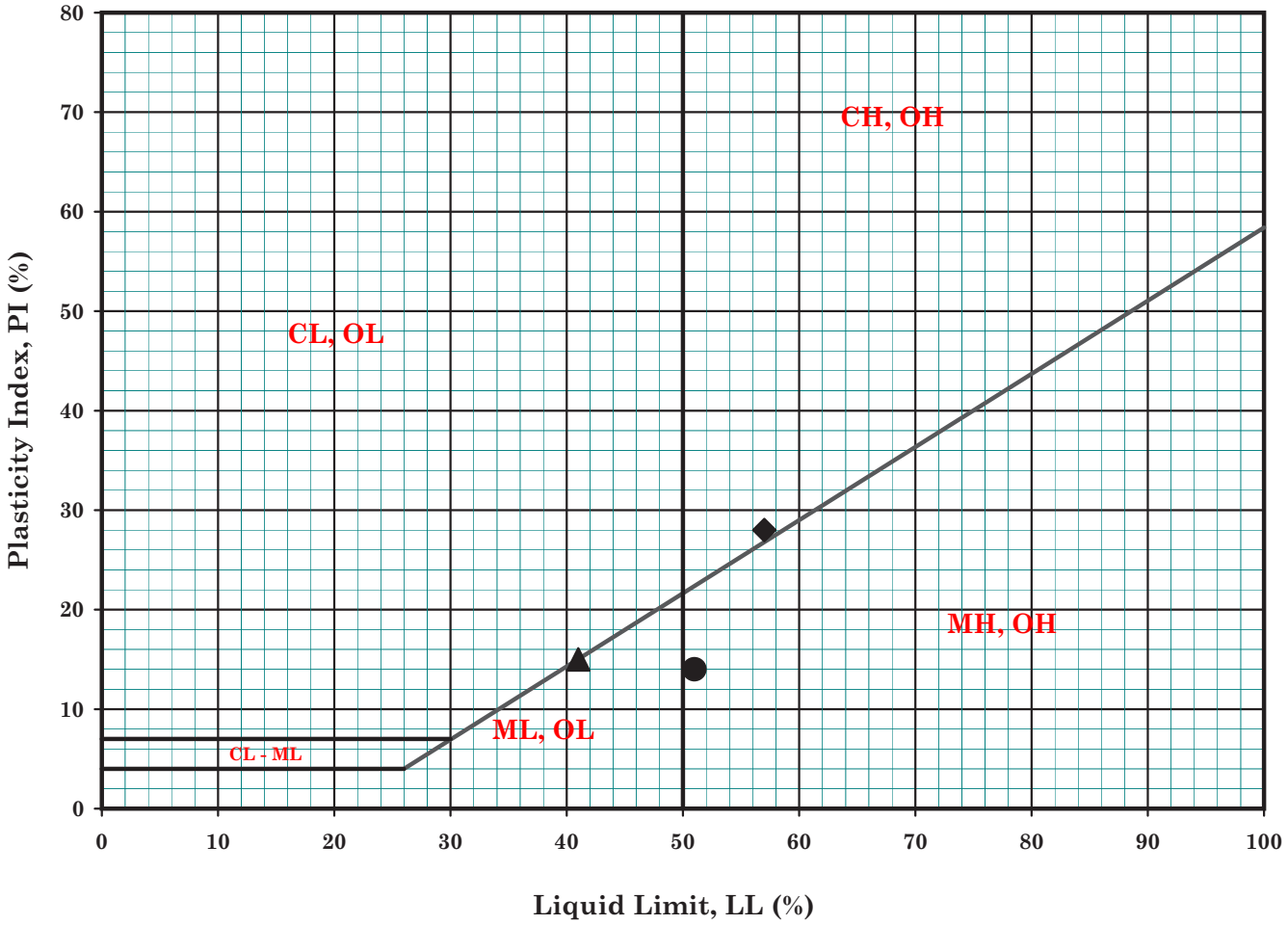


GROUP DELTA CONSULTANTS	Client	HDR
	Project Name	SANBAG 1st Mile
	Boring No.	B-03 at 15 feet
	Figure Number	B-4



GROUP DELTA CONSULTANTS	Client	HDR
	Project Name	SANBAG 1st Mile
	Boring No.	B-12 at 2.5 feet
	Figure Number	B-5

PLASTICITY CHART



Symbol	Boring No.	Sample No.	Depth (ft)		Depth (m)		MC (%)	LL (%)	PL (%)	PI (%)	LI	Description
●	B-03	R15	15.0	16.5	4.6	5.0	29.90	51	37	14		SANDY elastic SILT (MH)
▲	B-03	S40	40.0	41.5	12.2	12.7	23.70	41	26	15		SILT (ML)
◆	B-10	R10	10.0	11.5	3.1	3.5	23.00	57	29	28		Fat CLAY (CH)
■												
○												
△												
◇												
□												

Remarks :

GROUP DELTA CONSULTANTS

HDR 1st mile

Project No. : L-894

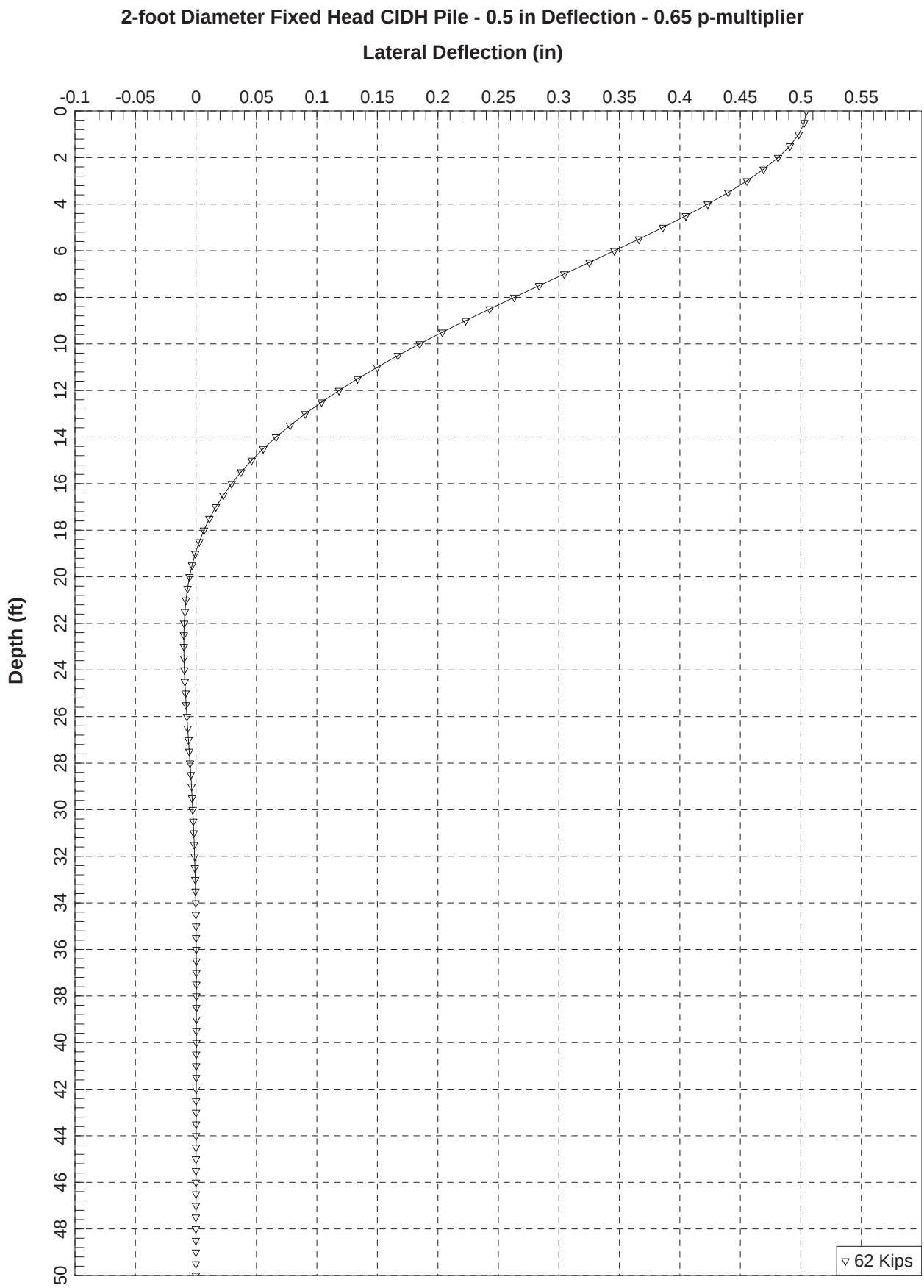
Date : 02/10/11

ATTERBERG LIMITS

(ASTM D-4318 / CT-204 / T-89)

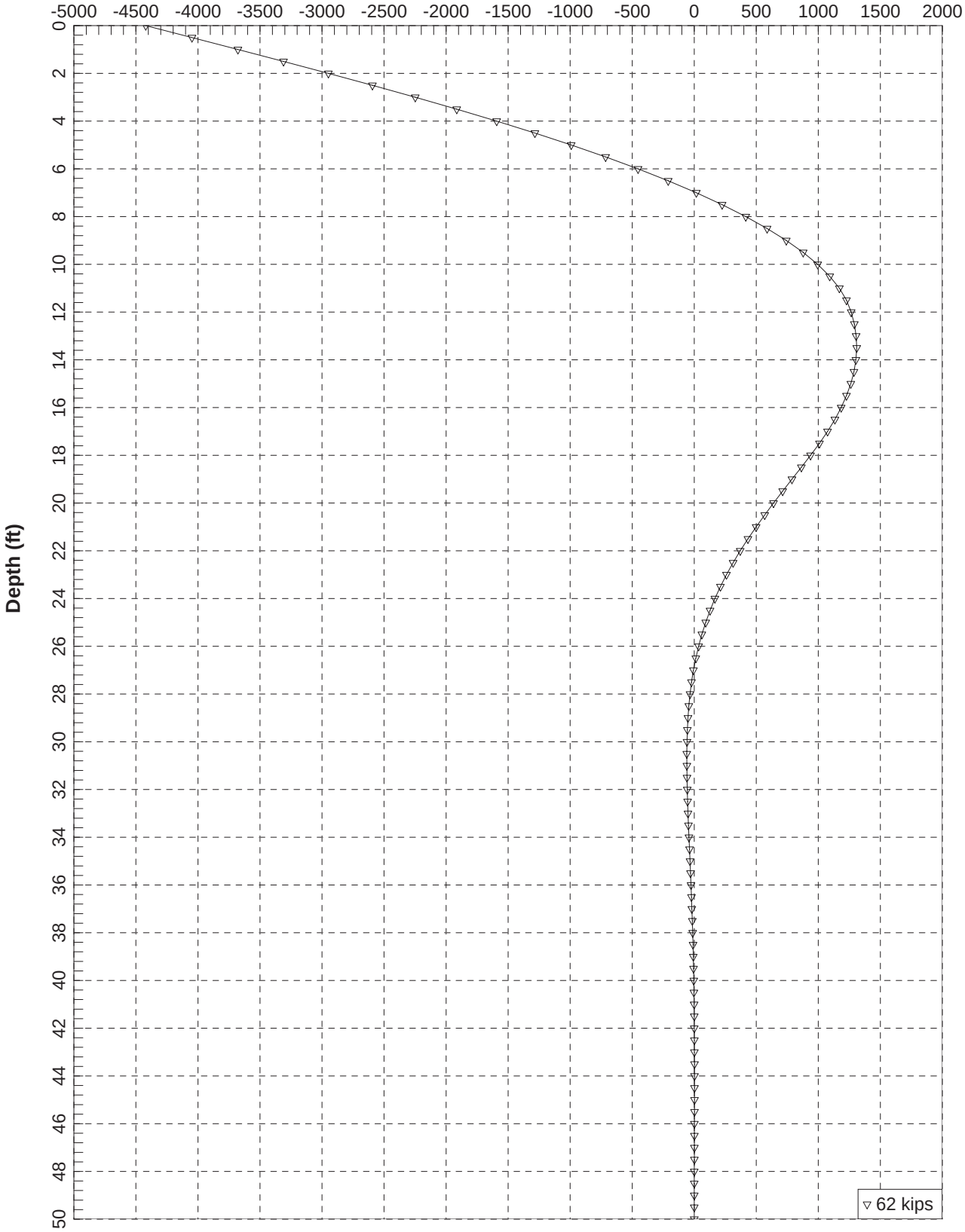
Figure No. : B-6

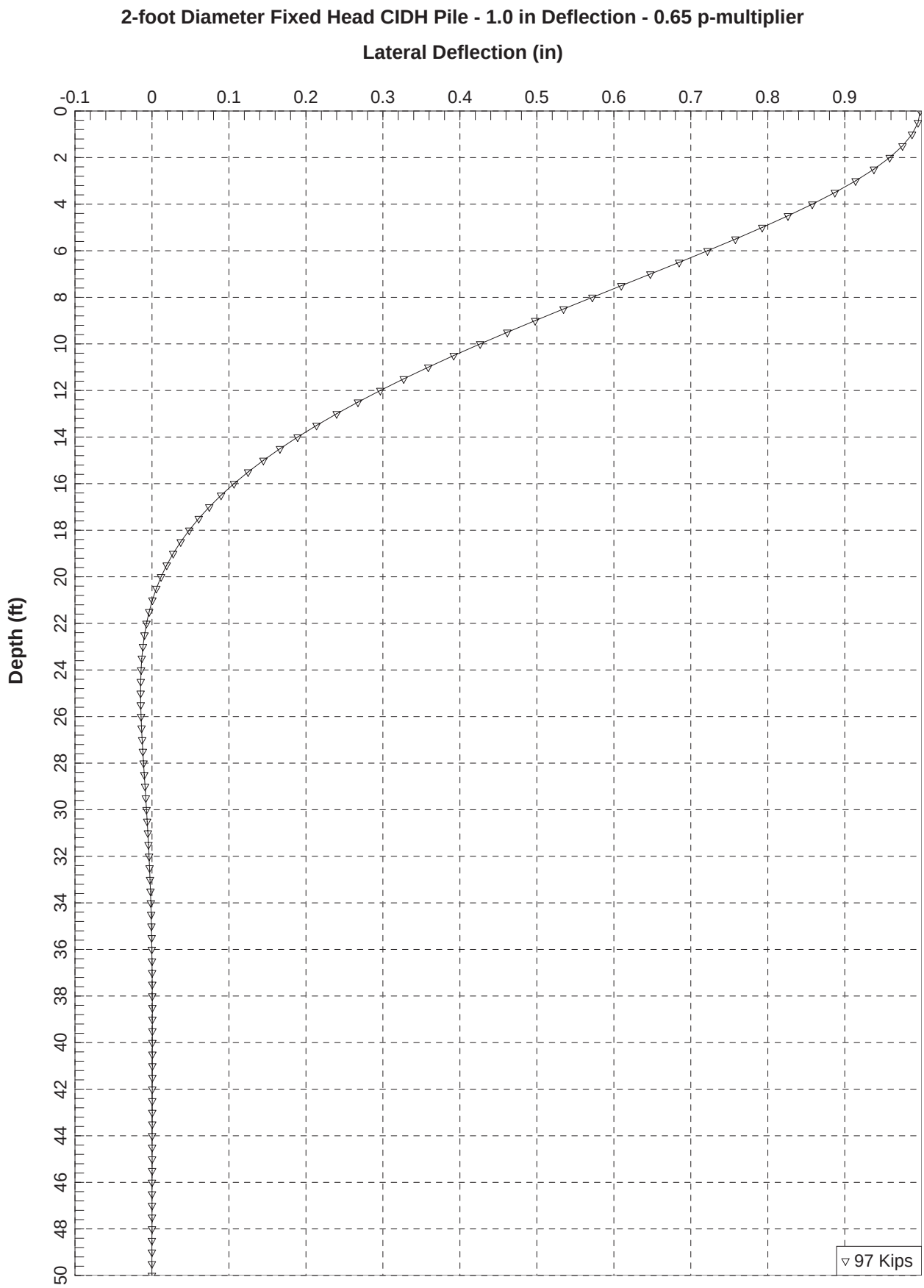
APPENDIX C LATERAL PILE CAPACITY CALCULATIONS

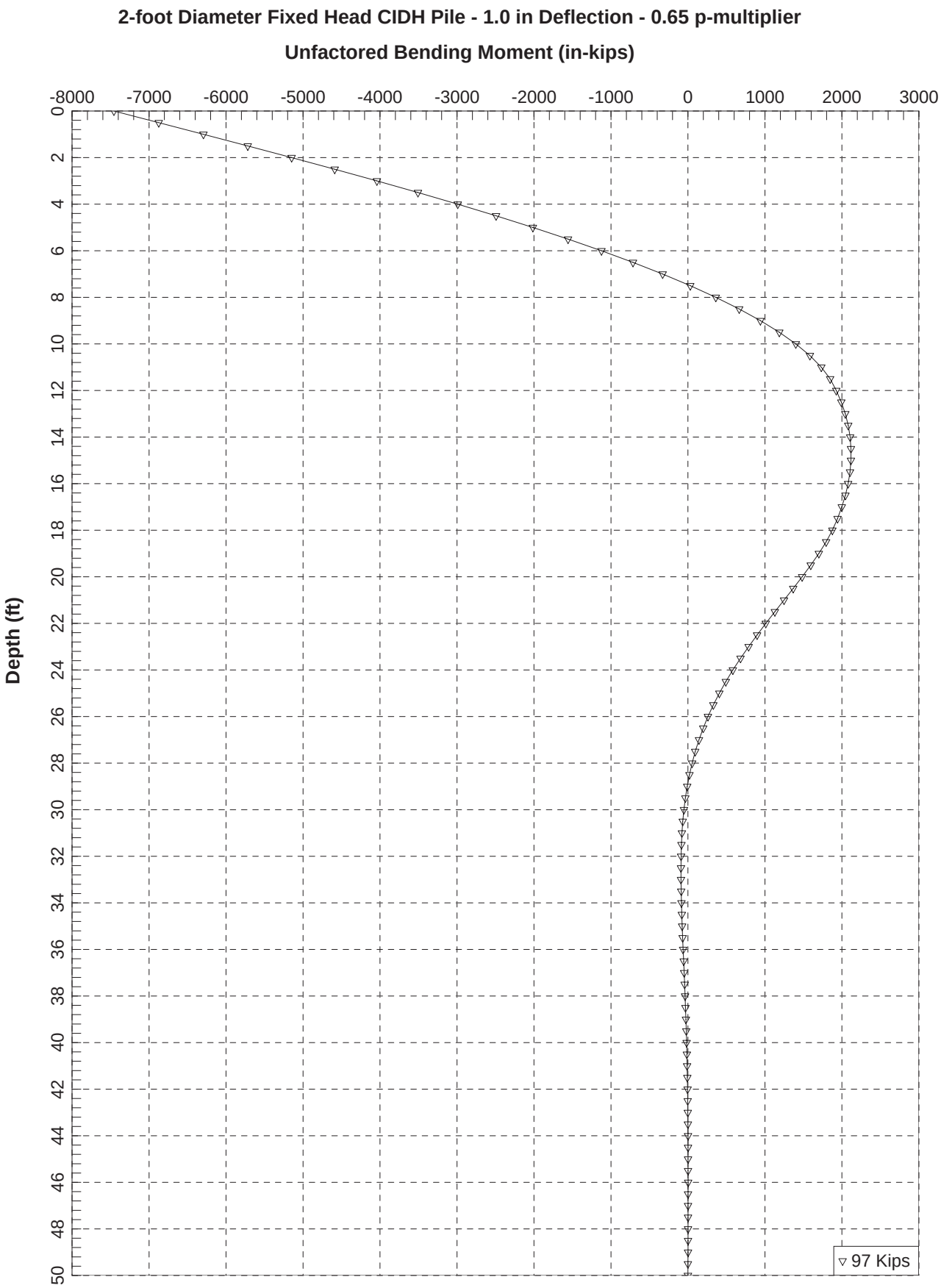

2-foot Diameter Fixed Head CIDH Pile - 0.5 in Deflection - 0.65 p-multiplier
Lateral Deflection (in)
-0.1
-0.05
0
0.05
0.1
0.15
0.2
0.25
0.3
0.35
0.4
0.45
0.5
0.55
Depth (ft)
0
2
4
6
8
10
12
14
16
18
20
22
24
26
28
30
32
34
36
38
40
42
44
46
48
50
62 Kips

2-foot Diameter Fixed Head CIDH Pile - 0.5 in Deflection - 0.65 p-multiplier

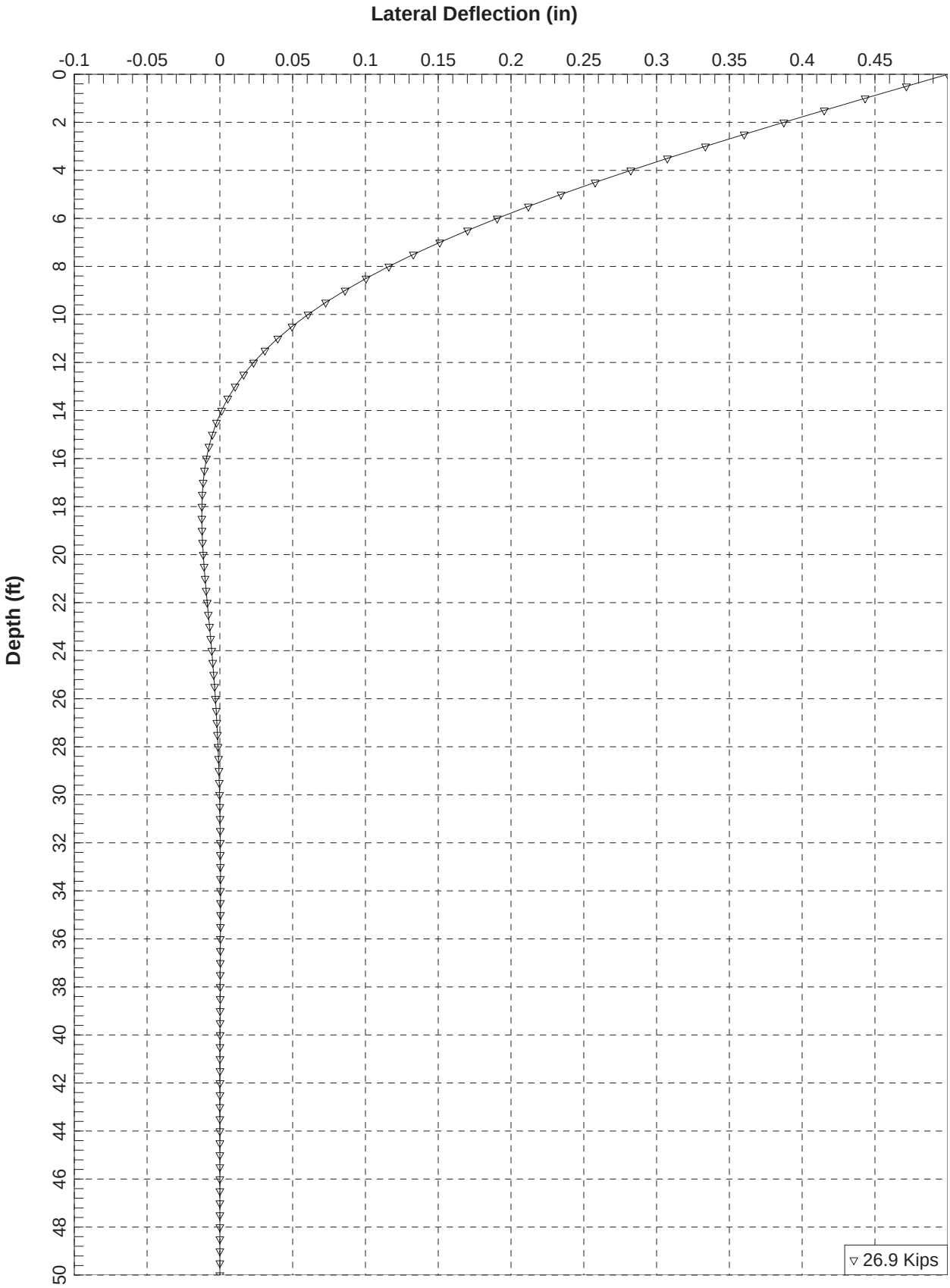
Unfactored Bending Moment (in-kips)




2-foot Diameter Fixed Head CIDH Pile - 1.0 in Deflection - 0.65 p-multiplier
Lateral Deflection (in)
-0.1
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
Depth (ft)
0
2
4
6
8
10
12
14
16
18
20
22
24
26
28
30
32
34
36
38
40
42
44
46
48
50
97 Kips

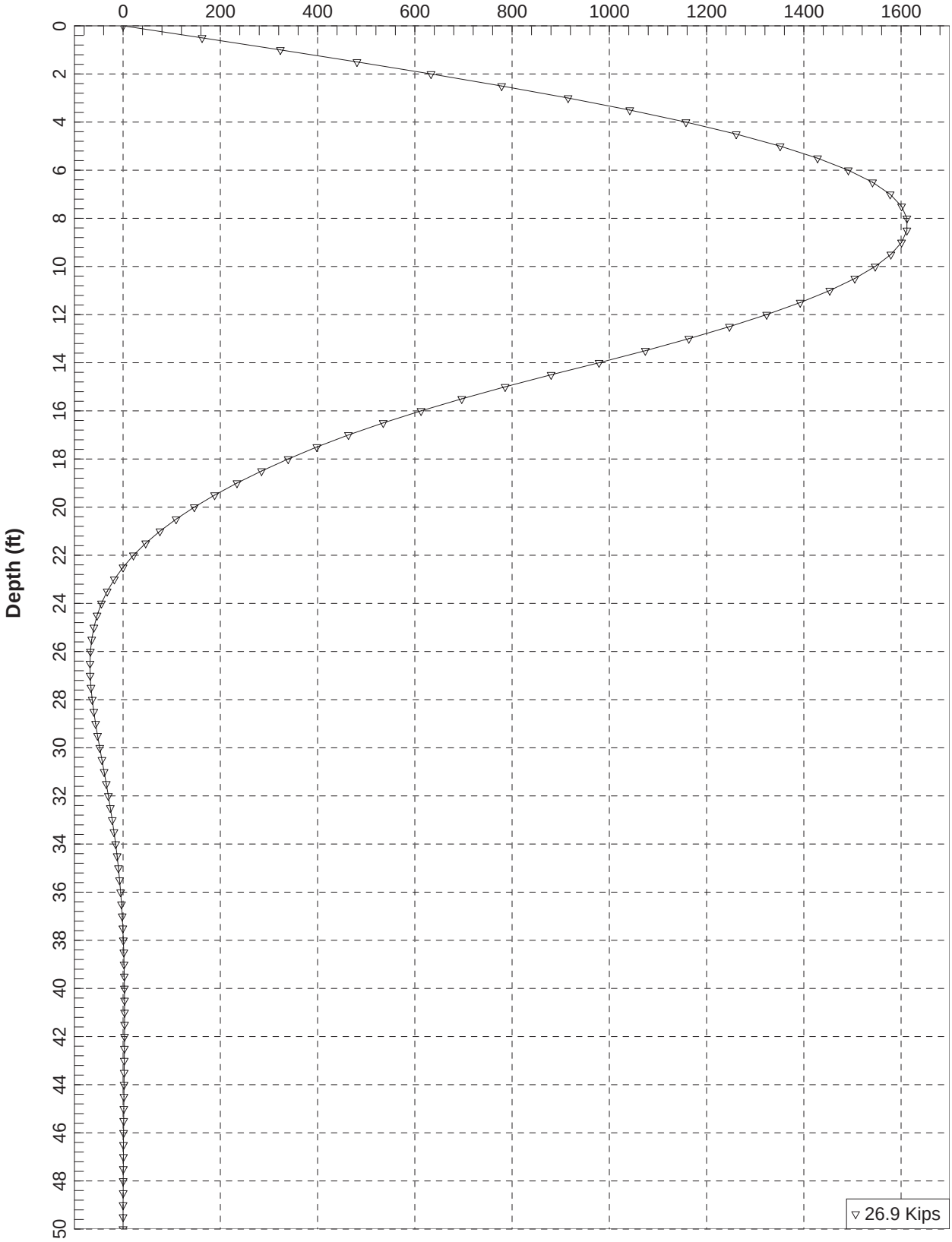

2-foot Diameter Fixed Head CIDH Pile - 1.0 in Deflection - 0.65 p-multiplier
Unfactored Bending Moment (in-kips)
-8000
-7000
-6000
-5000
-4000
-3000
-2000
-1000
0
1000
2000
3000
Depth (ft)
0
2
4
6
8
10
12
14
16
18
20
22
24
26
28
30
32
34
36
38
40
42
44
46
48
50
97 Kips

2-foot Diameter Free Head CIDH Pile - 0.5 in Deflection - 0.65 p-multiplier

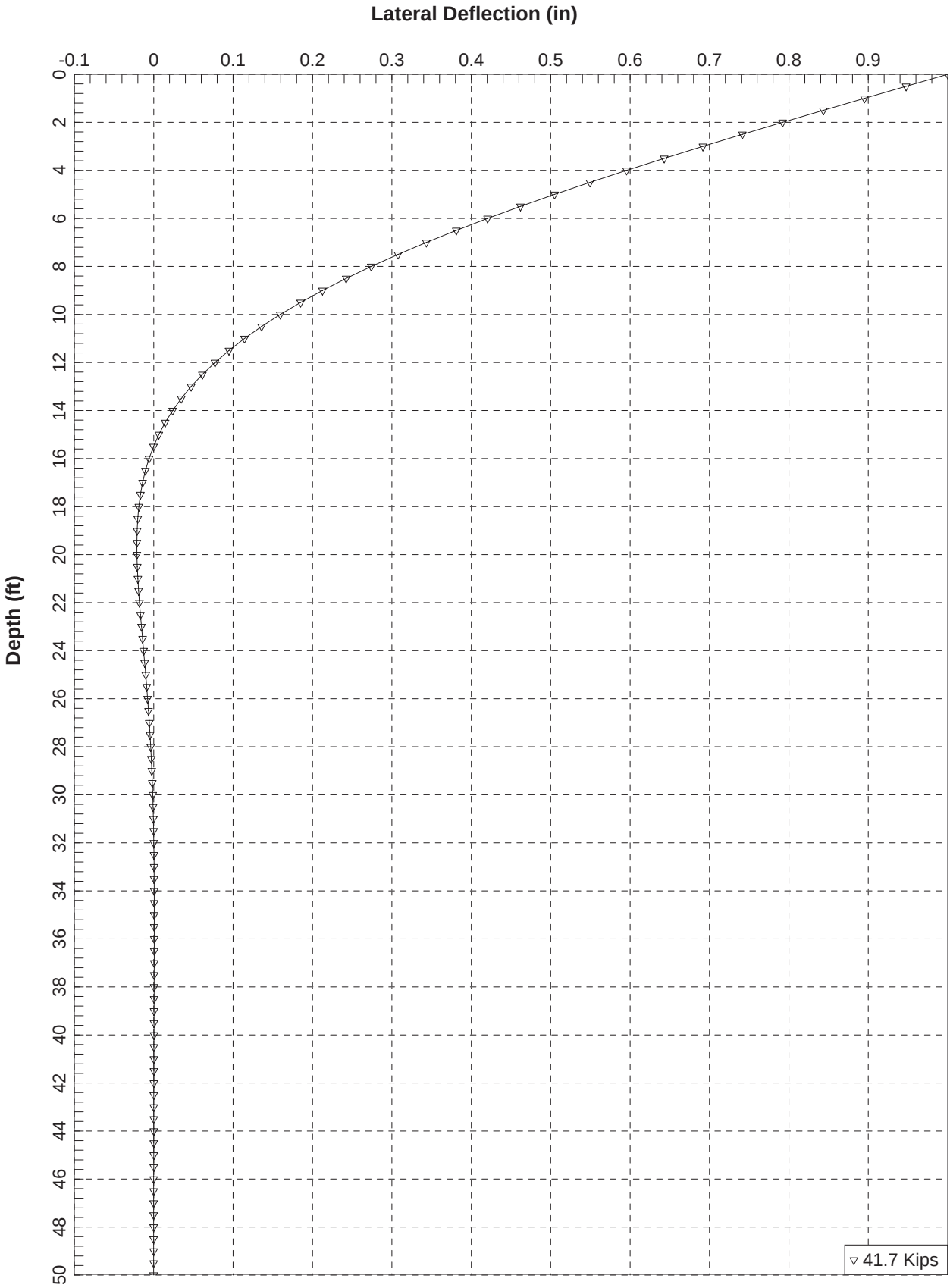


2-foot Diameter Free Head CIDH Pile - 0.5 in Deflection - 0.65 p-multiplier

Unfactored Bending Moment (in-kips)

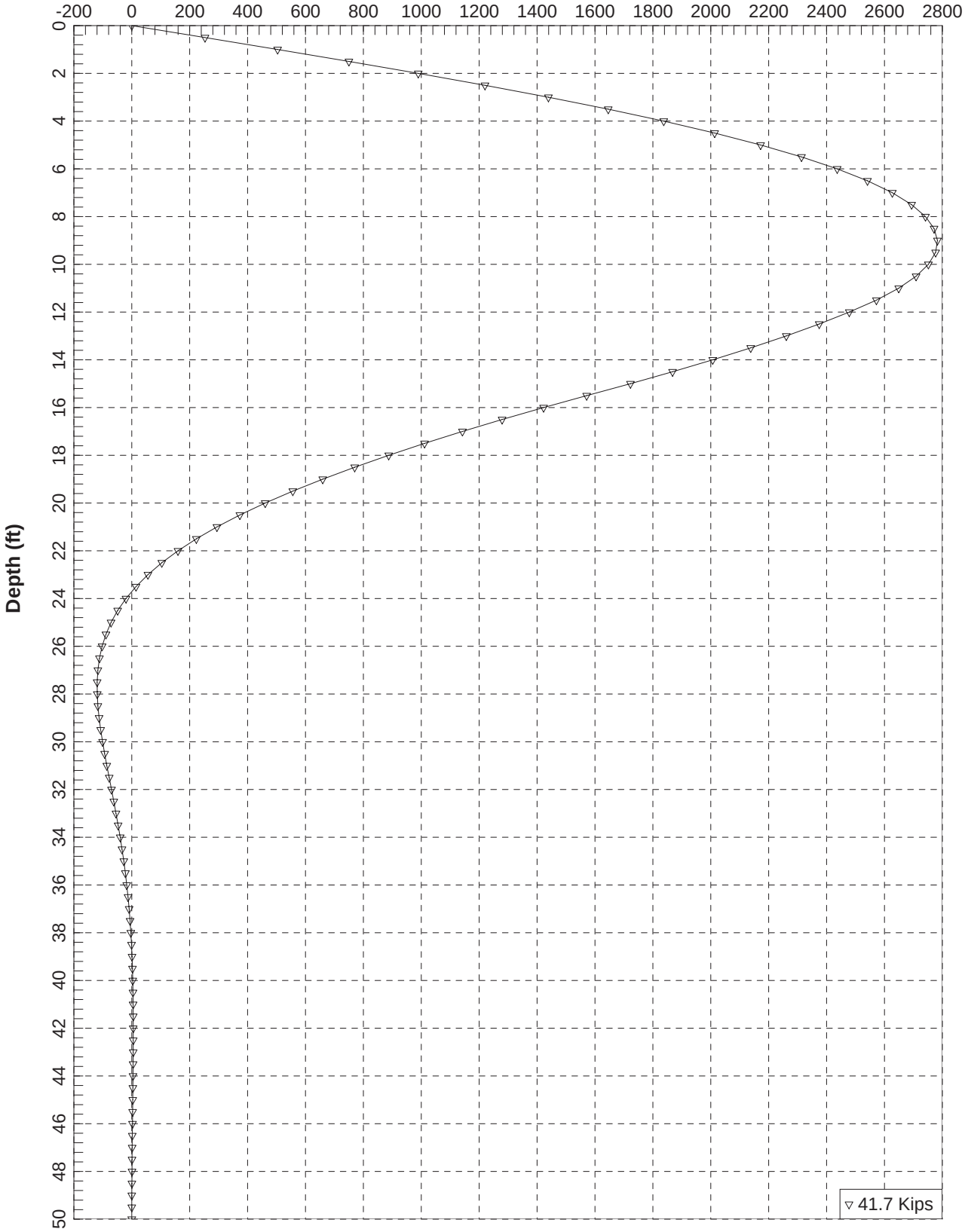


2-foot Diameter Free Head CIDH Pile - 1.0 in Deflection - 0.65 p-multiplier

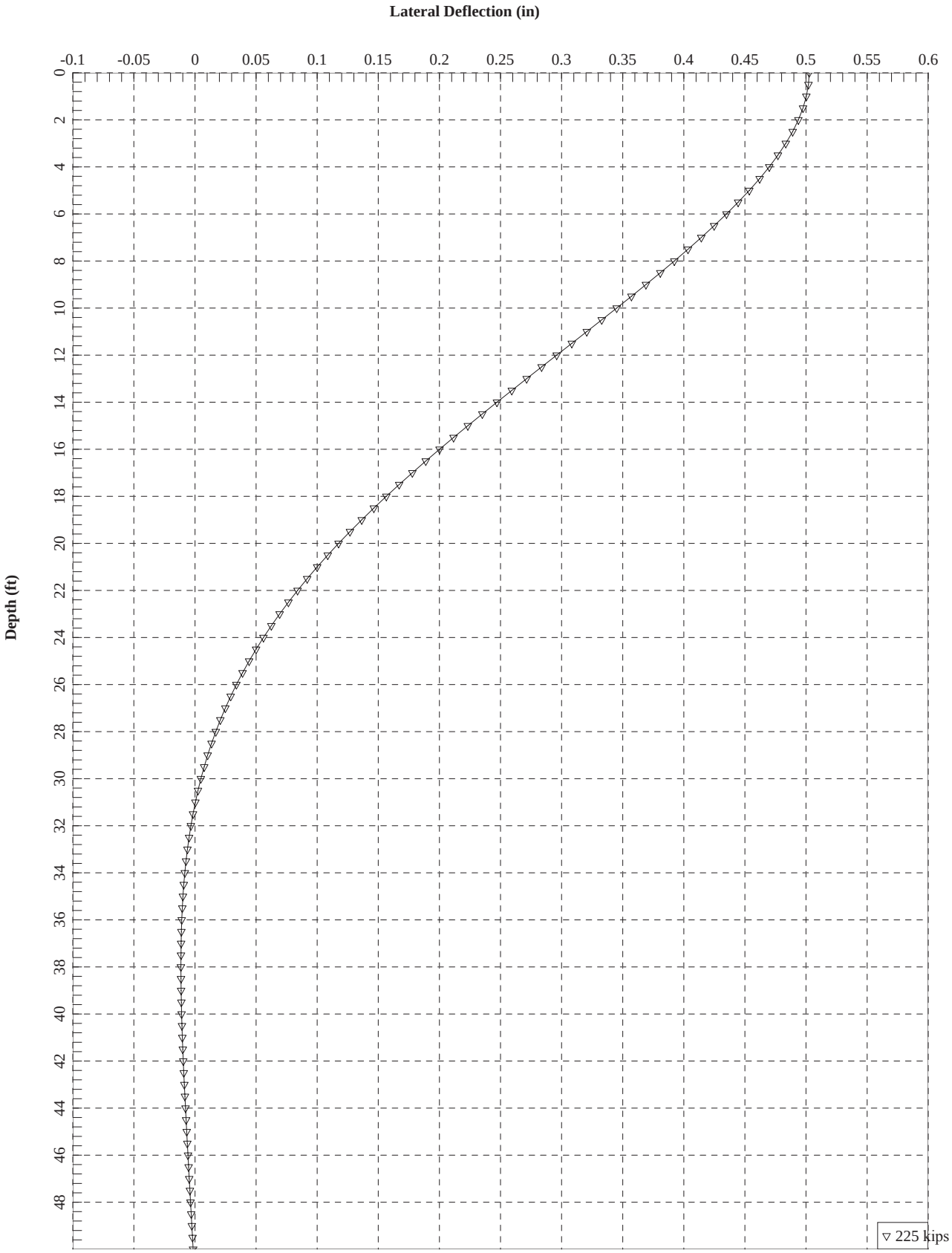


2-foot Diameter Free Head CIDH Pile - 1.0 in Deflection - 0.65 p-multiplier

Unfactored Bending Moment (in-kips)

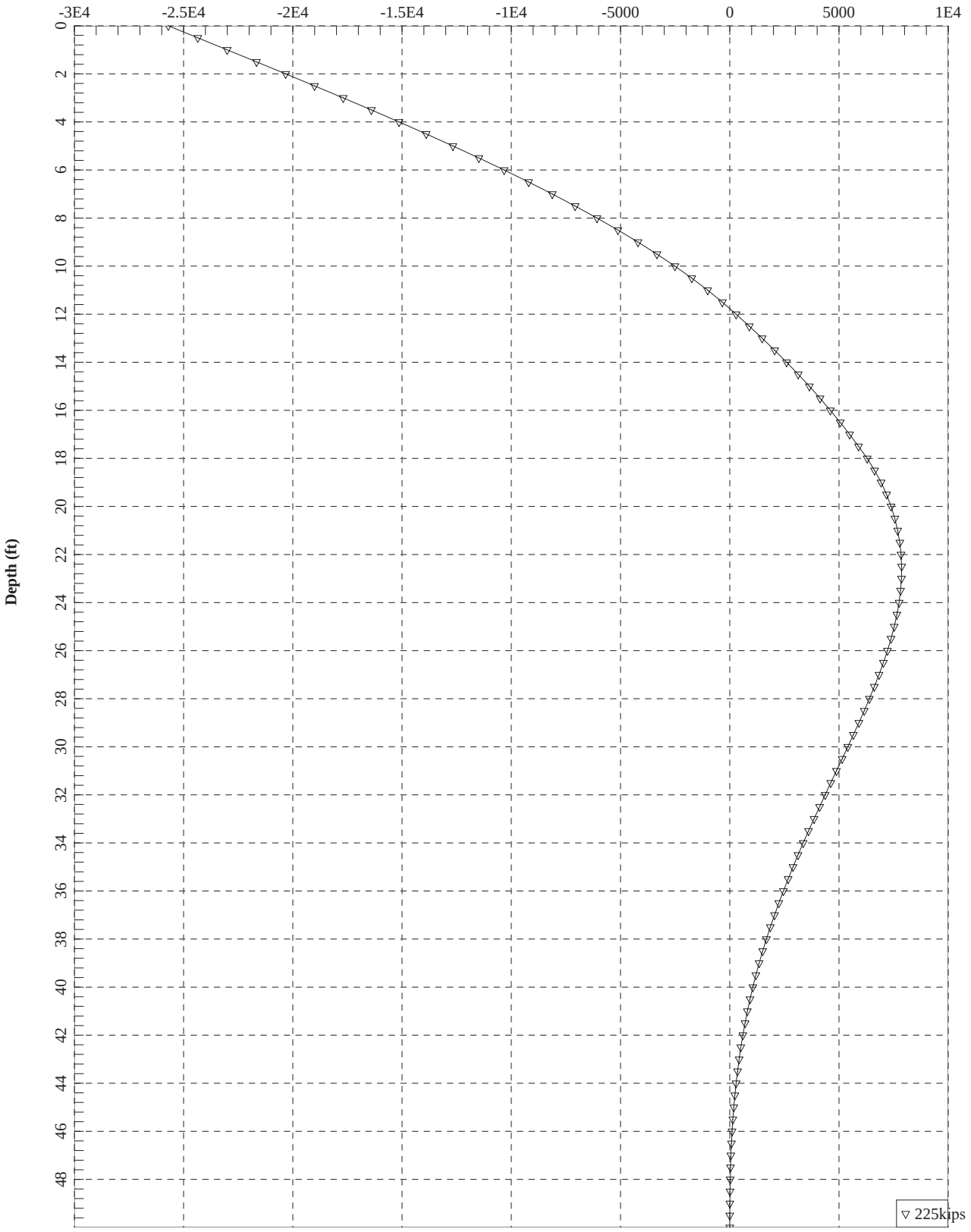


4-foot Diameter Fixed Head CIDH Pile - 0.2 in Deflection - 0.65 p-multiplier

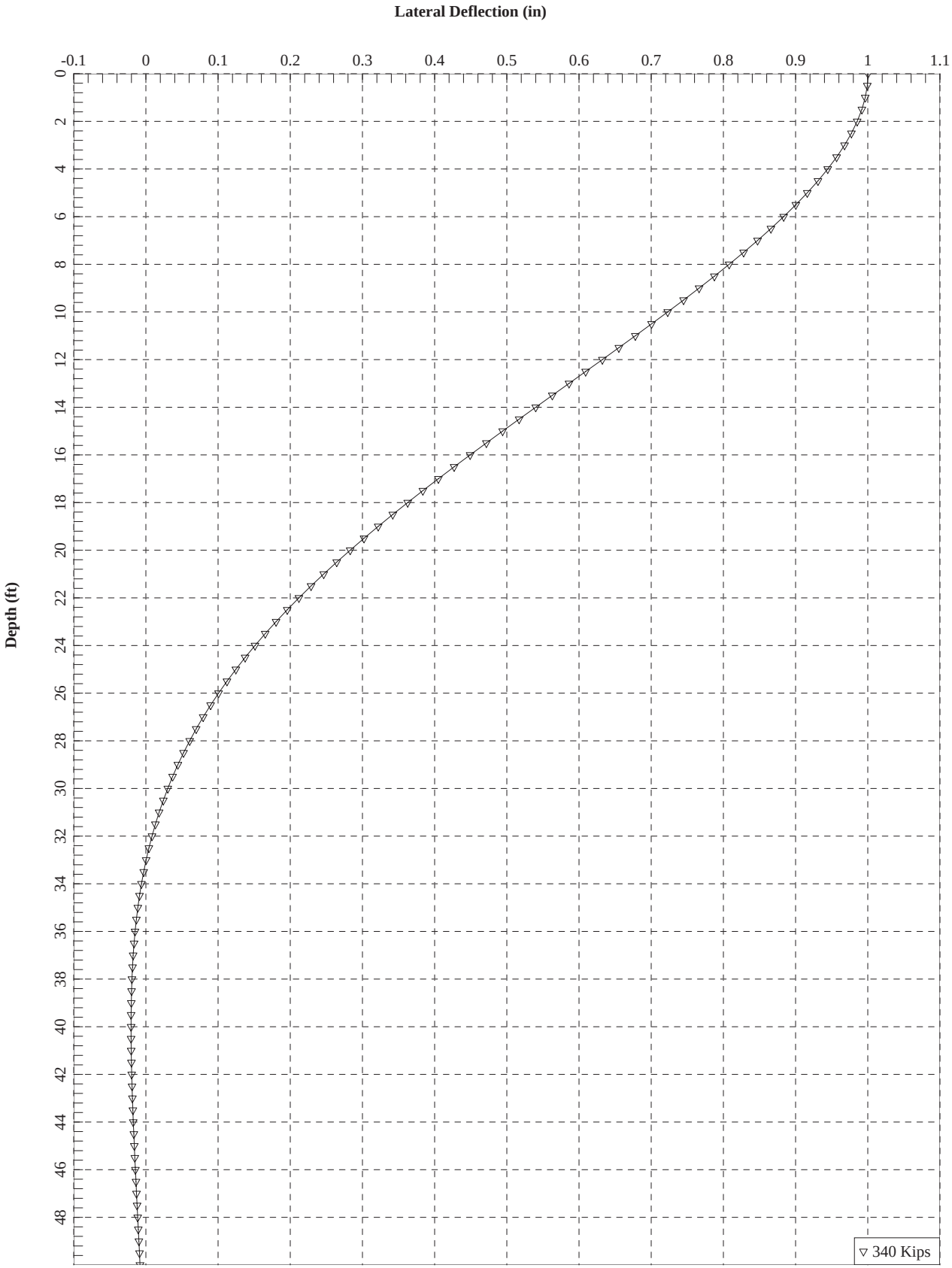


4-foot Diameter Fix Head CIDH Pile - 0.5 in Deflection - 0.65 p-multiplier

Bending Moment (in-kips)

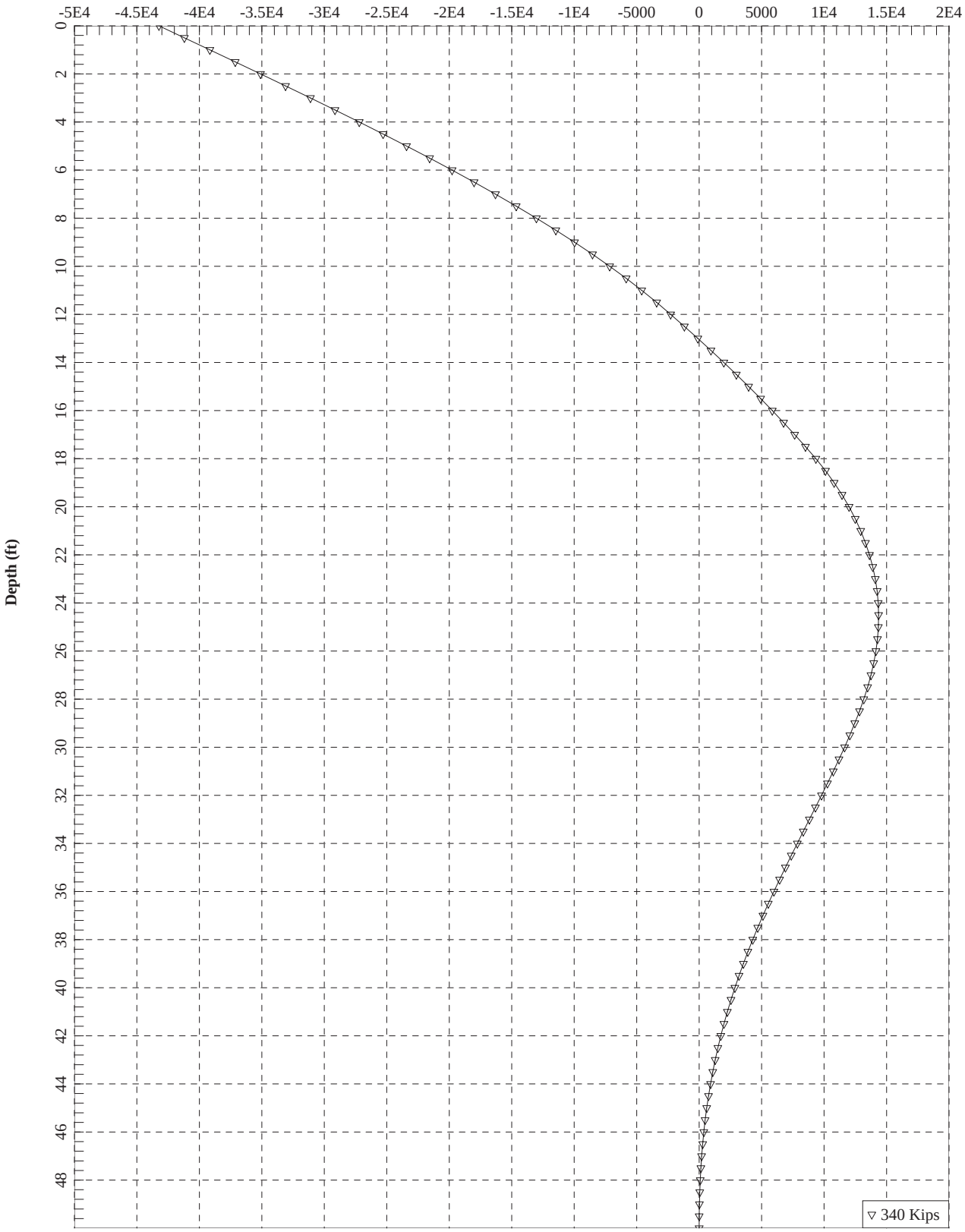


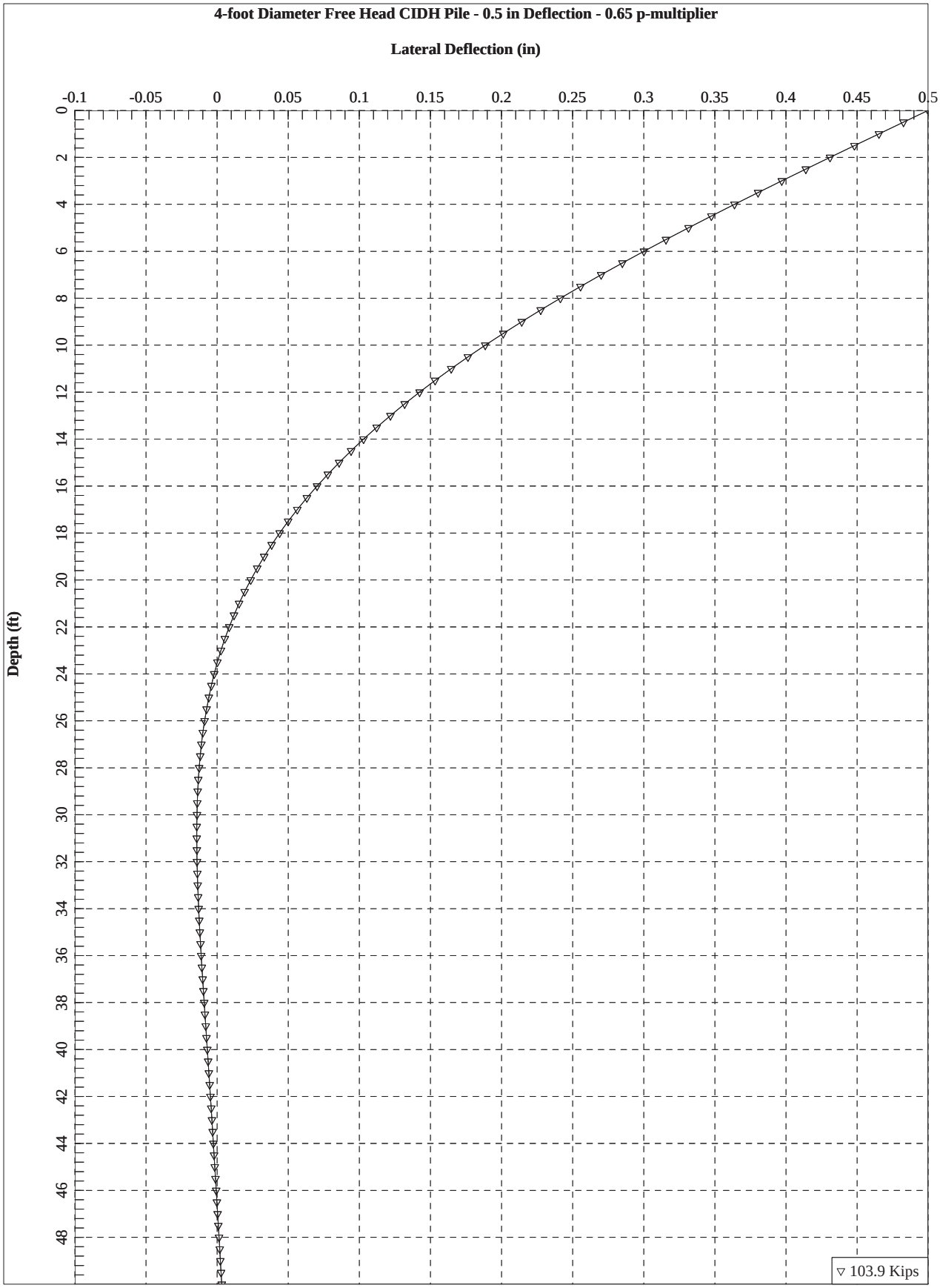
4-foot Diameter Fix Head CIDH Pile - 1.0 in Deflection - 0.65 p-multiplier



4-foot Diameter Fix Head CIDH Pile - 1.0 in Deflection - 0.65 p-multiplier

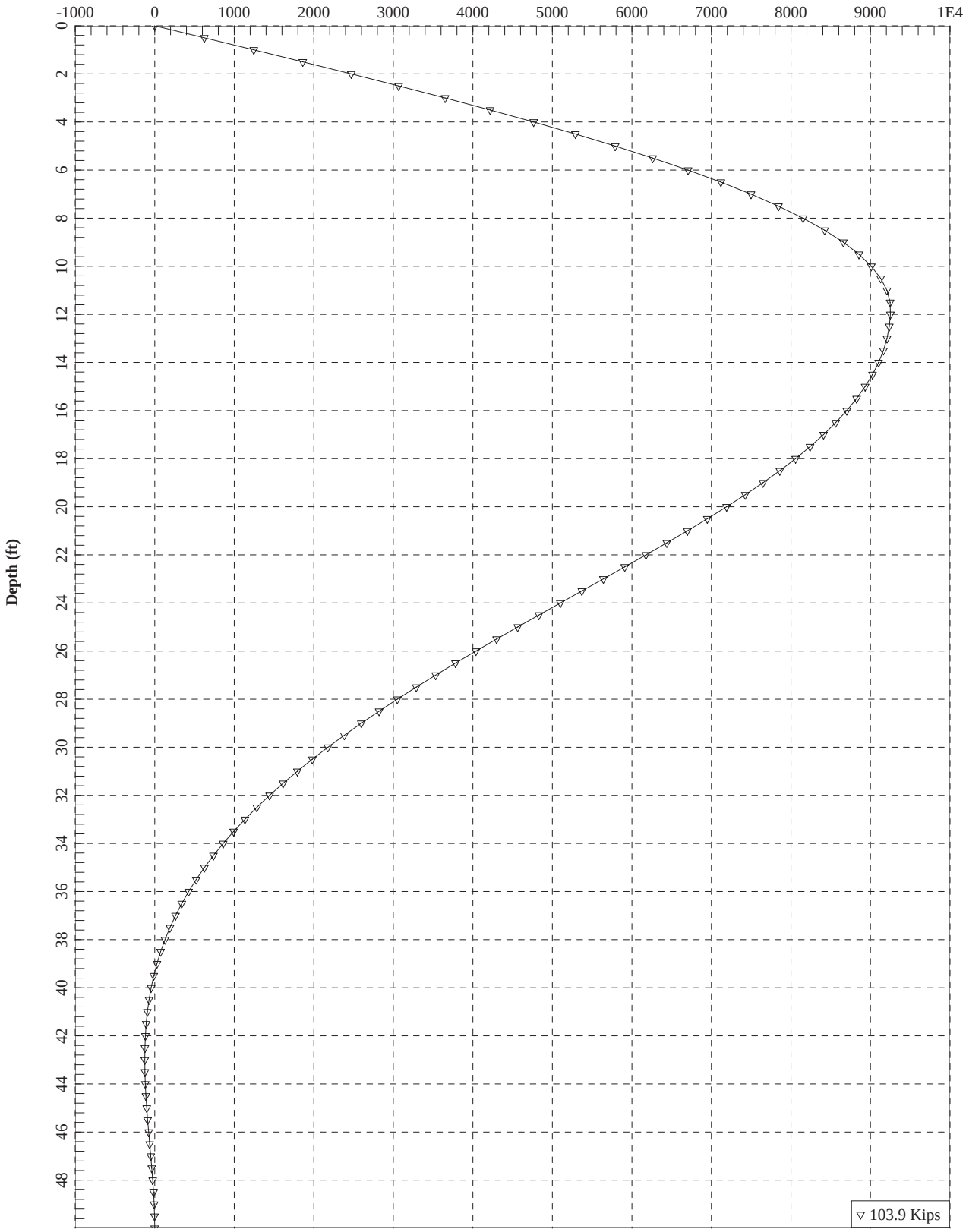
Bending Moment (in-kips)



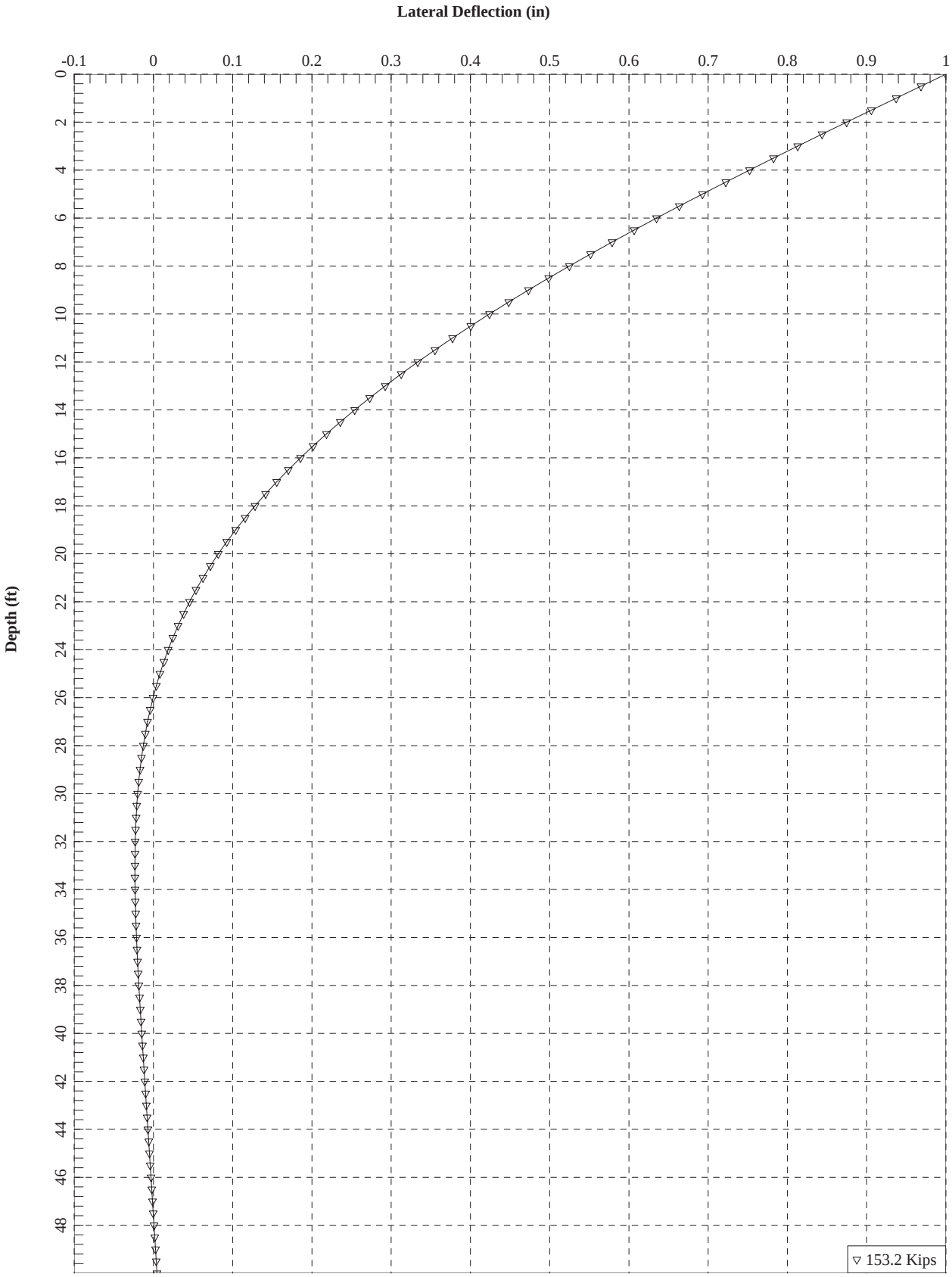

4-foot Diameter Free Head CIDH Pile - 0.5 in Deflection - 0.65 p-multiplier
Lateral Deflection (in)
-0.1
-0.05
0
0.05
0.1
0.15
0.2
0.25
0.3
0.35
0.4
0.45
0.5
Depth (ft)
0
2
4
6
8
10
12
14
16
18
20
22
24
26
28
30
32
34
36
38
40
42
44
46
48
103.9 Kips

4-foot Diameter Free Head CIDH Pile - 0.5 in Deflection - 0.65 p-multiplier

Bending Moment (in-kips)

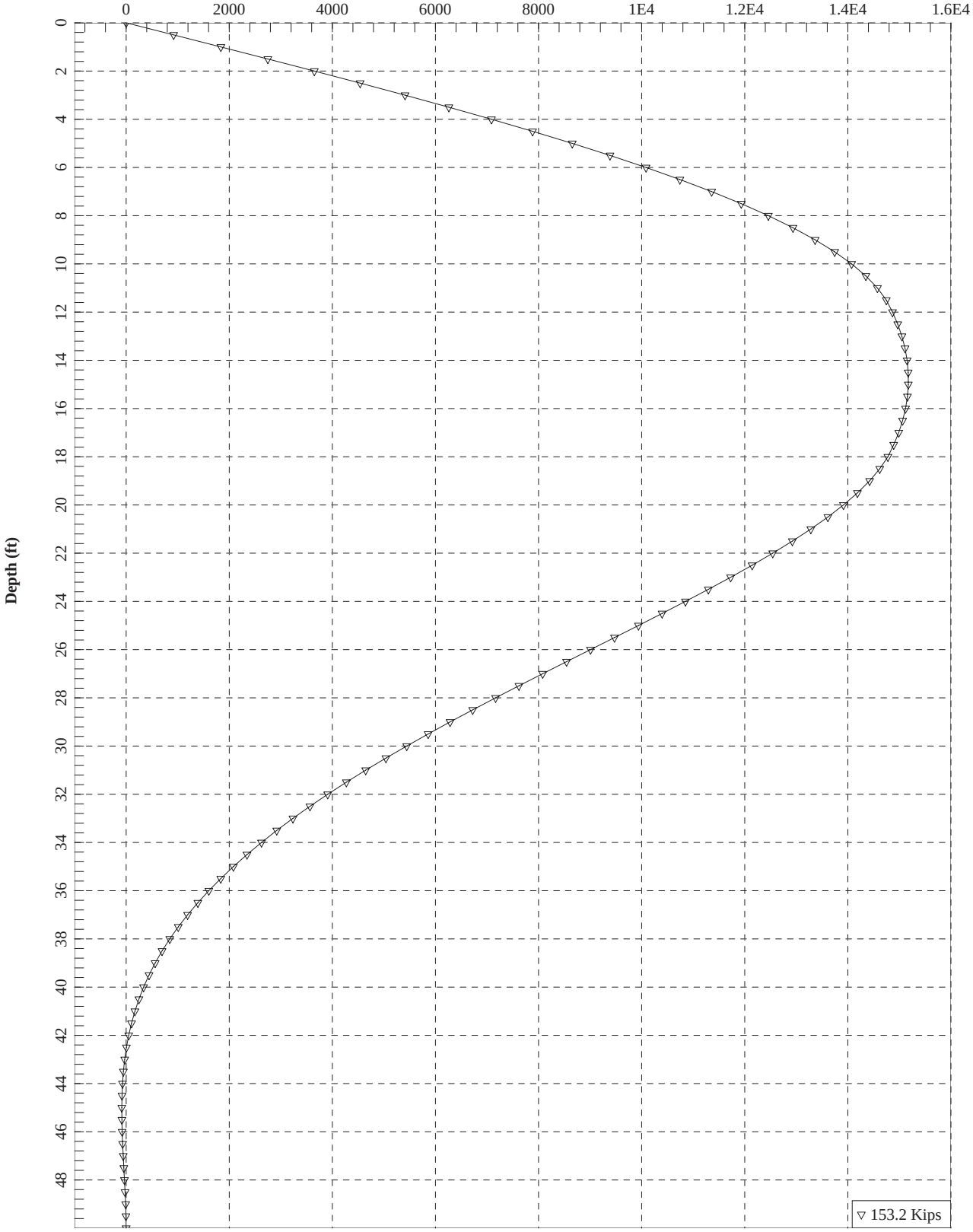


4-foot Diameter Free Head CIDH Pile - 1.0 in Deflection - 0.65 p-multiplier

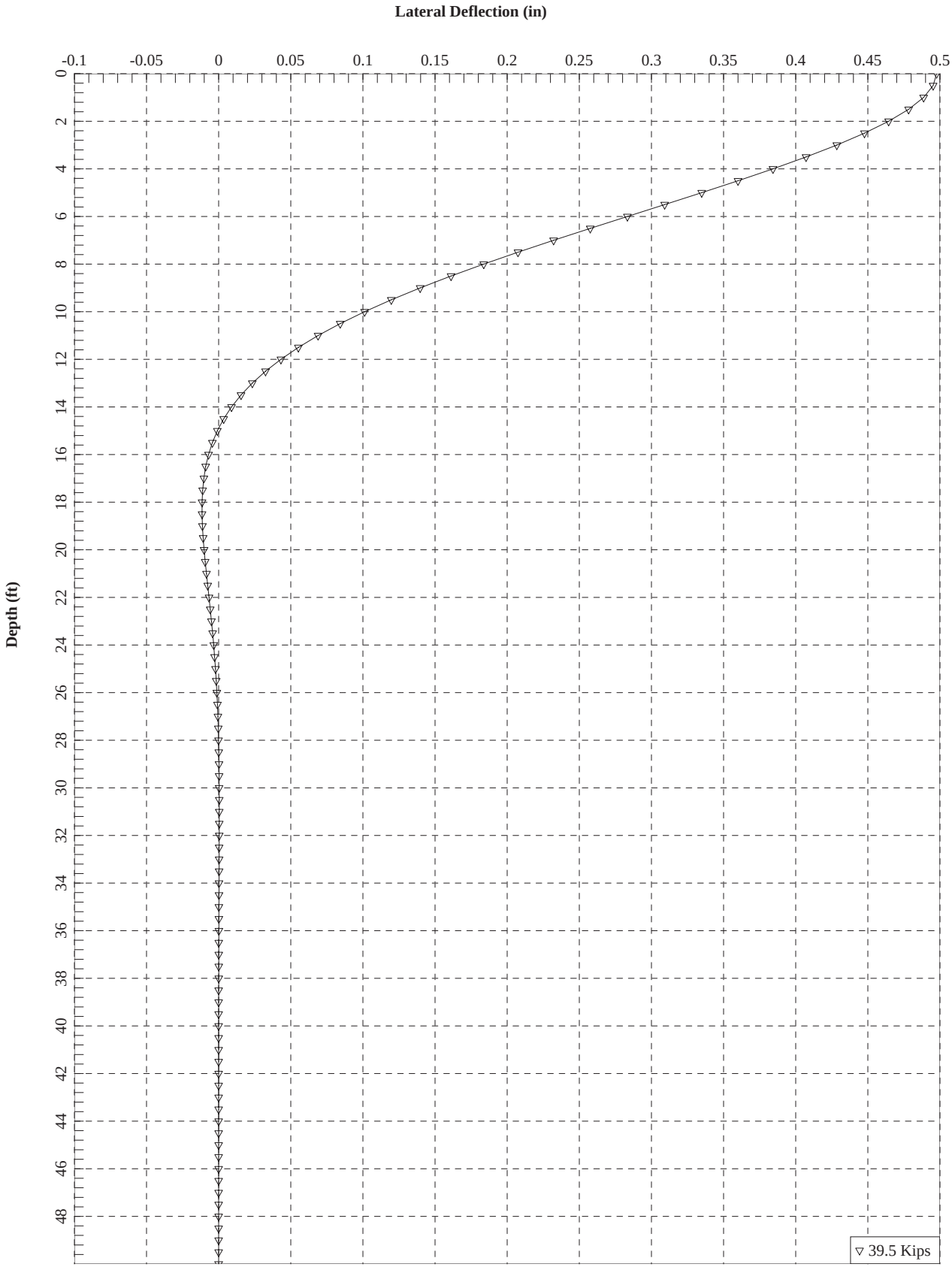


4-foot Diameter Free Head CIDH Pile - 1.0 in Deflection - 0.65 p-multiplier

Bending Moment (in-kips)

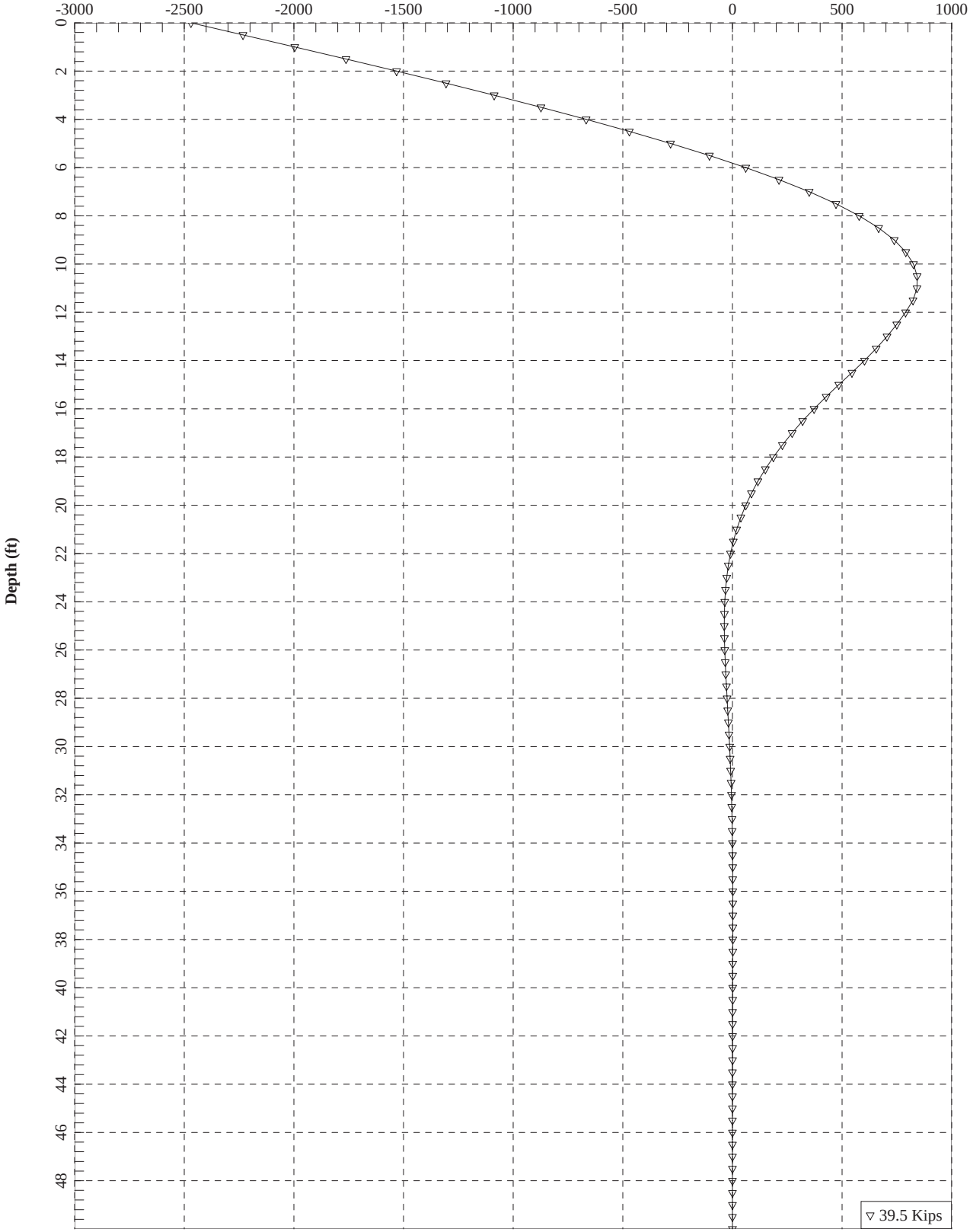


HP 12x84 Strong Fix Head 0.5 in Deflection p=0.65

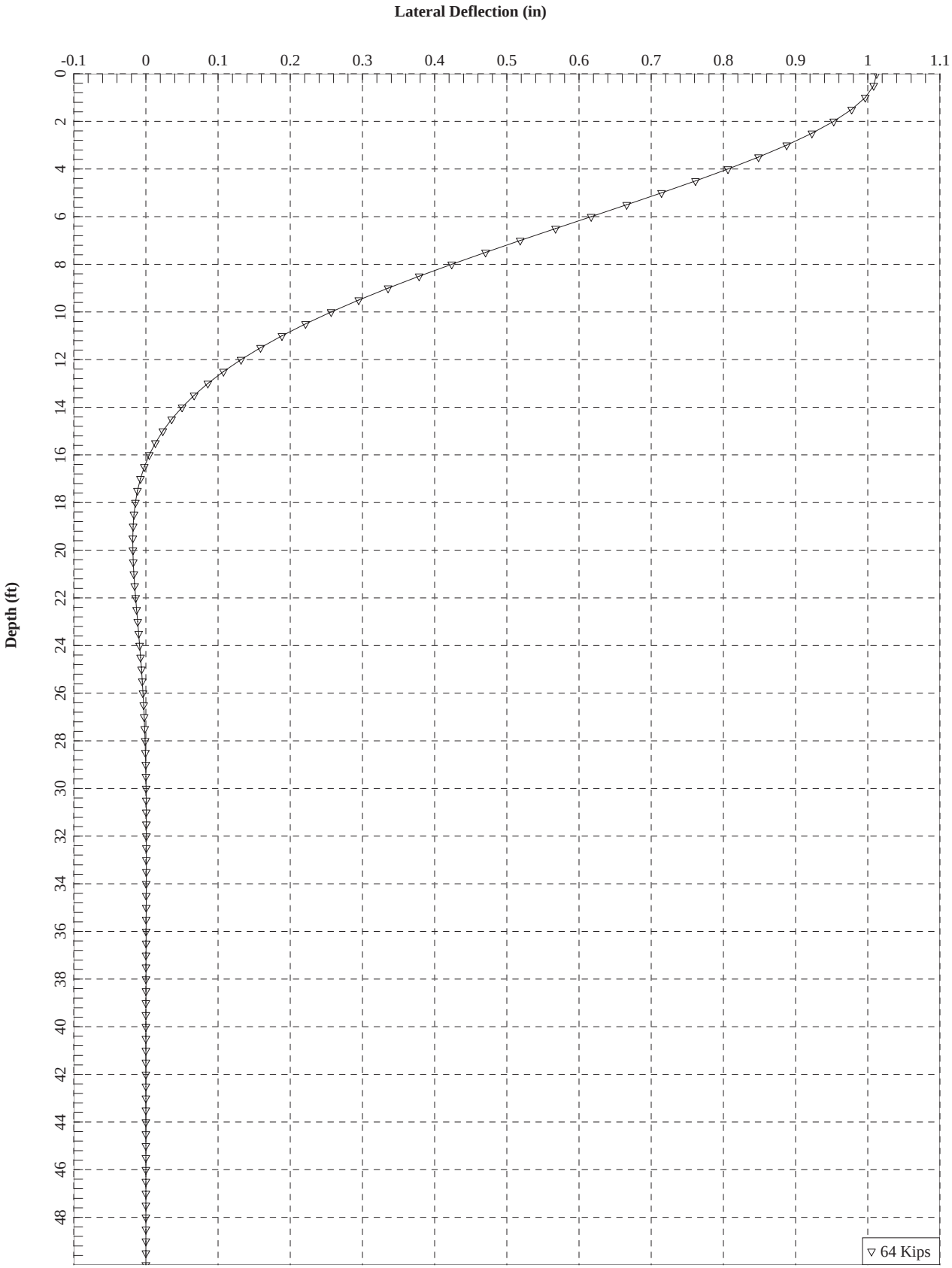


HP 12x84 Strong Fix HD d=0.5 in Moment

Bending Moment (in-kips)

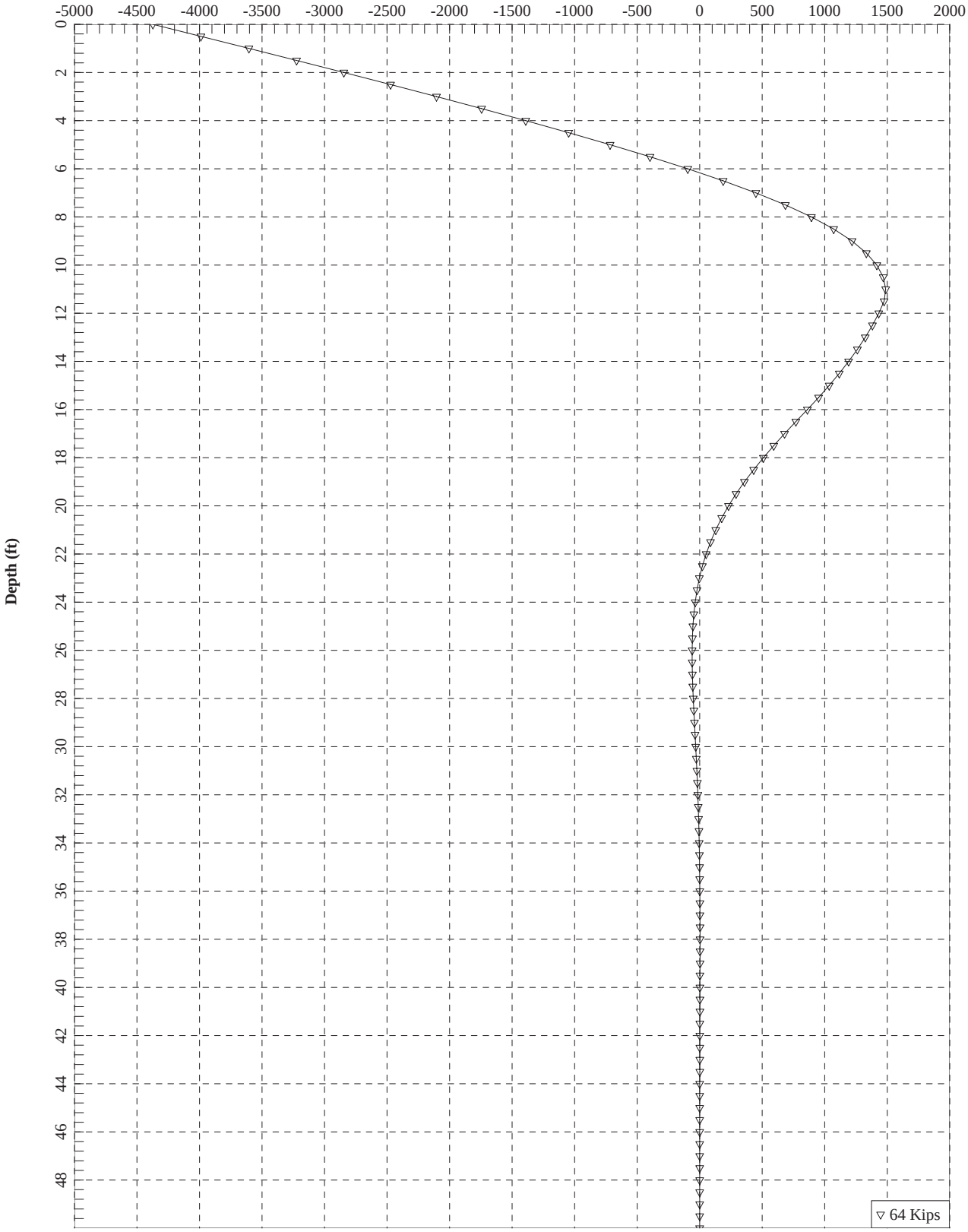


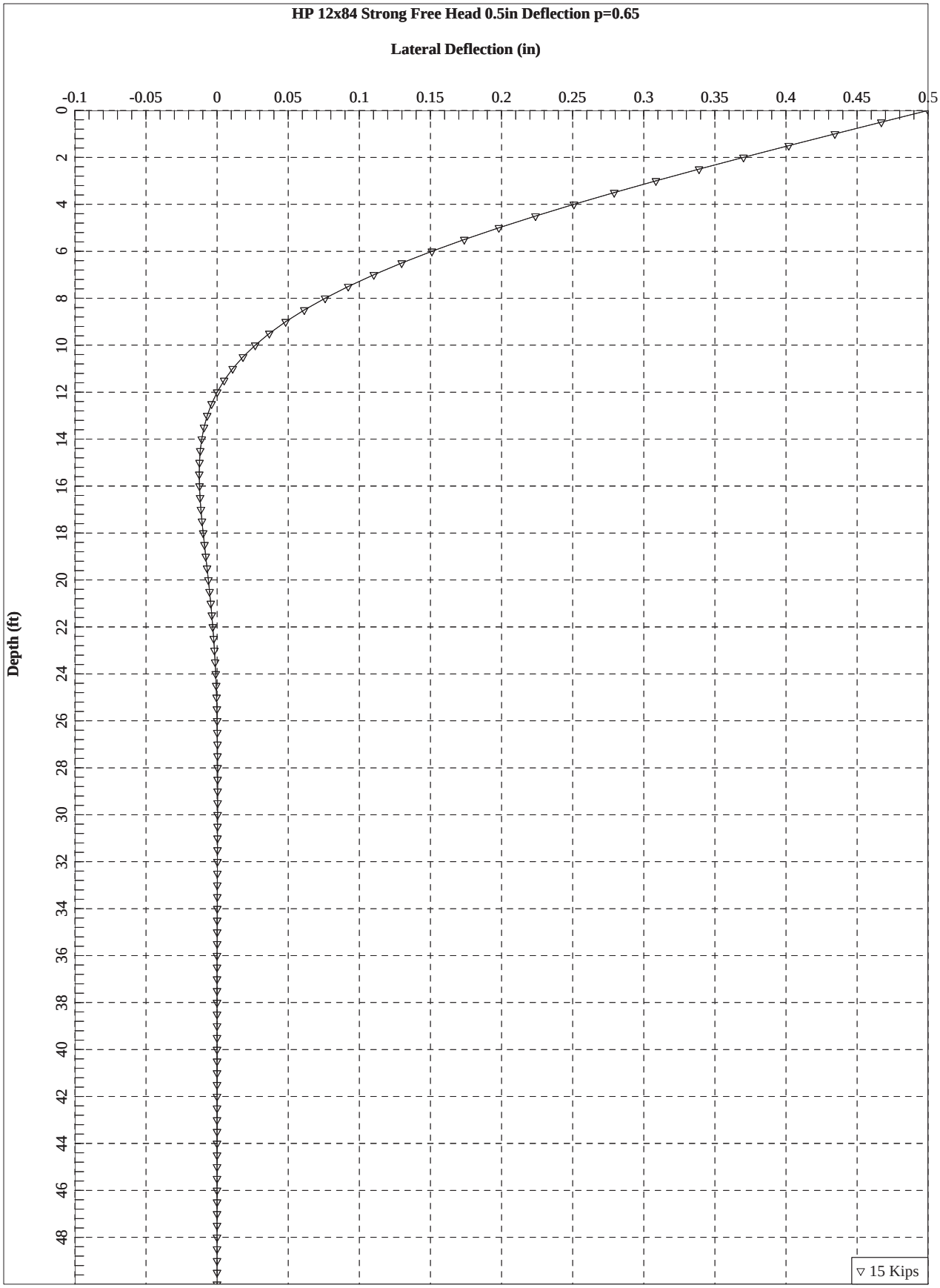
HP 12x84 Strong Fix Head 1.0 in Deflection p=0.65



HP 12x84 Strong Fix HD d=1.0 in Moment

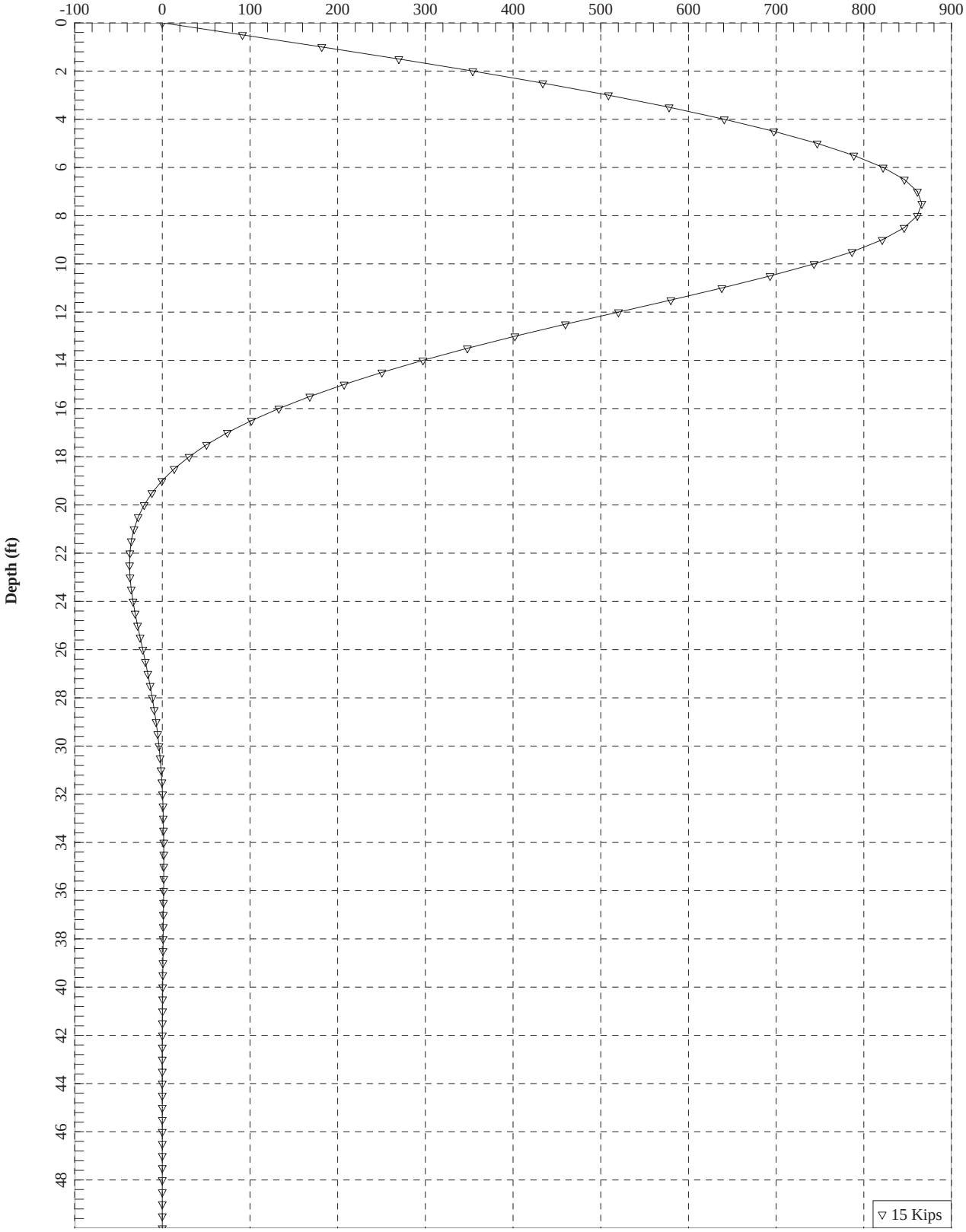
Bending Moment (in-kips)



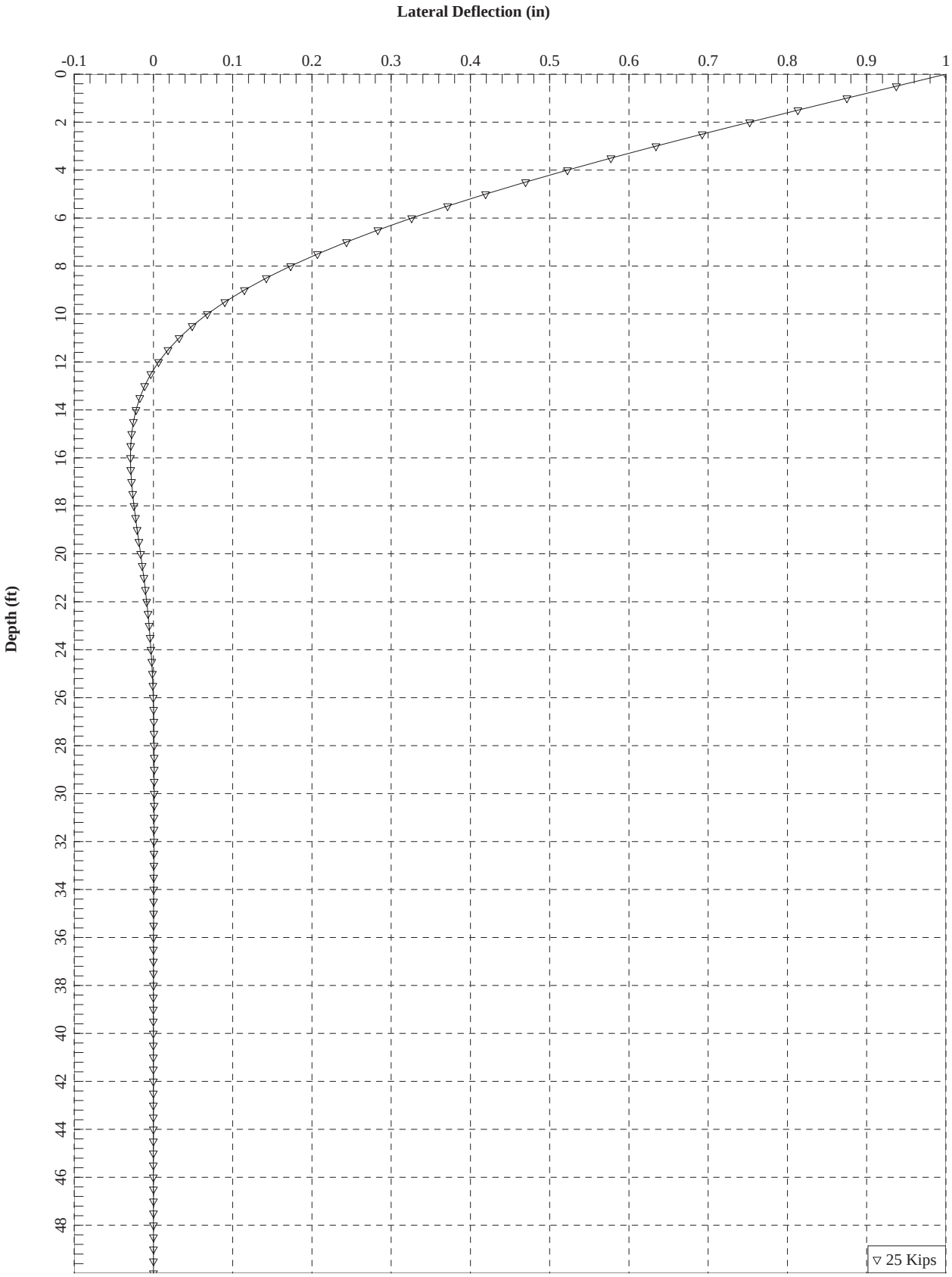

HP 12x84 Strong Free Head 0.5in Deflection p=0.65
Lateral Deflection (in)
-0.1
-0.05
0
0.05
0.1
0.15
0.2
0.25
0.3
0.35
0.4
0.45
0.5
Depth (ft)
0
2
4
6
8
10
12
14
16
18
20
22
24
26
28
30
32
34
36
38
40
42
44
46
48
15 Kips

HP 12x84 Strong FreeHD d=0.5in Moment

Bending Moment (in-kips)

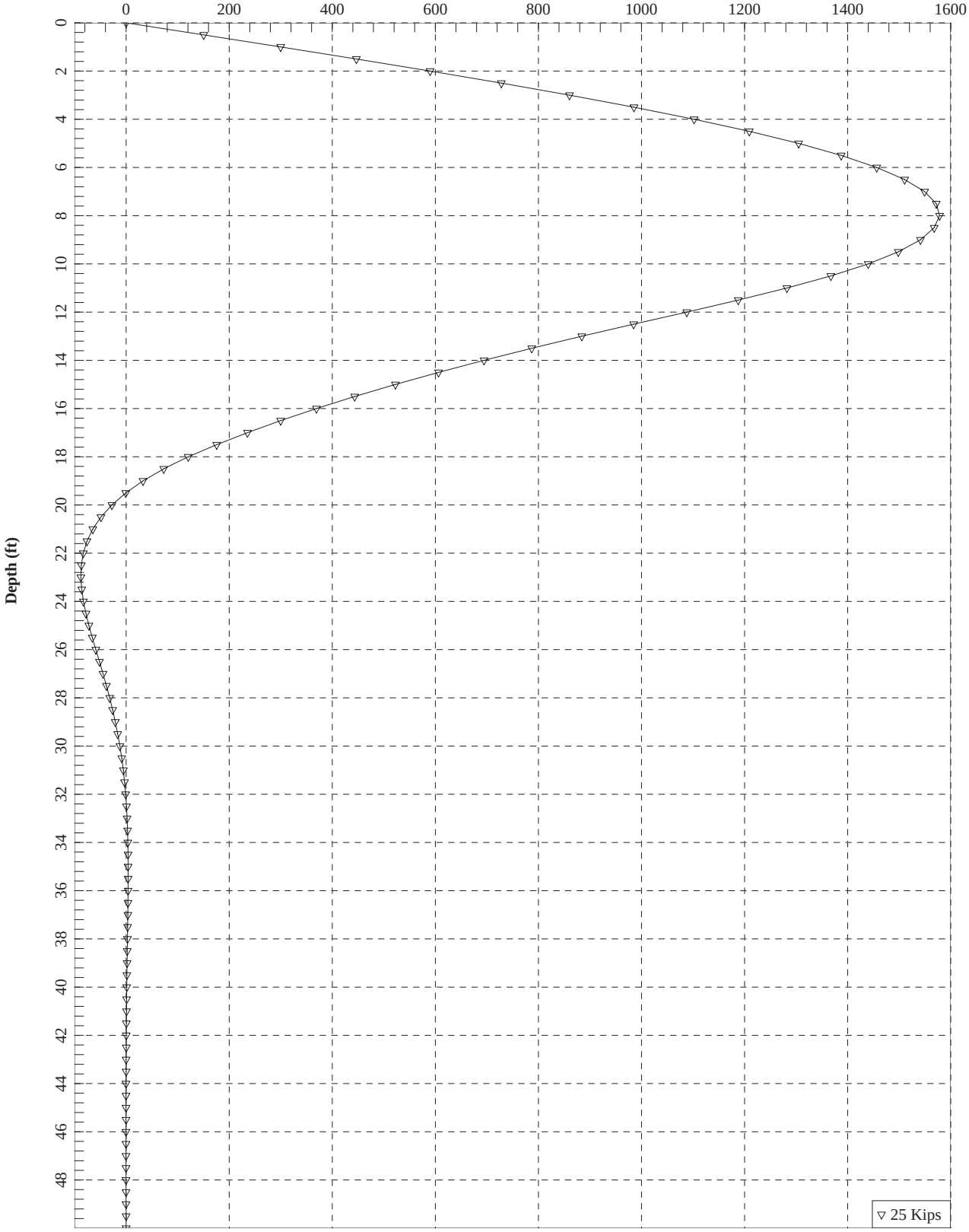


HP 12x84 Strong Free Head 1.0 in Deflection p=0.65

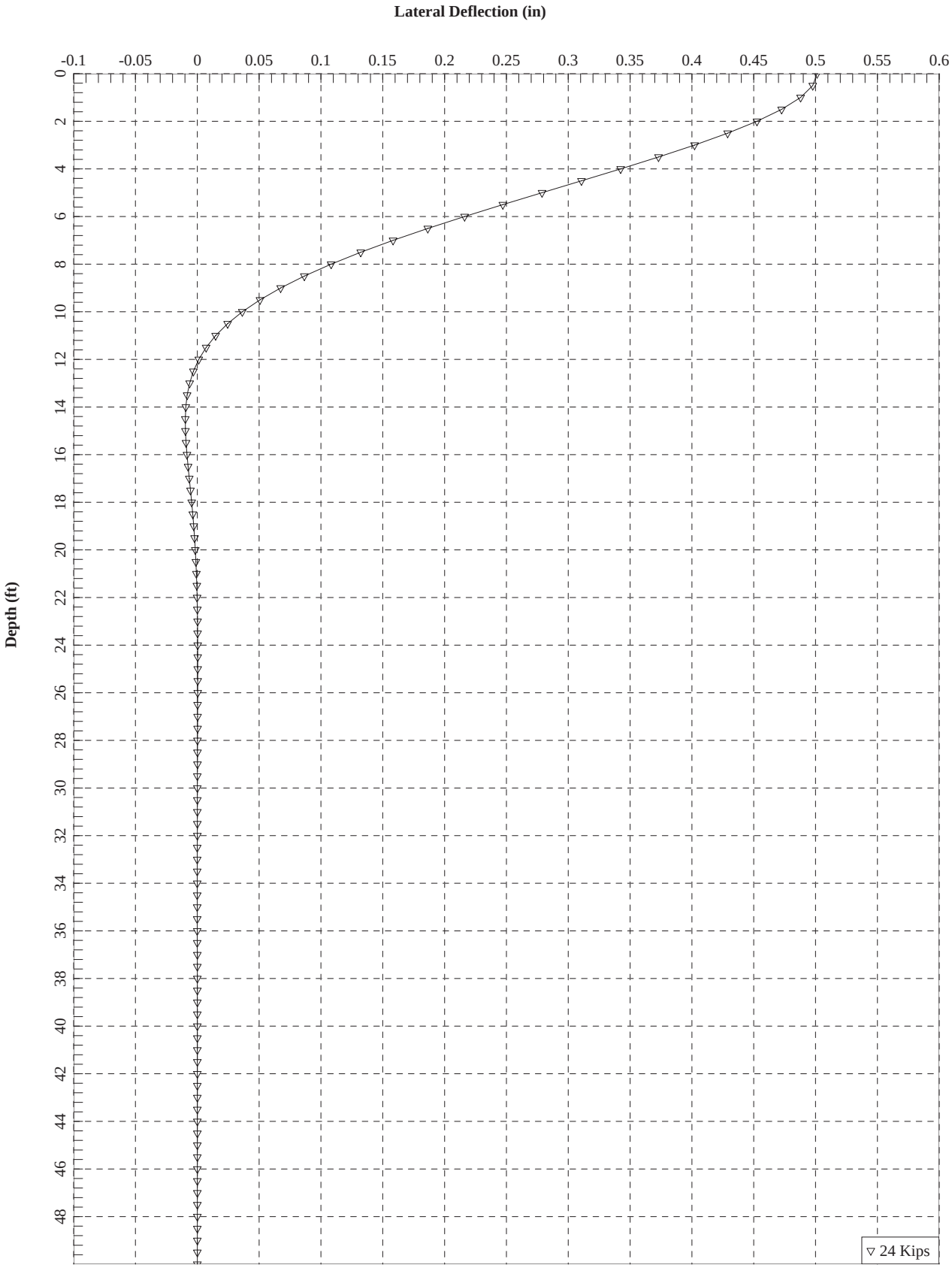


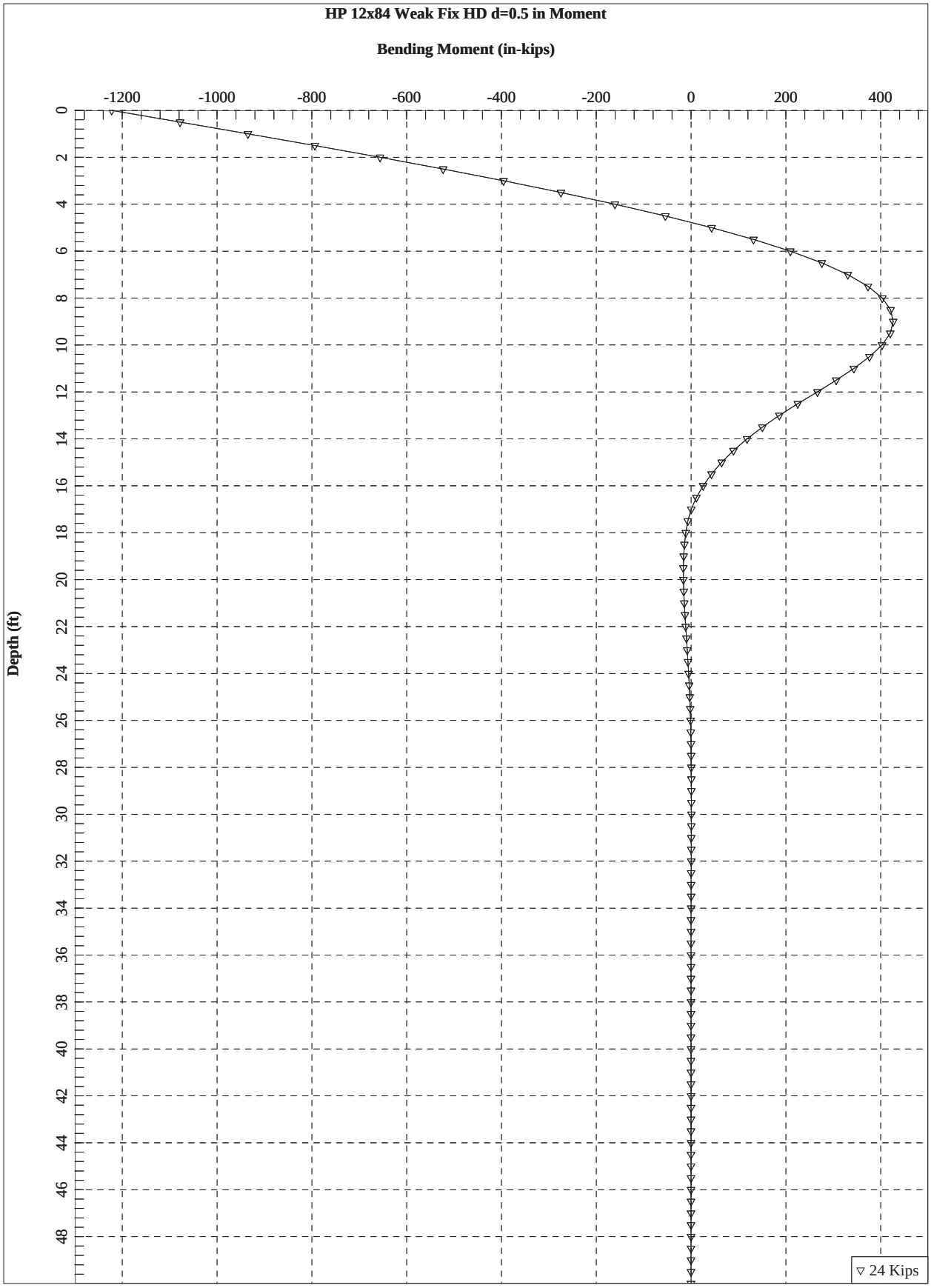
HP 12x84 Strong FreeHD d=1.0 in Moment

Bending Moment (in-kips)

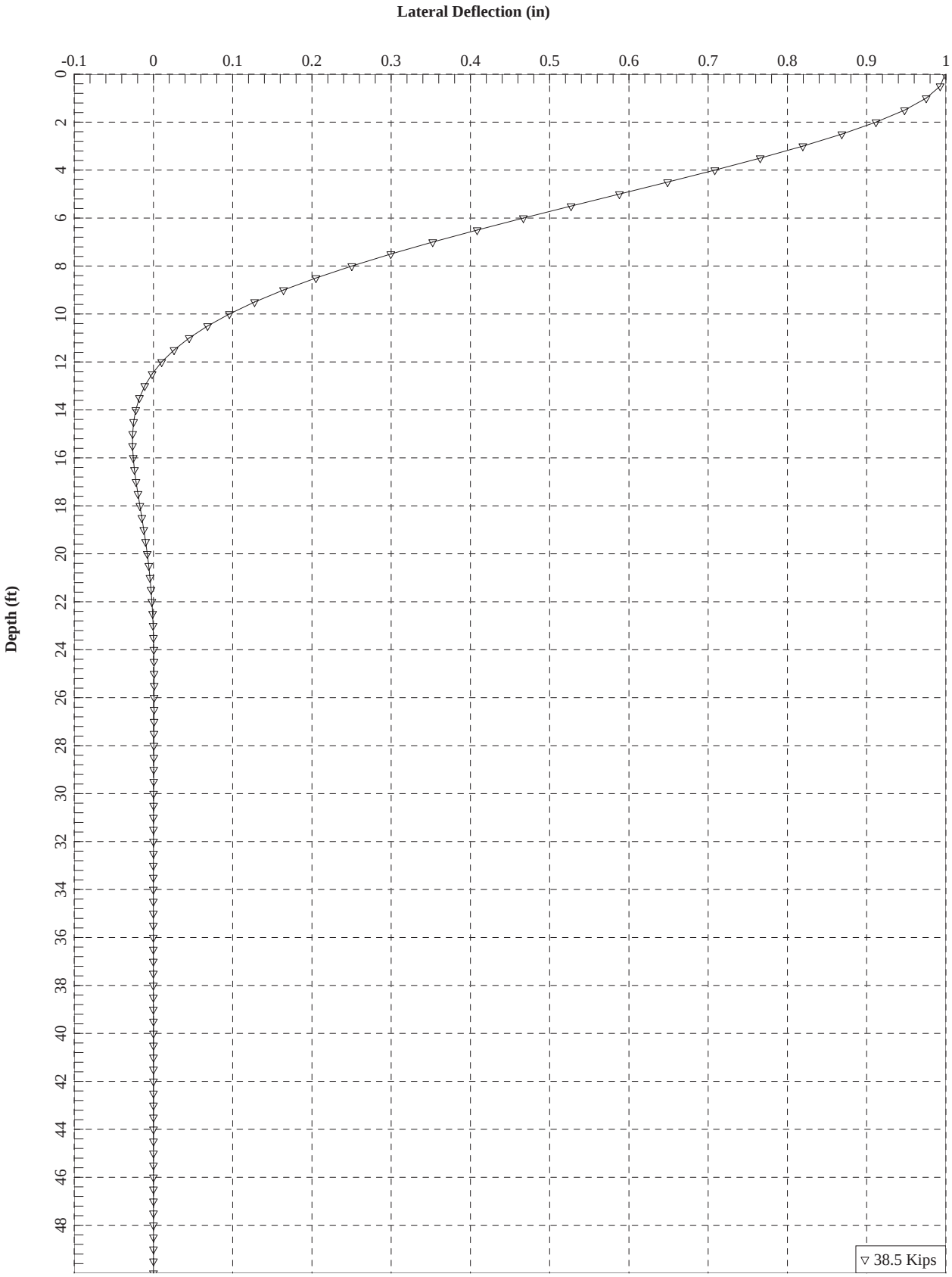


HP 12x84 Weak Fix Head 0.5 in Deflection p=0.65




HP 12x84 Weak Fix HD d=0.5 in Moment
Bending Moment (in-kips)
-1200
-1000
-800
-600
-400
-200
0
200
400
Depth (ft)
0
2
4
6
8
10
12
14
16
18
20
22
24
26
28
30
32
34
36
38
40
42
44
46
48
24 Kips

HP 12x84 Weak Fix Head 1.0 in Deflection p=0.65



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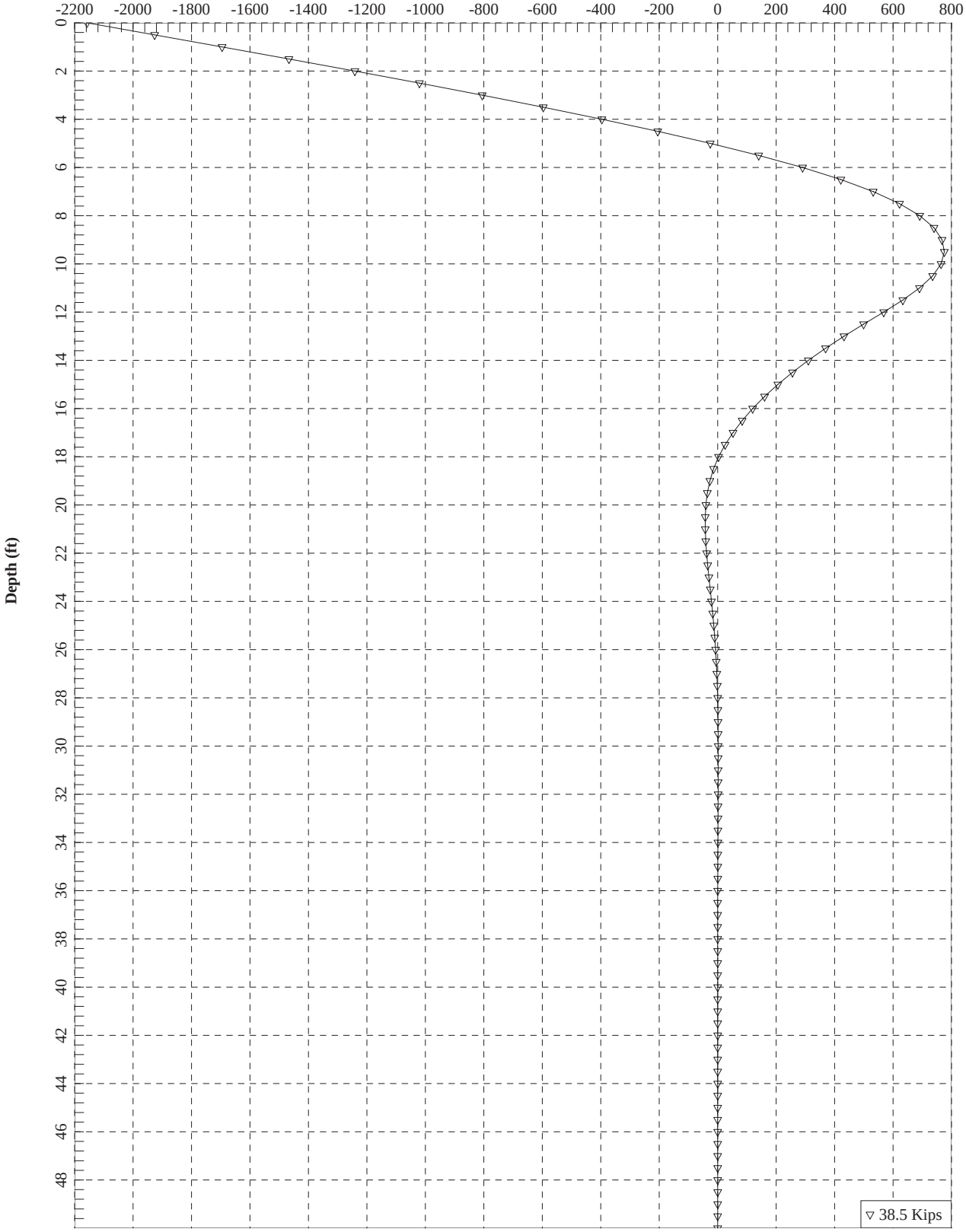

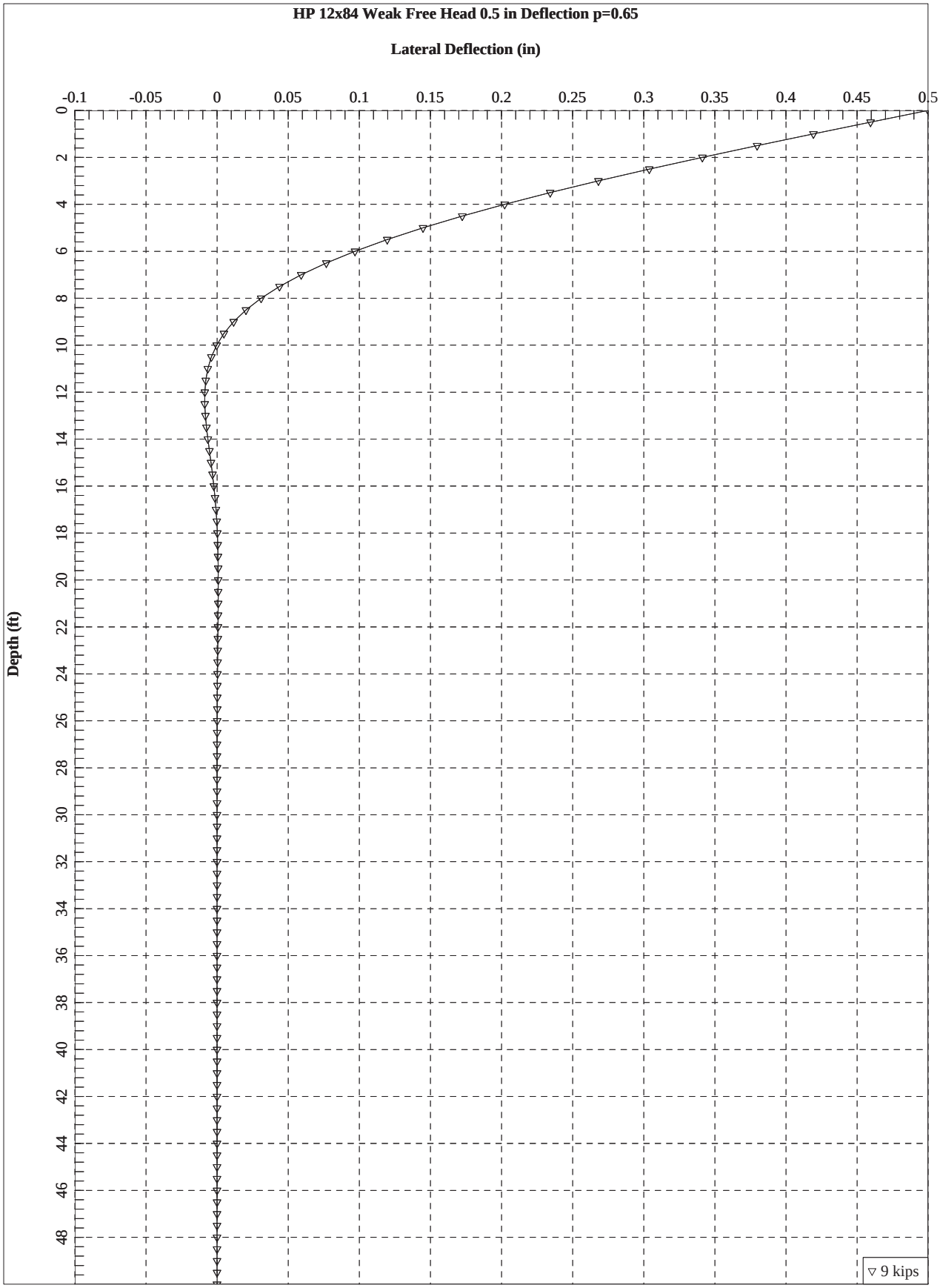
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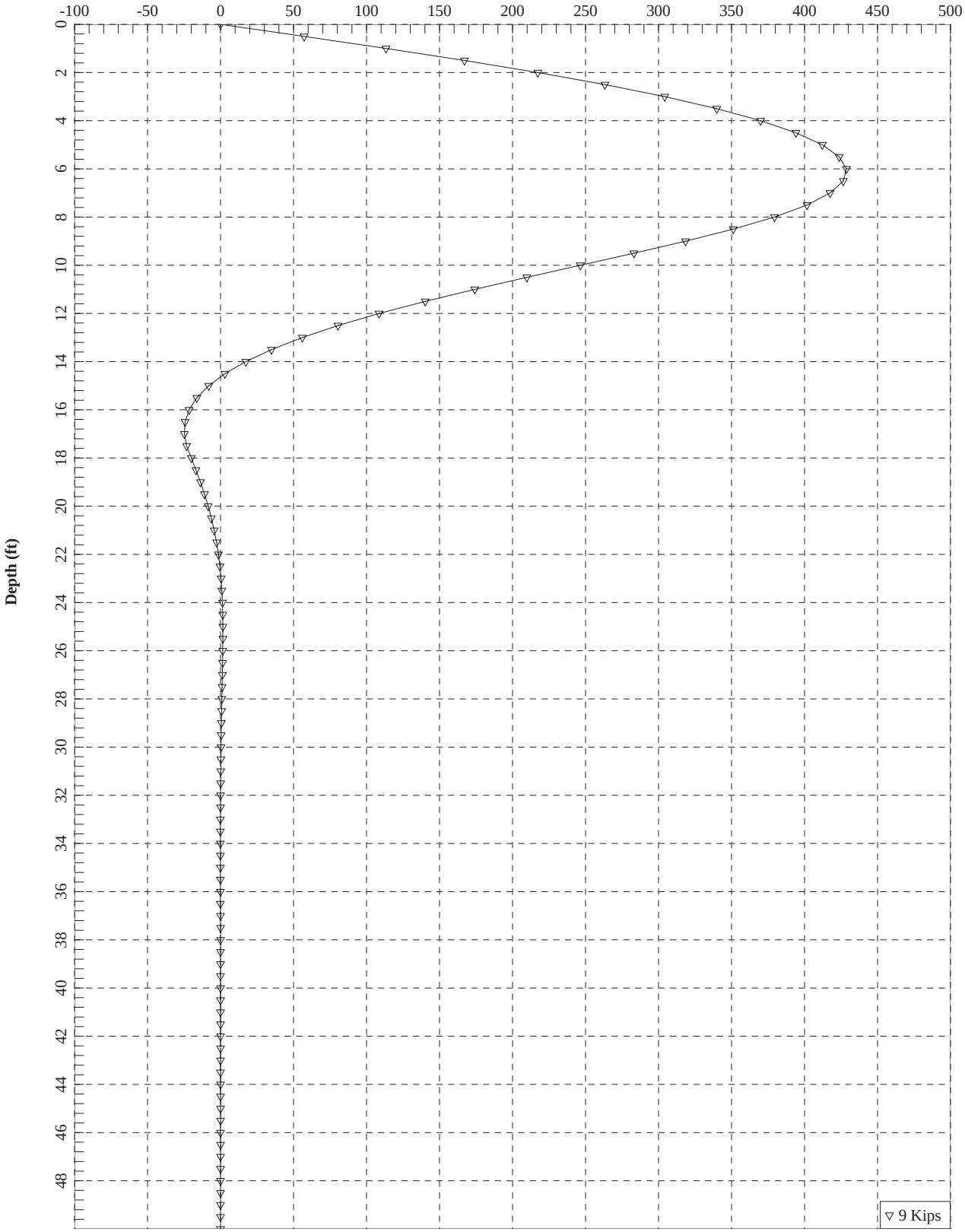
-0.05
0
0.05
0.1
0.15
0.2
0.25
0.3
0.35
0.4
0.45
0.5
Depth (ft)
0
2
4
6
8
10
12
14
16
18
20
22
24
26
28
30
32
34
36
38
40
42
44
46
48
9 kips

HP 12x84 Weak Free HD d=0.5 in Moment

Bending Moment (in-kips)



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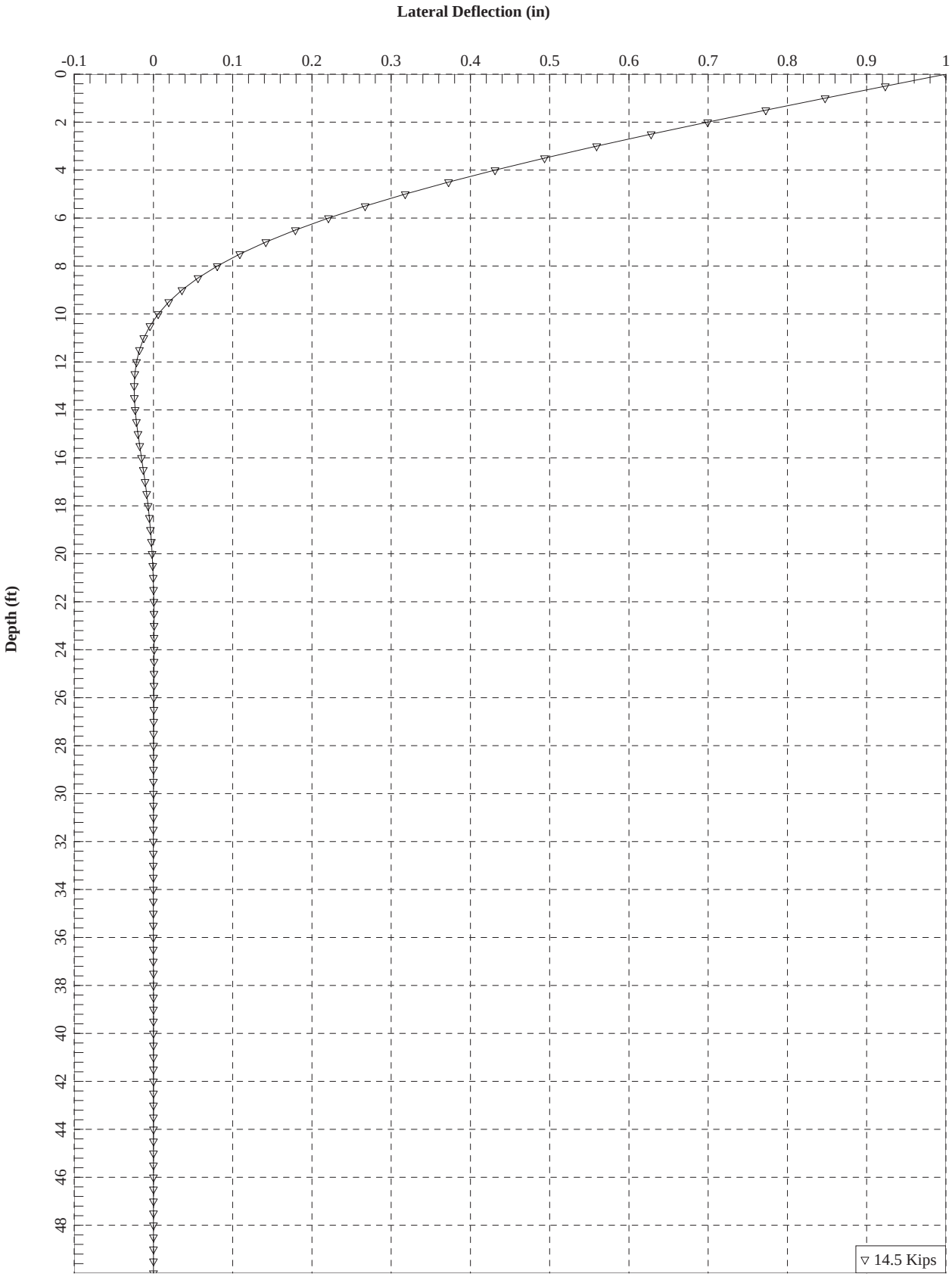

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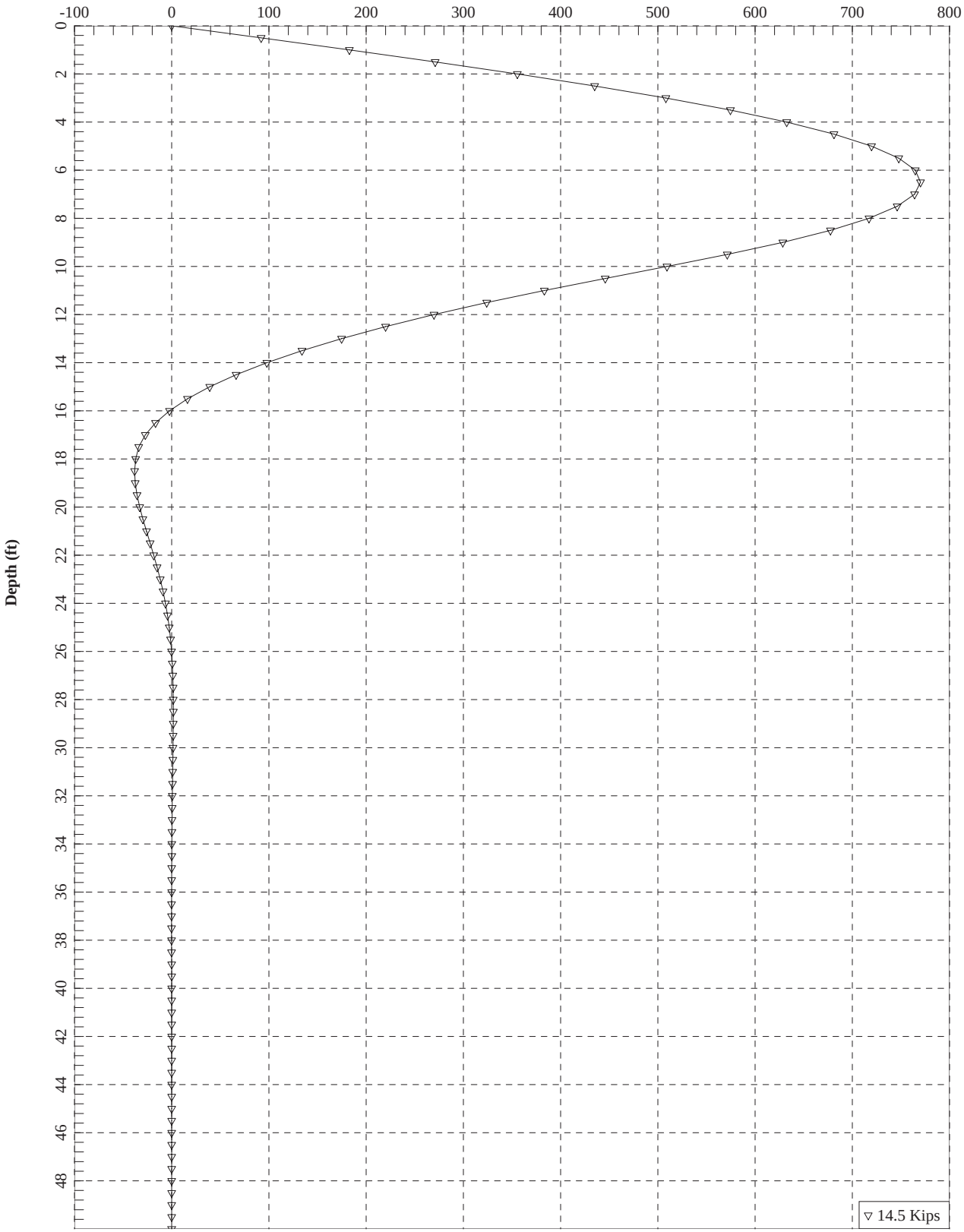

APPENDIX F PHASE I ENVIRONMENTAL SITE ASSESSMENT

REDLANDS FIRST MILE PROJECT
Phase I Environmental Site Assessment
San Bernardino, San Bernardino County, California

DRAFT

July 2010

Prepared for:

San Bernardino Associated Governments
1170 W. 3rd Street, 2nd Floor
San Bernardino, CA 92602

Prepared by:

HDR Engineering, Inc.
3200 E. Camelback Road, Suite 350
Phoenix, Arizona 85018

July 6, 2010

San Bernardino Associated Governments
Attn: Mitch Alderman
1170 W. 3rd Street, 2nd Floor
San Bernardino, CA 92602

Re: *Phase I Environmental Site Assessment* Report Submittal
Redlands First Mile Project
San Bernardino, San Bernardino County, California

Dear Mr. Alderman,

We are pleased to provide you with the above-referenced *Phase I Environmental Site Assessment* report. The attached report presents our methodology, findings, opinions, conclusions, and recommendations.

HDR appreciates the opportunity to serve the San Bernardino Associated Governments (SANBAG) on this important project. If you have any questions or comments, please feel free to contact us at (602) 522-7700.

Cordially,

HDR ENGINEERING, INC.

Colleen Murray
Hazardous Materials Specialist

Kelly W. Kading, CPG, CHMM
Senior Professional Associate

Distribution: Two electronic copies and two bound copies.

File: Two bound copies

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Acronyms

AAI	All Appropriate Inquiries
AIRS	Aerometric Information Retrieval System
AST	aboveground storage tank
ASTM	American Society for Testing and Materials
CA WDS	California Waste Discharge System
Cal/EPA	California Environmental Protection Agency
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CERCLIS	Comprehensive Environmental Response, Compensation, and Liability Information System
CFR	California Code of Regulations
CHMIRS	California Hazardous Materials Incident Reporting System
CORRACTS	Corrective Action Report
DHS	Department of Homeland Security
DTSC	Department of Toxic Substances Control
EDR	Environmental Data Resources, Inc.
EIR/EIS	Environmental Impact Report/Environmental Impact Statement
EPCRA	Emergency Planning and Community Right-to-Know Act
ERNS	Emergency Response Notification System
ESA	Environmental Site Assessment
FIFRA	Federal Insecticide, Fungicide, and Rodenticide Act
FINDS	Facility Index System
FRDS	Federal Reporting Data System
FTTS	Federal FIFRA/TSCA Tracking System
HDR	HDR Engineering, Inc.
HREC	Historic Recognized Environmental Condition
LUST	leaking underground storage tank
MINES	Mines Master Index File
NFRAP	No Further Remedial Action Planned
NPL	National Priorities List
PADS	PCB Activity Database System
RAATS	RCRA Administrative Action Tracking System
RCRA	Resource Conservation and Recovery Act

RCRIS LQG	Resource Conservation and Recovery Information System Large Quantity Generators
RCRIS SQG	Resource Conservation and Recovery Information System Small Quantity Generators
RCRIS TSD	Resource Conservation and Recovery Information System Treatment, Storage, and Disposal
REC	Recognized Environmental Condition
RWQCB	Regional Water Quality Control Board
R/W	right-of-way
SANBAG	San Bernardino Associated Governments
SCRRA	Southern California Regional Rail Authority
SI	site inspection
SLIC	Spills, Leaks, Investigation and Cleanup Database
SMBRP	Site Mitigation and Brownfields Reuse Program
SWF/LF	Solid Waste Facilities/Landfill
SWIS	Solid Waste Information System
SWRCB	State Water Resources Control Board
TSCA	Toxic Substances Control Act
TSD	treatment, storage, and disposal
U.S.C.	United States Code
USEPA	U.S. Environmental Protection Agency
USGS	United States Geological Survey
UST	underground storage tank
VCP	Voluntary Cleanup Program.

Note: An additional acronym list is located in Appendix C.

EXECUTIVE SUMMARY

HDR Engineering, Inc. (HDR) has conducted a Phase I Environmental Site Assessment (ESA) for the Redland First Mile project, located in San Bernardino, San Bernardino County, California. The project begins at the Southern California Regional Rail Authority (SCRRA) San Bernardino Depot and follows the BNSF Redlands Subdivision railroad tracks south and east to D Street (hereafter referenced as the project area). The project area consists of the BNSF Redlands Subdivion railroad tracks, and proposed right-of-way (R/W). Figures depicting the location of the project area and proposed R/W are included in Appendix A, and photographs of the area are included in Appendix B.

This Phase I ESA identifies sites with recognized environmental conditions (RECs, as defined in ASTM E 1527-05) for the project area that may adversely affect construction or project area right-of-way acquisition (if required). In the event that a site's regulatory issue has been resolved by the regulatory agency with jurisdiction, that site may be classified as a "Historic REC" (HREC). In addition to the ASTM-based REC classification of a site, HDR also utilizes a risk ranking system to describe "sites of concern" located within the project area. A site of concern is one that the investigative process has determined to have sufficient possibility of contamination, which warrants special attention during the Phase I investigation. A site of concern may or may not ultimately be classified as a REC site as defined by ASTM, yet still may be "of concern" and is therefore highlighted in the report. A site of concern may or may not be carried forward in recommendations for further investigation, depending upon the specific issues associated with the site.

This ESA includes a summary of the site reconnaissance conducted on May 24 through 26, 2010, a review of environmental databases, and a review of historical data sources.

The ESA process resulted in the following findings and conclusions:

FINDINGS

- The project area is located in an urban area of mixed-use development in San Bernardino, California. In addition to the railroad tracks located in the project area, the adjacent properties include the SCRRA depot, residential developments, a variety of repair facilities (auto repair, furniture upholstery, pool table repair), current and former scrap metal recycling facilities, a Southern California Gas Company plant, vacant and occupied commercial and industrial warehouses, retail facilities, and some undeveloped land. The surrounding 1/4 mile buffer (used for identification of sites near the project that may cause an impact) includes similar development, as well as a Department of Homeland Security (DHS) office building, an industrial laundry facility, a commercial trucking operation, and a Signal Oil Company office.
- An environmental database search was performed by Environmental Data Resources, Inc. (EDR) for the project area, and a one-quarter-mile surrounding buffer. The boundaries provided to EDR were based on the preliminary R/W footprint for the project, as depicted in the May 11, 2010 Preliminary R/W Footprint figure. As of the date of this report, the extent of the project area was reduced to include only a portion of the original R/W. As a result, many of the listings included in the EDR report are not relevant based on the distance from the redefined project area.
- The EDR report identified 418 environmental records for sites located within or adjacent to the abovementioned preliminary R/W footprint. Within an urban area it is anticipated that commercial operations will increase the number of listings in a database search. Many of the database listings, however, are not considered to be of concern to the project due to the scope of the project, the distance of the listed site from the project area, and/or a facility's lack of (or

compliance with) any previously noted violation(s). Additional database findings are not considered to be of concern to the project due to the nature of the database. As a result of these factors, as well as the updated R/W footprint (current project area), 374 of the 418 records listed are not considered to be of concern to the project. The remaining 44 records correspond to 15 sites of concern (sites are often listed in multiple databases). Details relating to the 15 sites are presented in Table 1 and in Appendix D.

- While not listed in the EDR report, one additional site was identified through the Cal EPA GeoTracker® website, which allows access to some state regulatory files that are available online. The site is identified as the City of San Bernardino Economic Development Agency Proposed Transit Village Core Project Area, located south of Rialto Avenue and west of E Street (Map Code P). According to the Department of Toxic Substance Control (DTSC) online files, the currently vacant lot previously housed a railroad maintenance facility in the 1960s and 1970s. DTSC has approved a Targeted Site Investigation for the area, which was proposed to include soil, soil gas, and groundwater samples to be analyzed for metals, petroleum hydrocarbons, polychlorinated biphenyls (PCBs), chlorinated solvents, and volatile organic compounds (VOCs) in soil, soil gas, and groundwater. The site is therefore classified as an indeterminate-risk site; however it cannot be classified as a REC based on the ASTM definition.
- Within the state of California, several databases exist for the purpose of tracking underground storage tanks (USTs). Many of the databases are no longer updated, and limited information is available for the sites identified in these databases (HIST UST, SWEEPS UST, CA FID UST). While some overlap of sites does exist among the databases, each database may contain sites not listed elsewhere, and often the sites identified in these databases are not listed in the current State UST database. Based on the lack of updated and consistent information, the most accurate information regarding many of the UST listings identified for the project area cannot be verified without additional regulatory file review and/or site-specific interviews.
- Historical research of the project area found that the project area has been developed since at least 1930. Development in the area has consisted of similar land use to what is currently present. The railroad tracks located within the project area have been present since at least the late 1800s, and many of the commercial and industrial warehouses/facilities have been present since at least 1930. For the purposes of this ESA, historical aerial, Sanborn fire insurance map, and historic city directory research was conducted. Six additional sites of concern were identified during the historical research for the project and surrounding areas. Details relating to the sites are presented in Table 1, and in Appendix D.
- The site reconnaissance of the project area did not identify any additional sites of concern. No indications of large-scale, previous spills or hazardous material usage or disposal were identified within the project area. No pits, ponds, lagoons, or other indications of buried or large-scale hazardous material were identified during the reconnaissance of the project area. No large areas of staining were identified along the railroad R/W. It is important to note that none of the facilities located within the project area or immediately adjacent were individually assessed, and staining or disturbed ground may not have been visible from the vantage point of the site reconnaissance (railroad tracks and pubic access roads).
- The absence of site-specific interviews, regulatory files and inconsistency among UST databases may prove to be significant data gaps, particularly for the properties located within the proposed R/W. The findings of the interviews and regulatory file review can serve to confirm the presence/status of the tanks, or other hazardous materials concerns which may alter the ranking or REC classification of a site.

Table 1 summarizes the findings of the site of concern identified during this ESA.

Table 1. Sites of Concern

HDR Map Code (1)	Site Name	Address	Site Operations Relative to Hazmat Issues(2), Regulatory Listing(3)	Data Source (4)	Risk Ranking L/ I/ H (5)	Located within Proposed R/W(6)	Add't File Review/ Interviews Recom-mended?
A	SCRRA Depot	1170 W. 3rd Street	Railroad depot. Open SLIC, open LUST, HIST Cortese, HIST UST listings.	R, D, H	H	Y	Y
B	Precision Automotive	909 W. 2nd Street	Auto repair facility. CA FID UST, SWEEPS UST. No updated UST information available.	R, D, H	I	N	Y
C	Historic Service Station	895 W. 2nd Street	HSS. Open LUST case	R, D, H	H	N	N
D	Snow Freight Lines/ Super Cal Express	958 W. Rialto Avenue	Commercial trucking facility. One closed LUST case, two USTs listed in HIST UST database. No updated UST information available.	R, D, H	H	Y	Y
E	Pacific Van and Storage	815 W. Rialto Avenue	Commercial trucking facility. CA FID UST, and SWEEPS UST listing. No updated UST information available.	R, D, H	I	N	Y
F	Viking Tire	747 W. Rialto Avenue	Tire supply and repair facility. Closed LUST case, and HIST Cortese listing.	R, D, H	H	N	Y
G	San Bernardino Central Metal	144 S. G Street	Scrap metal recycling facility. NPDES permit, SWRCY listing, located adjacent to open CERCLIS site with similar operations.	R, D, H	H	Y	Y

HDR Map Code (1)	Site Name	Address	Site Operations Relative to Hazmat Issues(2), Regulatory Listing(3)	Data Source (4)	Risk Ranking L/ I/ H (5)	Located within Proposed R/W(6)	Add't File Review/ Interviews Recom-mended?
H	Southwest California Gas Company	155 S. G Street	Municipal gas plant. Closed LUST case, HIST Cortese, four active USTs onsite.	R, D, H	H	Y	Y
I	Signal Oil Company	173 S. G Street	Office building. Closed Envirostor, CERCLIS-NFRAP.	R, D, H	L	N	N
J	Southwest Metal Company	740 W. Congress Street	Scrap metal recycling facility. Open Envirostor and CERCLIS listings.	R, D, H	H	N	Y
K	Department of Homeland Security Office Building	655 W. Rialto Avenue	Federal government office building. Open Envirostor listing.	R, D, H	H	N	Y
L	Bekins Moving and Storage	134 S. E Street	Former moving company. Three USTs listed in HIST UST database. No additional UST information available.	R, D, H	H	Y	Y
M	Pep Boys Automotive	147 S. E Street	Automotive repair facility.	R, D, H	I	N	Y
N	San Bernardino City FD Maintenance Shop	120 S. D Street	Fire Dept. maintenance shop. One UST listed in SWEEPS UST and HIST UST databases. No additional UST information available.	R, D, H	H	Y	Y
O	U-Haul	110 S. D Street	Commercial moving company. Two closed LUST cases onsite.	R, D, H	H	N	Y

HDR Map Code (1)	Site Name	Address	Site Operations Relative to Hazmat Issues(2), Regulatory Listing(3)	Data Source (4)	Risk Ranking L/ I/ H (5)	Located within Proposed R/W(6)	Add't File Review/ Interviews Recom-mended?
P	Vacant Lot, site of proposed Transit Village Core Project Area	South of railroad tracks, and west of E Street	Former railroad maintenance area. Targeted Site Investigation area per DTSC review.	R, D, H	I	Y	Y
Q	**Former rail car repair facility and Edison Electric Power House**	**South of railroad tracks, and east of E Street**	**Former rail car repair facility and power house with UST identified in Sanborn map.**	**R, H**	**H**	**Y**	**Y**
R	**Carry Shell Service Station**	**1077 W. 3rd Street**	**HSS.**	**R, H**	**I**	**N**	**Y**
S	**Union Oil Company**	**789 W. Rialto Avenue**	**HSS.**	**R, H**	**I**	**N**	**Y**
T	**Bob's Service Station**	**415 W. Rialto Avenue**	**HSS.**	**R, H**	**I**	**N**	**Y**
U	**Service Station**	**115 S. E Street**	**FSS (currently Greenwood's Uniforms)**	**R, H**	**I**	**N**	**Y**
V	**Economy Cleaners/Body Shop**	**133 S. E Street**	**Former body shop and laundromat.**	**R, H**	**I**	**Y**	**Y**

Sites listed in bold print are considered by ASTM to be a Recognized Environmental Concern (REC) or Historic REC (HREC)

(1) Corresponds to location of site as indicated in Appendices A and B
(2) CSS = Current Service Station, FSS= Former Service Station, HSS = Historic Service Station (no longer present)
(3) LUST=Leaking Underground Storage Tank, UST= Underground Storage Tank, DTSC = Dept. of Toxic Substances Control. Complete list of acronyms identified in EDR report in Appendix C
(4) Indicates primary information sources for listing: R=Reconnaissance, D=Database, H=Historical Source (city Directories, historical aerial photographs)
(5) Risk of potential impacts onsite, Low / Indeterminate / High
(6) Sites may be partially or entirely within proposed right-of-way (R/W)

CONCLUSION

HDR has identified 22 sites of concern located within the project area or surrounding buffer. Of the 22 sites, 19 sites have conditions that would qualify as a REC, and two sites as an HREC. One additional site could not be classified as a REC based on the ASTM definition. Based on the pending investigation at the site however, HDR has concluded that additional investigation is necessary at the site. The following statement is required by ASTM E 1527-05 as a positive declaration of whether REC(s) were found:

> *HDR has performed a Phase I Environmental Site Assesssment (ESA)) in conformance with the scope and limitations of ASTM E 1527-05 of the project area (as defined elsewhere in this report). Any exceptions to or deletions from these practices are described in the report. This report has revealed evidence of 19 sites with Recognized Environmental Conditions (RECs), and two sites with Historic RECs in connection with the project area.*

RECOMMENDATIONS

Based on the findings and conclusions reached in this report, HDR makes the following recommendations for the 22 sites of concern identified:

Recommendation 1

HDR recommends that additional regulatory file review, and/or site-specific interviews be conducted for the following 20 sites located within the proposed R/W, or adjacent to the project area, based on the regulatory listings, and/or onsite operations. The findings of the file review and interviews will provide additional information to confirm the hazards present at each site. Additionally, the information gathered will aid in advancing the protocol for Phase II Environmental Site Assessments anticipated within the project area. Recommendation 1 applies to the following sites:

- SCRRA San Bernardino Depot (Map Code A)
- Precision Automotive (Map Code B)
- Snow Freight Lines/Super Cal Express (Map Code D)
- Pacific Van and Storage (Map Code E)
- Viking Tire (Map Code F)
- San Bernardino Central Metal (Map Code G)
- Southwest California Gas Company (Map Code H)
- Southwest Metal Company (Map Code J). While the site is not located immediately adjacent to the proposed R/W, the regulatory listings associated with the site and proximity to San Bernardino Central Metal are cause for additional investigation.
- DHS Building (Map Code K)
- Bekins Moving and Storage (Map Code L)
- Pep Boys Automotive (Map Code M)
- San Bernardino Fire Department Maintenance Shop (Map Code N)
- U-Haul (Map Code O)
- City of San Bernardino Economic Development Agency Proposed Transit Village Core Project Area, located south of Rialto Avenue and west of E Street (Map Code P)
- Street car barn and repair facility, and Edison Electric Power House located on the south side of the tracks, just east of E Street (Map Code Q)
- Carry Shell Service Station (Map Code R)

- Union Oil Company (Map Code S)
- Bob's Service Station (Map Code T)
- Service Station (Map Code U)
- Economy Cleaners/Body Shop (Map Code V)

Recommendation 2

HDR recommends that all construction contractors should be instructed to immediately stop all subsurface activities in the event that potentially hazardous materials are encountered, an odor is identified, or significantly stained soil is visible. Contractors should be instructed to follow all applicable regulations regarding discovery and response for hazardous materials encountered during the construction process. Special care should be taken in the event of ground disturbance near the following REC, or HREC sites not located immediately adjacent to the project area.

- Historic Service Station (Map Code C)
- Signal Oil Company (Map Code I)

Recommendation 3

HDR recommends that if this report is 6 months old or older when property acquisition or construction begins, the recommendations within this report be reevaluated. The applicable ASTM standard (E 1527-05) requires a reevaluation of site conditions if a Phase I report (ESA) is older than 180 days (6 months).

1.0 INTRODUCTION

1.1 Purpose and Involved Parties

This Phase I Environmental Site Assessment (ESA) documents the evaluation of the project site for indications of "recognized environmental conditions." A recognized environmental condition (REC) is defined by ASTM Practice E 1527-05 as: *"The presence or likely presence of any hazardous substances or petroleum products on a project site 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 project site or into the ground, groundwater, or surface water of the project site. The term includes hazardous substances or petroleum products even under conditions of storage and use in compliance with local and state laws and regulations. In the event that a site's regulatory issue has been resolved by the regulatory agency with jurisdiction, that site may be classified as a "Historic REC". This classification means that although the issue has been resolved to the satisfaction of the regulatory agency, a possibility exists that residual contamination may be present at the site. The terms "REC" and "Historic REC" are not intended to include de minimis conditions that generally do not present a material risk of harm to public health or the environment and that generally would not be the subject of an enforcement action if brought to the attention of regulatory agencies. Conditions determined to be de minimis are not recognized environmental conditions."*

HDR Engineering, Inc. (HDR), received authorization from San Bernardino Associated Governments (SANBAG) to conduct an ESA for the Redlands First Mile Project (RFM) located in San Bernardino, San Bernardino County, California (hereafter referenced as the project area). This Phase I ESA has been prepared for SANBAG (the ultimate user of the report), and only SANBAG has the right to rely on the contents of this Phase I ESA.

1.2 ESA Methodology

This ESA was designed to generally comply with the level of documentation recommended in the ASTM standard (ASTM E 1527-05) for the performance of ESAs. Deviations from the ASTM standard include the deletion of certain records sources determined to be inapplicable or of limited value to the specific needs of this project. In accordance with HDR's contracted scope of work, HDR did not conduct interviews with property owners or operators with facilities located within the project area.

HDR included the three primary activities included in the ASTM guidance (conforming to EPA's All Appropriate Inquiry [AAI] requirements), namely (1) records review, (2) site reconnaissance, and (3) preparation of this report.

In addition to the ASTM-based "REC" classification of a site, HDR also employs a relative risk ranking system that includes several investigative elements to describe "sites of concern" located within a project area. A site of concern is a site that the investigative process has determined to have sufficient possibility of contamination, which warrants special attention during the Phase I investigation. A site of concern may or may not ultimately be classified as a REC site as defined by ASTM, yet still may be "of concern" and is therefore highlighted in the report. A site of concern may or may not be carried forward in recommendations for further investigation, depending upon the specific issues associated with the site.

Once the elements of the investigation process are completed, HDR categorizes identified sites of concern using a subjective risk ranking system, classifying the sites as low-risk, moderate-risk, high-risk, or (in some instances) indeterminate-risk. The following paragraphs provide general descriptions of each category.

Low-risk sites are those sites that have few indications of potential for release of hazardous materials. On some occasions, sites that have had a hazardous materials issue in the past but have been remediated with approval of the local state environmental agency (or EPA) may qualify as low-risk. Examples of low-risk sites include undeveloped or agricultural property, residential property, or benign commercial properties such as office buildings, warehouses, distribution facilities, or municipal facilities with no listed violation.

Moderate-risk sites are those sites that have some indications of possible hazardous materials issues. A moderate-risk site may appear on a database as having a permit to handle hazardous materials, but has recorded no violations to date. Another way that a site could be interpreted as moderate risk would be if the environmental records search indicated no listing, but the site is an auto repair facility with visible surface staining. Examples of moderate-risk sites include auto repair garages, welding shops, or manufacturing facilities with minor listings in the environmental database.

High-risk sites are those sites that have a high potential for releasing hazardous materials to the soil or groundwater, or have a recorded release issue. Examples of high-risk sites include current service stations, bulk fueling terminals, sites listed in environmental databases as having had a release, or a known release that has not been remediated.

Indeterminate sites are those which, at the time of report preparation, did not include sufficient information to include a high, medium or low ranking. Indeterminate sites often require additional file review to determine the details of any related environmental issues at the site.

When HDR assigns a risk ranking to a site, the risk ranking criteria are reviewed and concurred with by at least one Environmental Professional as defined in ASTM. It is HDR policy to have subjective criteria cross-reviewed for accuracy and adherence to its assessment protocols and internal quality assurance standards. It is worthwhile to note that risk ranking does not directly correspond to whether a site qualifies as a REC; rather, the risk ranking system is intended as a method of categorizing sites on large projects for consideration of common contamination characteristics.

1.3 Scope of Services, Significant Assumptions, and Limitations

The services provided for this project consisted of the following:

- Provide a description of the project area including current land uses.
- Provide a general description of the topography, soils, geology, and groundwater flow direction.
- Review reasonably ascertainable and reviewable regulatory information published by federal, state, local, tribal, health, and/or environmental agencies pertaining to the project area.
- Review historical data sources for the project area, including aerial photographs, topographic maps, fire insurance maps, city directories, and other readily available development data.
- Conduct an area reconnaissance and an environmental review—including a visual inspection of adjoining properties—with a focus on indications of hazardous substances, petroleum products, polychlorinated biphenyls (PCBs), wells, storage tanks, solid waste disposal pits and sumps, and utilities.
- Prepare a written report of methods, findings, and conclusions.

The goal of this scope of services is to assist the user in identifying conditions near the project area that may indicate risks regarding hazardous materials storage, disposal, or other impacts. The resulting report may qualify the user for relief from liabilities as one of three “defenses” identified in the 2002 Brownfields Amendments to the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Section 9607 (AAI subsections). These three defenses include:

1. The "innocent landowner" defense to potential liabilities under 42 United States Code [U.S.C.] § 9601
2. The "contiguous project corridor owner" defense pursuant to 42 U.S.C. § 9607q
3. The "bona fide prospective purchaser" defense pursuant to 42 U.S.C. § 9607r

Federal regulations at 40 Code of Federal Regulations [C.F.R.] Part 312, promulgated by EPA, require that liability release be based (in part) on completion of AAI prior to purchase of a property. Those inquiries are documented by Phase I reports, or ESAs. EPA has agreed that the recently developed ASTM guidance (ASTM Practice E 1527-05) specifies and interprets AAI requirements.

A user is defined by ASTM Practice E 1527-05 as the party seeking to use Practice E 1527 to complete an ESA of the project area and may include a potential purchaser of land at the project area, a potential tenant of the project area, an owner of land at the project area, a lender, or a project area manager. Investigative areas not included in the standard ASTM ESA scope include: asbestos, lead-based paint, lead in drinking water, radon, urea formaldehyde, wetland issues, regulatory compliance, cultural and historic resources, industrial hygiene, health and safety, ecological resources, endangered species, indoor air quality, and high voltage power lines. The scope of services for ESA projects also does not include the completion of soil borings, the installation of groundwater monitoring wells, or the collection of soil or groundwater samples. Likely sources of vapor intrusion, from potential on-site or off-site sources, are identified. State and national policies and standards relevant to vapor intrusion are in flux and subject to change.

HDR has made certain assumptions in preparing the scope of this assessment:

- Data gathered from public information sources (i.e., libraries or public regulatory agencies) are accurate and reliable.
- Site operations reflect site conditions relative to potential releases, and no intentional concealment of environmental conditions or releases has occurred.
- Interview information (if gathered) is directly reported as gathered by the assessor and is limited by the accuracy of the interviewee's recollection and experience.
- Published geologic information and site observations made by the environmental professional are used to estimate likely contaminant migration pathways in the subsurface. These estimates by the environmental professional are limited in accuracy and are generally cross-referenced with existing information about similar sites and environmental releases in the area.

Regulatory information is limited to sites discovered after the late 1980s because reliable records were not kept by regulatory agencies prior to that time frame.

Where a REC has resulted from historical uses or conditions, but apparently no longer persists at the site, the term Historic REC (HREC) is used.

The findings and conclusions presented in this report are based on the procedures described in ASTM Practice E 1527-05, informal discussions with various agencies, a review of the available literature cited in this report, conditions noted at the time of this ESA, and HDR's interpretation of the information obtained as part of this Phase I ESA. The findings and conclusions are limited to the specific project and properties described in this report, and by the accuracy and completeness of the information provided by others.

An ESA cannot entirely eliminate uncertainty regarding the potential for RECs. Conducting this assessment is intended to reduce, but not eliminate, uncertainty regarding the potential for RECs in connection with the project area within reasonable limits of time and cost. In conducting its services,

HDR used a degree of care and skill ordinarily exercised under similar circumstances by reputable members of its profession practicing in the same locality. No other warranty is made or intended. This ESA generally conforms to the level of documentation required in ASTM Practice E 1527-05. Deviations from the ASTM standard included deletion of certain records sources deemed to be inapplicable, or of limited value, to the specific needs of this client.

2.0 SITE DESCRIPTION

2.1 Location and Legal Description

The project area is located on approximately one mile of BNSF Redlands Subdivision Railroad track, beginning at the Southern California Regional Rail Authority (SCRRA) San Bernardino Depot and extending south and east along the tracks to South D Street. The project area includes the tracks, and proposed right-of-way (R/W) located adjacent to the track. In addition, a one-quarter mile buffer surrounding the abovementioned project area was also evaluated for the purposes of this report. The project area is located in a land grant area that falls outside of the Section, Township and Range system, within the city of San Bernardino, San Bernardino County, California. Figures depicting the location of the project area, and proposed R/W are included in Appendix A. Photographic documentation of the project area is included in Appendix B.

2.2 Site and Vicinity Characteristics

The project area is located in an urban area of mixed-use development. In addition to the railroad tracks located in the project area, the adjacent properties include the SCRRA depot, residential developments, a variety of repair facilities (auto repair, furniture upholstery, pool table repair), current and former scrap metal recycling facilities, a Southern California Gas Company plant, vacant and occupied commercial and industrial warehouses, retail facilities, and some undeveloped land. The surrounding buffer includes similar development, as well as a Department of Homeland Security office building, an industrial laundry facility, a commercial trucking operation, and a Signal Oil Company office building. According to the United States Geological Survey 7.5 minute series quadrangle maps for San Bernardino South, California (1957, photo-revised 1980), the elevation of the project area ranges from approximately 1020 to 1060 feet above mean sea level. The native topography in the area is relatively flat, sloping slightly to the south.

2.3 Description of Structures, Roads, and Other Site Improvements

Structures located within the project area are largely first generation, and many have been present since at least 1930. Based on the mixed-use development of the area, the structures vary significantly depending on use. The SRCCA San Bernardino Depot located at the northern terminus of the project area is a large, multi-story brick building, and has been present since at least the early 1900s. The residential properties located in the project area are located west of I-215, and consist of both single and two-story homes. The remaining structures include commercial and industrial warehouse facilities, and the scrap metal recycling yard (located adjacent to the tracks at South G Street). The configuration, construction, and size of the warehouses vary depending on the site operations. Many of the warehouses include large parking areas and loading bays. The scrap metal recycling yard includes several warehouses and buildings, as well as numerous scrap metal piles. The roads located within the project area include paved, multi-lane roadways and I-215, which crosses the project area south of Rialto Avenue. Many of the warehouse facilities include paved parking areas, some of which are included in the project area (see Figure 2).

2.4 Area Geology and Hydrogeology

The project area is located in the northeast portion of the Peninsular Ranges physiographic province, near the border of the Transverse Ranges (located to the north). The province is characterized by predominantly north-south trending mountain ranges of Mesozoic granitic rocks that derived from the same batholith which formed the core of the Sierra Nevada Mountains in California. The project area is located within the Upper Santa Ana River Valley, which is characterized by the Recent Age alluvial

deposits derived from the Santa Ana River and its tributaries. Soils in the project area consist primarily of silty sand and sand with some clay. Depth to groundwater within the project area ranges from approximately 30 to 38 feet, and is anticipated to flow to the southeast (Bergeron, 1995).

3.0 USER-PROVIDED INFORMATION

SANBAG provided HDR with documents identifying the location of the project area. Neither a survey map nor property zoning information was provided. The user did not provide information indicating that it has any specialized information for the project area pertaining to land use, previous environmental cleanups, previous chemical spills or releases, purchase price of any properties within the area or cleanup liens against properties within the project area.

4.0 RECORDS REVIEW

4.1 Environmental Records Review

Environmental Data Resources, Inc. (EDR) was contracted by HDR to complete an environmental records search of federal, state, local, tribal databases as defined by ASTM E 1527-05, and EDR proprietary databases. HDR provided EDR with the project area boundaries, and search parameters (radius of concern) as a reference for EDR. The boundaries provided to EDR were based on the preliminary R/W footprint for the RFM project, as depicted in the Preliminary R/W Footprint figure dated May 11, 2010. As of the date of this report, the extent of the project area was reduced to include only a portion of the original R/W. As a result, many of the listings included in the EDR report are not relevant based on the distance from the redefined project area. In addition to the project area, a buffer zone of one-quarter-mile from the original R/W was also searched by EDR. The buffer zone is included to ensure that facilities located adjacent to the tracks are included in the database report. The database search was produced by EDR on May 19, 2010. The results of the database search are summarized in the following table and paragraphs. A complete copy of the EDR environmental database report is included in Appendix C. Six focus maps are included in the EDR report, however only Focus Map 3 and 4 are relevant to the redefined project area.

Table 4-1. Summary of Environmental Database Search

Database	Description	Records Listed	Records of Concern to the Project
Federal			
NPL	The National Priorities List (NPL) is the U.S. EPA's database of uncontrolled or abandoned hazardous waste facilities that have been listed for priority remedial actions under the Superfund program.	0	0
Delisted NPL	The National Oil and Hazardous Substances Pollution Contingency Plan (NCP) established the criteria that the EPA uses to delete sites from the NPL.	0	0
CERCLIS/ CERCLIS – NFRAP	The CERCLIS database is a compilation of facilities that the USEPA has investigated or is currently investigating for a release or threatened release of hazardous substances pursuant to CERCLA. No Further Remedial Action Planned (NFRAP) refers to facilities that have been removed and archived from its inventory of CERCLA sites.	7	2
LIENS 2	CERCLIS 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.	0	0
RCRA TSD/ CORRACTS	The USEPA maintains a database of Resource Conservation and Recovery Act (RCRA) facilities associated with treatment, storage, and disposal (TSD) of hazardous materials that are undergoing "corrective action." A Corrective Action Report (CORRACTS) order is issued when there has been a release of hazardous waste or constituents into the environment from a RCRA facility.	0	0

Database	Description	Records Listed	Records of Concern to the Project
RCRA INFO	The RCRA INFO database, maintained by the EPA, lists facilities that generate hazardous waste as part of their normal business practices. Generators are listed as large, small, or conditionally exempt. Large quantity generators (LQG) produce at least 1,000 kg/month of nonacutely hazardous waste or 1 kg/month of acutely hazardous waste. Small quantity generators (SQG) produce 100 to 1,000 kg/month of nonacutely hazardous waste. Conditionally exempt small quantity generators (CESQG) are those that generate less than 100 kg/month of nonacutely hazardous waste.	26	1
US ENG Controls	A listing of sites with engineering controls in place.	0	0
US INST Controls	A listing of sites with institutional controls in place.	0	0
ERNS	Emergency Response Notification System (ERNS) records and stores information on reported releases of oil and hazardous substances.	6	0
PADS	PCB Activity Database System (PADS) identifies generators, transporters, commercial storers, and/or brokers and disposers of PCBs who are required to notify the USEPA of such activities.	0	0
FTTS	FIFRA/TSCA Tracking System, Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA)/Toxic Substances Control Act (TSCA). 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).	1	0
State and Local			
RESPONSE	The Department of Toxic Substances Control's (DTSC) list which 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.	0	0
HIST CAL-SITES	The CALSITES database contains potential or confirmed hazardous substance release properties. In 1996, California EPA (Cal/EPA) reevaluated and significantly reduced the number of sites in the Calsites database. The database is no longer updated by the State agency. It has been replaced by ENVIROSTOR.	0	0
ENVIROSTOR	DTSC Site Mitigation and Brownfields Reuse Program's EnviroStor database identifies sites that have known contamination or sites for which there may be reason 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 information including, 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.	9	3
LUST	Leaking Underground Storage Tanks (LUST) Incident Report – State Water Resources Control Board (SWRCB) LUST records contain an inventory of reported leaking UST incidents.	34	10
CA FID UST	The California Facility Inventory Underground Storage Tank(UST) (CA FID UST) database contains historical active and inactive UST listings as provided by the SWRCB. The database has not been updated since 1994.	38	7
State UST	UST Database – SWRCB provides a database of registered Underground Storage Tanks within the specified area.	9	1

Database	Description	Records Listed	Records of Concern to the Project
HIST UST	The Hazardous Substance Storage Container Database is a historical listing of UST sites previously maintained by SWRCB. Current data can be found in the State or local UST database.	53	7
SWEEPS UST	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.	42	7
SWF/LF State Landfill/ Historical Landfill	Solid Waste Information System – The Integrated Waste Management Board maintains a list of Solid Waste Facilities/Landfill (SWF/LF) Sites, including active and inactive, permitted and non-permitted solid waste disposal facilities.	0	0
CHMIRS	California's Hazardous Materials Incident Report System (CHMIRS) contains information on reported hazardous material incidents (accidental releases or spills), as maintained by the Office of Emergency Services.	1	0
DEED	The DTSC Site Mitigation and Brownfields Reuse Program (SMBRP) 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.	1	0
DRYCLEANERS	DTSC's 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; dry cleaning plants, except rugs; carpet and upholster cleaning; industrial launderers; laundry and garment services.	2	0
Manufactured Gas Plants	The EDR Proprietary Manufactured Gas Plant Database includes records of coal gas plants (manufactured gas plants) compiled by EDR's researchers. 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.	2	0
CA WDS	California Waste Discharge Systems (CA WDS) include sites which have been issued waste discharge requirements by the SWRCB.	4	1
NPDES	The National Pollutant Discharge Elimination System (NPDES) database contains a list of NPDES permits, as provided by the SWRCB.	9	1
Cortese/HIST Cortese	Cortese Hazardous Waste & Substances Sites – The Cal/EPA/Office of Emergency Information previously maintained a list of sites designated as LUST, SWF/LF or Cal-Sites. The list is no longer updated and cases are maintained by the SWRCB, Integrated Waste Management Board and DTSC.	16	2
SWRCY	A listing of recycling facilities in the state of California, provided by the Department of Conservation.	2	1
SLIC	The SLIC (Spills, Leaks, Investigations and Cleanup) program is designated to protect and restore water quality from spills, leaks and similar discharges. Statewide SLIC cases are maintained by the SWRCB.	3	1

Database	Description	Records Listed	Records of Concern to the Project
HAZNET	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.	153	0
Brownfields	A Brownfield site is an industrial or commercial project corridor that is abandoned, inactive, or underutilized, on which expansion or redevelopment is complicated because of the actual or perceived environmental contamination.	0	0
	Total Records	**418**	**44**

4.2 Summary of Listed Records

The EDR report identified 418 environmental records for sites located within or adjacent to the abovementioned preliminary R/W footprint. Within an urban area it is anticipated that commercial operations will increase the number of listings in a database search. Many of the database listings, however, are not considered to be of concern to the project due to the scope of the project, the distance of the listed site from the project area, and/or a facility's lack of, or compliance with any previously noted violation(s). Additional database findings are not considered to be of concern to the project due to the nature of the database. For example, records listed in the HAZNET database only identify facilities that have shipped hazardous waste with a manifest, which does not necessarily indicate a hazardous materials concern. As a result of these factors, as well as the updated R/W footprint (current project area), 374 of the 418 records listed are not considered to be of concern to the project. The remaining 44 records, which correspond to 15 sites (sites are often listed in multiple databases), are considered to be of concern, based on the evaluation of HDR's environmental professionals (as defined by ASTM). Details relating to the 15 sites of concern are presented below, and summarized in the data table presented in Appendix D. Regulatory files for each site were requested from the Santa Ana Regional Water Quality Control Board (SARWQCB), however results for only two of the requested sites were available. HDR also utilized the California EPA (Cal EPA) GeoTracker® website to obtain additional information for listed sites. Where available, information obtained from the in-person and online file review is also presented below.

It is important to note that in the state of California, several databases exist for the purpose of tracking underground storage tanks (USTs). Many of the databases are no longer updated, and limited information is available for the sites identified in these databases (HIST UST, SWEEPS UST, CA FID UST). While some overlap of sites does exist among the databases, each database may contain sites not listed elsewhere, and often the sites identified in these databases are not listed in the current State UST database. Based on the lack of updated and consistent information, the most accurate information regarding many of the UST listings identified for the project area cannot be verified without additional regulatory file review and/or site-specific interviews.

The following 15 sites were identified in the EDR report:

- SCRRA San Bernardino Depot (listed as Atchison, Topeka and Santa Fe Railroad, and San Bernardino Waste Treatment Plant) (Map Code A), 1170 W. 3rd Street. The site is listed as an open Spills, Leaks, Investigations and Cleanup (SLIC) site, and an open Leaking Underground Storage Tank (LUST) site. Four USTs are listed in the HIST UST database for the site, in addition to a HIST Cortese listing related to the leaking UST. Based on the open status of the SLIC and LUST cases, this site is considered a high-risk site, and a REC.
- Precision Automotive (listed as Motor Car Company and Performance Automotive) (Map Code B), 909 W. 2nd Street. The site is listed in both the CA FID UST and SWEEPS UST

databases. Three tanks were listed as active, according to the SWEEPS UST database, which is no longer updated. No additional, updated information was available regarding the tanks' status (active or removed). It has been the experience of HDR personnel that frequently, soil contamination exists in the subsurface surrounding USTs not otherwise classified as a LUST. As a result of this experience, and the lack of updated information regarding the status of the tanks, the exact risk cannot be determined. The site is considered to be of indeterminate risk, and a REC.

- Historic Service Station (listed as Allen Property) (Map Code C), 895 W. 2nd Street. One open LUST case is listed at the site. In addition, the site is listed in both the CA FID UST and SWEEPS UST databases, which are no longer updated. According to regulatory file review conducted at the SARWQCB, four USTs were removed from the site in February 2001. Subsequent soil sampling identified soil contamination in the area of the removed tanks. After a request for LUST case closure was denied, San Bernardino County requested additional soil sampling at the site to better determine the extent of contamination (2002). As of May 2009, the request was unmet and the case remains open. Based on the open status of the LUST case, this site is considered a high-risk site, and a REC.
- Snow Freight Lines/Super Cal Express (Map Code D), 958 W. Rialto Avenue. One LUST case was closed at the facility in August 2001. Two USTs are also listed at the site in the HIST UST database. No additional information regarding the status of USTs (active or removed) was listed. As a result of the onsite LUST case, and unknown status of the USTs identified at the site, the site is considered a high-risk site, and a REC.
- Pacific Van and Storage (Map Code E), 815 W. Rialto Avenue. The site is listed in both the CA FID UST and SWEEPS UST databases, which are no longer updated. It has been the experience of HDR personnel that frequently, soil contamination exists in the subsurface surrounding USTs not otherwise classified as a LUST. As a result of this experience, and the lack of updated information regarding the status of the tanks, the exact risk cannot be determined. The site is considered an indeterminate-risk site, and a REC.
- Viking Tire (Map Code F), 747 W. Rialto Avenue. A LUST case for the facility was opened in March 1989, and closed in May 1989 after soil excavation and disposal. The site is also listed in the HIST Cortese database, relating to the LUST case. As a result of the onsite LUST case, the site is considered a high-risk site, and a REC.
- San Bernardino Central Metal (Map Code G), 144 S. G Street The site is listed in the National Pollutant Discharge Elimination System (NPDES) database, California Waste Discharge Systems (CA WDS) database, and as a state recycling facility (SWRCY). It has been the experience of HDR personnel that scrap metal recycling facilities are often contaminated with heavy metals as a result of cutting and shredding operations. The site is also located immediately adjacent to a property that formerly conducted similar operations, and is listed as an active CERCLIS site (see Southwest Metal Co. listing below). Based on the facilities' operations, and proximity to the active CERCLIS site, the site is considered a high-risk site, and a REC.
- Southwest California Gas Company (Map Code H), 155 S. G Street. One closed LUST case is listed for the site. According to online files, the case was opened in January 1991 and closed in March 1994. A HIST Cortese record is also listed for the site in connection with the LUST case. Four USTs were identified at the site in the HIST UST, and SWEEPS UST databases, with the CA FID UST database identifying the tanks as active. The site is also listed as a permitted UST facility in the State UST database, which is regularly updated. As a result of the onsite LUST case, and active USTs onsite, the site is considered a high-risk site, and a REC.
- Signal Oil Co. (Map Code I), 173 S. G Street. The facility is listed as a closed Envirostor, and a

CERCLIS-NFRAP (no further remedial action planned) site. The facility was identified as an Envirostor site in 1983 based on a 1950 telephone directory listing as an "Oil Company". A site assessment was performed in 1987 and no further action was recommended in 1989. The CERCLIS assessment was also conducted in 1987, and the NFRAP recommendation concurred with in 1989. A follow-up database verification was conducted by the DTSC in 2004, and confirmed the no further action finding. Based on the closed status of the cases, the site is considered a low-risk site, and a Historic REC (HREC).

- Southwest Metal Company (Map Code J), 740 W. Congress Street. The facility (located immediately south of the San Bernardino Central Metal site) is a former metals recycling property that is listed as an active Envirostor and CERCLIS site. Assessments and site screenings at the facility have identified the site as the "highest priority for further assessment" based on metals contamination (cadmium, hexavalent chromium, lead), acid solution contamination associated with the concrete acid pond formerly onsite, and other inorganic solid waste. In 2006 the state requested that the US EPA take the lead on the case. The site is also listed as a small quantity generator with recorded violations. Based on the open status of the cases, this site is considered a high-risk site, and a REC.
- Department of Homeland Security (address only listed) (Map Code K), 655 W. Rialto Avenue. The site is listed as an open Envirostor case. According to an online file review conducted via the GeoTracker website, the site was undergoing characterization in 2000 for lead contamination identified during grading activities at the site. As of March 2000, Cal EPA was in the process of entering an agreement with the property owner to provide regulatory oversight for investigation and remedial action at the site. No additional information regarding the findings of the investigation was available. Based on the open status of the Envirostor listing, the site is considered a high-risk site, and a REC.
- Bekins Moving and Storage (Map Code L), 134 S. E Street. Three USTs are listed in the HIST UST database. No additional information on the status of the tanks was available. Based on the unknown status of the tanks, as well as the current location of the site within the proposed R/W footprint (see Figure 2), the site is considered a high-risk site, and a REC.
- Pep Boys Automotive (Map Code M), 147 S. E Street. The site is listed in the SWEEPS UST and HIST UST databases, with the CA FID UST database identifying one active waste oil tank onsite. No updated information regarding the tanks' status was available. Based on the unknown status of the tanks, the site is considered an indeterminate-risk site, and a REC.
- San Bernardino City Fire Department Maintenance Shop (listed as Inland Moving and Storage) (Map Code N), 120 S. D Street. One gasoline UST is listed at the facility in the SWEEPS UST and HIST UST databases. According to the CA FID UST database (no longer updated), the UST onsite is active. No updated information regarding the UST's status was available. Based on the lack of up-to-date information regarding the tank, and the location of the site within the proposed R/W footprint, the site is considered a high-risk site, and a REC.
- U-Haul (Map Code O), 110 S. D Street. Two closed LUST cases were listed at the site. According to regulatory files reviewed at the SARWQCB, the first case was opened in 1988 after soil contamination and free product were observed during excavation of the facilities four USTs (located north of the office building onsite). A soil vapor extraction system was implemented and subsequent analytical samples identified contaminant concentrations to be below actionable levels. The case was closed in January 1997. The second case was opened in June of 1998 after petroleum contamination was identified during the removal of the UST's dispenser island. The vertical extent of the soil contamination was limited to less than five feet below ground surface

and the lateral extent to less than five feet from the dispenser island (located north of the office building onsite). The facility's listings in the HIST UST, SWEEPS UST, and CA FID UST databases relate to the USTs formerly located onsite. Based on the presence of closed LUST cases, the site is considered a high-risk site, and an HREC.

While not listed in the EDR report, one additional site was identified through the Cal EPA GeoTracker® website. The site is identified as the City of San Bernardino Economic Development Agency Proposed Transit Village Core Project Area, located south of Rialto Avenue and west of E Street (Map Code P). The site is listed as an active Department of Toxic Substances Control (DTSC) Evaluation Site. According to DTSC online files, the currently vacant lot formerly housed a railroad maintenance facility in the 1960s and 1970s. The Department has approved a Targeted Site Investigation for the area, which was proposed to include soil, soil gas, and groundwater samples to test for metals, petroleum hydrocarbons, polychlorinated biphenyls (PCBs), chlorinated solvents, and volatile organic compounds (VOCs) in soil, soil gas, and groundwater. Based on the lack of analytical findings associated with the site, the risk cannot be fully determined. However, based on the lack of conditions that indicate an existing release, a past release, or a material threat of a release at the site, it is not considered a REC at this time.

4.3 Historical Use Information

The objective of reviewing historical use information is to develop a history of previous land uses in the vicinity of the project area and to assess these uses for potential hazardous materials impacts that may affect the project. HDR reviewed those historical sources that were readily available and reviewable and likely to provide useful information, given the time and cost constraints inherent in ESA projects.

4.3.1 Fire Insurance Maps

Fire insurance maps are produced by private fire insurance companies to indicate uses of the project area on specified dates. HDR requested fire insurance maps from EDR, the copyright holder for the Sanborn map collection. Sanborn maps for the years 1894 and 1906 were reviewed for the project area. The project area was largely residential and undeveloped in the 1894 maps, with the exception of some commercial warehouses located in the area, and the West Coast Lumber Company which was located north of the railroad tracks, west of E Street. It is unclear whether the current SCRRA depot was present in 1894 because the map coverage does not extend to the north side of 3rd Street. The railroad tracks currently located within the project area were present in 1894, in their current configuration. Additional tracks (no longer present) were located between E and F Streets, along a short segment of Rialto Avenue (formerly 1st Street) west of E Street, and along E Street south of Rialto Avenue (intersecting with current project area).

The SCRRA depot was present on the 1906 Sanborn map. The western portion of the project area remained largely consistent with the earlier map, with the addition of The Parker Iron Works Machine Shop, located just east of the project area on the south side of 3rd Street. Additional warehouses were located to the north of the tracks, between D and E Streets. The tracks located on E Street in the 1894 map were no longer present by 1906, but track located between E and F Streets south of Rialto Avenue was present. A street car barn and repair facility, and the Edison Electric Power House were located on the south side of the tracks, just east of E Street (Map Code Q). According to the Sanborn map, an underground fuel tank was located at the site in 1906. The facility also housed two generators and two transformers. The former barn and power house were located within the proposed R/W for the project. As a result of it's location within the R/W footprint, former onsite operations and associated waste streams, and identification of a UST on the property, this site is considered a high-risk, REC site.

4.3.2 Historical Aerial Photographs

Historical aerial photographs are valuable for the environmental assessor to review features of properties near the project area over a long period of time. HDR reviewed historical aerial photographs provided by EDR for the years 1930, 1938, 1953, 1966, 1977, 1989, 1994, 2002 and 2009. Information relating to observed features is presented below. No sites of concern were identified in the historical aerial photograph review.

1930 – The project area was developed similarly to its current configuration, consisting of residential and commercial/industrial warehouses. However, due to poor image quality, specific details on the development in the project and surrounding areas could not be determined. The additional railroad tracks located between E and F Streets, both north and south of Rialto Avenue were present in 1930. The SCRRA San Bernardino Depot was also located at the project area's northern terminus. The surrounding area was largely residential, with some commercial developments. Agricultural and undeveloped land were located throughout the area.

1938 – The western portion of the project area consisted largely of residential and commercial development. Buildings were located at the northern portion of the project area, on the south side of 3rd Street (currently vacant lots). Additional commercial warehouses were located in the area of the current I-215 (not present in 1938), north and south of the railroad tracks. Some undeveloped land was present on both the north and south sides of the track, between E and G Streets. San Bernardino Central Metal was not present; however structures were located in the vicinity of Southwest Metal Company. Several buildings and railroad tracks were present in the currently vacant lots located south of Rialto Avenue, west of E Street. The repair barn and power house identified in the 1906 Sanborn map (Map Code Q) were present in 1938.

1953 – Additional commercial development was located throughout the project area on both the north and south side of the tracks, with only a small portion of undeveloped land located north of the project area between E and G Streets. Interstate 215 was not yet constructed, and the agricultural fields previously located south of the project area were no longer present.

1966 – Interstate 215 was present by 1966. The project area remained consistent with the 1953 image. However, the repair barn and power house located south of the railroad tracks (just east of D Street) were no longer present.

1977 – Commercial buildings were located on the west and east sides of the project area (on the south side of 3rd Street) were no longer present. The area between E and G Streets (north of the project area) was largely undeveloped in 1977, though some commercial buildings were still present in the area. The railroad tracks previously located north of the project area (south of Rialto Avenue) in this area were no longer present. The portion of the project area located between D and E Streets existed in its current configuration, with the exception of a commercial building located on the north side of the tracks, at E Street (currently vacant).

1989 – The project and surrounding areas were similar to the 1977 image. Residential developments located on the north side of Rialto Avenue were replaced by commercial and retail developments by 1989. Due to poor image quality, additional specific details on the development in the project and surrounding areas could not be determined.

1994 – The project area remained similar to that of the 1989 image.

2002 – The largely undeveloped area north of the project area (between E and G Streets) included the Department of Homeland Security (DHS) buildings by 2002. One additional structure (currently not

present) was located east of the DHS parking area. The remainder of the area was undeveloped. The remainder of the project and surrounding areas were consistent with the 1994 image.

2009 – The commercial building located on the north side of the tracks (at E Street) was no longer present. The project and surrounding areas existed in their current configuration.

4.3.3 City Directory Information

City directory review was conducted at the San Bernardino Public Library's California Room, for the years 1949 to 2008 in intervals of five years. The information garnered during the review confirmed historic development consistent with the site reconnaissance and historical aerial review. The following five sites were identified during the city directory review. Each site is considered a site of concern based on operations at the facility, likely presence of USTs, and/or waste streams likely associated with onsite operations. Based on the lack of regulatory listing associated with the sites, or additional site details, each is considered an indeterminate-risk site, and a REC site.

- Carry Shell Service (listed in 1949), located at 1077 W. 3rd Street (Map Code R)
- Union Oil Company (listed from 1949 to 1961), located at 789 W. Rialto Avenue (Map Code S)
- Bob's Service Station (listed from 1949 to 1961), located at 415 W. Rialto Avenue (Map Code T)
- Service Station (currently Greenwood's Uniforms) (listed from 1945 to 1961) located at 115 S. E Street (Map Code U)
- Economy Cleaners listed in 1976, and Body Shop listed from 1949 to 1976, located at 133 S. E Street (Map Code V)

4.3.4 Historical Topographic Maps

Historical topographic maps provide an overview of the area relative to potential previous land uses. HDR reviewed historical topographic maps of the project area and adjoining properties from the United States Geological Survey 7.5 minute series quadrangle maps for San Bernardino South, California (1954 photorevised 1967, 1973, and 1980). These maps served to verify the information gathered in the historic aerial photograph review.

4.4 Environmental Liens and Additional Information

No information regarding the chain-of-title ownership history or environmental liens recorded against the project area was provided by the user. Environmental lien searches were not conducted as part of the scope of work for this project.

4.5 Summary of Previous Environmental Investigations

No previous environmental investigations were reviewed for purposes of this ESA.

5.0 SITE RECONNAISSANCE AND INTERVIEWS

5.1 Site Reconnaissance

On May 24 through 26 2010, HDR personnel conducted a site reconnaissance of the project area, located on the BNSF Redlands Subdivision railroad track, between the SCRRA depot and D Street. A railroad safety professional escorted HDR staff on the tracks, allowing reconnaissance within the railroad R/W. The project area consisted of the tracks and adjacent R/W, which included residential properties (west of I-215), commercial/industrial facilities (throughout project area), with some undeveloped land (throughout project area). The SCRRA San Bernardino Depot was located at the northern terminus of the project area, and consisted of the depot building, and several tracks located to the north of the building. The tracks were oriented to the east/west, with the BNSF Redlands Subdivision line extending south at 3rd Street, between I and J Streets. The portion of the project area located from the depot to I-215 was surrounded by both residential and commercial/industrial facilities. Several vacant lots were also located adjacent to the project area between 2nd and 3rd Street. Miscellaneous debris was present within this portion of the project area, including used tires, household debris, scrap metal and wood, and one 55-gallon drum located at the 111 S. I Street facility (former vending machine company).

The portion of the project area located to the east of I-215 consisted of commercial warehouses. Additional drums and totes were identified at properties located adjacent to the project area. San Bernardino Central Metal (Map Code G) was located on the south side of the tracks at G Street. No debris or visible staining was present on the tracks in the vicinity of the facility, however the portion of the facility that is located within the proposed R/W could not be observed due to the perimeter fencing. Two large vacant lots were located on the north and south sides of the tracks, west of E Street. A large mound of soil was located on the north side of the tracks, just north of the Bekins Moving and Storage facility (Map Code L). No odor or staining was identified near the mound, however its source could not be identified. A Southern California Edison Substation was located approximately 150 feet north of the project area, between D and E Streets. No pits, ponds, lagoons, or other indications of buried or large-scale hazardous material were identified during the reconnaissance of the project area. No large areas of staining were identified along the railroad R/W. It is important to note that none of the facilities located within the project area or immediately adjacent were individually assessed, and staining or disturbed ground may not have been visible from the vantage point of the site reconnaissance.

5.2 Interview

Interviews were not permitted for the purposes of this ESA.

5.3 Known Current and Past Uses of the Site and Adjoining Properties

The project area is located in an urban area of mixed-use development. In addition to the railroad tracks located in the project area, the adjacent properties include the SCRRA depot, residential developments, a variety of repair facilities (auto repair, furniture upholstery, pool table repair), current and former scrap metal recycling facilities, a Southern California Gas Company plant, vacant and occupied commercial and industrial warehouses, retail facilities, and some undeveloped land. The surrounding buffer includes similar development, as well as a DHS office building, an industrial laundry facility, a commercial trucking operation, and a Signal Oil Company office building. Historic development within the project and surrounding area was largely consistent with the current development. The railroad tracks have been present since at least the late 1800s. Many of the commercial warehouses have been present since about the 1930s, with some demolition occurring north of the project area, between E and G streets in the mid-

to late 1970s. Several properties located within the project area are partially or entirely located within the proposed R/W. These properties currently include:

- SCRRA San Bernardino Dept located at 1170 W. 3rd Street (Map Code A)
- Snow Freight Lines/Super Cal Express located at 958 W. Rialto Avenue (Map Code D)
- A former vending machine company located at 111 S. I Street, and parking area located immediately south of the building.
- San Bernardino Central Metal located at 144 S. G Street (Map Code G)
- Southwest California Gas Company located at 155 S. G Street (Map Code H)
- Bekins Moving and Storage located at 134 S. E Street (Map Code L)
- The northern portion of a shopping center located south of Bekins Moving and Storage
- City of San Bernardino Economic Development Agency Proposed Transit Village Core Project Area, located south of Rialto Avenue and west of E Street (Map Code P)
- Street car barn and repair facility, and Edison Electric Power House located on the south side of the tracks, just east of E Street (Map Code Q)
- Former Economy Cleaners and Body Shop located at 133 S. E Street (Map Code V)
- San Bernardino City Fire Department Maintenance Shop located at 120 S. D Street (Map Code N)

5.4 Utilities

HDR did not observe indications of subsurface utilities other than typical municipal utilities such as water, sewer, electrical, and telecommunications facilities. Additional utilities related to the operation of the railroad tracks are located throughout the project area.

6.0 DATA GAP ANALYSIS

The ASTM E 1527-05 standard requires a listing of "data gaps" encountered during the investigative process that may affect the validity of the conclusions drawn by the environmental professional. The ASTM E 1527-05 standard also requires that the environmental professional estimate the relative importance of the data gaps. Generally, gaps in available data are related to the availability of historical data sources for specific sites of concern. The environmental professional uses multiple historical data sources as a method to provide coverage for data gaps. Historical information is collected on a recurring basis, and the passage of time between data sets may or may not constitute a significant gap in data coverage. For this project, the following items may constitute a data gap as defined by ASTM:

- Lack of site-specific interviews
- Lack of adequate regulatory files available for review
- Inconsistency among California UST databases

The absence of site-specific interviews, adequate regulatory files available for review, and inconsistency among UST databases may prove to be significant data gaps, particularly for the properties located within the proposed R/W. The findings of the interviews and regulatory file review can serve to confirm the presence/status of the tanks, or other hazardous materials concerns which may alter the ranking or REC classification of a site.

7.0 FINDINGS AND CONCLUSIONS

HDR has conducted a Phase I ESA for the RFM project, located in San Bernardino, San Bernardino County, California. The project area begins at the SCRRA San Bernardino Depot and follows the BNSF Redlands Subdivision railroad tracks south and east to D Street. The project area consists of the BNSF Redlands Subdivision railroad tracks, and proposed right-of-way (R/W).

This Phase I ESA identifies sites with RECs for the project area that may adversely affect construction or project area right-of-way acquisition. In the event that a site's regulatory issue has been resolved by the regulatory agency with jurisdiction, that site may be classified as a "Historic REC". In addition to the ASTM-based REC classification of a site, HDR also utilizes a risk ranking system to describe "sites of concern" located within the project area. This ESA was conducted in general conformance with the scope and limitations of the ASTM Practice E 1527-05. Any exceptions to or deletions from these ASTM practices are described in the previous sections of this report.

This ESA includes a summary of the site reconnaissance conducted on May 24-26, 2010, a review of environmental databases, and a review of historical data sources The ESA process resulted in the following findings and conclusions.

7.1 Findings

- The project area is located in an urban area of mixed-use development in San Bernardino, California. In addition to the railroad tracks located in the project area, the adjacent properties include the SCRRA depot, residential developments, a variety of repair facilities (auto repair, furniture upholstery, pool table repair), current and former scrap metal recycling facilities, a Southern California Gas Company plant, vacant and occupied commercial and industrial warehouses, retail facilities, and some undeveloped land. The surrounding 1/4 mile buffer (used for identification of sites near the project that may cause an impact) includes similar development, as well as a DHS office building, an industrial laundry facility, a commercial trucking operation, and a Signal Oil Company office building.
- An environmental database search was performed by EDR for the project area, and a one-quarter-mile surrounding buffer. The boundaries provided to EDR were based on the preliminary R/W footprint for the project, as depicted in the May 11, 2010 Preliminary R/W Footprint figure. As of the date of this report, the extent of the project area was reduced to include only a portion of the original R/W. As a result, many of the listings included in the EDR report are not relevant based on the distance from the redefined project area.
- The EDR report identified 418 environmental records for sites located within or adjacent to the abovementioned preliminary R/W footprint. Within an urban area it is anticipated that commercial operations will increase the number of listings in a database search. Many of the database listings, however, are not considered to be of concern to the project due to the scope of the project, the distance of the listed site from the project area, and/or a facility's lack of (or compliance with) any previously noted violation(s). Additional database findings are not considered to be of concern to the project due to the nature of the database. As a result of these factors, as well as the updated R/W footprint (current project area), 374 of the 418 records listed are not considered to be of concern to the project. The remaining 44 records correspond to 15 sites of concern (sites are often listed in multiple databases). Details relating to the 15 sites are presented in Table 1 and in Appendix D.
- While not listed in the EDR report, one additional site was identified through the Cal EPA

GeoTracker® website, which allows access to some state regulatory files that are available online. The site is identified as the City of San Bernardino Economic Development Agency Proposed Transit Village Core Project Area, located south of Rialto Avenue and west of E Street (Map Code P). According to the Department of Toxic Substance Control (DTSC) online files, the currently vacant lot previously housed a railroad maintenance facility in the 1960s and 1970s. DTSC has approved a Targeted Site Investigation for the area, which was proposed to include soil, soil gas, and groundwater samples to be analyzed for metals, petroleum hydrocarbons, PCBs, chlorinated solvents, and VOCs in soil, soil gas, and groundwater. The site is therefore classified as an indeterminate-risk site; however it cannot be classified as a REC based on the ASTM definition.

- Within the state of California, several databases exist for the purpose of tracking USTs. Many of the databases are no longer updated, and limited information is available for the sites identified in these databases (HIST UST, SWEEPS UST, CA FID UST). While some overlap of sites does exist among the databases, each database may contain sites not listed elsewhere, and often the sites identified in these databases are not listed in the current State UST database. Based on the lack of updated and consistent information, the most accurate information regarding many of the UST listings identified for the project area cannot be verified without additional regulatory file review and/or site-specific interviews.
- Historical research of the project area found that the project area has been developed since at least 1930. Development in the area has consisted of similar land use to what is currently present. The railroad tracks located within the project area have been present since at least the late 1800s, and many of the commercial and industrial warehouses/facilities have been present since at least 1930. For the purposes of this ESA, historical aerial, Sanborn fire insurance map, and historic city directory research was conducted. Six additional sites of concern were identified during the historical research for the project and surrounding areas. Details relating to the sites are presented in Table 1, and in Appendix D.
- The site reconnaissance of the project area did not identify any additional sites of concern. No indications of large-scale, previous spills or hazardous material usage or disposal were identified within the project area. No pits, ponds, lagoons, or other indications of buried or large-scale hazardous material were identified during the reconnaissance of the project area. No large areas of staining were identified along the railroad R/W. It is important to note that none of the facilities located within the project area or immediately adjacent were individually assessed, and staining or disturbed ground may not have been visible from the vantage point of the site reconnaissance (railroad tracks and pubic access roads).
- The absence of site-specific interviews, regulatory files and inconsistency among UST databases may prove to be significant data gaps, particularly for the properties located within the proposed R/W. The findings of the interviews and regulatory file review can serve to confirm the presence/status of the tanks, or other hazardous materials concerns which may alter the ranking or REC classification of a site.

Table 7-1 summarizes the findings of the site of concern identified during this ESA.

Table 7-1. Sites of Concern

HDR Map Code (1)	Site Name	Address	Site Operations Relative to Hazmat Issues(2), Regulatory Listing(3)	Data Source (4)	Risk Ranking L/ I/ H (5)	Located within Proposed R/W(6)	Add't File Review/ Interviews Recom-mended?
A	SCRRA Depot	1170 W. 3rd Street	Railroad depot. Open SLIC, open LUST, HIST Cortese, HIST UST.	R, D, H	H	Y	Y
B	Precision Automotive	909 W. 2nd Street	Auto repair facility. CA FID UST, SWEEPS UST. No updated UST information available.	R, D, H	I	N	Y
C	Historic Service Station	895 W. 2nd Street	HSS. Open LUST case	R, D, H	H	N	N
D	Snow Freight Lines/ Super Cal Express	958 W. Rialto Avenue	Commercial trucking facility. One closed LUST case, two USTs listed in HIST UST database. No updated UST information available.	R, D, H	H	Y	Y
E	Pacific Van and Storage	815 W. Rialto Avenue	Commercial trucking facility. CA FID UST, and SWEEPS UST listing. No updated UST information available.	R, D, H	I	N	Y
F	Viking Tire	747 W. Rialto Avenue	Tire supply and repair facility. Closed LUST case, and HIST Cortese listing.	R, D, H	H	N	Y
G	San Bernardino Central Metal	144 S. G Street	Scrap metal recycling facility. NPDES permit, SWRCY listing, located adjacent to open CERCLIS site with similar operations.	R, D, H	H	Y	Y

HDR Map Code [1]	Site Name	Address	Site Operations Relative to Hazmat Issues[2], Regulatory Listing[3]	Data Source [4]	Risk Ranking L/ I/ H [5]	Located within Proposed R/W[6]	Add't File Review/ Interviews Recom-mended?
H	Southwest California Gas Company	155 S. G Street	Municipal gas plant. Closed LUST case, HIST Cortese, four active USTs onsite.	R, D, H	H	Y	Y
I	Signal Oil Company	173 S. G Street	Oil plant. Closed Envirostor, CERCLIS-NFRAP.	R, D, H	L	N	N
J	Southwest Metal Company	740 W. Congress Street	Scrap metal recycling facility. Open Envirostor and CERCLIS listings.	R, D, H	H	N	Y
K	Department of Homeland Security Office Building	655 W. Rialto Avenue	Federal government office building. Open Envirostor listing.	R, D, H	H	N	Y
L	Bekins Moving and Storage	134 S. E Street	Former moving company. Three USTs listed in HIST UST database. No additional UST information available.	R, D, H	H	Y	Y
M	Pep Boys Automotive	147 S. E Street	Automotive repair facility.	R, D, H	I	N	Y
N	San Bernardino City FD Maintenance Shop	120 S. D Street	Fire Dept. maintenance shop. One UST listed in SWEEPS UST and HIST UST databases. No additional UST information available.	R, D, H	H	Y	Y
O	U-Haul	110 S. D Street	Commercial moving company. Two closed LUST cases onsite.	R, D, H	H	N	Y

HDR Map Code (1)	Site Name	Address	Site Operations Relative to Hazmat Issues(2), Regulatory Listing(3)	Data Source (4)	Risk Ranking L/ I/ H (5)	Located within Proposed R/W(6)	Add't File Review/ Interviews Recom-mended?
P	Vacant Lot, site of proposed Transit Village Core Project Area	South of railroad tracks, and west of E Street	Former railroad maintenance area. Targeted Site Investigation area per DTSC review.	R, D, H	I	Y	Y
Q	**Former rail car repair facility and Edison Electric Power House**	**South of railroad tracks, and east of E Street**	**Former rail car repair facility and power house with UST identified in Sanborn map.**	**R, H**	**H**	**Y**	**Y**
R	**Carry Shell Service Station**	**1077 W. 3rd Street**	**HSS.**	**R, H**	**I**	**N**	**Y**
S	**Union Oil Company**	**789 W. Rialto Avenue**	**HSS.**	**R, H**	**I**	**N**	**Y**
T	**Bob's Service Station**	**415 W. Rialto Avenue**	**HSS.**	**R, H**	**I**	**N**	**Y**
U	**Service Station**	**115 S. E Street**	**FSS (currently Greenwood's Uniforms)**	**R, H**	**I**	**N**	**Y**
V	**Economy Cleaners/Body Shop**	**133 S. E Street**	**Former body shop and laundromat.**	**R, H**	**I**	**Y**	**Y**

Sites listed in bold print are considered by ASTM to be a Recognized Environmental Concern (REC) or Historic REC (HREC)

(1) Corresponds to location of site as indicated in Appendices A and B
(2) CSS = Current Service Station, FSS= Former Service Station, HSS = Historic Service Station (no longer present)
(3) LUST=Leaking Underground Storage Tank, UST= Underground Storage Tank, DTSC = Dept. of Toxic Substances Control. Complete list of acronyms identified in EDR report in Appendix C
(4) Indicates primary information sources for listing: R=Reconnaissance, D=Database, H=Historical Source (city Directories, historical aerial photographs)
(5) Risk of potential impacts onsite, Low / Indeterminate / High /
(6) Sites may be partially or entirely within proposed right-of-way (R/W)

7.2 Conclusions

HDR has identified 22 sites of concern located within the project area or surrounding buffer. Of the 22 sites, 19 sites have conditions that would qualify as a REC, and two sites as an HREC. One additional site could not be classified as a REC based on the ASTM definition. Based on the pending investigation at the site however, HDR has concluded that additional investigation is necessary at the site. The following statement is required by ASTM E 1527-05 as a positive declaration of whether REC(s) were found:

> *HDR has performed a Phase I Environmental Site Assessment (ESA) in conformance with the scope and limitations of ASTM E 1527-05 of the project area (as defined elsewhere in this report). Any exceptions to or deletions form these practices are described in the report. This report has revealed evidence of 19 sites with Recognized Environmental Conditions (RECs), and two sites with Historic RECs in connection with the project area.*

8.0 RECOMMENDATIONS

Recommendations included in this report have been developed through the investigative procedures described in the *Scope of Services, Significant Assumptions, and Limitations* section of this report. These findings should be reviewed within the context of the limitations provided in the *Scope of Services, Significant Assumptions, and Limitations* section. Based on the location and specific details of the identified risk sites, HDR has identified 20 RECs and one HREC associated with the project area, in addition to one additional site that is pending investigation.

Based on the findings and conclusions reached in this report, HDR makes the following recommendations for the 22 sites of concern identified:

8.1 Recommendation 1

HDR recommends that additional regulatory file review, and/or site-specific interviews be conducted for the following 20 sites located within the proposed R/W, or adjacent to the project area, based on the regulatory listings, and/or onsite operations. The findings of the file review and interviews will provide additional information to confirm the hazards present at each site. Additionally, the information gathered will aid in advancing the protocol for Phase II Environmental Site Assessments anticipated within the project area. Recommendation 1 applies to the following sites:

- SCRRA San Bernardino Depot (Map Code A)
- Precision Automotive (Map Code B)
- Snow Freight Lines/Super Cal Express (Map Code D)
- Pacific Van and Storage (Map Code E)
- Viking Tire (Map Code F)
- San Bernardino Central Metal (Map Code G)
- Southwest California Gas Company (Map Code H)
- Southwest Metal Company (Map Code J). While the site is not located immediately adjacent to the proposed R/W, the regulatory listings associated with the site and proximity to San Bernardino Central Metal are cause for additional investigation.
- DHS Building (Map Code K)
- Bekins Moving and Storage (Map Code L)
- Pep Boys Automotive (Map Code M)
- San Bernardino Fire Department Maintenance Shop (Map Code N)
- U-Haul (Map Code O)
- City of San Bernardino Economic Development Agency Proposed Transit Village Core Project Area, located south of Rialto Avenue and west of E Street (Map Code P)
- Street car barn and repair facility, and Edison Electric Power House located on the south side of the tracks, just east of E Street (Map Code Q)
- Carry Shell Service Station (Map Code R)
- Union Oil Company (Map Code S)
- Bob’s Service Station (Map Code T)
- Service Station (Map Code U)

- Economy Cleaners/Body Shop (Map Code V)

8.2 Recommendation 2

HDR recommends that all construction contractors should be instructed to immediately stop all subsurface activities in the event that potentially hazardous materials are encountered, an odor is identified, or significantly stained soil is visible. Contractors should be instructed to follow all applicable regulations regarding discovery and response for hazardous materials encountered during the construction process. Special care should be taken in the event of ground disturbance near the following REC, or HREC sites not located immediately adjacent to the project area.

- Historic Service Station (Map Code C)
- Signal Oil Company (Map Code I)

8.3 Recommendation 3

HDR recommends that if this report is 6 months old or older when property acquisition or construction begins, the recommendations within this report be reevaluated. The applicable ASTM standard (E 1527-05) requires a reevaluation of site conditions if a Phase I report (ESA) is older than 180 days (6 months).

9.0 QUALIFICATIONS OF ENVIRONMENTAL PROFESSIONALS

9.1 Signatures and Qualifications

We declare that, to the best of our professional knowledge and belief, we meet the definition of environmental professional as defined in Section 312.10 of 42 C.F.R. Part 312. This Phase I ESA was conducted under the supervision of a qualified environmental professional.

We have the specific qualifications based on education, training, and experience to assess a property of the nature, history, and setting of the subject property. We have developed and performed the AAI in conformance with standards and practices set forth in 40 C.F.R. Part 312.

The preceding report has been prepared in general conformance with standard industry practice for performance of ESAs, and includes the applicable portions of the investigation procedures codified in ASTM E 1527-05, *Standard Practice for Environmental Site Assessments: Environmental Site Assessment Process*. The end user of this report may rely on the contents, findings, and conclusions to be accurate within the limitations stated in this report and in the ASTM standard. The report also complies with specific requirements supplied by the client.

Hazardous Material Specialist
Colleen Murray

Environmental Professional
Kelly W. Kading, CPG, CHMM
Senior Professional Associate

Environmental Professional/CA REA
Jeanette Winter
Environmental Planner

9.1.1 Qualifications of Environmental Professionals

This Phase I ESA was performed by the following HDR employee.

Ms. Colleen Murray, HDR's qualified environmental professional, as defined by ASTM Practice E 1527-05, has more than 5 years of experience in the assessment of impacted properties and compliance with environmental regulations. She has a Bachelor's degree in Organizational Studies from Arizona State University and is currently pursuing a Master's degree in Environmental and Emergency Management. Ms. Murray's experience includes environmental health and safety, industrial hygiene, emergency response, and the submittal of various state and federally required reports and permits.

9.1.2 Qualifications of QA/QC Review Professionals

Reviews for quality assurance and quality control were performed by the following HDR employees.

Mr. Kelly W. Kading, CPG, CHMM, an environmental professional as defined by ASTM E 1527-05, has more than 22 years of experience in assessment and remediation of impacted properties and compliance with environmental regulations. He has a B.S. in Geology from Colorado State University and is a Certified Professional Geologist (#9173), and a Certified Hazardous Materials Manager (#1995). He specializes in forensic investigation of hazardous materials-impacted properties for municipal and state agencies, as well as commercial clients. His experience covers assessment of more than 1,500 properties ranging from agricultural land to multigenerational industrial properties in 32 states and 2 foreign countries. He is highly knowledgeable of federal, state, and local environmental regulations and standards and has served on the National Board of Directors of the Academy of Certified Hazardous Materials Managers. He serves as HDR's National Phase I Best Practices Team leader, and is responsible for training HDR's Phase I practitioners nationwide.

Ms. Jeanette Winter, HDR's qualified environmental professional, as defined by ASTM Practice E 1527-05, has 10 years of experience in the assessment of impacted properties and compliance with environmental regulations. She has a B.S. in Environmental Studies from San Jose State University and is a California Registered Environmental Assessor.

10.0 REFERENCES

American Society for Testing and Materials (ASTM). 2005. ASTM Practice E 1527-05. *Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Process.*

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Bergeron, Pete B. 22 May 1995. *Work Plan for Site Closure: Verification Boring Advancement.*

Appendix A
Figures

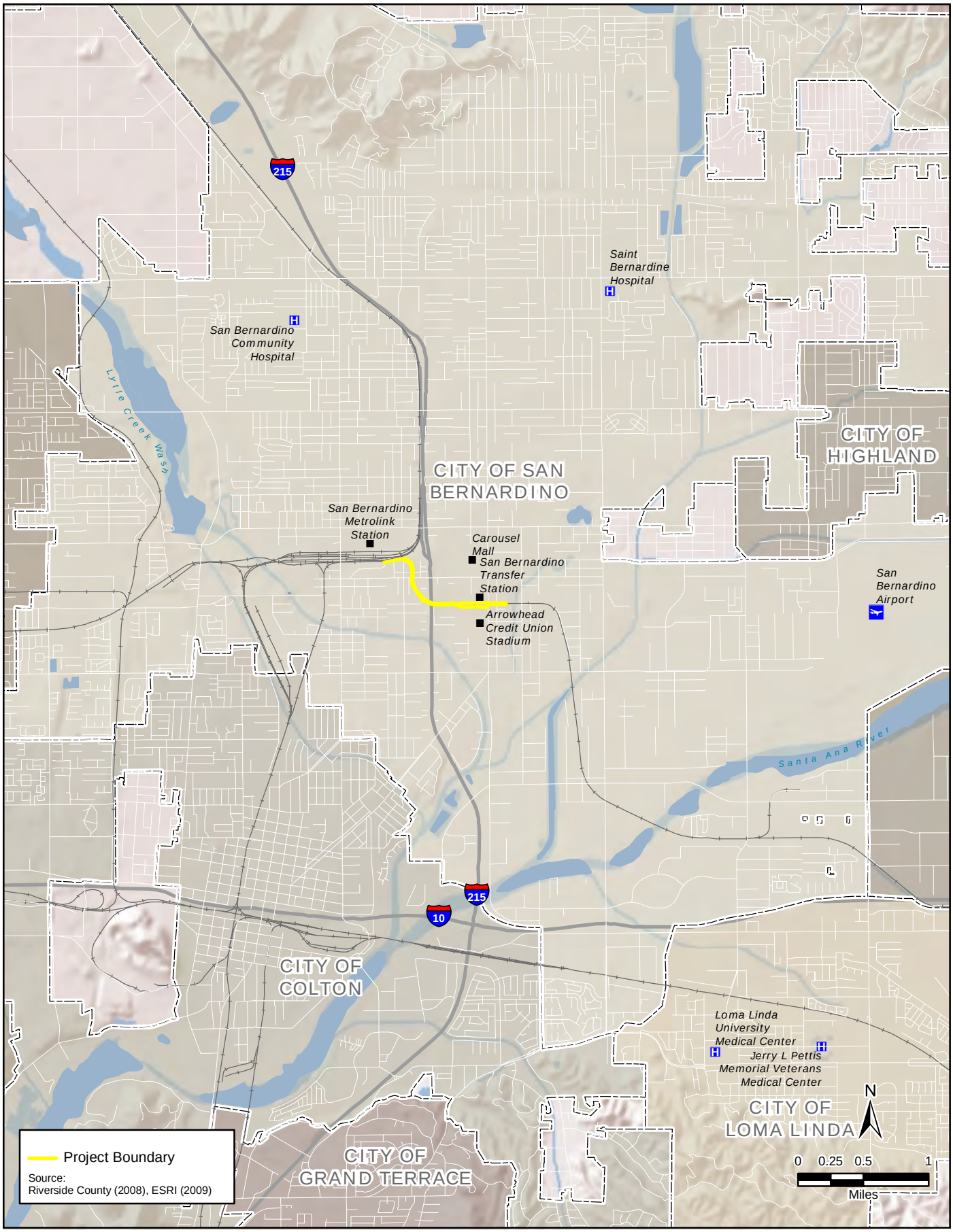
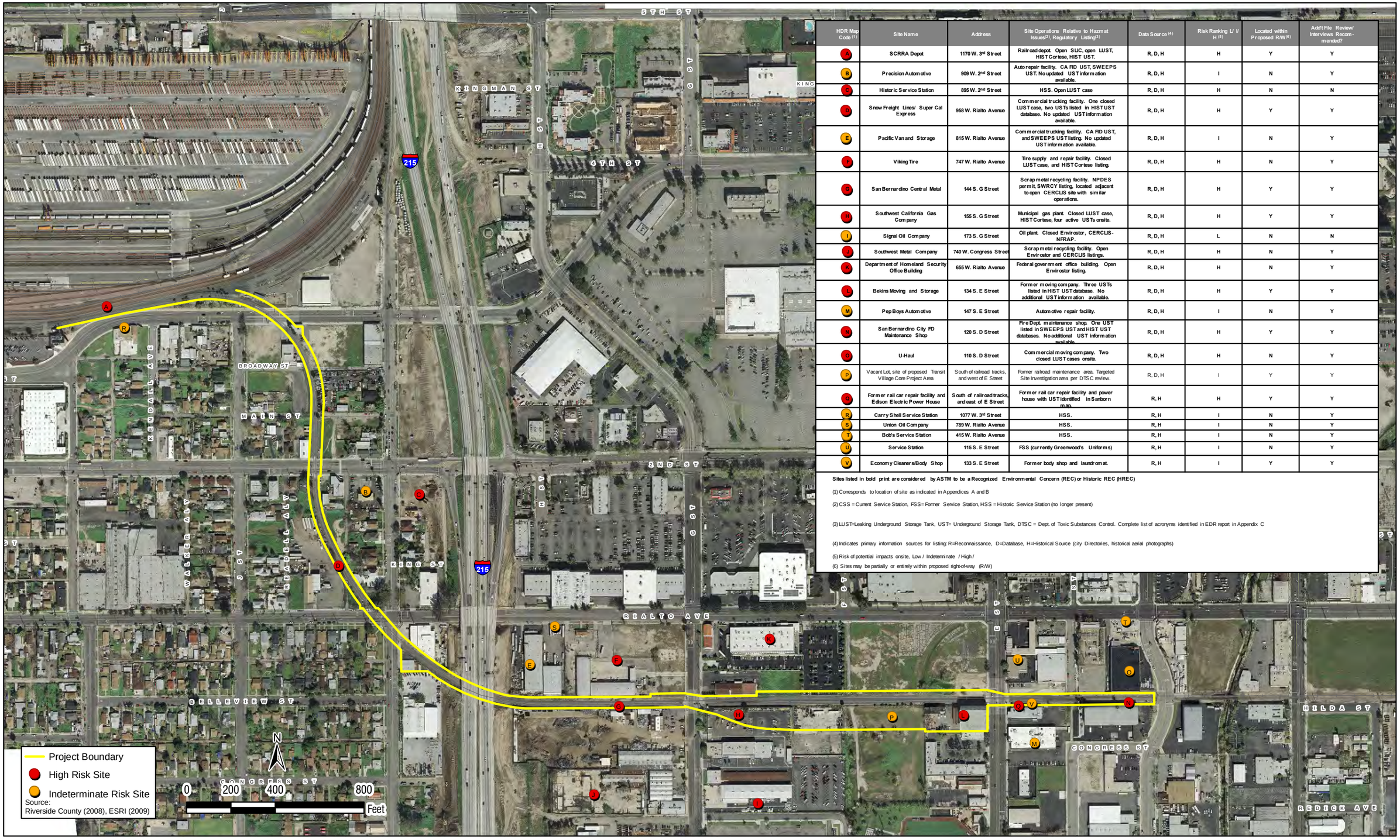


Figure 1
Project Location
Redlands 1st Mile



HDR Map Code (1)	Site Name	Address	Site Operations Relative to Hazmat Issues(2), Regulatory Listing(3)	Data Source (4)	Risk Ranking L/ I/ H (5)	Located within Proposed R/W(6)	Addt'l File Review/ Interviews Recom-mended?
A	SCRRA Depot	1170 W. 3rd Street	Railroad depot. Open SLIC, open LUST, HIST Cortese, HIST UST.	R, D, H	H	Y	Y
B	Precision Automotive	909 W. 2nd Street	Auto repair facility. CA RD UST, SWEEPS UST. No updated UST information available.	R, D, H	I	N	Y
C	Historic Service Station	895 W. 2nd Street	HSS. Open LUST case	R, D, H	H	N	N
D	Snow Freight Lines/ Super Cal Express	958 W. Rialto Avenue	Commercial trucking facility. One closed LUST case, two USTs listed in HIST UST database. No updated UST information available.	R, D, H	H	Y	Y
E	Pacific Van and Storage	815 W. Rialto Avenue	Commercial trucking facility. CA RD UST, and SWEEPS UST listing. No updated UST information available.	R, D, H	I	N	Y
F	Viking Tire	747 W. Rialto Avenue	Tire supply and repair facility. Closed LUST case, and HIST Cortese listing.	R, D, H	H	N	Y
G	San Bernardino Central Metal	144 S. G Street	Scrap metal recycling facility. NPDES permit, SWRCY listing, located adjacent to open CERCLIS site with similar operations.	R, D, H	H	Y	Y
H	Southwest California Gas Company	155 S. G Street	Municipal gas plant. Closed LUST case, HIST Cortese, four active USTs onsite.	R, D, H	H	Y	Y
I	Signal Oil Company	173 S. G Street	Oil plant. Closed Envirostor, CERCLIS-NFRAP.	R, D, H	L	N	N
J	Southwest Metal Company	740 W. Congress Street	Scrap metal recycling facility. Open Envirostor and CERCLIS listings.	R, D, H	H	N	Y
K	Department of Homeland Security Office Building	655 W. Rialto Avenue	Federal government office building. Open Envirostor listing.	R, D, H	H	N	Y
L	Bekins Moving and Storage	134 S. E Street	Former moving company. Three USTs listed in HIST UST database. No additional UST information available.	R, D, H	H	Y	Y
M	Pep Boys Automotive	147 S. E Street	Automotive repair facility.	R, D, H	I	N	Y
N	San Bernardino City FD Maintenance Shop	120 S. D Street	Fire Dept. maintenance shop. One UST listed in SWEEPS UST and HIST UST databases. No additional UST information available.	R, D, H	H	Y	Y
O	U-Haul	110 S. D Street	Commercial moving company. Two closed LUST cases onsite.	R, D, H	H	N	Y
P	Vacant Lot, site of proposed Transit Village Core Project Area	South of railroad tracks, and west of E Street	Former railroad maintenance area. Targeted Site Investigation area per DTSC review.	R, D, H	I	Y	Y
Q	Former rail car repair facility and Edison Electric Power House	South of railroad tracks, and east of E Street	Former rail car repair facility and power house with UST identified in Sanborn map.	R, H	H	Y	Y
R	Carry Shell Service Station	1077 W. 3rd Street	HSS.	R, H	I	N	Y
S	Union Oil Company	789 W. Rialto Avenue	HSS.	R, H	I	N	Y
T	Bob's Service Station	415 W. Rialto Avenue	HSS.	R, H	I	N	Y
U	Service Station	115 S. E Street	FSS (currently Greenwood's Uniforms)	R, H	I	N	Y
V	Economy Cleaners/Body Shop	133 S. E Street	Former body shop and laundromat.	R, H	I	Y	Y

Sites listed in bold print are considered by ASTM to be a Recognized Environmental Concern (REC) or Historic REC (HREC)

(1) Corresponds to location of site as indicated in Appendices A and B

(2) CSS = Current Service Station, FSS = Former Service Station, HSS = Historic Service Station (no longer present)

(3) LUST=Leaking Underground Storage Tank, UST= Underground Storage Tank, DTSC = Dept. of Toxic Substances Control. Complete list of acronyms identified in EDR report in Appendix C

(4) Indicates primary information sources for listing: R=Reconnaissance, D=Database, H=Historical Source (city Directories, historical aerial photographs)

(5) Risk of potential impacts onsite, Low / Indeterminate / High /

(6) Sites may be partially or entirely within proposed right-of-way (R/W)

Figure 2
Phase I Environmental Site Assessment
Redlands 1st Mile

Appendix B
Photographic Documentation

Photo 1: Map Code A - Southern California Regional Railroad Authority (SCRRA) Depot, located at the northern terminus of the project area. View is toward the northeast.

Photo 2: Map Code B - Precision Automotive, 909 W. 2nd Street. View is toward the southeast.

Photo 3: Map Code C - Historic service station, 895 W. 2nd Street. View is toward the northeast.

Photo 4: Map Code D - Snow Freight Lines/Super Cal Express, 958 W. Rialto Avenue. View is toward the southwest.

Photo 5: Map Code E - Pacific Van and Storage, 815 W. Rialto Avenue. View is toward the northeast.

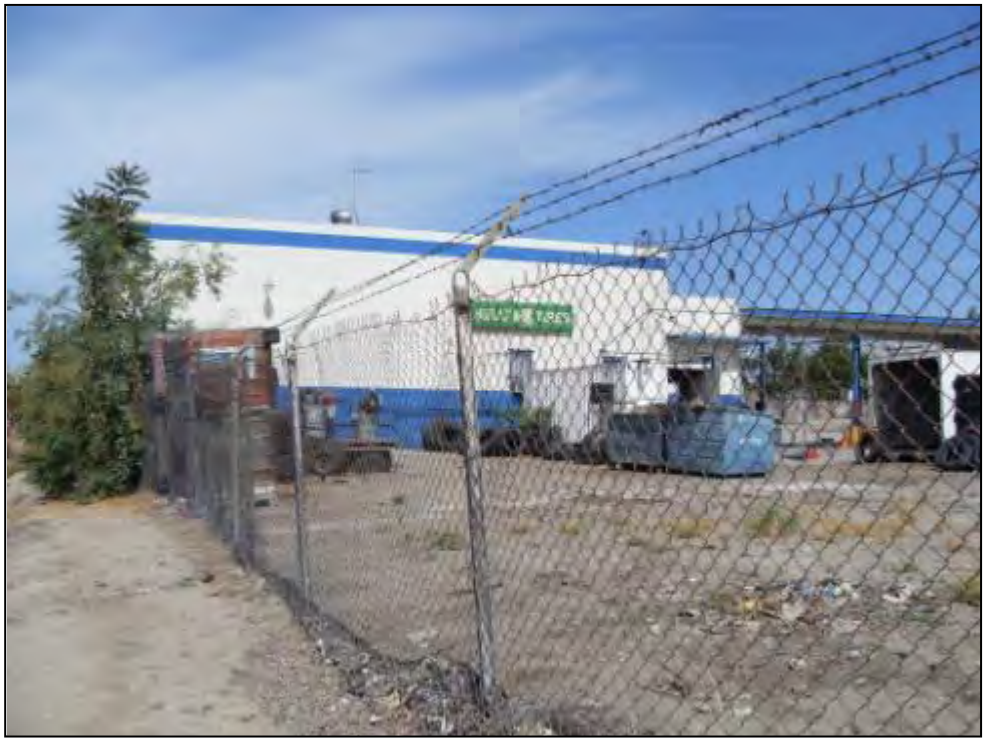


Photo 6: Map Code F - Viking Tire (currently Kelly Tires), 747 W. Rialto Avenue. View is toward the northwest.

Photo 7: Map Code G - San Bernardino Central Metal, 144 S. G Street. View is toward the southwest.

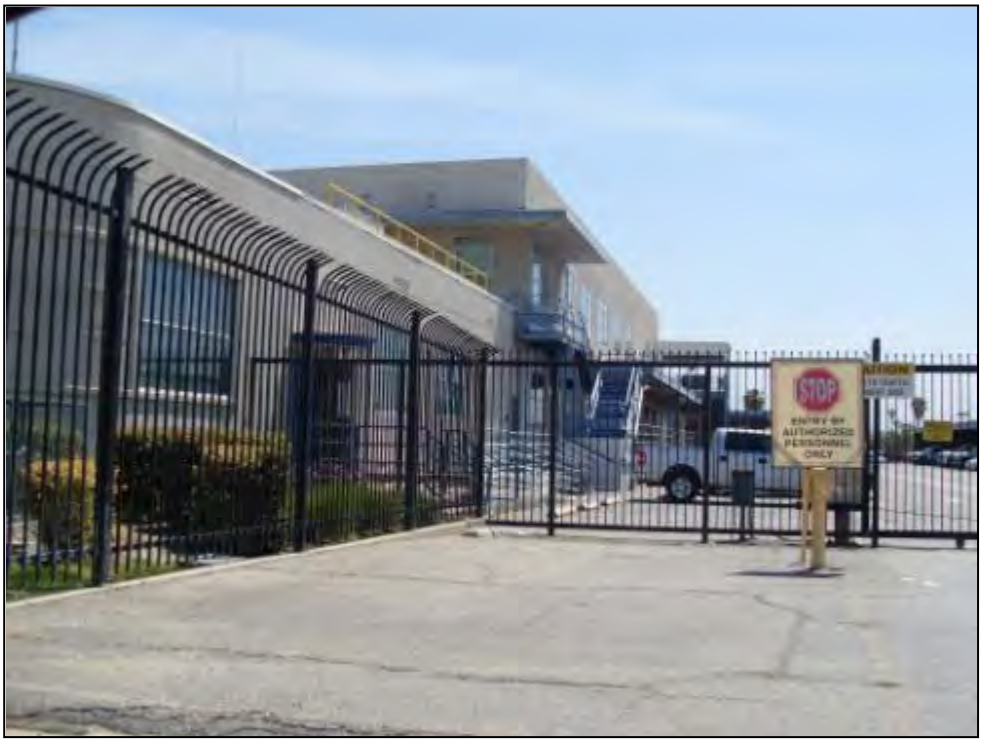


Photo 8: Map Code H - Southwest California Gas Company, 155 S. G Street. View is toward the east.

Photo 9: Map Code I - Signal Oil Company, 173 S. G Street. View is toward the east.

Photo 10: Map Code J - Southwest Metal Company, 740 W. Congress. View is toward the northeast.

Photo 11: Map Code K - Department of Homeland Security office building, 655 W. Rialto Avenue. View is toward the southeast.

Photo 12: Map Code L - Bekins Moving and Storage, 134 S. E Street. View is toward the southwest.

Photo 13: Map Code M - Pep Boys Automotive, 147 S. E Street. View is toward the southeast.

Photo 14: Map Code N - San Bernardino City FD Maintenance Shop, 120 S. E Street. View is toward the southwest.

Photo 15: Map Code O - U-Haul, 110 S. D Street. View is toward the northwest.

Photo 16: Map Code P - Vacant lot, site of proposed Transit Village Core Project area, located south of tracks and west of E Street. View is from the tracks, toward the south.

Photo 17: Map Code Q - Site of former rail car repair facility andEdison Power house, Also Map Code V, body shop, 133 S. E Street. View is toward the east.

Photo 18: Map Code R - former Carry Shell Service Station, 1077 W. 3rd Street. View is toward the southwest.

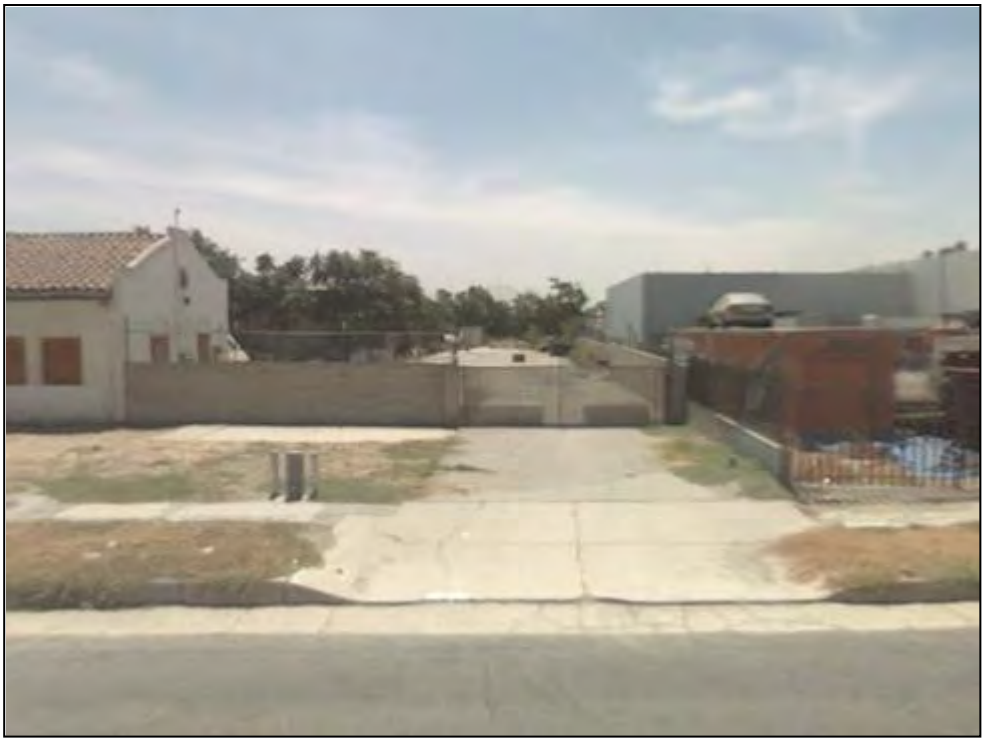


Photo 19: Map Code S - former Union Oil Company service station, 789 W. Rialto Avenue. View is toward the south.

Photo 20: Map Code T - former service station, 415 W. Rialto Avenue. View is toward the south.

Photo 21: Map Code U - former service station, 115 S. E Street. View is toward the northeast.

Appendix C
EDR Information

The EDR report is available for review on the CD for the EA/DEIR

Appendix D
Sites of Concern Data Table

HDR Map Code (1)	Site Name	Address	Site Operations Relative to Hazmat Issues(2), Regulatory Listing(3)	Data Source (4)	Risk Ranking L/ I/ H (5)	Located within Proposed R/W(6)	Add't File Review/ Interviews Recom-mended?
A	SCRRA Depot	1170 W. 3rd Street	Railroad depot. Open SLIC, open LUST, HIST Cortese, HIST UST listings.	R, D, H	H	Y	Y
B	Precision Automotive	909 W. 2nd Street	Auto repair facility. CA FID UST, SWEEPS UST. No updated UST information available.	R, D, H	I	N	Y
C	Historic Service Station	895 W. 2nd Street	HSS. Open LUST case	R, D, H	H	N	N
D	Snow Freight Lines/ Super Cal Express	958 W. Rialto Avenue	Commercial trucking facility. One closed LUST case, two USTs listed in HIST UST database. No updated UST information available.	R, D, H	H	Y	Y
E	Pacific Van and Storage	815 W. Rialto Avenue	Commercial trucking facility. CA FID UST, and SWEEPS UST listing. No updated UST information available.	R, D, H	I	N	Y
F	Viking Tire	747 W. Rialto Avenue	Tire supply and repair facility. Closed LUST case, and HIST Cortese listing.	R, D, H	H	N	Y
G	San Bernardino Central Metal	144 S. G Street	Scrap metal recycling facility. NPDES permit, SWRCY listing, located adjacent to open CERCLIS site with similar operations.	R, D, H	H	Y	Y

HDR Map Code (1)	Site Name	Address	Site Operations Relative to Hazmat Issues(2), Regulatory Listing(3)	Data Source (4)	Risk Ranking L/ I/ H (5)	Located within Proposed R/W(6)	Add't File Review/ Interviews Recom-mended?
H	Southwest California Gas Company	155 S. G Street	Municipal gas plant. Closed LUST case, HIST Cortese, four active USTs onsite.	R, D, H	H	Y	Y
I	Signal Oil Company	173 S. G Street	Office building. Closed Envirostor, CERCLIS-NFRAP.	R, D, H	L	N	N
J	Southwest Metal Company	740 W. Congress Street	Scrap metal recycling facility. Open Envirostor and CERCLIS listings.	R, D, H	H	N	Y
K	Department of Homeland Security Office Building	655 W. Rialto Avenue	Federal government office building. Open Envirostor listing.	R, D, H	H	N	Y
L	Bekins Moving and Storage	134 S. E Street	Former moving company. Three USTs listed in HIST UST database. No additional UST information available.	R, D, H	H	Y	Y
M	Pep Boys Automotive	147 S. E Street	Automotive repair facility.	R, D, H	I	N	Y
N	San Bernardino City FD Maintenance Shop	120 S. D Street	Fire Dept. maintenance shop. One UST listed in SWEEPS UST and HIST UST databases. No additional UST information available.	R, D, H	H	Y	Y
O	U-Haul	110 S. D Street	Commercial moving company. Two closed LUST cases onsite.	R, D, H	H	N	Y

HDR Map Code (1)	Site Name	Address	Site Operations Relative to Hazmat Issues(2), Regulatory Listing(3)	Data Source (4)	Risk Ranking L/ I/ H (5)	Located within Proposed R/W(6)	Add't File Review/ Interviews Recom-mended?
P	Vacant Lot, site of proposed Transit Village Core Project Area	South of railroad tracks, and west of E Street	Former railroad maintenance area. Targeted Site Investigation area per DTSC review.	R, D, H	I	Y	Y
Q	**Former rail car repair facility and Edison Electric Power House**	**South of railroad tracks, and east of E Street**	**Former rail car repair facility and power house with UST identified in Sanborn map.**	**R, H**	**H**	**Y**	**Y**
R	**Carry Shell Service Station**	**1077 W. 3rd Street**	**HSS.**	**R, H**	**H**	**N**	**Y**
S	**Union Oil Company**	**789 W. Rialto Avenue**	**HSS.**	**R, H**	**I**	**N**	**Y**
T	**Bob's Service Station**	**415 W. Rialto Avenue**	**HSS.**	**R, H**	**I**	**N**	**Y**
U	**Service Station**	**115 S. E Street**	**FSS (currently Greenwood's Uniforms)**	**R, H**	**I**	**N**	**Y**
V	**Economy Cleaners/Body Shop**	**133 S. E Street**	**Former body shop and laundromat.**	**R, H**	**I**	**Y**	**Y**

Sites listed in bold print are considered by ASTM to be a Recognized Environmental Concern (REC) or Historic REC (HREC)

(1) Corresponds to location of site as indicated in Appendices A and B
(2) CSS = Current Service Station, FSS= Former Service Station, HSS = Historic Service Station (no longer present)
(3) LUST=Leaking Underground Storage Tank, UST= Underground Storage Tank, DTSC = Dept. of Toxic Substances Control. Complete list of acronyms identified in EDR report in Appendix C
(4) Indicates primary information sources for listing: R=Reconnaissance, D=Database, H=Historical Source (city Directories, historical aerial photographs)
(5) Risk of potential impacts onsite, Low / Indeterminate / High
(6) Sites may be partially or entirely within proposed right-of-way (R/W)

HAZARDOUS MATERIALS SITES

HDR Map Code[1]	Site Name	Address/ Assessor Parcel Number	Site Operations Relative to Hazmat Issues[2], Regulatory Listing[3]	Data Source[4]	Risk Ranking L/ I/ H[5]	Add't File Review/ Interviews Conducted	Phase II Preliminary Site Investigation Recommended[6]?
A	SCRRA Depot	1170 and 1260 W. 3rd Street/ (Several APNs)	Railroad depot. Open SLIC, open LUST, HIST Cortese, HIST UST listings.	R, D, H	H	No	Yes, Onsite
B	Precision Automotive	909 W. 2nd Street/ 0138-312-56	Auto repair facility. CA FID UST, SWEEPS UST. No updated UST information available.	R, D, H	I	Interview Only	Yes, Public R/W
C	Historic Service Station	895 W. 2nd Street/ 0134-331-26	HSS. Open LUST case.	R, D, H	H	File Review Only	No
D	Snow Freight Lines/ Super Cal Express	958 W. Rialto Avenue/ 0138-312-16,57	Commercial trucking facility. One closed LUST case, two USTs listed in HIST UST database.	R, D, H	H	Yes	Yes, Onsite
E	Pacific Van and Storage	815 W. Rialto Avenue/ 0136-011-46	Commercial trucking facility. CA FID UST, and SWEEPS UST listing. No updated UST information available.	R, D, H	I	Interview Only	Yes, Public R/W
F	Viking Tire	747 W. Rialto Avenue/ 0136-011-22, 28, & 27	Tire supply and repair facility. Closed LUST case, and HIST Cortese listing.	R, D, H	H	Yes	Yes, Public R/W
G	San Bernardino Central Metal	144 S. G Street/ 0136-011-31, 0136-091-11,12	Scrap metal recycling facility. NPDES permit, SWRCY listing, possible CERCLIS listing.	R, D, H	H	Yes	Yes, Onsite
H	Southern California Gas Company	155 S. G Street/ 0136-101-14,15, & 21	Natural gas facility. Closed LUST case, HIST Cortese, four active USTs onsite.	R, D, H	H	File Review Only	Yes, Onsite
I	Signal Oil Company	173 S. G Street/ 0136-101-11	Office building. Closed Envirostor, CERCLIS-NFRAP.	R, D, H	L	No	No
J	Southwest Metal Company	740 W. Congress Street/ 0136-091-15	Scrap metal recycling facility. Open Envirostor and CERCLIS listings.	R, D, H	H	No	No
K	Department of Homeland Security Office Building	655 W. Rialto Avenue/ 0136-021-28	Federal government office building. Open Envirostor listing.	R, D, H	H	File Review Only	Yes, Onsite
L	Bekins Moving and Storage	134 S. E Street/ 0136-111-01	Former moving company. Three USTs listed in HIST UST database.	R, D, H	H	Yes	Yes, Onsite
M	Pep Boys Automotive	147 S. E Street	Automotive repair facility.	R, D, H	I	No	No
N	San Bernardino City FD Maintenance Shop	120 S. D Street	Fire Dept. maintenance shop. One UST listed in SWEEPS UST and HIST UST databases. No additional UST information available.	R, D, H	H	No	No
O	U-Haul	110 S. D Street	Commercial moving company. Two closed LUST cases onsite.	R, D, H	H	No	No
P	Vacant Lot, site of proposed Transit Village Core Project Area	South of railroad tracks, and west of E Street/ 0136-111-24	Former railroad maintenance area. Targeted Site Investigation area per DTSC review.	R, D, H	I	File Review Only	Yes, Onsite
Q	Former rail car repair facility and Edison Electric Power House	South of railroad tracks, and east of E Street	Former rail car repair facility and power house with UST identified in Sanborn map.	R, H	H	No	No
R	Carry Shell Service Station	1077 W. 3rd Street/ 0138-271-01	HSS.	R, H	H	No	Yes, Public R/W
S	Union Oil Company	789 W. Rialto Avenue/ 0136-011-19	HSS.	R, H	I	Yes	Yes, Public R/W
T	Bob's Service Station	415 W. Rialto Avenue	HSS.	R, H	I	No	No
U	Service Station	115 S. E Street	FSS (currently Greenwood's Uniforms)	R, H	I	Interview Only	No
V	Economy Cleaners/Body Shop	133 S. E Street	Former body shop and laundromat.	R, H	I	Interview Only	No
W	Vacant Building	777 W. Rialto Avenue	Possible former recycling facility.	R, I	I	Interview Only	Yes, Onsite
X	Vacant Lot	Located north of the tracks and west of E Street/ 0136-021-23, 0136-021-25 & 0136-021-12	Former distribution warehouse possibly with USTs onsite.	I, H	I	No	Yes, Onsite
Y	Pacific Pride Service Station	1405 W. Rialto Avenue	CSS. Closed LUST case onsite.	R, D, H	H	File Review Only	No
Z	BNSF Maintenance yard	1500 W. Rialto Avenue	Former BNSF railroad maintenance yard and current commercial trucking operations. CHMIRS, HMIRS, SLIC listings.	R, D, H	H	No	No
AA	Inland Beverage Company	223 S. G Street	Former beverage distribution facility. One closed LUST case onsite.	R, D, H	H	No	No
AB	Chubby Chassis	275 S. G Street	Former auto repair facility. One closed LUST case onsite	R, D, H	H	No	No

Sites listed in bold print are considered by ASTM to be a Recognized Environmental Concern (REC) or Historic REC (HREC). For definition of REC/HREC, please refer to June 2010 Phase I Environmental Site Assessment.

(1) Corresponds to location of site as indicated in Figure 2

(2) CSS = Current Service Station, FSS= Former Service Station, HSS = Historic Service Station (no longer present)

(3) LUST=Leaking Underground Storage Tank, UST= Underground Storage Tank, DTSC = Dept. of Toxic Substances Control. Complete list of acronyms identified in Appendix C of June 2010 Phase I Environmental Site Assessment

(4) Indicates primary information sources for listing: R=Reconnaissance, D=Database, H=Historical Source (city directories, historical aerial photographs), I=Interview

(5) Risk of potential impacts onsite, Low / Indeterminate / High

(6) Column indicates a recommendation for additional investigation in the form of a Phase II Preliminary Site Investigation (PSI) for the site. The PSI may be conducted within the site's property boundaries (indicated as "Onsite") or within public right-of-way (R/W), which includes railroad R/W and City of San Bernardino R/W (roadways).

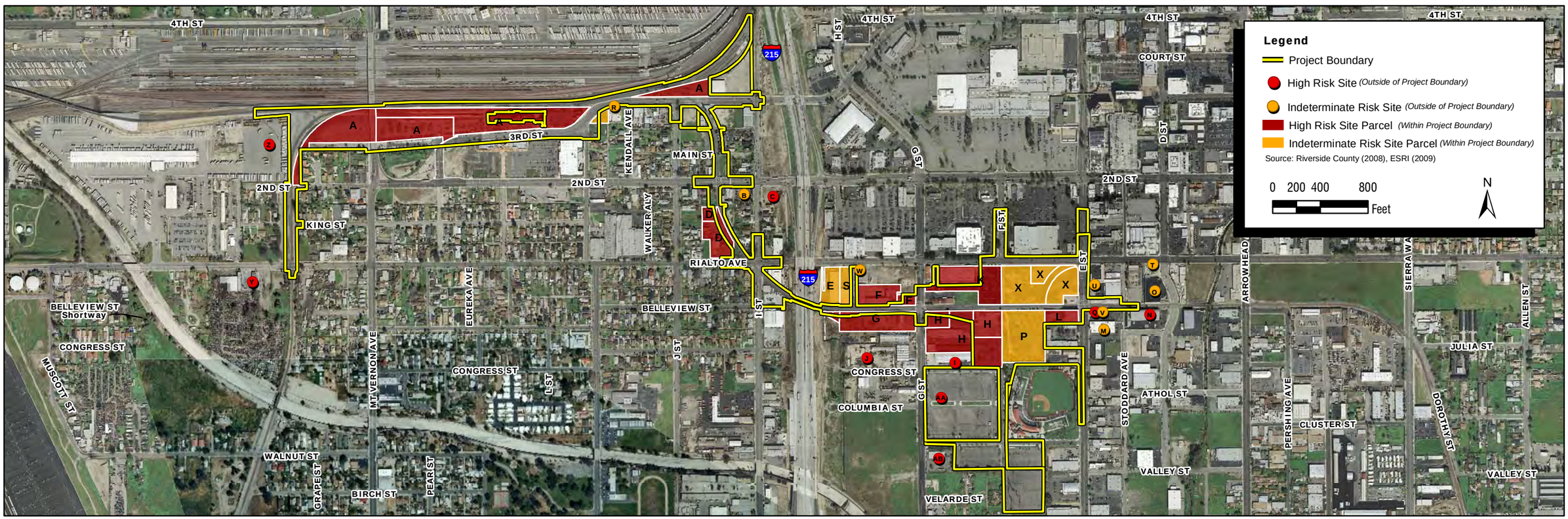


Figure 3.7-1
Phase I Environmental Site Assessment
Downtown San Bernardino Passenger Rail Project

ADDITIONAL FINDINGS

HDR ONE COMPANY Many Solutions℠	Technical Memorandum
To: Mitch Alderman, San Bernardino Associated Governments	
From: Colleen Murray Kelly W. Kading, CPG CHMM	Project: Redlands First Mile Phase I Environmental Site Assessment
CC: Justin Wheeler, HDR Irvine Hazmat Files, HDR Phoenix	
Date: March 23, 2011	

RE: Additional Findings, Redland First Mile Environmental Site Assessment

The purpose of this memorandum is to provide the San Bernardino Associated Governments (SANBAG) with additional findings related to the Redland First Mile (RFM) Environmental Site Assessment (ESA) report completed in June 2010. Specifically, this memorandum serves to update information obtained from onsite interviews and regulatory file reviews, as well as information gathered for the western-most portion of the RFM area of potential effect (APE), referenced as the Short Way, which was not included in the original ESA's project area. The following sections detail these updated findings.

BACKGROUND

The original ASTM-compliant ESA was conducted by HDR, Inc (HDR) in June 2010. At that time, the project area's boundaries began at the Southern California Regional Rail Authority (SCRRA) San Bernardino Depot and followed the BNSF Redlands Subdivision railroad tracks south and east to D Street. The ESA process included a site reconnaissance of the project area, a review of various historical sources, and an environmental database review produced by Environmental Data Resources, Inc. (EDR). The ESA investigative process identified 22 sites of concern. The 'site of concern' classification was based on current or historical operations and/or regulatory listing(s) associated with a site (most frequently underground storage tanks or leaking underground storage tanks) that may have contributed to soil contamination at the site, or in the vicinity. At the time of the original ESA report, onsite interviews (an ASTM-required component of the ESA) were not permitted. In addition, due to limitations of the state of California's regulatory file review process, files for only two of the 22 sites were made available to HDR personnel at that time. Based on the findings of the ESA, HDR recommended that onsite interviews and additional regulatory file review be conducted for 20 of the 22 sites of concern. The two sites omitted from that recommendation were located a significant enough distance from the RFM APE that HDR personnel did not recommend any further investigation. Often in an ESA, sites of concern are highlighted but no additional action is recommended.

UPDATE PROCEDURE

In order to update the findings of the June 2010 RFM ESA, HDR conducted onsite interviews at the sites of concern, as permitted by site owners/operators. HDR also requested regulatory files for the 22 sites from the Santa Ana Regional Water Quality Control Board (SARWQCB), the Department of Toxic Substance Control (DTSC) and the San Bernardino County Fire Department. Additional online regulatory file reviews was conducted via the DTSC's online database (Envirostor) and the State Water Resources Control Board (SWRCB) online database (GeoTracker).

HDR also conducted a site reconnaissance, an environmental database review (also produced by EDR), and a historical sources review for the Short Way segment of the RFM project area. An updated figure depicting the entire RFM project area (and sites of concern) can be found in Appendix B.

UPDATED FINDINGS – ONSITE INTERVIEWS AND REGULATORY FILE REVIEW

- HDR personnel attempted to conduct onsite interviews with on December 20 and 21, 2010. In the event that a site was vacant, adjacent property owners/representatives were interviewed. In some instances, the site of concern and the adjacent properties were vacant, or no personnel authorized to grant an interview was onsite. In these instances, no interview was conducted. (Attempts were made

by HDR personnel to make contact with authorized personnel, however requests for information were not returned). Of the 20 sites of concern for which interviews were recommended, interviews were conducted at 11 of the sites. Details regarding the onsite interviews can be found in the data table included in Appendix A.

- Of the 20 regulatory file review requests made to the DTSC, SARWQCB and the San Bernardino Fire Department, records for only five of the sites were returned. Records for two additional sites were reviewed via the online data bases referenced above. Details regarding the regulatory file review can be found in the data table included in Appendix A.
- Based on the findings of the interviews and file review two additional sites of concern were identified along the RFM project area. The two sites (Map Codes W, and X) have been included in the figure included in Appendix B.

UPDATED FINDINGS – SHORT WAY ASSESSMENT

- HDR personnel conducted a site reconnaissance of the Short Way on January 20, 2011. The reconnaissance included the SCRRA depot, and the segment of tracks located west of Mount Vernon, and south to Rialto Avenue. Land use for this portion of the project area was consistent with the remainder of the RFM project area (commercial, industrial and residential development). No sites of concern were identified from the site reconnaissance of the Short Way.
- An online environmental database review was produced by EDR in January 2011. The report identified the following sites of concern:
    - Merit Oil/Pacific Pride located at 1405 W. Rialto Avenue (Map Code Y). One leaking underground storage tank (LUST) case was opened at the site in 1998 and closed in 1999. Based on its LUST listing, the site is considered a high-risk site of concern and a Recognized Environmental Concern (REC). However, based on the closed status of the case, the site is considered a Historic REC (see original ESA for detailed description of a REC and Historic REC). Based on its cross-to-downgradient location, no additional action is recommended for the site.
    - Burlington Northern Santa Fe (BNSF) maintenance yard located at 1500 W. Rialto Avenue (Map Code Z). The EDR report contains numerous listings for the site, including several Hazardous Materials Incident Report System (HMIRS) listings, two California Hazardous Materials Incident Report System (CHMIRS) listings, and one Spills, Leaks, Investigations and Cleanups (SLIC) listing. Based on the facility operations (railroad maintenance facility) and regulatory listings associated with the site, the BNSF yard is considered a high-risk site of concern and a REC. However, based on the distance and cross-to-downgradient location of the site in relation to the current APE, no additional action is recommended for this site.
- While already identified as a site of concern, the 2011 EDR report identified a second listing for the SCRRA Depot (listed as Atchison Topeka Santa Fe) located at 1260 W. 3rd Street. Six underground storage tanks (USTs) were listed at the site. The current status of the tanks could not be determined from the information listed in the EDR report. Additional regulatory file review was conducted via the Envirostor and Geotracker online databases, however no files for the site were available. Based on the investigation currently underway related to the 1170 W. 3rd Street listing, no additional action is recommended for this listing.
- Historical research found that historical development along the Short Way was also consistent with the remainder of the RFM project area. No additional sites of concern were identified from the historical research of the Short Way.

RECOMMENDED ACTIONS TO SUPPORT FINAL DESIGN

- Based on the findings of the original ESA investigative process, as well as the updated findings of the regulatory file reviews and onsite interviews, HDR recommends additional investigation in the form of a Phase II Preliminary Site Investigation (PSI) for 14 sites located along the RFM. The 14 sites are listed in the data table included in Appendix A.

- Additional investigation for these sites is based on the location of known or suspected contamination and/or other details associated with the site's regulatory listing or current conditions. A drilling and sampling program should be implemented to verify or refute the existence of actionable concentrations of released hazardous materials. A specific and targeted analytical program should be implemented to determine the concentration of residual impacts, if present, for the 14 sites. The PSI may be conducted on the actual site's property, or on nearby roadways or railroad right-of-way depending on property acquisition and/or the APE for the project.
- HDR recommends that all construction contractors should be instructed to immediately stop all subsurface activities in the event that potentially hazardous materials are encountered, an odor is identified, or significantly stained soil is visible. Contractors should be instructed to follow all applicable regulations regarding discovery and response for hazardous materials encountered during the construction process.
- HDR recommends that if the original ESA report is 6 months old or older when property acquisition or construction begins, the recommendations within the report be reevaluated. The applicable ASTM standard (E 1527-05) requires a reevaluation of site conditions if a Phase I report (ESA) is older than 180 days (6 months).

The author of this Technical Memorandum is available for questions, if needed, at 602-522-7787.

PHASE I ENVIRONMENTAL SITE ASSESSMENT
FOR THE PROPOSED SAN BERNARDINO TRANSIT CENTER

DRAFT PHASE I
ENVIRONMENTAL SITE ASSESSMENT

Proposed San Bernardino Transit Center
595 West Rialto Avenue
San Bernardino, California 92410

June 27, 2008

Prepared for:
Brett Clavio
Omnitrans
1700 West Fifth Street
San Bernardino, California 92411

Prepared by:

ATC Associates Inc.
25 Cupania Circle
Monterey Park, California 91755

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1.0 EXECUTIVE SUMMARY

1.1 General Information

Project Information:
Proposed San Bernardino Transit Center

Consultant Information:
ATC Associates Inc.
25 Cupania Circle
Monterey Park, California 91755
Telephone: (323) 517-9780
Fax: (323) 517-9781
Reconnaissance Date: June 18, 2008
Site Assessor: Ms. Victoria Rojo
Senior Reviewer: Mr. Dino Orbiso
Environmental Professional: Mr. Dino Orbiso

Site Information:
595 West Rialto Avenue
San Bernardino, California 92410
San Bernardino County
Site Access Contact:
Mr. Brett Clavio
Omnitrans
Client Information:
Mr. Brett Clavio
Omnitrans
1700 West Fifth Street
San Bernardino, California 92411
Telephone: (909) 379-7256

We declare that, to the best of our professional knowledge and belief, we meet the definition of Environmental Professional as defined in § 312.10 part of 40 CFR 312. We have the specific qualifications based on education, training and experience to assess a Property of the nature, history and setting of the subject Property. We have developed and performed the all appropriate inquiries in conformance with the standards and practices set forth in 40 CFR Part 312.

Victoria Rojo
Staff Scientist
Site Assessor/Environmental Professional

Dino Orbiso, R.E.A.
Due Diligence Group Manager

Jim Madden, R.G., R.E.A., C.E.M.
Senior Reviewer/Environmental Professional
Senior Project Manager

1.2 Findings and Conclusions Summary

ATC Associates Inc. (ATC) has performed this Phase I Environmental Site Assessment (ESA) in conformance with the scope and limitations of ASTM Standard Practice E 1527-05. Any exceptions to, or deletions from, this practice are described in Section 2.0 of this report. The Property is located at the southeast corner of the Rialto Avenue and E Street Intersection, in the City of San Bernardino, San Bernardino County, California. The Property is a vacant parcel of land approximately five (5) acres in size. The Property is currently situated in an area that is primarily characterized by commercial usage.

This assessment has revealed evidence of *recognized environmental conditions* in connection with the Property.

FINDINGS AND CONCLUSIONS SUMMARY							
Report Section		**Further Action?**	**De Minimis Condition**	**Recognized Environmental Condition (REC)**	**Historical REC**	**ASTM Non-Scope Condition**	**Description**
4.0	**Client Provided Information**	No		x			See Footnote 1 below
5.1.1	**Federal Database Findings**	No					
5.1.2	**State and Tribal Database Findings**	No					
5.1.3	**Local Environmental Record Sources**	Yes					See Footnote 2 below
5.2	**Physical Setting Sources**	No					
5.3	**Historical Records Sources**	No		x			See Footnote 1 below
6.2	**Hazardous Substance Use, Storage and Disposal**	No					
6.3	**Underground Storage Tanks**	No					
6.4	**Aboveground Storage Tanks**	No					
6.5	**Other Petroleum Products**	No					
6.6	**Polychlorinated Biphenyls (PCBs)**	No					
6.7	**Unidentified Substance Containers**	No					
6.8	**Non-hazardous Solid Waste**	No					
6.9	**Wastewater**	No					
6.10	**Waste Pits, Ponds and Lagoons**	No					
6.11	**Sumps**	No					
6.12	**Septic Systems**	No					
6.13	**Stormwater Management System**	No					
6.14	**Wells**	No					
7.0	**Interviews**	No					
8.1	**Asbestos-Containing Material (ACM)**	No					
8.2	**Radon**	No					
8.3	**Lead in Drinking Water**	No					
8.4	**Lead-Based Paint (LBP)**	No					
8.5	**Mold Screening**	No					
8.6	**Additional Client Requested Conditions**	No					

1. The review of historical sources and client provided reports and assessments have identified features and activities on the Property that are environmental concerns. As early as 1888, the Property was used as a lumber facility, whose activities at various times included painting, milling, and possible treatment of lumber. Of note are two artesian wells that appear to have been used on the Property from 1888 to 1894. Historical documentation indicates that the Property was at some point used for rail, freight, and transit purposes. The historical documentation also indicates that various types of vehicular or rail and transit related maintenance activities have occurred on the Property. Previous assessments and investigations revealed that subsurface conditions on the Property have been impaired by historic activities on the Property. **More specificly, these sources indicate that soil at the Property has been impaired by petroleum hydrocarbons and metals. The historic activities and uses at the Property are considered *recognized environmental conditions.*** Of note as well are the uses of the adjacent properties. The review of the historical documentation indicates that historic adjacent property uses have included various industrial activities, including rail and freight facilities, automobile garages, and gasoline stations. Based on the types of processes, chemicals, activities that are often associated with these kinds of facilities, there is the potential of historical off site impacts to the Property.

2. A response from the San Bernardino County Fire Department is currently pending. ATC anticipates that the results from the file review at the fire department will be available for inclusion in the final version of this report.

1.3 Significant Data Gap Summary

The following is a summary of *significant data gaps* identified in this report.

SIGNIFICANT DATA GAP SUMMARY		
Report Section		**Description**
3.5	**Current Uses of Adjoining Properties**	No *significant data gap* identified.
4.2	**Environmental Liens or Activity and Use Limitations (AULs)**	The lien search is currently pending at this time.
5.1	**Standard Environmental Records**	No *significant data gap* identified.
5.2	**Physical Setting Sources**	No *significant data gap* identified.
5.3	**Historical Records Sources**	A response from the San Bernardino County Fire Department Hazardous Materials Division is pending.
6.1	**Methodology and Limiting Conditions**	No *significant data gap* identified.
7.0	**Interviews**	No *significant data gap* identified.

1.4 Recommendations

Based on information collected from the Phase I ESA, ATC offers the following recommendations for further action:

2.0 INTRODUCTION

2.1 Purpose

The purpose of this Phase I ESA was to identify *recognized environmental conditions* and certain potential environmental conditions outside the scope of ASTM Standard Practice E 1527-05 in connection with the Property at the time of the site reconnaissance. This report documents the findings, opinions and conclusions of the Phase I ESA.

2.2 Scope

This Phase I ESA was conducted in general accordance with the ASTM Standard Practice E 1527-05, consistent with a level of care and skill ordinarily practiced by the environmental consulting profession currently providing similar services under similar circumstances. Significant additions, deletions or exceptions to ASTM Standard Practice E 1527-05 are noted below or in the corresponding sections of this report. The scope of this assessment included an evaluation of the following:

- Physical setting characteristics of the Property through a review of referenced sources such as topographic maps and geologic, soils and hydrologic reports.

- Usage of the Property, adjoining properties and surrounding area through a review of referenced historical sources such as land title records, fire insurance maps, city directories, aerial photographs, prior reports and interviews.

- Observations and interviews regarding current Property usage and conditions including: the use, treatment, storage, disposal or generation of hazardous substances, petroleum products, hazardous wastes, non-hazardous solid wastes and wastewater.

- Usage of adjoining and surrounding area properties and the likely impact of known or suspected releases of hazardous substances or petroleum products from those properties on the Property.

- Information in referenced environmental agency databases and local environmental records, within the specified approximate minimum search distance from the Property.

The scope of the assessment also included consideration of the following environmental issues or conditions that are beyond the scope of ASTM Standard Practice E 1527-05:

- Radon document review, consisting of the review of published radon data with regard to the potential for elevated levels of radon gas in the surrounding area of the Property.

- Lead in drinking water data review, consisting of contacting the water supplier for information regarding whether or not the potable water provided to the Property meets or exceeds drinking water standards for lead.

- Wetlands document review, consisting of a review of a current National Wetlands Inventory map of the surrounding area to note if the Property is identified as having a wetland.

- Flood plain document review, consisting of a review of a reasonably ascertainable flood plain map of the surrounding area to note if the Property is identified as being located within a flood plain.

Significant Assumptions

Any assumptions in this report were not considered as having significant impact on the determination of *recognized environmental conditions* associated with the Property.

2.4 Limitations and Exceptions

ATC has prepared this Phase I ESA report using reasonable efforts to identify *recognized environmental conditions* associated with hazardous substances or petroleum products at the Property. Findings contained within this report are based on information collected from observations made on the day(s) of the site reconnaissance and from reasonably ascertainable information obtained from certain public agencies and other referenced sources.

The ASTM Standard Practice E 1527-05 recognizes inherent limitations for Phase I ESAs, including, but not limited to:

- *Uncertainty Not Eliminated* – A Phase I ESA cannot completely eliminate uncertainty regarding the potential for *recognized environmental conditions* in connection with any property.

- *Not Exhaustive* – A Phase I ESA is not an exhaustive investigation of the Property and environmental conditions on such Property.

- *Past Uses of the Property* – Phase I requirements only require review of standard historical sources at five year intervals. Therefore, past uses of Property at less than five year intervals may not be discovered.

Users of this report may refer to ASTM Standard Practice E 1527-05 for further information regarding these and other limitations. This report is not definitive and should not be assumed to be a complete and/or specific definition of all conditions above or below grade. Current subsurface conditions may differ from the conditions determined by surface observations, interviews and reviews of historical sources. The most reliable method of evaluating subsurface conditions is through intrusive techniques, which are beyond the scope of this report. Information in this report is not intended to be used as a construction document and should not be used for demolition, renovation, or other property construction purposes. Any use of this report by any party, beyond the scope and intent of the original parties, shall be at the sole risk and expense of such user.

ATC makes no representation or warranty that the past or current operations at the Property are, or have been, in compliance with all applicable federal, state and local laws, regulations and codes. This report does not warrant against future operations or conditions, nor does it warrant

warrant against operations or conditions present of a type or at a location not investigated. Regardless of the findings stated in this report, ATC is not responsible for consequences or conditions arising from facts not fully disclosed to ATC during the assessment.

An independent data research company provided the government agency database referenced in this report. Information on surrounding area properties was requested for approximate minimum search distances and is assumed to be correct and complete unless obviously contradicted by ATC's observations or other credible referenced sources reviewed during the assessment. ATC shall not be liable for any such database firm's failure to make relevant files or documents properly available, to properly index files, or otherwise to fail to maintain or produce accurate or complete records.

ATC used reasonable efforts to identify evidence of aboveground and underground storage tanks and ancillary equipment on the Property during the assessment. "Reasonable efforts" were limited to observation of accessible areas, review of referenced public records and interviews. These reasonable efforts may not identify subsurface equipment or evidence hidden from view by things including, but not limited to, snow cover, paving, construction activities, stored materials and landscaping.

Any estimates of costs or quantities in this report are approximations for commercial real estate transaction due diligence purposes and are based on the findings, opinions and conclusions of this assessment, which are limited by the scope of the assessment, schedule demands, cost constraints, accessibility limitations and other factors associated with performing the Phase I ESA. Subsequent determinations of costs or quantities may vary from the estimates in this report. The estimated costs or quantities in this report are not intended to be used for financial disclosure related to the Financial Accounting Standards Board (FASB) Statement No. 143, FASB Interpretation No. 47, Sarbanes/Oxley Act or any United States Securities and Exchange Commission reporting obligations, and may not be used for such purposes in any form without the express written permission of ATC.

ATC is not a professional title insurance or land surveyor firm and makes no guarantee, express or implied, that any land title records acquired or reviewed in this report, or any physical descriptions or depictions of the Property in this report, represent a comprehensive definition or precise delineation of Property ownership or boundaries.

The Environmental Professional Statement in Section 1.1 of this report does not "certify" the findings contained in this report and is not a legal opinion of such *Environmental Professional*. The *Environmental Professional* Statement is intended to document ATC's opinion that an individual meeting the qualifications of an Environmental Professional was involved in the performance of the assessment and that the activities performed by, or under the supervision of, the *Environmental Professional* were performed in conformance with the standards and practices set forth in 40 CFR Part 312 per the methodology in ASTM Standard Practice E 1527-05 and the scope of work for this assessment.

Per ASTM Standard Practice E 1527-05, Section 6, User Responsibilities, the Client of this assessment has specific obligations for performing tasks during this assessment that will help identify the possibility of *recognized environmental conditions* in connection with the Property. Failure by the Client to fully comply with the requirements may impact their ability to use this report to help qualify for *Landowner Liability Protections* (LLPs) under Comprehensive

Environmental Response, Compensation, and Liability Act (CERCLA). ATC makes no representations or warranties regarding a Client's qualification for protection under any federal, state or local laws, rules or regulations.

In accordance with the ASTM Standard Practice E 1527-05, this report is presumed to be valid for a six month period. If the report is older than six months, the following information must be updated in order for the report to be valid: (1) regulatory review, (2) site visit, (3) interviews, (4) specialized knowledge and (5) environmental liens search. Reports older than one year may not meet the ASTM Standard Practice 1527-05 and therefore, the entire report must be updated to reflect current conditions and Property-specific information.

Other limitations and exceptions that are specific to the scope of this report may be found in corresponding sections.

2.5 Special Terms and Conditions (Client Reliance)

This report is for the use and benefit of, and may be relied upon by, Omnitrans (Client), and any of its affiliates, and third parties authorized in writing by Client and ATC, including the lender(s) in connection with a secured financing of the Property, and their respective successors and assigns. Any third party agrees by accepting this report that any use or reliance on this report shall be limited by the exceptions and limitations in this report, and with the acknowledgment that actual site conditions may change with time, and that hidden conditions may exist at the Property that were not discovered within the authorized scope of the assessment. Any use by or distribution of this report to third parties, without the express written consent of ATC, is at the sole risk and expense of such third party.

ATC makes no other representation to any third party except that it has used the degree of care and skill ordinarily exercised by environmental consultants in the preparation of the report and in the assembling of data and information related thereto. No other warranties are made to any third party, either expressed or implied. Unless otherwise agreed upon in writing by ATC and a third party, ATC's liability to any third party authorized to use or rely on this report with respect to any acts or omissions shall be limited to a total maximum amount of $100,000.

3.0 SITE DESCRIPTION

3.1 Location and Legal Description

The Property is located at the southeast corner of the intersection of Rialto Avenue and E Street, in the City of San Bernardino, San Bernardino County, California. The Property is a vacant parcel of land approximately five (5) acres in size. The Assessor's Parcel Numbers for the Property are 0136-021-12, 0136-021-23, 0136-021-24 and 0136-021-25.

3.2 Surrounding Area General Characteristics

The surrounding area is generally level and developed for commercial and recreational uses. A detailed listing of adjoining properties is provided in Section 3.5.

3.3 Current Use of the Property

The Property is currently vacant and undeveloped.

3.4 Description of Property Improvements

The following table provides general descriptions of the Property improvements.

PROPERTY IMPROVEMENTS	
Size of Property (approximate)	5 acres
General Topography of Property	Generally level
Adjoining and/or Access/Egress Roads	Rialto Avenue to the north and E Street to the east.
Paved or Concrete Areas (including parking)	Site is vacant and undeveloped
Unimproved Areas	None
Landscaped Areas	None
Surface Water	None
Potable Water Source	City of San Bernardino Water Department
Sanitary Sewer Utility	City of San Bernardino
Storm Sewer Utility	City of San Bernardino
Electrical Utility	Southern California Edison
Natural Gas Utility	Southern California Gas
Current Occupancy Status	Site is vacant and undeveloped
Unoccupied Buildings/Spaces	Site is vacant and undeveloped
Number of Occupied Buildings	Site is vacant and undeveloped
General Building Description	Site is vacant and undeveloped
Number of Floors	Not applicable
Total Square Feet of Space (approximate)	Site is vacant and undeveloped
Construction Completion Date (year) (approximate)	Site is vacant and undeveloped
Construction Type	Site is vacant and undeveloped
Interior Finishes Description	Site is vacant and undeveloped
Exterior Finishes Description	Site is vacant and undeveloped

PROPERTY IMPROVEMENTS	
Cooling System Type	Site is vacant and undeveloped
Heating System Type	Site is vacant and undeveloped
Emergency Power	None

3.5 Current Uses of Adjoining Properties

The current uses of the adjoining properties were observed as follows:

North – Adjacent to the north of the Property is Rialto Avenue, beyond which is a commercial retail center anchored by Food 4 Less (555 West 2nd Street) and Latino Services Offices (108 North E Street). To the northeast of the Property, at the northeast intersection of E Street and Rialto Avenue, is the Main Street Hand Wash (101 North E Street).

East – Adjacent to the east of the Property is E Street, beyond which is Astro Motel (111 South E Street).

South – Adjacent to the south of the property are the railroad tracks owned by the Atchison, Topeka and Santa Fe Railway Company (ATSF), beyond which is a vacant parcel of land. Further beyond is the Arrowhead Credit Union Park (280 South E Street). Located adjacent to the southeast corner of the Property, across the ATSF rail tracks is a large multi-story building occupied by Bekins Moving and Storage (134 E Street).

West – Adjacent to the west of the Property is a small unnamed road, portions of which are dirt and portions of which are paved, beyond which is the United States Citizenship and Immigration Services Field Office (655 West Rialto Avenue) and associated parking lot.

The properties located to the north (Food 4 Less, 555 2nd Street), northeast (Main Street Hand Car Wash, 101 North E Street), west (Homeland Security Field Office, 655 West Rialto Avenue), and southeast (Bekins Moving and Storage Building, 134 E Street) regulatory databases reviewed by Environmental Data Resources (EDR) on their database report provided to ATC. Further discussion of these listings can be found in section 5.1.2.

4.0 CLIENT PROVIDED INFORMATION

The following section summarizes information (if any) provided by Omnitrans (the Client) with regard to the Phase I ESA. Documentation may be found in **Appendix D** or where referenced in this report.

4.1 Title Records

The Client provided no title records pertaining to the Property. The acquisition of a chain-of-title report was not a part of the scope of services for this ESA.

4.2 Environmental Liens or Activity and Use Limitations (AULs)

User provided no information regarding property environmental liens or activity and use limitations.

Additionally, ATC requested a search for environmental liens and AULs affecting the property from Environmental Data Resources, Inc. (EDR) of Milford, Connecticut. The lien search report is currently pending and results of the lien search are anticipated to be complete by the final version of this report.

4.3 Specialized Knowledge

The Client provided ATC with documentation indicating that prior investigations and assessments had identified *recognized environmental conditions* associated with the Property. References to the documentation is used throughout this report.

4.4 Significant Valuation Reduction for Environmental Issues

The Client provided no information regarding a significant valuation reduction for environmental issues associated with the Property.

4.5 Owner, Property Manager and Occupant Information

The Client identified the Property owner as the Union Pacific Railroad.

4.6 Reason for Performing Phase I ESA

According to the Client, the reason for conducting this ESA is to investigate potential environmental concerns associated with the Property in conjunction with a potential purchase of the Property.

4.7 Other Client Provided Documents

ATC was provided with the following prior environmental reports:

OTHER USER PROVIDED DOCUMENTS		
Title	**Date (if known)**	**Author and/or Source (if known)**
Revised Environmental Site Assessment North Block San Bernardino Yard	March 1992	Earth Technology Corporation
Report for Site Investigation and Focused Site Remediation	May 1995	ERM – West, Inc.
NESHAP Pre-Demolition Survey, Union Pacific Railroad	October 24, 1997	AMI Group
Additional Phase II Investigation	October 1999	GeoMatrix
Proposed Additional Soil Investigation and Remedial Activities	November 1, 2000	ERM
No Further Action Letter At North Block , Former San Bernardino Rail Yard	May 8, 2001	California Regional Water Quality Control Board – Santa Ana Region

Further discussion of the documentation listed above may be found in relevant sections of this report.

5.0 RECORDS REVIEW

5.1 Standard Environmental Records

The regulatory agency database report discussed in this section, provided by EDR of Milford, Connecticut, was reviewed for information regarding reported releases of hazardous substances and petroleum products on or near the Property. ATC also reviewed the "unmappable" (also referred to as "orphan") listings within the database report, cross-referencing available address information and facility names. Unmappable sites are listings that could not be plotted with confidence, but are potentially in the general area of the Property based on the partial street address, city, or zip code. Any unmappable site that was identified by ATC as a being within the approximate minimum search distance from the Property based on the site reconnaissance and/or cross-referencing to mapped listings, is included in the discussion within this section. The complete regulatory agency database report may be found in **Appendix E**.

The following is a summary of the findings of the database review.

SUMMARY OF FEDERAL, STATE AND TRIBAL DATABASE FINDINGS			
Regulatory Database	**Approx. Minimum Search Distance**	**Property Listed?**	**Additional Sites Listed**
Federal National Priority List (NPL)	1 mile	No	0
Federal Delisted NPL	½ mile	No	0
Federal Comprehensive Environmental Response, Compensation, and Liability Information System (CERCLIS) List	½ mile	No	3
Federal CERCLIS No Further Remedial Action Planned (NFRAP) Sites	½ mile	No	1
Federal Resource Conservation and Recovery Act (RCRA), Corrective Action (CORRACTS) Facilities	1 mile	No	0
Federal RCRIS non- CORRACTS Treatment, Storage, and Disposal (TSD) Facilities	½ mile	No	0
Federal RCRA Generators	Property & Adjoining	No	0
Federal RCRA Non- Generators (RCRA Non Gen)	Property & Adjoining	No	0
Federal Facility Index System (FINDS) List	Property & Adjoining	No	0
Federal Institutional Control/Engineering Control Registry	Property	No	N/A
Federal Emergency Response Notification System (ERNS) List	Property	No	N/A
Federal Facility Index System (FINDS) List	Property	No	0
Federal Consent Sites	1 mile	No	0
State and Tribal NPL	1 mile	No	0
State and Tribal CERCLIS List (Envirostor)	½ mile	No	11
State and Tribal Landfill or Solid Waste Disposal Sites	½ mile	No	0

SUMMARY OF FEDERAL, STATE AND TRIBAL DATABASE FINDINGS			
Regulatory Database	**Approx. Minimum Search Distance**	**Property Listed?**	**Additional Sites Listed**
State Underground Storage Tanks (UST), California Facility Inventory Database (CA FID UST), Hazardous Substance Storage Container Database (HIST) UST, and Statewide Environmental and Planning System (SWEEPS UST)	Property & Adjoining	No	1 CA FID UST 1 HIST UST 1 SWEEPS UST
Facility and Manifest Data List (HAZNET)	Property	No	N/A
State and Tribal Leaking Underground Storage Tanks (LUST)	½ mile	No	14
Spills, Leaks, Incidents, and Cleanups (SLIC)	¼ mile	No	2
State and Tribal Institutional Control/Engineering Control Registry	Property	No	0
San Bernardino County Permit: San Bernardino County Fire Department Hazardous Materials Division (San Bern. Co. Permit)	¼ mile	No	1
State and Tribal Voluntary Cleanup Program (VCP) Sites	½ mile	No	1

5.1.1 Federal Agency Database Findings

The Property was not listed on any of the federal databases reviewed for this assessment. In addition, the adjacent facilities were not listed in the federal agency databases reviewed within their respective search distances of the Property.

Three CERCLIS listings were identified within one-half mile of the Property. The facilities are not on the NPL. In addition, based on distance, status (no site assessment work needed), and/or presumed hydrologic gradient (down to crossgradient), the facilities are not considered likely to have had an adverse environmental impact to the Property.

One NFRAP listing was identified within one-half mile of the Property. This site has been removed and archived from the inventory of CERCLIS sites. Based on hydrologic position (down to crossgradient), this facility is not considered likely to have had an adverse environmental impact to the Property.

5.1.2 State and Tribal Database Findings

The Property was not listed on any of the state databases reviewed for this assessment. However, several of the adjacent facilities were listed state agency databases reviewed within their respective search distances of the Property. Below a discussion of each adjacent facility identified by EDR.

Lemans Nissan Inc. (currently Main Street Hand Car Wash)
101 North E Street
Databases: CA FID UST, SWEEPS UST
Approximate Distance from the Property: Adjacent to the north
Assumed Groundwater Gradient: Upgradient

Regulatory Data Summary: According to the database report, this location is an active UST location with one 550-gallon UST containing waste oil and one 1,000-gallon UST containing leaded fuel product are reported at this location.
Discussion: Based on the lack of reported leaks (not identified on the LUST database), this UST location is not considered to present a concern to the Property. In addition, this facility is not listed on the Geotracker database as a leaking underground fuel tank (LUFT).

Bekins Moving & Storage
134 South E Street
Databases: HIST UST
Approximate Distance from the Property: Adjacent to the southeast
Assumed Groundwater Gradient: Downgradient
Regulatory Data Summary: According to the database report, three USTs containing premium product were located at this location.
Discussion: Based on the lack of reported leaks (not identified on the LUST database), this UST location is not considered to present a concern to the Property. In addition, this facility is not listed on the Geotracker database as a leaking underground fuel tank (LUFT).

Food 4 Less
555 West 2nd Street
Databases: San Bern. Co. Permit
Approximate Distance from the Property: Adjacent to the north
Assumed Groundwater Gradient: Upgradient
Regulatory Data Summary: According to the database report, this property is an active hazardous materials handler and is owned by the Ralphs Grocery Company. The SCFD permit expires in October 2008.
Discussion: Based on the lack of reported leaks (not identified on the LUST database or any other database associated with hazardous materials releases), this facility is not considered to present a concern to the Property. In addition, this facility is not listed on the Geotracker database as a leaking underground fuel tank (LUFT) or as a UST location.

Name of facility not provided (currently occupied by Homeland Security)
655 West Rialto Avenue
Databases: ENVIROSTOR
Approximate Distance from the Property: Adjacent to the west
Assumed Groundwater Gradient: Crossgradient
Regulatory Data Summary: According to information contained in the ENVIROSTOR database (ID# 36000020), a letter, dated March 23, 2000, informed the Department of Toxic Substances Control (DTSC) that the SBCFD is entering into an agreement with the City of San Bernardino, Economic Development Agency (owner and responsible party) to provide regulatory oversight for the investigation and remedial action at this location. The letter stated that the SBCFD was notified about lead contamination discovered during grading activities. This location was being developed by the City of San Bernardino as the site of a proposed INS building, which has since been constructed. ATC obtained a copy of this letter from the Envirostor database website maintained by the DTSC (http://www.envirostor.dtsc.ca.gov/public/). A copy of the SBCFD letter is included in Appendix L.

Discussion: Based on the apparent medium of contamination (lead in soil), impacts from this facility appear to have a minimal chance of migrating onto the Property. However, at the request of Omnitrans, ATC is pursuing further documentation from the SBCFD and RWQCB on this facility to determine the exact nature of the clean-up at the facility. If information provided by the SBCFD and RWQCB changes the conclusions of this report, an addendum will be issued to Omnitrans.

Ten additional ENVIROSTOR listings were identified within one-half mile of the Property. Four of the listings have a No Further Action status. The remaining ENVIROSTOR listings are located down/crossgradient from the Property or are approximately one-third mile away. Based on presumed hydrologic position, status, and/or distance, these facilities are not considered likely to have had an adverse environmental impact to the Property.

Fourteen LUST listings were identified within one-half mile of the Property. Twelve of the listings, have a status of case closed. One of the remaining LUSTs (895 2nd Street) is undergoing pollution characterization and has affected soil only. Based on case type and distance (approximately 0.4 miles) from the Property, this facility is not considered to have had an adverse environmental impact to the Property. The remaining LUST (195 D Street) is located approximately 0.25 miles east-northeast of the Property and gasoline and diesel have reportedly impacted the soil and drinking water aquifer. According to information obtained from Geotracker, this facility has a case closed status (July 26, 2006). Based on regulatory status, the remaining LUST is not considered likely to have had an adverse environmental impact to the Property.

One facility (119 South Arrowhead Avenue) was listed twice as a SLIC listing. Hanford Foundry was also listed as a CERCLIS, VCP, and ENVIROSTOR databases. The site occupies 10.5 acres of land and is currently a vacant lot with sparse vegetation. Site screenings and preliminary assessments have been completed. In July 2004, the DTSC entered into a Voluntary Cleanup Agreement (VCA) with Kenneth C. Bussey Trust for the Hanford Foundry site. Most recently, a site characterization report has been approved (2006) and annual groundwater monitoring is taking place (2007). Based on distance (0.37 miles) from the Property, presumed hydrologic position (crossgradient), and because a responsible party has been identified, this facility is not considered likely to have had an adverse environmental impact to the Property.

Based on distance, topography, assumed groundwater gradient, current regulatory status, and/or the absence of reported releases, none of the remaining sites listed in the state and tribal databases are considered to be a *recognized environmental condition* to the Property.

5.1.3 Local Environmental Records Sources

San Bernardino County Fire Department (SBCFD)

ATC submitted a written request to the San Bernardino County Fire Department (SBCFD) for available hazardous materials and underground storage tank files for the Property. A response from the SBCFD is currently pending. The lack of a response from the SBCFD is considered a data gap. ATC anticipates that documentation from the review of files should be available for inclusion in the final version of this report.

California EPA Department of Toxic Substances Control (DTSC)

According to the DTSC Envirostor online database (http://www.envirostor.dtsc.ca.gov/public/), there are no records for the Property.

Omnitrans informed ATC that the adjacent facility to the east of the Property was involved with an extensive cleanup several years ago prior to the construction of the existing building structure. EDR identified the facility on the Envirostor database. Based on the apparent medium of contamination (lead in soil), impacts from this facility appear to have a minimal chance of migrating onto the Property. However, at the request of Omnitrans, ATC is pursuing further documentation from the SBCFD and RWQCB on this facility to determine the exact nature of the clean-up at the facility. If information provided by the SBCFD and RWQCB changes the conclusions of this report, an addendum will be issued to Omnitrans.

Regional Water Quality Control Board (RWQCB)

ATC requested available LUST information from the RWQCB – Santa Ana Region. According to Ms. August Lucas with RWQCB, no files were found for the site. Additionally, ATC reviewed the RWQCB GeoTracker website (http://www.geotracker.swrcb.ca.gov/) for information related to USTs, LUSTs, or other environmental concerns on the Property. The Property was not listed on the GeoTracker Website.

South Coast Air Quality Management District's (SCAQMD)

ATC researched Permits to Operate (P/O), Facility Equipment List Reports (EQL), Notices to Comply (NTCs), and Notices of Violations (NOVs) pertaining to the property using the South Coast Air Quality Management District's (SCAQMD) on-line Facility Information Detail (FIND) database). for information regarding Permits to Operate (P/O), Facility Equipment List Reports (EQL), and Notices of Violations (NOVs) pertaining to the property. No records were found for the Property.

Other Local Environmental Records Sources

No additional local environmental records sources were reviewed.

5.2 Physical Setting Sources

5.2.1 Topography

According to the United States Geological Survey (USGS) 7.5 minute topographic quadrangle map of the San Bernardino South, California Quadrangle (1980), the Property is located at an elevation of approximately 1,035 feet above mean sea level (MSL). The surrounding area has a general slope toward the south. No water bodies are depicted on the Property. A copy of the USGS topographic map is included as **Figure 1** (**Appendix A**).

5.2.2 Geology

The Property is situated on approximately 1,000 feet of unconsolidated and semi-consolidated Holocene-aged alluvium consisting of silt, sand and gravel interspersed with lenticular deposits of silt and clay. These sediments are divided into three principal aquifers, by thick confining layers of silt and clay that rest on a probable basement complex of pre-Tertiary igneous and metamorphic rocks (USGS, 1963).

5.2.3 Soils

According to the United States Department of Agriculture soil survey website, http://websoilsurvey.nrcs.usda.gov, soils at the Property most likely belong to the Garngeville Fine Sandy Loam soil type. Grangeville soils are over 60 inches deep and are somewhat poorly drained. In a typical profile they have fine sandy loam surface layers approximately 12 inches thick. The subsoil consists of sandy loam, fine sandy loam and loam to at least 60 inches. Available water holding capacity is very high, approximately 21.4 inches for 60 inches of soil depth.

5.2.4 Hydrology

According to the Regional Water Quality Control Board (RWQCB) geotracker website, http://geotracker.swrcb.ca.gov, the depth to groundwater at a leaking underground storage tank (LUST) site located approximately 0.2 mile northwest of the property, was approximately 94 feet below ground surface in November of 2006. The direction of groundwater flow was reportedly toward the southeast, although historically, groundwater flow has primarily been toward the south-southwest (USGS, 1963).

Estimated groundwater levels and/or flow directions may vary due to seasonal fluctuations in precipitation, local usage demands, geology, underground structures, or dewatering operations. The actual groundwater flow direction under the Property can be accurately determined only by installing groundwater-monitoring wells, which was beyond the scope of this project.

According to the *Additional Phase II Investigation* conducted by Geomatrix in October of 1999, groundwater was detected in boring GMX-13 at approximately 37 feet bgs.

5.2.5 Other Physical Setting Sources

Flood Plain Map

According to information provided by Federal Emergency Management Agency (FEMA) website http://www.fema.gov, the Property is located in flood zone X, or areas outside the flood zone. The community/panel number for the Flood Insurance Rate Map for the property is 06071C 8681F and the effective date is March 18, 1996. A copy of the flood plain map is included in **Appendix L**.

Wetlands Map

According to the United States Fish and Wildlife Service (USFWS) wetlands mapper website. http://nwi.fws.gov, no wetlands are located on the Property or adjacent properties.

5.3 Historical Records Sources

The following table summarizes the findings of the research presented below pertaining to historical Property and surrounding area uses.

HISTORICAL USE SUMMARY				
Period	**Identified Historical Uses**		**Source(s)**	**Intervals/Comments**
	Property	**Surrounding Area**		
Prior to 1940	Lumber and Mill Yard Rail and Freight Yard Various Industrial Activities	Various industrial uses including rail and freight	Topographic Maps, Sanborn Fire Insurance Maps, Aerial Photographs, City directories	An1888 Fire Insurance map is the earliest record identified. Data gaps of 16 years (1906-1922). No use changes across data gap.
1940 to 1960	Rail and Freight Yard Various Industrial Activities	Various Industrial uses including rail and freight, commercial and retail	Topographic Maps, Aerial Photographs, Sanborn Fire Insurance Maps, City directories	No data gaps.
1961 to 1980	Rail and Freight Yard Various Industrial Activities	Various Industrial uses including rail and freight, commercial and retail	Topographic Maps, Aerial Photographs, Sanborn Fire Insurance Maps, City directories	No data gaps
1981 to present	Various Industrial uses including rail and freight, commercial, and vacant land	Various Industrial uses including rail and freight, commercial and retail	Topographic Maps, Aerial Photographs, , City directories	No data gaps.

Despite the data gap noted in the Historical Use Summary table, the Property usage appeared unchanged over the period in which the gap was identified; therefore the data gap does not significantly impact the findings of this report. As such, the requirements of ASTM Standard Practice E 1527-05 §8.3.2.1 §8.3.2.2 have been satisfied and, as stated in ASTM Standard Practice E 1527-05 §8.3.2.3, the historical research is considered complete.

5.3.1 Aerial Photographs

ATC reviewed available aerial photographs of the Property and surrounding areas provided by EDR. Available aerial photographs ranged from 1930 to 2002. The following are descriptions and interpretations from the aerial photograph review.

AERIAL PHOTOGRAPH SUMMARY		
Year	**Scale**	**Comments**
1930	1 inch = 666 feet	**Site Property**: The Property appears to be developed with three rectangular buildings. A possible railroad right-of-way appears to divide the Property. **North**: A paved road (currently Rialto Avenue) is located to the north, beyond which are graded areas, commercial properties, and a continuation of the possible railroad right-of-way. **East**: A paved road (currently E Street) is located to the east, beyond which are a commercial building and a graded lot. **South**: A railroad right of way is located to the south, beyond which are graded land and commercial and residential properties. **West**: Residential properties, undeveloped land, and a graded area are located to the west, beyond which is a paved road (currently G Street).
1938	1 inch = 555 feet	**Site Property**: The Property appears to be developed with five rectangular buildings, the largest located at the northeastern corner of the Property. A possible railroad right-of-way appears to divide the Property. **North**: A paved road (currently Rialto Avenue) is located to the north, beyond which are graded areas and a continuation of the possible railroad right-of-way. **East**: A paved road (currently E Street) is located to the east, beyond which are commercial properties. **South**: A railroad right of way is located to the south, beyond which are graded land and commercial and residential properties. **West**: Residential properties, undeveloped land, and a graded area are located to the west, beyond which is a paved road (currently G Street).
1953	1 inch = 555 feet	**Site Property**: The Property appears to be developed with five rectangular buildings. A possible railroad right-of-way appears to divide the Property. **North**: A paved road (currently Rialto Avenue) is located to the north, beyond which are commercial buildings and graded areas. **East**: A paved road (currently E Street) is located to the east, beyond which are commercial properties. **South**: A railroad right of way is located to the south, beyond which are graded land and commercial properties. **West**: Residential properties and undeveloped areas are located to the west, beyond which is a paved road (currently G Street).
1966	1 inch = 666 feet	**Site Property**: The Property appears to be developed with five rectangular buildings. A possible railroad right-of-way appears to divide the Property. Parked vehicles are located on the eastern half of the Property. **North**: A paved road (currently Rialto Avenue) is located to the north, beyond which are commercial buildings and a large parking lot. **East**: A paved road (currently E Street) is located to the east, beyond which are commercial properties. **South**: A railroad right of way is located to the south, beyond which are graded land and commercial properties. **West**: Graded lots, residential properties, and commercial buildings are located to the west, beyond which is a paved road (currently G Street).

AERIAL PHOTOGRAPH SUMMARY		
Year	**Scale**	**Comments**
1977	1 inch = 666 feet	**Site Property**: The Property appears to be mostly graded. Two rectangular buildings are located in the northwestern and southeastern corners of the Property. Possible vehicles appear along the eastern edge of the Property and what appear to be trees are also located on the Property. **North**: A paved road (currently Rialto Avenue) is located to the north, beyond which are a large commercial/industrial building and a parking lot. **East**: A paved road (currently E Street) is located to the east, beyond which are commercial properties. **South**: A railroad right of way is located to the south, beyond which are a mostly vacant lot and commercial properties. **West**: Graded lots, residential properties, and commercial buildings are located to the west, beyond which is a paved road (currently G Street).
1989 1994	1 inch = 666 feet	**Site Property**: The Property appears to be mostly graded. Some vegetation is located in the eastern and southern portions of the Property. In addition, two rectangular buildings are located in the northwestern and southeastern corners of the Property. **North**: A paved road (currently Rialto Avenue) is located to the north, beyond which are commercial properties and a large parking lot. **East**: A paved road (currently E Street) is located to the east, beyond which are commercial properties. **South**: A railroad right of way is located to the south, beyond which are a vacant lot and commercial properties. **West**: A mostly graded lot is located to the west, beyond which is a paved road (currently G Street).
2002	1 inch = 666 feet	**Site Property**: The Property appears to be mostly graded. Some vegetation is located in the eastern half of the Property. In addition, two rectangular buildings are located in the northwestern and southeastern corners of the Property. **North**: A paved road (currently Rialto Avenue) is located to the north, beyond which are commercial properties and a large parking lot. **East**: A paved road (currently E Street) is located to the east, beyond which are commercial properties. **South**: A railroad right of way is located to the south, beyond which are a vacant lot and commercial properties. **West**: A parking lot and commercial buildings are located to the west, beyond which is a paved road (currently G Street).
2005	1 inch = 484 feet	**Site Property**: The Property appears to be mostly graded. Some vegetation is located in the eastern half of the Property. **North**: A paved road (currently Rialto Avenue) is located to the north, beyond which are commercial properties and a large parking lot. **East**: A paved road (currently E Street) is located to the east, beyond which are commercial properties. **South**: A railroad right of way is located to the south, beyond which are a vacant lot and commercial properties. **West**: A parking lot and commercial buildings are located to the west, beyond which is a paved road (currently G Street).

The review of aerial photographs identified that the Property had been used for rail and transit purposes at various points during its history. Buildings observed on the various aerial photographs are most likely associated with the rail and transit activities that were known to have occurred on the Property. A review of additional historical sources, previous investigations,

investigations, and assessment reports has indicated previous uses of the Property, including the rail and transit activities, have impacted the subsurface on the Property. More specificly, these sources indicate that soil at the Property has been impaired by petroleum hydrocarbons and metals. The historic activities and uses at the Property are considered *recognized environmental conditions.*

Copies of reproducible aerial photographs are included in **Appendix F**.

5.3.2 Fire Insurance Maps

ATC reviewed available Sanborn Fire Insurance Maps of the Property and surrounding areas provided by EDR. Available maps ranged from 1888 to 1969. The following are descriptions and interpretations from the map review.

SANBORN FIRE INSURANCE MAP SUMMARY	
Year	**Comments**
1888	**Property**: The Property is developed with West Coast Lumber Company (which consists of large storage areas, offices, a mill, and other associated structures), and a landing platform. A reference indicating shaftings in the basement, shavings dumped into basement, and 12 barrels of water are located on the roof. A carriage painting area is identified on the eastern portion of the Property. **North**: 1st Street (currently Rialto Avenue), beyond which is San Bernardino Fuel & Lime Company (which consist of lumber storage, hay barn, office, dwellings, and stables), dwellings, San Bernardino Lodging House, a store, an office, and a recreation house. 2nd Street is located further to the north. **East**: Areas to the east are not shown. **South**: A railroad track is located to the south, beyond which is not shown. **West**: An alley is located to the west, beyond which are a dwelling, a stable, a Chinese Laundry, and vacant land.
1891	**Property**: The Property is developed with West Coast Lumber Company (which consists of large storage areas, offices, a mill, and other associated structures), a landing platform, carriage painting building, and a Santa Fe Passenger Station. A reference was made to a water tank on the roof of an equipment building. In addition, an artesian well is located southeast of the mill and a second artesian well is located in a building structure located directly south of the mill. **North**: 1st Street (currently Rialto Avenue), beyond which is San Bernardino Fuel & Lime Company (which consist of lumber storage, hay barn, office, dwellings, and stables), Jewerkoup & Hooks Lumber Yard, dwellings, a beer bottling facility, lumber storage, and a recreation house. 2nd Street is located further to the north. **East**: South E Street is located to the east, beyond which is not shown **South**: Santa Fe Railroad is located to the south, beyond which is not shown. **West**: An alley is located to the west, beyond which are dwellings, a Chinese Laundry, and vacant land.

SANBORN FIRE INSURANCE MAP SUMMARY	
Year	**Comments**
1894	**Property**: The Property is developed with West Coast Lumber Company (which consists of large storage areas, sheds, a mill, and an office/sleeping room), a platform, an agricultural implement storage building, and a depot (which consists of a waiting room and office). A reference to a 15-foot tank is made in a smaller building located adjacent to the mill. In addition, an artesian well is located southeast of the mill. **North**: 1st Street (currently Rialto Avenue), Redlands Colton & Riverside Motor Line (which runs along 1st Street then north/south toward 2nd Street), vacant land, a small office, lumber storage, dwellings and stables, and a boarding and lodging facility are located to the north. Holcomb Bros Wood Yard and Russ Lumber Company are located further to the north, beyond which is 2nd Street. **East**: South E Street is located to the east, beyond which is not shown **South**: A Railroad (Main Track) is located to the south, beyond which is not shown. **West**: An alley is located to the west, beyond which are dwellings, a Chinese Laundry, and vacant land.
1906	**Property**: The Property is developed with a building occupied by San Bernardino Lumber & Box Company's Shook Storage. A smaller building is located near the southeastern corner of the parcel and is occupied by A.T. & S.F Railroad Depot. Railroad spurs (Southern Pacific Company's San Bernardino Branch) divide the western and eastern portions of the parcel. Additional railroad tracks run northeast/southwest from the center of the parcel. **North**: 1st Street (currently Rialto Avenue) and the continuation of the railroad, beyond which are Southern Pacific Company's Railroad Yard, San Bernardino Lumber and Box Company (which consists of lumber storage, oil storage, and a box factory and associated boiler room, printing press, and saw filing areas). Dwellings and associated stables are located beyond the intersection of F Street and 1st Street, **East**: South E Street is located to the east, beyond which is not shown **South**: Atchison Topeka & Santa Fe Railroad (Main Track) is located to the south, beyond which are Gibson Lumber Company and Pacific Electric Railway Company (which consists of buildings used by the Engineering Department and Line Department, and a storage structure. **West**: An alley is located to the west, beyond which are dwellings and associated stables, and vacant land.

SANBORN FIRE INSURANCE MAP SUMMARY	
Year	**Comments**
1950	**Property**: The Property is developed with Crane Co. (which consists of a plumbing supplies warehouse, a pipe storage building with an attached "vault", and an associated automobile garage), Forest Lumber Company (which consists of a woodworking and lumber warehouse and an office and paints building, a wholesale beer and wine warehouse, a lime and cement warehouse, and a lumber shed), a store, a cooling tower, a Pacific Electric Store Room, and a Pacific Electric Railway Company Substation (No. 24), which was built in 1921. Railroad spurs (San Bernardino Branch) divide the western and eastern portions of the parcel. Additional railroad tracks run northeast/southwest from the center of the parcel. **North**: Rialto Avenue (1st Street) and the continuation of the railroad, beyond which are a beverage warehouse and "Fr't" House, an auto service and oil warehouse, stores and a gasoline and oil station, freight depot, trucks storage building, Acme Color Printing Company Ltd. Printing Paper Warehouse (which includes an area for engraving and an office) are located to the north. A tractor service, storage buildings for implements and farm implements, a store, Hayward I.B.R. & Inv. Co. (which includes a lumber shed, a structure for building materials and paints, "office & pints" building), General Mills Inc. facility (which includes a building materials and lumber storage area, hay and feed building, and a fuel storage area), a facility used for wholesale produce (old railroad cars are used for cold storage), an "auto tops and upholstering" facility, auto repair facility, restaurant, followed by 2nd Street are located further to the north. Numerous stores and a wholesale meat store, a parcel service building and furniture storage are located beyond the intersection of F Street and Rialto Avenue to the northwest. **East**: South E Street is located to the east, beyond which is not shown **South**: Atchison Topeka & Santa Fe Railroad (Main Track) is located to the south, beyond which are Gibson Lumber Company and Pacific Electric Railway Company (which consists of buildings used by the Engineering Department and Line Department, and a storage structure. **West**: An alley is located to the west, beyond which are an auto repair facility and a vacant lot are located to the west. A ballroom,. beverage warehouse, dwellings, associated automobile garages, and South G Street are located further to the west.

SANBORN FIRE INSURANCE MAP SUMMARY	
Year	**Comments**
1953	**Property**: The Property is developed with a beverage warehouse, an automobile garage building with an attached "vault", a store, a wholesale beer and wine warehouse, a beverages warehouse, a cooling tower, a Pacific Electric Store Room, and some type of auto warehouse. Railroad spurs (San Bernardino Branch) divide the western and eastern portions of the parcel. Additional railroad tracks run northeast/southwest from the center of the parcel. **North**: Rialto Avenue and the continuation of the railroad, beyond which are a beverage warehouse and "Fr't" House, an auto service and oil warehouse, stores and a gasoline and oil station, freight depot, trucks storage building, Acme Color Printing Company Ltd. Printing Paper Warehouse (which includes an area for engraving and an office) are located to the north. A tractor service, storage buildings for implements and farm implements, a store, Hayward I.B.R. & Inv. Co. (which includes a lumber shed, a structure for building materials and paints, "office & pints" building), General Mills Inc. facility (which includes a building materials and lumber storage area, hay and feed building, and a fuel storage area), a facility used for wholesale produce (old railroad cars are used for cold storage), an "auto tops and upholstering" facility, auto repair facility, restaurant, followed by 2nd Street are located further to the north. Numerous stores and a wholesale meat store, a parcel service building and furniture storage are located beyond the intersection of F Street and Rialto Avenue to the northwest. **East**: South E Street is located to the east, beyond which is not shown **South**: Atchison Topeka & Santa Fe Railroad (Main Track) is located to the south, beyond which is not shown. **West**: An alley, beyond which are an auto repair facility and a vacant lot are located to the west. A ballroom,. beverage warehouse, dwellings, associated automobile garages, and South G Street are located further to the west.
1956	**Property**: The Property is developed with a beverage warehouse, an automobile garage building with an attached "vault", a store, a wholesale beer and wine warehouse, a beverages warehouse, a cooling tower, a Pacific Electric Store Room, and some type of auto warehouse. Railroad spurs (San Bernardino Branch) divide the western and eastern portions of the parcel. Additional railroad tracks run northeast/southwest from the center of the parcel. **North**: Rialto Avenue and the continuation of the railroad, beyond which are a beverage warehouse and "Fr't" House, an auto service and oil warehouse, stores and a gasoline and oil station, freight depot, trucks storage building, Acme Color Printing Company Ltd. Printing Paper Warehouse (which includes an area for engraving and an office) are located to the north. A tractor service, storage buildings for implements and farm implements, a store, general storage building, auto repair facility, restaurant, followed by 2nd Street are located further to the north. Numerous stores and a wholesale meat store, a parcel service building and furniture storage are located beyond the intersection of F Street and Rialto Avenue to the northwest. **East**: South E Street is located to the east, beyond which is not shown **South**: Atchison Topeka & Santa Fe Railroad (Main Track) is located to the south, beyond which is not shown. **West**: An alley, beyond which are an auto repair facility and a vacant lot are located to the west. A ballroom, stores, beverage warehouse, dwellings, associated automobile garages, a produce warehouse and South G Street are located further to the west.

SANBORN FIRE INSURANCE MAP SUMMARY	
Year	**Comments**
1958	**Property**: The Property is developed with a beverage warehouse, an automobile garage building with an attached "vault," a store, a wholesale beer and wine warehouse, a beverages warehouse, a cooling tower, a Pacific Electric Store Room, and some type of auto warehouse. Railroad spurs (San Bernardino Branch) divide the western and eastern portions of the parcel. Additional railroad tracks run northeast/southwest from the center of the parcel. **North**: Rialto Avenue and the continuation of the railroad, beyond which are a beverage warehouse and "Fr't" House, an auto service and oil warehouse, stores and a gasoline and oil station, freight depot, trucks storage building, Acme Color Printing Company Ltd. Printing Paper Warehouse (which includes an area for engraving and an office) are located to the north. A tractor service, storage buildings for implements and farm implements, a store, a bank, general storage building, auto repair facility, restaurant, followed by 2nd Street are located further to the north. Numerous stores and a wholesale meat store, a parcel service building and furniture storage are located beyond the intersection of F Street and Rialto Avenue to the northwest. **East**: South E Street is located to the east, beyond which is not shown **South**: Atchison Topeka & Santa Fe Railroad (Main Track) is located to the south, beyond which is not shown. **West**: An alley, beyond which are an auto repair facility and a vacant lot are located to the west. A ballroom, stores, beverage warehouse, dwellings, associated automobile garages, a produce warehouse and South G Street are located further to the west.
1961	**Property**: The Property is developed with a beverage warehouse, an automobile garage building with an attached "vault," a store, a wholesale beer and wine warehouse, a beverages warehouse, a cooling tower, a Pacific Electric Store Room, and some type of auto warehouse. Railroad spurs (San Bernardino Branch) divide the western and eastern portions of the parcel. Additional railroad tracks run northeast/southwest from the center of the parcel. **North**: Rialto Avenue and the continuation of the railroad, beyond which are a beverage warehouse and "Fr't" House, an auto service and oil warehouse, stores and a gasoline and oil station, freight depot, trucks storage building, Acme Color Printing Company Ltd. Printing Paper Warehouse (which includes an area for engraving and an office) are located to the north. A tire service, tire storage, tractor service, storage for implements, a bank, followed by 2nd Street are located further to the north. Numerous stores and a wholesale meat store, a parcel service building and furniture storage are located beyond the intersection of F Street and Rialto Avenue to the northwest. **East**: South E Street is located to the east, beyond which is not shown **South**: Atchison Topeka & Santa Fe Railroad (Main Track) is located to the south, beyond which is not shown. **West**: An alley, beyond which are an auto repair facility and a vacant lot are located to the west. A ballroom, stores, dwellings, associated automobile garages, a produce warehouse and South G Street are located further to the west.

SANBORN FIRE INSURANCE MAP SUMMARY	
Year	**Comments**
1963	**Property**: The Property is developed with a beverage warehouse, an automobile garage building with an attached "vault", a store, a wholesale beer and wine warehouse, a beverages warehouse, a cooling tower, a Pacific Electric Store Room, and some type of auto warehouse. Railroad spurs (San Bernardino Branch) divide the western and eastern portions of the parcel. Additional railroad tracks run northeast/southwest from the center of the parcel. **North**: Rialto Avenue and the continuation of the railroad, beyond which are a beverage warehouse and "Fr't" House, an auto service and oil warehouse, stores and a gasoline and oil station, freight depot, auto repair building, an area for engraving, and an office are located to the north. A tire service, tire storage, tractor service, storage for implements, a bank, followed by 2nd Street are located further to the north. Numerous stores and Montgomery Ward are located beyond the intersection of F Street and Rialto Avenue to the northwest. **East**: South E Street is located to the east, beyond which is not shown **South**: Atchison Topeka & Santa Fe Railroad (Main Track) is located to the south, beyond which is not shown. **West**: An alley, beyond which are an auto repair facility and a vacant lot are located to the west. A ballroom, stores, dwellings, associated automobile garages, a produce warehouse and South G Street are located further to the west.
1969	**Property**: The Property is developed with a beverage warehouse, an automobile garage building with an attached "vault", a store, a wholesale beer and wine warehouse, a beverages warehouse, a cooling tower, a Pacific Electric Store Room, and some type of auto warehouse. Railroad spurs (San Bernardino Branch) divide the western and eastern portions of the parcel. Additional railroad tracks run northeast/southwest from the center of the parcel. **North**: Rialto Avenue and the continuation of the railroad, beyond which are an auto service and oil warehouse, stores and a gasoline and oil station, freight depot, auto repair building, an area for engraving, and an office are located to the north. A tire service, tire storage, tractor service, storage for implements, a bank, followed by 2nd Street are located further to the north. Numerous stores and Montgomery Ward are located beyond the intersection of F Street and Rialto Avenue to the northwest. **East**: South E Street is located to the east, beyond which is not shown **South**: Atchison Topeka & Santa Fe Railroad (Main Track) is located to the south, beyond which is not shown. **West**: An alley, beyond which are an auto repair facility and a vacant lot are located to the west. A ballroom, stores, dwellings, associated automobile garages, a produce warehouse and South G Street are located further to the west.

As early as 1888, the Property was used as some type of lumber facility, whose activities at some point included painting, milling and possible treatment of lumber. Of note are two artesian wells that appear to have been used on the Property from 1888 to 1894. As previously identified in aerial photographs, the Sanborn Fire Insurance maps also identify that the Property was at some point used for rail and transit purposes. The maps also indicate that various types of vehicular or rail and transit related maintenance activities have occurred on the Property. A review of additional historical sources, previous investigations, and assessment reports has indicated that previous uses of the Property, including the rail and transit activities, have impacted the subsurface on the Property. More specific, these sources indicate that soil at the

Property has been impaired by petroleum hydrocarbons and metals. The historic activities and uses at the Property are considered *recognized environmental conditions.* Of note as well are the uses of the adjacent properties. The review of the maps indicate that historic adjacent property uses have included various industrial activities, including rail and freight facilities, automobile garages, and gasoline stations. Based on the types of processes, chemicals, activities that are often associated with these kinds of facilities, there is the potential of historical off-site impacts to the Property.

5.3.3 Property Tax Files

ATC attempted to review prior ownership information for the Property at the San Bernardino County Assessor's website http://www.co.san-bernardino.ca.us/assessor/. The website indicated that no historical tax files were available for the Property.

5.3.4 Recorded Land Title Records

The acquisition of recorded land title records was not required by the scope of work for the Phase I ESA.

5.3.5 Historical USGS Topographic Quadrangles

ATC reviewed historical USGS Topographic Quadrangle maps, obtained from EDR, for information regarding past uses of the Property. The historical topographic maps were dated 1901, 1954, 1967, 1973 and 1980. In the 1901 map edition, the Property is not readily identified due to the scale of the map (1' = 250,000'). In the maps from 1954 to 1980, the Property appears to be developed with several rail spurs, which intersect in a "Y" formation in the north portion of the property. Further, the Property and adjacent parcels are all shaded in a pink tint indicative of a developed urban setting. Copies of the historical topographic maps are provided in **Appendix G**.

A review of additional historical sources, previous investigations, and assessment reports has indicated that previous uses of the Property, including the rail and transit activities, have impacted the subsurface on the Property. More specific, these sources indicate that soil at the Property has been impaired by petroleum hydrocarbons and metals. The historic activities and uses at the Property are considered *recognized environmental conditions.*

5.3.6 City Directories

Research regarding the availability of historical city directories was conducted by EDR. City directories dated 1922 through 2002 were reviewed by EDR. The purpose of the review was to identify visible evidence of land use at the site and immediate vicinity that may indicate a potential environmental concern. The following are descriptions and interpretations from this review.

CITY DIRECTORY SUMMARY	
Year	**Comments**
1922	**Property**: No listings **Surrounding Area:** Various residents and a Freight Depot (124) on South F Street; and various residents on Waters Alley.

CITY DIRECTORY SUMMARY	
Year	**Comments**
1926	**Property**: No listings **Surrounding Area:** Various residents and PERY Substation (105) on South F Street; Coca Cola Bottling Co (105), SB Oil Co (108), Tugwell RF Tires (120) on North E Street; and various residents on Waters Alley.
1930	**Property**: No listings **Surrounding Area:** Various residents, Yonkers Cigar Co Wholesale (102), Inladn Engraving and Col (105), Ortype Co (105), San Bernardino Lumber (175), Box Co (175), and Motor Part Co (196) on North F Street; Pacific Electric Ry Substation (105), various residents, Pacific Electric Ry Engineering Department (137), and Shell Oil Co of California (177) on South F Street; and various residents on Waters Alley.
1936	**Property**: No listings **Surrounding Area:** A station (105), Railway Sub (105), Pacific Electric (105), various residents, Pacific Electric (137), Railway Engineering (137), and Shell Oil Co (177) on South F Street; a machine shop (603) and various residents on 2nd Street; and a resident on Waters Alley.
1942	**Property**: No listings **Surrounding Area:** Pacific Electric Ry Sub (106), PERY Engineering Department (137), a resident (106), and Shell Oil co (177) on South F Street; and a vacant lot (741) on Waters Alley.
1949	**Property**: No listings **Surrounding Area:** Pacific Electric Ry Sub (106), PERY Engineering Department (137), Co Whs (124), Sears Roebuck (124), and Shell Oil Co (177) on South F Street; and a resident (741) on Waters Alley.
1955	**Property**: No listings **Surrounding Area:** Pacific Electric Ry Co Front Office (137), Sears Roebuck and Co Whse (124), Cuuningham Leroy Oil Distr and Shell Oil Co (177) on South F Street; and a resident (741) on Waters Alley; Bard Distr Co Beverages (548), Earhart JA Auto Repair (564), Swarthout Valley Transfer (564), Auto Fast Frt (564), White Garage Auto Repair (625), Iminers Finer Meats (636), various residents, and Golden State Club (677) on West Rialto Avenue.
1961	**Property**: No listings **Surrounding Area:** Clarendon (108) on North E Street; Tandy Leather (102) on North F Street, Refrig (106); Marsh LB Allied (106), ING Pool (116), Installation (116) TV Antenna (116), Carefree Swim (116), Custom Chem (116), Sup Co (120), L Italian (140), 8 Pallotto (140), various residents, City Auto Parts (187), Sup Co (196), and Sn B Motor Parts (196) on North F Street; Portable Fleet (107), Sears Roebuck and Co Warehouse (124), Mirror (130), CB Glass (130), Way Co (137), Pacific Electric Rail (137), various residents, and Roy Oil Distr (179) on South F Street; various residents on Waters Alley; Bard Distr Co (548), Auto fast Frt (564), Sup Co T (566), Brake Service (566), various residents, meats (636), and Montgomery Ward (644) on West Rialto Avenue

CITY DIRECTORY SUMMARY	
Year	**Comments**
1965	**Property**: Griley Sec Freight; Acme Fast Freight **Surrounding Area:** Desert Transfer/Storage (564), Standard Brands Inc. (564), Breshears Garage (625), various residents, and Golden State Club (677) on West Rialto Avenue.
1970	**Property**: No listings **Surrounding Area:** Prestige Metal Craft (516), various residents, Moyles Auction Sales (541), Breshears Garage (625), Uribes Trucking Co (630), and Fred's Plumbing (654) on West Rialto Avenue.
1975	**Property**: No listings **Surrounding Area:** various residents, Dillon's TV Service (515), Prestige Metal Craft (516), Moyles Auction Sales (541), Ballard Plumbing Heating and Air Conditioning (620), Kingsley Auto Service (625), Uribes Trucking Co (630), Arrowhead Termite Control (654), Brown Auto Works (661), Golden State club (677), D Signs (683), and Dan's Lawn Mower Repair Center (685) on West Rialto Avenue; Le Mans Datsun Inc. (101), Western Telegraph (108), Executive Car Leasing (123), Executive Lounge (123), Postal Instant Press (123), Shads Restaurant (123), and Frostys Barber Shop (123) on North E Street; Astro Motel (111) South E Street; Inland Auto Body (106), TV Antenna Installation (116), Bryce Robert H Indst (120), and Fotomat Corp Islands (187) on North F Street; Portable Fleet Service (107), JPT Enterprises Inc. (124), and Blain E Co (177) on South F Street; Kingsley Auto Service (625), and Golden State Club (677) on West Rialto Avenue.
1980	**Property**: No listings **Surrounding Area:** No listings
1981	**Property**: Cal Co Trans **Surrounding Area:** Various residents, USA Petroleum Corp (187), and Fotomat Corp (187) on North F Street; Portable Fleet Service (107); U Infra Insulation Ufg Co (124), Camak Tool/Machinery (197), and Bradley Engineering Co (197) on South F Street; various residents, and Long J Silvers Seafood (601) on West 2nd Street; Astro Motel (111) on South E Street; various residents, 4 Arrow Lane Mobile Park (62), and 08 S Automotive (625) on West Rialto Avenue.
1985	**Property**: No listings **Surrounding Area:** No listings
1990	**Property**: No listings **Surrounding Area:** No listings
1995	**Property**: No listings **Surrounding Area:** No listings
2002	**Property**: No listings **Surrounding Area:** Executive Lounge (123) on North E Street

CITY DIRECTORY SUMMARY	
Year	**Comments**
2003	**Property**: No listings **Surrounding Area:** Various residents, Latino Service (108), Burger Express (123), offices (123), Trade Print Giant (123), chiropractic (123), PIP Printing, and Flashbacks (123) on North E Street; Astro Motel (111) on South E Street; various residents, and Pioneer Park Plaza (123) on North F Street; a resident (124) on South F Street; Long John Silvers (601) and Seafood Shops (601) West 2nd Street; and no listing (625) on West Rialto Avenue.

The EDR City Directory Abstract is included in **Appendix G**.

The city directories identified that the Property at various points in history was used for rail and freight purposes. As previously stated, review of additional historical sources, previous investigations, and assessment reports has indicated that previous uses of the Property, including the rail and freight activities, have impacted the subsurface on the Property. More specific, these sources indicate that soil at the Property has been impaired by petroleum hydrocarbons and metals. The historic activities and uses at the Property are considered *recognized environmental conditions.* Of note are also the various industrial properties, including gasoline stations, a substation, lumber companies, auto repair facilities, and printing shops, that have occupied adjacent properties since the 1920s. Based on the types of processes, chemicals, activities that are often associated with these kinds of facilities, there is the potential of historical off-site impacts to the Property.

5.3.7 Building Department Records

ATC reviewed available building department records at the City of San Bernardino Building and Safety Department (SBBSD). The review of building department records did not reveal any documentation that suggests the presence of *recognized environmental conditions* at the Property. A copy of the building department records is included in **Appendix L.**

5.3.8 Zoning/Land Use Records

ATC attempted to review historical zoning information for the Property at the SBBSD. No historical zoning/land use information was identified on the historical records reviewed at the SBBSD.

5.3.9 Prior Reports

Below is a summary of each report that OmniTrans provided to ATC for review.

Revised Environmental Site Assessment North Block San Bernardino Yard, March 1992, Earth Technology Group (EarthTech) - In October of 1989, EarthTech conducted a Phase I Environmental Site Assessment (ESA) at the San Bernardino Yard Site. The proposed OmniTrans Site (Property) was formerly the northern portion of the yard and was identified as the "North Block." In their ESA, EarthTech identified several potential environmental concerns, which included three main areas:

- Area 5 (Dark zone and stained Oil area)
- Area 6 (Northeast Corner Buildings and Yard, historic buildings and equipment use),
- Area 7 (Top Northwest Corner of the Site, ACM, oil staining on floors, potential PCBs associated with transformers).

In 1991, EarthTech conducted a Phase II ESA to evaluate the subsurface of these areas primarily for petroleum hydrocarbons, heavy metals and PCBs. Their findings were presented in a report dated March 1992. On August 7 and 8, 1991, EarthTech advanced 18 boreholes on the Property. All but three boreholes were advanced to a depth of 21.5 feet. No groundwater was encountered. The following table summarizes the findings of the EarthTech field activities:

SIGNIFICANT FINDINGS – EARTHTECH 1992 PHASE II ESA		
Area	**Borehole ID/Depth**	**Constituents Detected**
5	N-17/0.5 feet N-17/15 feet	TPH = 45,000 mg/kg Lead = 62 mg/kg TPH = ND
6	N-5/0.5 feet N-5/5 feet	TPH = 2,600 mg/kg TPH = 1,000 mg/kg
7	N-9/0.5 feet N-10/0.5 feet N-11/0.5 feet N-14/0.5 feet	TPH = 16,000 mg/kg BTEX = 694 mg/kg Lead = 140 mg/kg TPH = 1,600 mg/kg BTEX = 7.1 mg/kg Lead = 92 mg/kg TPH = 1,100 mg/kg Lead = 90 mg/kg Arsenic = 250 mg/kg TPH = 720 mg/kg

*TPH = Total petroleum hydrocarbons
Mg/kg = milligrams per kilograms
BTEX = Benzene, toluene, ethylbenzene, and xylenes

Based on the analytical data collected, EarthTech stated that soil at the Site contains elevated levels of hydrocarbons and metals. EarthTech stated that the soils appear to be near surface and composed of oil EarthTech provided the following volume estimates for the impacted soil:

- Area 5: Constituents TPH and Lead = 13 to 818 cubic yards
- Area 6: Constituents TPH = 130 to 1,047 cubic yards
- Area 7: Constituents TPH, Lead/Arsenic, BTEX 6 to 56 cubic yards

EartTech estimated that the total volume of impacted soil was between 149 to 1921 cubic yards. EarthTech provided several remedial options that, which they believed if used in conjunction with one another, could provide the most viable and cost effective means of clean-up. EarthTech stated that bioremediation, physical treatment and landfill/recycling disposal would be the most viable solution.

Report for Site Investigation and Focused Site Remediation, May 1995, ERM West - In 1995 ERM conducted an extensive site investigation of the property located adjacent and to the south of the Property. This area was also identified by EarthTech as the South Block. Please note that the property identified in the ERM report was at one time, along with the subject Property, part of the San Bernardino Rail Yard. ERM's scope of work included the advancement of 22 soil borings at the property. Soil samples were collected from each boring at representative depths and nine groundwater samples were collected from the borings as well. ERM concluded that petroleum hydrocarbon impacted soil is present on the property at an estimated volume of 4,000 cubic yards in the Stadium Area and at 7,500 cubic yards in the former Mobil Plant area. The hydrocarbons detected were quantified as longer chain hydrocarbons typical of diesel fuel and are likely weathered. ERM states that these are relatively immobile compounds and will tend to degrade in place rather than migrate vertically toward groundwater. ERM states that no halogenated VOCs were detected in any of the soil samples collected. ERM states that lead and/or arsenic levels were detected in concentrations exceeding Title 22 thresholds throughout the property. However, these compounds appear to be limited to the upper two (2) feet of soil and appear to be isolated vertically and laterally. ERM states that groundwater has not been impacted by petroleum hydrocarbons, however, one groundwater sample did have a concentration of a HVOC that appears to have originated from an off-site source (1,2 – DCA was detected at concentration of 12 micrograms per liter). ERM concludes that due to the elevated levels of hydrocarbons and metals in soils, some type of remediation is necessary prior to site development. ERM indicated that the most cost effective approach would be excavate impacted soils and to cap the impacted areas with a high density polyethylene (HDPE).

NESHAP Pre-Demolition Survey, Union Pacific Railroad, October 24, 1997, AMI Group – In September of 1997, the AMI Group conducted an asbestos pre-demolition survey of the sub-station building structure that was located at the Property's northwestern corner. Samples from the survey indicated that no asbestos was located in the building.

Additional Phase II Investigation, October 1999, Geomatrix Consultants – In September of 1999, Geomatrix Consultants completed an additional Phase II investigation report, which included the collection of soil samples and one groundwater sample. The Geomatrix scope of work was generated using data from the EarthTech Phase II Conducted in 1991-1992. The Geomatrix scope of work included the advancement of 16 soil borings in areas where total arsenic and lead were previously detected, Former transformers may have been located, TPH was previously detected and where no samples were previously collected and analyzed for total arsenic and lead. One groundwater grab sample was collected from boring GMX-13.

Based on the data collected, Geomatrix provided the following conclusions:

- Shallow soil in the vicinity of GMX-1 and GMX-4 may (Area 5) may contain total and soluble lead at concentrations that may require special handling or be considered a California hazardous waste.

- Soil containing petroleum hydrocarbons may require special handling if this material is to be disposed of off-site.
- With the exception of arsenic and total xylenes, concentrations of constituents detected in soil are below industrial PRGs and, therefore, should not pose an unacceptable health risk under an industrial exposure scenario, even considering the potential for additive effects.
- Based on the fact that the 95% UCL concentration for arsenic in samples at the Site is below 30 mg/kg (industrial PRG using a 1 x 10-5 cancer risk), exposure to arsenic should result in an acceptable health risk under an industrial exposure scenario.
- Based on the groundwater sample collected, petroleum hydrocarbons in shallow soil beneath the former maintenance building pad have not impacted groundwater.

Proposed Additional Soil Investigation and Remedial Activities, November 1, 2000, ERM - Based on previous investigations conducted by EarthTech in 1991-1992, a Phase II conducted by Geomatrix in 1999, and conversations between ERM and the Santa Ana RWQCB, ERM developed a workplan for proposed additional soil investigation and remedial activities at the Property in November of 2000. ERM concluded that the constituents of concern at the Property are lead and arsenic. More specifically, ERM focused their efforts in the area in the immediate vicinity of the former maintenance building pad where levels were elevated compared to the remainder of the North Block. The affected area appears to be present to maximum depths of 1 to 2 feet bgs. ERM proposed the advancement of five soil samples (SB-1 – SB-5) in the vicinity of the former maintenance building pad. ERM states that the area of impacted soil will be excavated to an anticipated depth of approximately two feet bgs.

No Further Action Letter At North Block , Former San Bernardino Rail Yard, Rialto Avenue and E Street, Union Pacific Railroad, San Bernardino California, May 8, 2001, Regional Water Quality Control Board, Santa Ana Region – Based on the results of the work plan submitted by ERM in November of 2000, the RWQCB Santa Ana Region, issued a “no further action” letter to Union Pacific in May of 2001. The RWQCB letter states that “considering the low concentrations of lead and arsenic, the shallow depths at which this lead and arsenic is located and groundwater located at a depth of 40 feet bgs, we do not consider the lead and arsenic to e a threat to the beneficial uses of groundwater in the Bunker Hill Groundwater Subbasin.” ATC reviewed the “no further action” letter, however a copy of the workplan results was not provided for review.

The review of previous reports has revealed that soil on the Property has been impacted by petroleum hydrocarbons and metals, more specifically, lead and arsenic. Previous consultants have indicated that the levels detected would warrant soil at the site to be disposed of as California hazardous waste that may need special handling prior to disposal off site. Lead impacted soil in the west-northwestern portion of the Property, below a former maintenance pad building, appears to have been excavated and samples collected after the excavation were sufficient enough to warrant closure from the RWQCB in 2001. Based on the analytical data presented in the previous reports and a review of historical documentation, additional assessment of the property is necessary to provide a more comprehensive view of subsurface conditions on the Property. This assessment should focus on areas not previously analyzed and investigated, including previous rail spur locations and an area just north of the former concrete transformer building. This area was the location of a boring (GMX-3) advanced by Geomatrix in

Geomatrix in 1999 that revealed a lead concentration of 162 mg/kg at a depth of 0.75 feet bgs. This level is above the preliminary remediation goal set forth by the EPA for lead in soil in a residential setting setting. ATC was not able to confirm whether soil in this area was excavated and removed off site during ERMs 2000 investigation and remediation at the Property.

5.3.10 Other Historical Sources

No other historical sources were reviewed

6.0 SITE RECONNAISSANCE

The Property and area reconnaissance were conducted on June 18, 2008 by ATC Senior Project Manager, Jim Madden. ATC was accompanied during the reconnaissance by Mr. Brett Clavio, Associate Planner with Omnitrans. The following is a summary of visual and/or physical observations of the Property on the day of the reconnaissance. Photographs can be found in **Appendix C**.

6.1 Methodology and Limiting Conditions

The reconnaissance consisted of visual and/or physical observations of: the property and improvements; adjoining sites as viewed from the property; and, the surrounding area based on visual observations made during the trip to and from the property. The Property was observed to be vacant and undeveloped. There were no access restrictions at the Property. Please note that a large stockpile of soil was located on southern portion of the property. Areas beneath the stockpile were not observe red. The weather during the site reconnaissance was sunny and warm. There were no visibility restrictions due to weather conditions.

6.2 Hazardous Substance Use, Storage, and Disposal

No evidence of hazardous substance use, storage, or disposal was observed on the Property during the reconnaissance.

6.3 Underground Storage Tanks (USTs)

No USTs or evidence of USTs were observed on the Property during the reconnaissance.

6.4 Aboveground Storage Tanks (ASTs)

No ASTs or evidence of ASTs were observed on the Property during the reconnaissance.

6.5 Other Petroleum Products

ATC did not observe evidence of other petroleum products on the Property.

6.6 Polychlorinated Biphenyls (PCBs)

No features, such as transformers, that may contain PCBs were observed on the Property during the reconnaissance. Please note that a substation with potential transformers may have historically been located on the Property. Previous consultants have tested soils in the areas where the transformers were thought to have been located. All soil samples revealed non-detect levels of PCBs

6.7 Unidentified Substance Containers

ATC did not observe the presence of unidentified substance containers on the Property.

6.8 Non-hazardous Liquid/Solid Waste

ATC did not observe evidence of non-hazardous liquid/solid waste on the Property.

6.9 Wastewater

ATC did not observe evidence of wastewater generated, treated or discharged on the Property or to adjoining properties. Sanitary sewage and stormwater are discussed in Sections 6.8 and 6.13 respectively and are not *recognized environmental conditions*.

6.10 Waste Pits, Ponds and Lagoons

ATC did not observe evidence of waste pits, ponds or lagoons on the Property.

6.11 Sumps

ATC did not observe evidence of sumps on the Property.

6.12 Septic Systems

ATC did not observe evidence of a septic system at the Property.

6.13 Stormwater Management System

No evidence of catch basins or storm drains was identified on the Property. Stormwater generated on the Property percolates into soils at the Property.

6.14 Wells

ATC did not observe any evidence of wells currently on the Property.

7.0 INTERVIEWS

The following persons were interviewed to obtain information regarding *recognized environmental conditions* in connection with the Property:

INTERVIEW SUMMARY				
Role	**Name**	**Title/Company**	**Years Assoc. With Property**	**Interview Type**
Property Contact / Escort	Mr. Bret Clavio	Associate Planner/Omnitrans	Unknown	In Person/ Email/Phone
Owner Representative	Mr. Don Caldwell	Special Properties/Union Pacific	Unknown	Email/Phone
Property Contact	Mr. Durand Rall	CEO/Omnitrans	Approx. 10 years	In person

Not included in this listing are those governmental employees that were contacted solely for the purpose of retrieving public information pertaining to the Property and who would not be expected to have first-hand knowledge of *recognized environmental conditions* at the Property.

Pertinent information from the interviews is discussed in applicable sections of this report with details (including failed attempts to interview, if any) documented on Record of Communication forms in Appendix J.

8.0 OTHER ENVIRONMENTAL CONDITIONS

8.1 Asbestos-Containing Material (ACM)

Based on the fact that no building structures are present on the Property, ACM was not considered as part of this report. Please note that a former substation located on the Property was sampled for ACM in 1997 prior to its demolition. All samples taken during that survey were non-detect for ACM.

8.2 Radon

Radon is a naturally occurring colorless, odorless gas that is a by-product of the decay of radioactive materials potentially present in bedrock and soil. The EPA guidance action level for annual residential exposure to radon is 4.0 picoCuries per liter of air (pCi/L). The guidance action level is not a regulatory requirement for private owners of commercial real estate, but is commonly used for comparison purposes to suggest whether further action at a building may be prudent.

ATC's review of published radon data indicates that the Property is located in radon Zone 2, or an area of low propensity with regard to the potential for elevated levels of radon gas. In a federal survey of 18 sites within San Bernardino County, 100 percent had radon concentrations less than 4.0 pCi/L. One site within the same zip code as the Property, had a radon concentrations 0.00 pCi/L. No additional investigation regarding radon is recommended at this time.

8.3 Lead in Drinking Water

According to the City of San Bernardino Water Department website (http://www.ci.san-bernardino.ca.us/sbmwd_about/default.asp), the Property area "receives its water supply from an underground aquifer called Bunker Hill Basin which is concentrated at the Northwestern end of the city. This water contained in the Bunker Hill Basin is replenished with rain and snowmelt that filters through our local San Bernardino Mountains." According to recent annual water quality reports provided by the City of Water Department, the municipally supplied water meets or exceeds all state and federal drinking water standards, including those for lead.

8.4 Lead-Based Paint (LBP)

Based on the fact that no building structures are present on the Property, LBP was not considered as part of this report.

8.5 Mold Screening

Based on the fact that no building structures are present on the Property, Mold was not considered as part of this report.

8.6 Additional Client Requested Conditions

No additional Client Requested Conditions were evaluated for this Phase I ESA.

9.0 REFERENCES

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Additional Phase II Investigation, October 1999, Geomatrix Consultants

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10.0 APPENDICES

Appendix A - Site Location Map
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APPENDIX A

SITE LOCATION MAP
(Topographic Map)

APPENDIX B

SITE VICINITY MAP
and
SITE PLAN

APPENDIX C

SITE PHOTOGRAPHS

APPENDIX D

CLIENT PROVIDED DOCUMENTATION
(This Appendix Not Used)

APPENDIX E

REGULATORY DATABASE REPORT

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(This Appendix Not Used)

APPENDIX L

OTHER SUPPORTING DOCUMENTATION

APPENDIX M

TERMINOLOGY

TERMINOLOGY

The following provides definitions and descriptions of certain terms that may be used in this report. Italics indicate terms that are defined by ASTM Standard Practice E 1527-05. The Standard Practice should be referenced for further detail (such as the precise wording), related definitions or additional explanation regarding the meaning of terms.

Recognized environmental condition(s) (REC) - 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.

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de minimis conditions – are 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*.

historical recognized environmental condition(s) (HREC) - environmental condition which in the past would have been considered a *recognized environmental condition*, but which may or may not be considered a *recognized environmental condition* currently. The final decision rests with the *environmental professional* and will be influenced by the current impact of the *historical recognized environmental condition* on the *property*. If a past release of any *hazardous substances* or *petroleum products* has occurred in connection with the property and has been remediated, with such remediation accepted by the responsible regulatory agency (for example, as evidenced by the issuance of a no further action letter or equivalent), this condition shall be considered a *historical recognized environmental condition*.

material threat – a physically observable or *obvious* threat which is reasonably likely to lead to a release that, in the opinion of the *environmental professional*, is threatening and might result in impact to public health or the environment. An example might include an aboveground storage tank system that contains a *hazardous substance* and which shows evidence of damage such that it may cause or contribute to tank integrity failure with a release of contents to the environment.

threat to human health or the environment – a substantial risk of harm to public health or the environment resulting from the presence or likely presence of 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*. An example might include a release of a *hazardous substance* in concentrations exceeding applicable governmental agency standards under conditions that could reasonably and foreseeably result in substantial exposure to humans or substantial damage to natural resources. The risk of that exposure or damage would represent a threat to human health or the environment.

generally would not be the subject of an enforcement action – the likelihood that an environmental condition would not be subject to enforcement action if brought to the attention of

appropriate governmental agencies. If the circumstances suggest an enforcement action would be less likely than not, then the condition is considered to be generally not the likely the subject of an enforcement action.

DOWNTOWN SAN BERNARDINO PASSENGER RAIL PROJECT DETENTION POND LOCATIONS PHASE I ENVIRONMNETAL SITE ASSESSMENT

DOWNTOWN SAN BERNARDINO PASSENGER RAIL PROJECT

Detention Pond Locations

Phase I Environmental Site Assessment

San Bernardino, San Bernardino County, California

January 2012

Prepared for:

San Bernardino Associated Governments
1170 W. 3rd Street, 2nd Floor
San Bernardino, CA 92602

Prepared by:

HDR Engineering, Inc.
3200 E. Camelback Road, Suite 350
Phoenix, Arizona 85018

January 27, 2012

San Bernardino Associated Governments
Attn: Mitch Alderman
1170 W. 3rd Street, 2nd Floor
San Bernardino, CA 92602

Re: *Phase I Environmental Site Assessment* Report Submittal
Downtown San Bernardino Passenger Rail Project
Detention Pond Locations
San Bernardino, San Bernardino County, California

Dear Mr. Alderman,

We are pleased to provide you with the above-referenced Phase I Environmental Site Assessment report. The attached report presents our methodology, findings, opinions, conclusions, and recommendations.

HDR appreciates the opportunity to serve the San Bernardino Associated Governments (SANBAG) on this important project. If you have any questions or comments, please feel free to contact us at (602) 522-7700.

Cordially,

HDR ENGINEERING, INC.

Colleen Murray
Hazardous Materials Specialist

Kelly W. Kading, CPG, CHMM
Senior Professional Associate

Distribution: Two electronic copies and two bound copies.

File: Two bound copies

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Acronyms

AAI	All Appropriate Inquiries
AIRS	Aerometric Information Retrieval System
AST	aboveground storage tank
ASTM	American Society for Testing and Materials
CA WDS	California Waste Discharge System
Cal/EPA	California Environmental Protection Agency
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CERCLIS	Comprehensive Environmental Response, Compensation, and Liability Information System
CFR	California Code of Regulations
CHMIRS	California Hazardous Materials Incident Reporting System
CORRACTS	Corrective Action Report
DHS	Department of Homeland Security
DTSC	Department of Toxic Substances Control
DSBPRP	Downtown San Bernardino Passenger Rail Project
EDR	Environmental Data Resources, Inc.
EIR/EIS	Environmental Impact Report/Environmental Impact Statement
EPCRA	Emergency Planning and Community Right-to-Know Act
ERNS	Emergency Response Notification System
ESA	Environmental Site Assessment
FIFRA	Federal Insecticide, Fungicide, and Rodenticide Act
FINDS	Facility Index System
FRDS	Federal Reporting Data System
FTTS	Federal FIFRA/TSCA Tracking System
HDR	HDR Engineering, Inc.
HREC	Historic Recognized Environmental Condition
LUST	leaking underground storage tank
MINES	Mines Master Index File
NFRAP	No Further Remedial Action Planned
NPL	National Priorities List
PADS	PCB Activity Database System
RAATS	RCRA Administrative Action Tracking System

RCRA	Resource Conservation and Recovery Act
RCRIS LQG	Resource Conservation and Recovery Information System Large Quantity Generators
RCRIS SQG	Resource Conservation and Recovery Information System Small Quantity Generators
RCRIS TSD	Resource Conservation and Recovery Information System Treatment, Storage, and Disposal
REC	Recognized Environmental Condition
RWQCB	Regional Water Quality Control Board
R/W	right-of-way
SANBAG	San Bernardino Associated Governments
SCRRA	Southern California Regional Rail Authority
SI	site inspection
SLIC	Spills, Leaks, Investigation and Cleanup Database
SMBRP	Site Mitigation and Brownfields Reuse Program
SWF/LF	Solid Waste Facilities/Landfill
SWIS	Solid Waste Information System
SWRCB	State Water Resources Control Board
TSCA	Toxic Substances Control Act
TSD	treatment, storage, and disposal
U.S.C.	United States Code
USEPA	U.S. Environmental Protection Agency
USGS	United States Geological Survey
UST	underground storage tank
VCP	Voluntary Cleanup Program.

Note: An additional acronym list is located in Appendix C.

EXECUTIVE SUMMARY

HDR Engineering, Inc. (HDR) has conducted a Phase I Environmental Site Assessment (ESA) for the proposed locations of two detention ponds and associated storm drain, for use in connection with the Downtown San Bernardino Passenger Rail Project (DSBPRP). The area of the detentions ponds and storm drain (hereafter referenced as the project area) is located along the Burlington Northern Santa Fe (BNSF) Redland Subdivision railroad tracks in the area of the San Bernardino Transit Center (SBTC), and extending to southern boundary of the San Bernardino Stadium parking area, in San Bernardino, San Bernardino County, California. In addition to the project area, a one-quarter-mile surrounding vicinity was also evaluated for the purposes of this report. Figures depicting the location of the project area are included in Appendix A, with photographs included in Appendix B.

This Phase I ESA identifies recognized environmental conditions (RECs, as defined in ASTM E 1527-05) for the project area that may adversely affect construction or subject property right-of-way acquisition. In the event that the regulatory issue has been resolved by the regulatory agency with jurisdiction, the condition may be classified as a "Historic REC" (HREC).

This ESA includes a summary of the site reconnaissance conducted on January 24, 2012 and telephone interview, a review of environmental databases, and a review of historical data sources.

The ESA process resulted in the following findings and conclusions:

FINDINGS

- The proposed locations of the detention ponds and storm drain currently consist of a vacant lot located south of the BNSF railroad tracks, west of E Street, and the parking lot for the adjacent San Bernardino Stadium. The project area is located in an urban area of mixed-use development in San Bernardino. The surrounding vicinity includes a Department of Homeland Security (DHS) office building, a Southern California Gas Company service and support yard, vacant and occupied commercial and industrial warehouses, auto repair facilities, retail facilities, and undeveloped land. The BNSF railroad tracks, located north of the subject property, have been present since at least the late 1800s.
- The Environmental Data Resources, Inc. (EDR) environmental database report identified 1,023 environmental records for sites located within the project area or a one-mile radius of concern. Many of the database listings, however, are not considered to be of concern to the project due to the scope of the project, the distance of the listed site from the project area, and/or a facility's lack of, or compliance with any previously noted violation(s). Additional database findings are not considered to be of concern to the project due to the nature of the database. As a result, 1,002 of the 1,023 records listed are not considered to be of concern to the project. The remaining 21 records correspond to three sites that are considered to be of concern, and five additional sites that are considered to have notable findings. The discrepancy between the number of records and the number of sites is a result of sites often being listed in multiple databases.
- Sites of concern include one Envirostor site (DHS facility) and two leaking underground tank (LUST) sites (former Inland Beverage Company and Chubby Chassis). The sites are considered to be of concern based on the details associated with the regulatory listings, and the location of the site relative to identified groundwater gradient in the project area.
- While not listed in the EDR report, a portion of the project area is considered to be of

concern, based on regulatory information identified through the Cal EPA GeoTracker® website. The area is identified as the City of San Bernardino Economic Development Agency Proposed Transit Village Core Project Area. The area is located south of the BNSF railroad tracks and west of E Street, where a portion of the proposed storm drain is to be located. According to the Department of Toxic Substance Control (DTSC) online files, the currently vacant lot previously housed a railroad maintenance facility in the 1960s and 1970s. DTSC approved a Targeted Site Investigation for the area, which was proposed to include soil, soil gas, and groundwater samples to be analyzed for metals, petroleum hydrocarbons, polychlorinated biphenyls (PCBs), chlorinated solvents, and volatile organic compounds (VOCs) in soil, soil gas, and groundwater. A 2009 Targeted Site Investigation found low levels of total petroleum hydrocarbons (TPHs), metals (arsenic, cadmium, copper, lead mercury, and zinc), and 1,3-butadiene in soil. A portion of this area was also included Phase II ESA conducted by HDR in July 2011 (limited to an area located immediately south of the BNSF railroad tracks). The results of the Phase II indicated arsenic in concentrations exceeding the California Human Health Screening Level (CHHSL) for industrial and commercial properties. However, all concentrations of arsenic detected at the site were below background guidance and were considered naturally occurring. Organic compounds were not detected in onsite soil samples in concentrations exceeding regulatory action levels.

- The five sites identified with notable findings in the EDR include underground storage tank (UST) sites, closed LUST sites and one Comprehensive Environmental Response, Compensation, and Liability Information System CERCLIS NFRAP (no further remedial action planned) site. The sites are not considered to be of concern based on the distance from the project area, downgradient location, and/or details associated with the regulatory listing.
- Three additional sites with notable findings were identified in the city directory review. The sites include former auto repair facilities or distribution warehouses with the potential for USTs formerly located onsite. The sites are not considered to be of concern, based on distance and downgradient location from the project area.
- Historical aerial photograph review indicated that a former railroad maintenance facility and railroad tracks were located within the project area. The maintenance facility and tracks were present from at least the 1930s through about the 1970s. According to information gathered during a telephone interview, previous environmental investigations in the project area identified contamination onsite. The interviewee (Lou Schnepp of the San Bernardino Redevelopment Agency) stated the site had been remediated prior to construction of the San Bernardino Stadium in the early 2000s.

CONCLUSION

HDR has identified three sites with conditions that constitute an HREC, and one site with conditions that constitute a REC. The following statement is required by ASTM E 1527-05 as a positive declaration of whether REC(s) were found:

> *HDR has performed a Phase I Environmental Site Assesssment (ESA) in conformance with the scope and limitations of ASTM E 1527-05 of the subject property (as defined elsewhere in this report). Any exceptions to or deletions from these practices are described in the report. This report has revealed evidence of three Historic Recognized Environmental Condition (HREC), and one REC in connection with the project area.*

RECOMMENDATIONS

Based on the findings and conclusions reached in this report, HDR makes the following recommendations for the subject property:

Recommendation 1

HDR recommends that all construction contractors should be instructed to immediately stop all subsurface activities in the event that potentially hazardous materials are encountered, an odor is identified, or significantly stained soil is visible. Contractors should be instructed to follow all applicable regulations regarding discovery and response for hazardous materials encountered during the construction process.

Recommendation 2

HDR recommends that if this report is 6 months old or older when property acquisition or construction begins, the recommendations within this report be reevaluated. The applicable ASTM standard (E 1527-05) requires a reevaluation of site conditions if a Phase I report (ESA) is older than 180 days (6 months).

1.0 INTRODUCTION

1.1 PURPOSE AND INVOLVED PARTIES

This Phase I Environmental Site Assessment (ESA) documents the evaluation of the project area for indications of "recognized environmental conditions." A recognized environmental condition (REC) is defined by ASTM Practice E 1527-05 as: *"The presence or likely presence of any hazardous substances or petroleum products on a project site 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 project site or into the ground, groundwater, or surface water of the project site. The term includes hazardous substances or petroleum products even under conditions of storage and use in compliance with local and state laws and regulations. In the event that a site's regulatory issue has been resolved by the regulatory agency with jurisdiction, that site may be classified as a "Historic REC". This classification means that although the issue has been resolved to the satisfaction of the regulatory agency, a possibility exists that residual contamination may be present at the site. The terms "REC" and "Historic REC" are not intended to include de minimis conditions that generally do not present a material risk of harm to public health or the environment and that generally would not be the subject of an enforcement action if brought to the attention of regulatory agencies. Conditions determined to be de minimis are not recognized environmental conditions."*

HDR Engineering, Inc. (HDR), received authorization from San Bernardino Associated Governments (SANBAG) to conduct an ESA for the proposed locations of detention ponds and associated pipeline, in connection with the Downtown San Bernardino Passenger Rail Project (DSBPRP) and San Bernardino Transit Center (SBTC), located in San Bernardino, San Bernardino County, California (hereafter referenced as the project area). This Phase I ESA has been prepared for SANBAG (the ultimate user of the report), and only SANBAG has the right to rely on the contents of this Phase I ESA.

1.2 ESA METHODOLOGY

This ESA was designed to generally comply with the level of documentation recommended in the ASTM standard (ASTM E 1527-05) for the performance of ESAs. Deviations from the ASTM standard include the deletion of certain records sources determined to be inapplicable or of limited value to the specific needs of this project.

HDR included the four primary activities included in the ASTM guidance (conforming to EPA's All Appropriate Inquiry [AAI] requirements), namely (1) records review, (2) historic data review, (3) site reconnaissance, and (4) preparation of this report.

1.3 SCOPE OF SERVICES, SIGNIFICANT ASSUMPTIONS, AND LIMITATIONS

The services provided for this project consisted of the following:

- Provide a description of the subject property including current land uses.
- Provide a general description of the topography, soils, geology, and groundwater flow direction.
- Review reasonably ascertainable and reviewable regulatory information published by federal, state, local, tribal, health, and/or environmental agencies pertaining to the subject property.
- Review historical data sources for the subject property, including aerial photographs, topographic maps, fire insurance maps, city directories, and other readily available development data.

- Conduct an area reconnaissance and an environmental review—including a visual inspection of adjoining properties—with a focus on indications of hazardous substances, petroleum products, polychlorinated biphenyls (PCBs), wells, storage tanks, solid waste disposal pits and sumps, and utilities.
- Prepare a written report of methods, findings, and conclusions.

The goal of this scope of services is to assist the user in identifying conditions near the subject property that may indicate risks regarding hazardous materials storage, disposal, or other impacts. The resulting report may qualify the user for relief from liabilities as one of three "defenses" identified in the 2002 Brownfields Amendments to the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Section 9607 (AAI subsections). These three defenses include:

1. The "innocent landowner" defense to potential liabilities under 42 United States Code [U.S.C.] § 9601
2. The "contiguous project corridor owner" defense pursuant to 42 U.S.C. § 9607q
3. The "bona fide prospective purchaser" defense pursuant to 42 U.S.C. § 9607r

Federal regulations at 40 Code of Federal Regulations [C.F.R.] Part 312, promulgated by EPA, require that liability release be based (in part) on completion of AAI prior to purchase of a property. Those inquiries are documented by Phase I reports, or ESAs. EPA has agreed that the recently developed ASTM guidance (ASTM Practice E 1527-05) specifies and interprets AAI requirements.

A user is defined by ASTM Practice E 1527-05 as the party seeking to use Practice E 1527 to complete an ESA of the subject property and may include a potential purchaser of land at the subject property, a potential tenant of the subject property, an owner of land at the subject property, a lender, or a subject property manager. Investigative areas not included in the standard ASTM ESA scope include: asbestos, lead-based paint, lead in drinking water, radon, urea formaldehyde, wetland issues, regulatory compliance, cultural and historic resources, industrial hygiene, health and safety, ecological resources, endangered species, indoor air quality, and high voltage power lines. The scope of services for ESA projects also does not include the completion of soil borings, the installation of groundwater monitoring wells, or the collection of soil or groundwater samples. Likely sources of vapor intrusion, from potential on-site or off-site sources, are identified. State and national policies and standards relevant to vapor intrusion are in flux and subject to change.

HDR has made certain assumptions in preparing the scope of this assessment:

- Data gathered from public information sources (i.e., libraries or public regulatory agencies) are accurate and reliable.
- Site operations reflect site conditions relative to potential releases, and no intentional concealment of environmental conditions or releases has occurred.
- Interview information (if gathered) is directly reported as gathered by the assessor and is limited by the accuracy of the interviewee's recollection and experience.
- Published geologic information and site observations made by the environmental professional are used to estimate likely contaminant migration pathways in the subsurface. These estimates by the environmental professional are limited in accuracy and are generally cross-referenced with existing information about similar sites and environmental releases in the area.

Regulatory information is limited to sites discovered after the late 1980s because reliable records were not kept by regulatory agencies prior to that time frame.

Where a REC has resulted from historical uses or conditions, but apparently no longer persists at the site, the term Historic REC (HREC) is used.

The findings and conclusions presented in this report are based on the procedures described in ASTM Practice E 1527-05, informal discussions with various agencies, a review of the available literature cited in this report, conditions noted at the time of this ESA, and HDR's interpretation of the information obtained as part of this Phase I ESA. The findings and conclusions are limited to the specific project and properties described in this report, and by the accuracy and completeness of the information provided by others.

An ESA cannot entirely eliminate uncertainty regarding the potential for RECs. Conducting this assessment is intended to reduce, but not eliminate, uncertainty regarding the potential for RECs in connection with the subject property within reasonable limits of time and cost. In conducting its services, HDR used a degree of care and skill ordinarily exercised under similar circumstances by reputable members of its profession practicing in the same locality. No other warranty is made or intended. This ESA generally conforms to the level of documentation required in ASTM Practice E 1527-05. Deviations from the ASTM standard included deletion of certain records sources deemed to be inapplicable, or of limited value, to the specific needs of this client.

2.0 SITE DESCRIPTION

2.1 LOCATION AND LEGAL DESCRIPTION

The project area consists of the proposed locations for two detention ponds and the associated storm drain, for use in connection with the DSBPRP and SBTC. The proposed location for the detention ponds are in the parking lot of the San Bernardino Stadium, one at the far south end of the lot and the second at the far west end. The storm drain is proposed from the SBTC, south through a vacant field located south of the Burlington Northern Santa Fe (BNSF) Redland Subdivision railroad tracks and west of E Street, and along the parking lot located to the west of the stadium. Figures depicting the location of the project area are included in Appendix A. In addition to the area referenced above, a one-quarter-mile surrounding vicinity was also evaluated for the purposes of this report. The subject property is located in a land grant area that falls outside of the Section, Township and Range system. Photographic documentation of the project area is included in Appendix B.

2.2 SITE AND VICINITY CHARACTERISTICS

The project area consists of a vacant lot located south of the BNSF railroad tracks and west of E Street, and the parking lot for the adjacent San Bernardino Stadium. The project area is located in an urban area of mixed-use development in San Bernardino. The surrounding vicinity includes a Department of Homeland Security (DHS) office building, a Southern California Gas Company service and support yard, vacant and occupied commercial and industrial warehouses, auto repair facilities, retail facilities, and undeveloped land. According to the United States Geological Survey 7.5 minute series quadrangle maps for San Bernardino South, California (1954, photorevised 1967, 1973, and 1980), the elevation of the project area is approximately 1020 feet above mean sea level. The native topography in the area is relatively flat, sloping slightly to the southeast.

2.3 DESCRIPTION OF STRUCTURES, ROADS, AND OTHER SITE IMPROVEMENTS

Currently, no structures are located in the proposed areas of the drainage ponds or storm drain. The proposed locations of the detention ponds are currently paved, as is the segment of storm drain located south of the vacant lot, to the west of the stadium. One paved access road is located at the west side of the vacant lot, extending south from the railroad tracks to the stadium's parking lot. Based on the mixed-use development of the area, the configuration, construction, and size of the structures located in the surrounding vicinity vary depending on the type of development (residential, commercial, or industrial). The roadways located adjacent to the subject property include multi-lane surface streets or two-lane residential streets nearby, with Interstate 215 (I-215) located approximately 0.33 mile to the west of the project area.

2.4 AREA GEOLOGY AND HYDROGEOLOGY

The project area is located in the northeast portion of the Peninsular Ranges physiographic province, near the border of the Transverse Ranges (located to the north). The province is characterized by predominantly north-south trending mountain ranges of Mesozoic granitic rocks that derived from the same batholith which formed the core of the Sierra Nevada Mountains in California. The subject property is located within the Upper Santa Ana River Valley, which is characterized by the Recent Age alluvial deposits derived from the Santa Ana River and its tributaries. Soils in the subject property consist primarily of silty sand and sand with some clay. Depth to groundwater within the subject property ranges from approximately 30 to 38 feet below ground surface, and is anticipated to flow to the southeast (Bergeron, 1995).

3.0 USER-PROVIDED INFORMATION

SANBAG provided HDR with documents identifying the location of the subject property. Neither a survey map nor property zoning information was provided. The user did not provide information indicating that it has any specialized information for the subject property pertaining to land use, previous environmental cleanups, previous chemical spills or releases, purchase price of any properties within the area or cleanup liens against properties within the subject property.

4.0 RECORDS REVIEW

4.1 ENVIRONMENTAL RECORDS REVIEW

Environmental Data Resources, Inc. (EDR) was contracted by HDR to complete an environmental records search of federal, state, local, tribal databases as defined by ASTM E 1527-05, and EDR proprietary databases. HDR provided EDR with the search parameters (radius of concern) as a reference for EDR. For the purposes of this report, the radius of concern was expanded to one-mile in order to cover the entire project area; however, only the results located within one-quarter-mile of the proposed drainage features were included in further analysis. Sites within one-quarter-mile are the most likely to affect the project area. The boundaries provided to EDR were based on a figure of the drainage ponds and storm drain locations, dated December 2011. The database search report was produced by EDR on January 20, 2012. A complete copy of the EDR environmental database report is included in Appendix C.

Table 4-1 Summary of Environmental Database Search

Database	Description	Records Listed	Records of Concern to the Project
Federal			
NPL	The National Priorities List (NPL) is the U.S. EPA's database of uncontrolled or abandoned hazardous waste facilities that have been listed for priority remedial actions under the Superfund program.	0	0
Delisted NPL	The National Oil and Hazardous Substances Pollution Contingency Plan (NCP) established the criteria that the EPA uses to delete sites from the NPL.	0	0
CERCLIS/ CERCLIS – NFRAP	The CERCLIS database is a compilation of facilities that the USEPA has investigated or is currently investigating for a release or threatened release of hazardous substances pursuant to CERCLA. No Further Remedial Action Planned (NFRAP) refers to facilities that have been removed and archived from its inventory of CERCLA sites.	4	1
LIENS 2	CERCLIS 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.	0	0
RCRA TSD/ CORRACTS	The USEPA maintains a database of Resource Conservation and Recovery Act (RCRA) facilities associated with treatment, storage, and disposal (TSD) of hazardous materials that are undergoing "corrective action." A Corrective Action Report (CORRACTS) order is issued when there has been a release of hazardous waste or constituents into the environment from a RCRA facility.	0	0
RCRA INFO	The RCRA INFO database, maintained by the EPA, lists facilities that generate hazardous waste as part of their normal business practices. Generators are listed as large, small, or conditionally exempt. Large quantity generators (LQG) produce at least 1,000 kg/month of nonacutely hazardous waste or 1 kg/month of acutely hazardous waste. Small quantity generators (SQG) produce 100 to 1,000 kg/month of nonacutely hazardous waste. Conditionally exempt small quantity generators (CESQG) are those that generate less than 100 kg/month of nonacutely hazardous waste.	50	0
US ENG Controls	A listing of sites with engineering controls in place.	0	0
US INST Controls	A listing of sites with institutional controls in place.	0	0
ERNS	Emergency Response Notification System (ERNS) records and stores information on reported releases of oil and hazardous substances.	10	0

Database	Description	Records Listed	Records of Concern to the Project
PADS	PCB Activity Database System (PADS) identifies generators, transporters, commercial storers, and/or brokers and disposers of PCBs who are required to notify the USEPA of such activities.	0	0
FTTS	FIFRA/TSCA Tracking System, Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA)/Toxic Substances Control Act (TSCA). 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).	2	0
State and Local			
RESPONSE	The Department of Toxic Substances Control's (DTSC) list which 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.	1	0
HIST CAL-SITES	The CALSITES database contains potential or confirmed hazardous substance release properties. In 1996, California EPA (Cal/EPA) reevaluated and significantly reduced the number of sites in the Calsites database. The database is no longer updated by the State agency. It has been replaced by ENVIROSTOR.	0	0
ENVIROSTOR	DTSC Site Mitigation and Brownfields Reuse Program's EnviroStor database identifies sites that have known contamination or sites for which there may be reason 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 information including, 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.	12	2
LUST	Leaking Underground Storage Tanks (LUST) Incident Report – State Water Resources Control Board (SWRCB) LUST records contain an inventory of reported leaking UST incidents.	72	4
CA FID UST	The California Facility Inventory Underground Storage Tank (CA FID UST) database contains historical active and inactive UST listings as provided by the SWRCB. The database has not been updated since 1994.	73	4
State UST	UST Database – SWRCB provides a database of registered Underground Storage Tanks within the specified area.	16	1
HIST UST	The Hazardous Substance Storage Container Database is a historical listing of UST sites previously maintained by SWRCB. Current data can be found in the State or local UST database.	77	4
SWEEPS UST	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.	81	4
SWF/LF State Landfill/ Historical Landfill	Solid Waste Information System – The Integrated Waste Management Board maintains a list of Solid Waste Facilities/Landfill (SWF/LF) Sites, including active and inactive, permitted and non-permitted solid waste disposal facilities.	0	0
VCP	DTSC's list of voluntary cleanup properties (VCP), 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	2	0

Database	Description	Records Listed	Records of Concern to the Project
CHMIRS	California's Hazardous Materials Incident Report System (CHMIRS) contains information on reported hazardous material incidents (accidental releases or spills), as maintained by the Office of Emergency Services.	15	0
DEED	The DTSC Site Mitigation and Brownfields Reuse Program (SMBRP) 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.	1	0
DRYCLEANERS	DTSC's 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; dry cleaning plants, except rugs; carpet and upholster cleaning; industrial launderers; laundry and garment services.	2	0
Manufactured Gas Plants	The EDR Proprietary Manufactured Gas Plant Database includes records of coal gas plants (manufactured gas plants) compiled by EDR's researchers. 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.	0	0
CA WDS	California Waste Discharge Systems (CA WDS) include sites which have been issued waste discharge requirements by the SWRCB.	8	0
NPDES	The National Pollutant Discharge Elimination System (NPDES) database contains a list of NPDES permits, as provided by the SWRCB.	17	0
Cortese/HIST Cortese	Cortese Hazardous Waste & Substances Sites – The Cal/EPA/Office of Emergency Information previously maintained a list of sites designated as LUST, SWF/LF or Cal-Sites. The list is no longer updated and cases are maintained by the SWRCB, Integrated Waste Management Board and DTSC.	31	1
SWRCY	A listing of recycling facilities in the state of California, provided by the Department of Conservation.	1	0
SLIC	The SLIC (Spills, Leaks, Investigations and Cleanup) program is designated to protect and restore water quality from spills, leaks and similar discharges. Statewide SLIC cases are maintained by the SWRCB.	3	0
HAZNET	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.	356	0
San Bern. County Permits	San Bernardino County Fire Department Hazardous Materials Division permits.	189	0
PROC	A list of certified processors maintained by the Department of Conservation	0	0
Brownfields	A Brownfield site is an industrial or commercial project corridor that is abandoned, inactive, or underutilized, on which expansion or redevelopment is complicated because of the actual or perceived environmental contamination.	0	0
	Total Records	**1,023**	**21**

4.2 SUMMARY OF LISTED RECORDS

The EDR report identified 1,023 environmental records for listings located within the one-mile radius of concern. Within an urban area it is anticipated that commercial operations will increase the number of listings in a database search. Many of the database listings, however, are not considered to be of concern to the project due to the scope of the project, the distance of the listed site from the project area, and/or a facility's lack of, or compliance with any previously noted violation(s). Additional database findings are not considered to be of concern to the project due to the nature of the database. For example, records listed in the HAZNET database only identify facilities that have shipped hazardous waste with a manifest, which does not necessarily indicate a hazardous materials release concern. As a result of these factors, 1,002 of the 1,023 records listed are not considered to be of concern to the project. The remaining 21 records correspond to three sites of concern and five additional sites that are considered to have notable findings, based on the evaluation of HDR's environmental professionals (as defined by ASTM). The discrepancy between the number of records and the number of sites (eight total) is a result of sites often being listed in multiple databases. Details regarding each of the sites are presented below.

The following three sites are considered of concern:

- The DHS property, located at 655 W. Rialto Avenue (Map Code A on Figure 2), is considered to be a site of concern based on it's listing in the Envirostor database. According to an online file review conducted via the GeoTracker® website, the site was undergoing characterization in 2000 for lead contamination identified during grading activities at the site. Files obtained from the San Bernardino County Fire Department included a case closure report for the site that was issued in August 2000. The closure was based on the analytical results from soil samples collected during a site investigation conducted in February 2000. The investigation identified that the samples obtained from the area of potential acquisition at the subject property were non-detect (ND) for lead, and total recoverable petroleum hydrocarbons (TRPH). Additional samples (collected from the northeastern portion of the property) did contain lead and TRPH above the regulatory limit, resulting in subsequent excavation and removal of those soils from the site, and a case closure (CHJ, 2000). Based on the short segment of storm drain proposed at the facility's southeastern boundary, and considering the closure of the Envirostor case, the site is considered an HREC.
- Inland Beverage Company (Map Code F on Figure 2), formerly located at 223 South G Street, is listed in the leaking underground storage tank (LUST) database. According to online regulatory file review via the GeoTracker® website, the LUST case was opened in 1986 and closed in 1997. The gasoline release resulted in both soil and groundwater contamination. Based on the former facility's upgradient location from one of the proposed detention pond locations, and considering the closed status of the LUST case, the site is considered an HREC.
- Chubby Chassis/All Car & Truck Care Center (Map Code H on Figure 2), formerly located at 275 South G Street, is listed in the LUST database. According to online regulatory files reviewed via the GeoTracker® website, one LUST case was opened and closed in 1990. The case involved the release of hydraulic fluid/oil to the soil only. Based on the close proximity of the site to the proposed location for the westernmost drainage pond, and considering the closed status of the case, this site is considered an HREC.

The following five sites are considered notable findings:

- Southern California Gas Company, located at 155 S. G Street (Map Code B on Figure 2),

is listed in the LUST database, with one close LUST case. Regulatory files for the facility were reviewed at the Santa Ana Regional Water Quality Control Board (SARWQCB). Files identified one 10,000-gallon gasoline UST (installed in 1986), and one 12,000-gallon fuel UST (installed 1981) onsite, and one 6,000 gallon UST removed in 1985 (unknown installation date). A gasoline leak was detected at the pump for the 10,000-gallon tank. Five groundwater monitoring wells were installed, and monitored the contamination for one year. Based on declining levels of total petroleum hydrocarbons (TPH) and BTEX, the LUST case was closed in 1994 when groundwater samples indicated non-detect for both TPH and BTEX. The files did not reference excavation or soil remediation activities. In addition to the LUST case, a HIST Cortese record is also listed for the site in connection with the LUST case. Four underground storage tank (USTs) were identified at the site in the HIST UST and SWEEPS UST databases, with the CA FID UST database identifying the tanks as active. The site is also listed as a permitted UST facility in the State UST database, which is regularly updated. As a result of the numerous regulatory listings associated with the site, it is considered a notable finding. However, based on the site's distance and closed status of the LUST case, it is not considered to be a REC.

- Rogers Harmon Motors Inc (Map Code G on Figure 2), formerly located at 240 South E Street, is listed in the HIST, CA FID and SWEEPS UST databases. The EDR report lists one waste-oil tank formerly onsite. The site is not listed as a permitted UST facility in the State UST database, which is regularly updated. It has been the experience of HDR personnel that frequently, soil contamination exists in the subsurface surrounding USTs not otherwise classified as a LUST. Based on this experience, the site is considered a notable finding. However, based on its cross-gradient location and lack of any associated leak identified for the site, the site is not considered to be a REC.
- 1-Day Paint and Body Center Inc (Map Code I on Figure 2), located at 288 South E Street, is listed the LUST database. According to online regulatory files reviewed via the GeoTracker® website, the LUST case was opened in 1993 and closed in 1994. The gasoline release resulted in soil contamination only. Two gasoline USTs are also listed in the SWEEPS UST database. The current status of the tanks is not listed; however, the site is not listed as a permitted UST facility in the State UST database, which is currently updated. As a result of the former LUST case onsite, the site is considered a notable finding. However, based on the site's distance and cross-gradient location from the project area, and closed status of the LUST case, the site is not considered to be a REC.
- Former Signal Oil Company (Map Code E on Figure 2), located at 173 South G Street is listed as a historic Envirostor case and a Comprehensive Environmental Response, Compensation, and Liability Information System CERCLIS NFRAP (no further remedial action planned) site. The database records relate to the listing state that Signal Oil Company was identified in the phone book by regulatory agencies. Once a preliminary investigation of the site was done, both the cases were closed (Envirostor and CERCLIS). Based on the close proximity of the site to the subject property, the site is considered a notable finding. However, based on the details of these cases, the site is not considered to be a REC.
- Wixen Pipe and Supply Co (Map Code K), formerly located at 348 South E Street is listed in the CA FID, SWEEPS and HIST UST databases. It has been the experience of HDR personnel that frequently, soil contamination exists in the subsurface surrounding

USTs not otherwise classified as a LUST. Based on this experience, the site is considered a notable finding. However, based on its cross-gradient location and lack of any associated leak identified for the site, the site is not considered to be a REC.

While not listed in the EDR report, a portion of the project area is considered of concern based on regulatory information identified through the Cal EPA GeoTracker® website. The area is identified as the City of San Bernardino Economic Development Agency Proposed Transit Village Core Project Area. The area is located south of the BNSF railroad tracks and west of E Street, where a portion of the proposed storm drain is to be located (Map Code C). The site was listed as an active Department of Toxic Substances Control (DTSC) Evaluation Site until 2010 when a "no further action" status was declared for the site. According to DTSC online files, the currently vacant lot formerly housed a railroad maintenance facility in the 1960s and 1970s. The Department approved a Targeted Site Investigation (TSI) for the subject property, which was proposed to include soil, soil gas, and groundwater samples to test for metals, petroleum hydrocarbons, polychlorinated biphenyls (PCBs), chlorinated solvents, and volatile organic compounds (VOCs) in soil, soil gas, and groundwater. A 2009 TSI found low levels of TPHs, metals (arsenic, cadmium, copper, lead mercury, and zinc), and 1,3-butadiene in soil. A Phase II ESA was conducted for a portion of the site by HDR in July 2011 (only an area located immediately south of the BNSF railroad tracks was investigated). Specific details regarding the Phase II can be found in Section 4.5. The results of the Phase II indicated arsenic in concentrations exceeding the California Human Health Screening Level (CHHSL) for industrial and commercial properties. However, all concentrations of arsenic detected at the site were below background guidance and were considered naturally occurring. Organic compounds were not detected in onsite soil samples in concentrations exceeding regulatory action levels. Based on the previous investigations conducted that identified soil contamination onsite, the site is considered a REC.

4.3 Historical Use Information

The objective of reviewing historical use information is to develop a history of previous land uses in the vicinity of the subject property and to assess these uses for potential hazardous materials impacts that may affect the project. HDR reviewed those historical sources that were readily available and reviewable and likely to provide useful information, given the time and cost constraints inherent in ESA projects.

4.3.1 Fire Insurance Maps

Fire insurance maps are produced by private fire insurance companies to indicate uses of the subject property on specified dates. HDR requested fire insurance maps from EDR, the copyright holder for the Sanborn map collection. Sanborn maps for the years 1894 and 1906 were reviewed for the subject property. The BNSF railroad tracks located at the north end of the subject property were present in the 1894 image.

4.3.2 Historical Aerial Photographs

Historical aerial photographs are valuable for the environmental assessor to review features of properties at/near the subject property over a long period of time. HDR reviewed historical aerial photographs provided by EDR for the years 1938, 1959, 1966, 1977, 1980, 1989, 1994, and 2002. Details related to the aerial photography review are presented below.

In 1938, the project area consisted of railroad tracks and associated rail maintenance facilities in the areas of the proposed storm drain, and the southernmost detention pond. Several buildings and numerous tracks traversed the area from the current BNSF railroad tracks, extending past the southern boundary of the project area. Several aboveground storage tanks (ASTs) and areas of stained soil were present throughout the former maintenance area. The area of the westernmost detention pond consisted of agricultural land.

The surrounding vicinity was developed with warehouses and commercial buildings (along E Street), as well as railroad tracks to the north of the current BNSF tracks, and some undeveloped and additional agricultural land along G Street.

By 1953, additional ASTs and buildings were located in the area of the maintenance facility. The agricultural land was no longer present in the area of the proposed westernmost detention pond; the area instead consisted of undeveloped land with a commercial facility located at G Street. Development in the surrounding vicinity expanded to include commercial and warehouse facilities along G Street, and additional facilities along E Street.

In 1966, some of the ASTs located near the northern portion of the project area had been removed, but the majority of the structures remained in the maintenance area. No other notable changes to the project area were identified in the mid-1960s. The surrounding vicinity was also largely unchanged. By 1977, the majority of the maintenance facility's structures had been removed. One building remained located near the current BNSF railroad tracks, with a second large building still present at the southern end of the project area. The surrounding vicinity remained largely unchanged through the late 1970s. The project area and surrounding vicinity were largely unchanged in 1980, as well.

Due to poor image quality of the 1989 aerial photograph, it is difficult to determine specific details about the development of the project area and surrounding vicinity. However, it is noted that the large building located at the southern end of the project area (in the maintenance area) was no longer present by 1989. By 1994, the project area consisted of undeveloped land. The surrounding vicinity consisted of development largely consistent with its current configuration. The railroad tracks previously located to the north of the current BNSF tracks were no longer present.

In 2002 the project area existed in its current configuration. The San Bernardino Stadium and surrounding paved parking areas were present. The surrounding vicinity's development was also consistent with the current configuration.

The former presence of a railroad maintenance facility is considered a notable finding based on operations and waste streams associated with this type of facility. Because the former maintenance facility and waste streams are no longer present at the site, and the passage of several decades since the facilities were in operation, the area is not considered a REC. See Recommendation 1 for guidance on dealing with any heretofore unknown contamination discovered during construction.

4.3.3 City Directory Information

City directory review was conducted at the San Bernardino Public Library's California Room, for the years 1926 to 2010 in intervals of approximately five years (not all years between 1926 and 2010 were available for review). The information gathered during the review confirmed historic development consistent with the site reconnaissance and historical aerial review. The following sites were identified as notable findings based on operations and associated waste streams and/or the possible presence of USTs formerly located onsite. Based on the lack of regulatory information and/or location/gradient, the sites are not considered RECs.

- Auto Repair located at 280 South E Street (Map Code I on Figure 2) was listed in 1940 and 1944.
- Olson Distributing Co. located at 124 South E Street (Map Code D) was listed from 1949 through 1961.
- Beverage Distribution Warehouse located at 324 South E Street (Map Code J) was listed from 1961 through 1980.

4.3.4 Historical Topographic Maps

Historical topographic maps provide an overview of the area relative to potential previous land uses. HDR reviewed historical topographic maps of the subject property and adjoining properties from the United States Geological Survey 7.5 minute series quadrangle maps for San Bernardino South, California (1954, photorevised 1967, 1973, and 1980). These maps served to verify the information gathered in the historic aerial photograph review.

4.4 Environmental Liens and Additional Information

No information regarding the chain-of-title ownership history or environmental liens recorded against the subject property was provided by the user. Environmental lien searches were not conducted as part of the scope of work for this project.

4.5 Summary of Previous Environmental Investigations

In July 2011, HDR conducted a Phase II ESA of a segment of the vacant lot located immediately south of the BNSF railroad tracks, near the SBTC (identified as the City of San Bernardino Economic Development Agency Proposed Transit Village Core Project Area in Section 4.2). The Phase II ESA resulted in the following findings:

- Analytical results show that arsenic concentrations reported in all three soil samples exceeded the CHHSL of 0.24 mg/kg. The concentrations ranged from a low of 1.9 mg/kg to a high of 6.2 mg/kg. All of these concentrations were below the regional background concentration of 12 mg/kg (DTSC 2005, USGS 1984).
- All arsenic concentrations were below the DTSC hazardous waste criteria Total Threshold Limit Concentration (TTLC) of 500 mg/kg, therefore site soils may be disposed of as a Class III Municipal Solid Waste at any landfill that accepts such waste.
- Organic compounds listed on the Method 8260 volatile organic compounds (VOCs), Method 8270 semi-VOCs (SVOCs), and Method 8082 polychlorinated biphenyls (PCBs) method lists were not detected in onsite soil samples in concentrations exceeding regulatory action levels.

HDR concluded that the results of the Phase II ESA indicated arsenic in concentrations exceeding the CHHSL for industrial and commercial properties. However, all concentrations of arsenic detected were below background guidance and were considered naturally occurring. Therefore, no special provisions for the handling of soil during construction were recommended to be included in the construction plans. It is important to note that the entire vacant lot was not included in HDR's Phase II investigation. A complete copy of the Phase II, with figures identifying the areas that were included in the analysis, can be found in Appendix D.

5.0 SITE RECONNAISSANCE AND INTERVIEWS

5.1 SITE RECONNAISSANCE

On January 23, 2012 HDR personnel conducted a site reconnaissance of the project area and surrounding vicinity. The project area consisted of a vacant, grassy lot and the paved parking area for the nearby San Bernardino Stadium. One paved access road was present at the western end of the vacant lot, with remnants of concrete foundations and railroad tracks within the lot. Several metal fences, and two temporary waste bins, were also located in the vacant lot. South of the vacant lot was the San Bernardino Stadium and surrounding paved parking area. The proposed locations for both detention ponds were within the paved parking areas. The surrounding vicinity consisted of commercial warehouses and facilities, retail properties, undeveloped lots, auto repair facilities and some residential properties. No pits, ponds, lagoons, or other indications of large-scale hazardous material were identified during the reconnaissance of the project area or surrounding vicinity.

5.2 INTERVIEW

Mr. Lou Schnepp of the San Bernardino Redevelopment Agency was interviewed via telephone on January 25, 2012. Mr. Schnepp confirmed that the area of the current stadium and parking lot was formerly a maintenance station for the Pacific Electric Railway. Mr. Schnepp noted that environmental investigations had been completed for the project area prior to the stadium's construction in the early 2000s. He did not have a copy of the reports containing the specific findings of the investigations, but stated that contamination was encountered in the area, and was remediated at the time of construction.

5.3 KNOWN CURRENT AND PAST USES OF THE SITE AND ADJOINING PROPERTIES

The project area consists of a vacant lot located south of the BNSF railroad tracks and west of E Street, and the parking lot for the adjacent San Bernardino Stadium. Historically, the majority of the project area consisted of railroad tracks and associated maintenance facilities for the Pacific Electric Railway (from at least 1930 through about the early 1970s). A portion of the project area (location of the proposed westernmost detention pond) consisted of agricultural land and an undeveloped lot prior to current use. The surrounding vicinity includes a DHS office building, a scrap metal recycling facility, a Southern California Gas Company service and support yard, vacant and occupied commercial and industrial warehouses, auto repair facilities, retail facilities, and undeveloped land. Historic development in the surrounding vicinity consisted of similar development dating back to the 1930s. The BNSF railroad tracks currently located at the SBTC have been present since the late 1800s.

5.4 UTILITIES

HDR did not observe indications of subsurface utilities other than typical municipal utilities such as water, sewer, electrical, and telecommunications facilities. Additional utilities related to the operation of the railroad tracks are located within the surrounding vicinity.

6.0 DATA GAP ANALYSIS

The ASTM E 1527-05 standard requires a listing of "data gaps" encountered during the investigative process that may affect the validity of the conclusions drawn by the environmental professional. The ASTM E 1527-05 standard also requires that the environmental professional estimate the relative importance of the data gaps. Generally, gaps in available data are related to the availability of historical data sources for specific sites of concern. The environmental professional uses multiple historical data sources as a method to provide coverage for data gaps. Historical information is collected on a recurring basis, and the passage of time between data sets may or may not constitute a significant gap in data coverage. For this project, the following item may constitute a data gap as defined by ASTM:

- Lack of a review of previous environmental investigations of the project area

The lack of a review of previous environmental investigations for the project may prove to be a significant data gap; however, based on the proposed use for the project area and the previous redevelopment of the project area, the potential data gap is not anticipated to affect the findings of this report.

7.0 FINDINGS AND CONCLUSIONS

HDR has conducted a Phase I ESA for the proposed locations of two detention ponds and associated storm drain, for use in connection with the DSBPRP. The area of the detentions ponds and storm drain is located along the BNSF Redland Subdivision railroad tracks in the area of the SBTC, and extending to southern boundary of the San Bernardino Stadium parking area, in San Bernardino, San Bernardino County, California. In addition to the project area, a one-quarter-mile surrounding vicinity was also evaluated for the purposes of this report. Figures depicting the location of the project area are included in Appendix A, with photographs included in Appendix B.

This Phase I ESA identifies recognized environmental conditions (RECs, as defined in ASTM E 1527-05) for the project area that may adversely affect construction or subject property right-of-way acquisition. In the event that the regulatory issue has been resolved by the regulatory agency with jurisdiction, the condition may be classified as a "Historic REC".

This ESA includes a summary of the site reconnaissance conducted on January 24, 2012 and telephone interview, a review of environmental databases, and a review of historical data sources.

The ESA process resulted in the following findings and conclusions.

7.1 FINDINGS

- The proposed locations of the detention ponds and storm drain currently consist of a vacant lot located south of the BNSF railroad tracks, west of E Street, and the parking lot for the adjacent San Bernardino Stadium. The project area is located in an urban area of mixed-use development in San Bernardino. The surrounding vicinity includes a DHS office building, a Southern California Gas Company service and support yard, vacant and occupied commercial and industrial warehouses, auto repair facilities, retail facilities, and undeveloped land. The BNSF railroad tracks, located north of the subject property, have been present since at least the late 1800s.
- The EDR environmental database report identified 1,023 environmental records for sites located within the project area or a one-mile radius of concern. Many of the database listings, however, are not considered to be of concern to the project due to the scope of the project, the distance of the listed site from the project area, and/or a facility's lack of, or compliance with any previously noted violation(s). Additional database findings are not considered to be of concern to the project due to the nature of the database. As a result, 1,002 of the 1,023 records listed are not considered to be of concern to the project. The remaining 21 records correspond to three sites that are considered to be of concern, and five additional sites that are considered to have notable findings. The discrepancy between the number of records and the number of sites is a result of sites often being listed in multiple databases.
- Sites of concern include one Envirostor site (DHS facility) and two LUST sites (former Inland Beverage Company and Chubby Chassis). The sites are considered to be of concern based on the details associated with the regulatory listings, and the location of the site relative to identified groundwater gradient in the project area.
- While not listed in the EDR report, a portion of the project area is considered of concern based on regulatory information identified through the Cal EPA GeoTracker® website. The area is identified as the City of San Bernardino Economic Development Agency Proposed Transit Village Core Project Area. The area is located south of the BNSF railroad tracks and west of E Street, where a portion of the proposed storm drain is to be

located. According to the DTSC online files, the currently vacant lot previously housed a railroad maintenance facility in the 1960s and 1970s. DTSC approved a Targeted Site Investigation for the area, which was proposed to include soil, soil gas, and groundwater samples to be analyzed for metals, petroleum hydrocarbons, polychlorinated biphenyls (PCBs), chlorinated solvents, and VOCs in soil, soil gas, and groundwater. A 2009 Targeted Site Investigation found low levels of TPHs, metals (arsenic, cadmium, copper, lead mercury, and zinc), and 1,3-butadiene in soil. A portion of this area was also included Phase II ESA conducted by HDR in July 2011 (limited to an area located immediately south of the BNSF railroad tracks). The results of the Phase II indicated arsenic in concentrations exceeding the CHHSL for industrial and commercial properties. However, all concentrations of arsenic detected at the site were below background guidance and were considered naturally occurring. Organic compounds were not detected in onsite soil samples in concentrations exceeding regulatory action levels.

- The five sites identified with notable findings in the EDR include UST sites, closed LUST sites and one CERCLIS NFRAP site. The sites are not considered to be of concern based on the distance from the project area, down gradient location, and/or details associated with the regulatory listing.
- Three additional sites with notable findings were identified in the city directory review. The sites include former auto repair facilities or distribution warehouses with the potential for USTs formerly located onsite. The sites are not considered to be of concern, based on distance and downgradient location from the project area.
- Historical aerial photograph review indicated that a former railroad maintenance facility and railroad tracks were located within the project area. The maintenance facility and tracks were present from at least the 1930s through about the 1970s. According to information gathered during a telephone interview, previous environmental investigations in the project area identified contamination onsite. The interviewee (Lou Schnepp of the San Bernardino Redevelopment Agency) stated the site had been remediated prior to construction of the San Bernardino Stadium in the early 2000s.

7.2 CONCLUSIONS

HDR has identified three sites with conditions that constitute an HREC, and one site with conditions that constitute a REC. The following statement is required by ASTM E 1527-05 as a positive declaration of whether REC(s) were found:

> *HDR has performed a Phase I Environmental Site Assesssment (ESA) in conformance with the scope and limitations of ASTM E 1527-05 of the subject property (as defined elsewhere in this report). Any exceptions to or deletions from these practices are described in the report. This report has revealed evidence of three Historic Recognized Environmental Conditions (HRECs), and one REC in connection with the project area.*

8.0 RECOMMENDATIONS

Recommendations included in this report have been developed through the investigative procedures described in the *Scope of Services, Significant Assumptions, and Limitations* section of this report. These findings should be reviewed within the context of the limitations provided in the *Scope of Services, Significant Assumptions, and Limitations* section. Based on the location and specific details of the identified risks, HDR has identified three HRECs and one REC associated with the project area.

Based on the findings and conclusions reached in this report, HDR makes the following recommendations for the subject property:

8.1 RECOMMENDATION 1

HDR recommends that all construction contractors should be instructed to immediately stop all subsurface activities in the event that potentially hazardous materials are encountered, an odor is identified, or significantly stained soil is visible. Contractors should be instructed to follow all applicable regulations regarding discovery and response for hazardous materials encountered during the construction process.

8.2 RECOMMENDATION 2

HDR recommends that if this report is 6 months old or older when property acquisition or construction begins, the recommendations within this report be reevaluated. The applicable ASTM standard (E 1527-05) requires a reevaluation of site conditions if a Phase I report (ESA) is older than 180 days (6 months).

9.0 QUALIFICATIONS OF ENVIRONMENTAL PROFESSIONALS

9.1 SIGNATURES AND QUALIFICATIONS

We declare that, to the best of our professional knowledge and belief, we meet the definition of environmental professional as defined in Section 312.10 of 42 C.F.R. Part 312. This Phase I ESA was conducted under the supervision of a qualified environmental professional.

We have the specific qualifications based on education, training, and experience to assess a property of the nature, history, and setting of the subject property. We have developed and performed the AAI in conformance with standards and practices set forth in 40 C.F.R. Part 312.

The preceding report has been prepared in general conformance with standard industry practice for performance of ESAs, and includes the applicable portions of the investigation procedures codified in ASTM E 1527-05, *Standard Practice for Environmental Site Assessments: Environmental Site Assessment Process*. The end user of this report may rely on the contents, findings, and conclusions to be accurate within the limitations stated in this report and in the ASTM standard. The report also complies with specific requirements supplied by the client.

Hazardous Material Specialist/CA REA
Colleen Murray

Environmental Professional
Kelly W. Kading, CPG, CHMM
Senior Professional Associate

9.1.1 Qualifications of Environmental Professionals

This Phase I ESA was performed by the following HDR employee.

Ms. Colleen Murray, HDR's qualified environmental professional, as defined by ASTM Practice E 1527-05, has more than 7 years of experience in the assessment of impacted properties and compliance with environmental regulations. She has a Bachelor's degree in Organizational Studies from Arizona State University and is currently pursuing a Master's degree in Environmental and Emergency Management. Ms. Murray's experience includes environmental health and safety, industrial hygiene, emergency response, and the submittal of various state and federally required reports and permits.

9.1.2 Qualifications of QA/QC Review Professionals

Reviews for quality assurance and quality control were performed by the following HDR employees.

Mr. Kelly W. Kading, CPG, CHMM, an environmental professional as defined by ASTM E 1527-05, has more than 24 years of experience in assessment and remediation of impacted properties and compliance with environmental regulations. He has a B.S. in Geology from Colorado State University and is a Certified Professional Geologist (#9173), and a Certified Hazardous Materials Manager (#1995). He specializes in forensic investigation of hazardous materials-impacted properties for municipal and state agencies, as well as commercial clients. His experience covers assessment of more than 3,000 properties ranging from agricultural land to multigenerational industrial properties in 34 states and 2 foreign countries. He is highly knowledgeable of federal, state, and local environmental regulations and standards and has served on the National Board of Directors of the Academy of Certified Hazardous Materials Managers. He serves as HDR's National Phase I Best Practices Team leader, and is responsible for training HDR's Phase I practitioners nationwide.

10.0 REFERENCES

American Society for Testing and Materials (ASTM). 2005. ASTM Practice E 1527-05. *Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Process.*

California EPA GeoTracker® website (January 25, 2012). http://geotracker.waterboards.ca.gov /default.asp.

Department of Toxic Substances Control Envirostor website (January 25, 2012). http://www.envirostor.dtsc.ca.gov/public/map.asp.

Environmental Data Resources, Inc. (EDR). Report: *DSBPRP & SBTC Detention Pond.* January 20, 2012.

Bergeron, Pete B. 22 May 1995. *Work Plan for Site Closure: Verification Boring Advancement.*

Interview: Lou Schnepp via telephone. January 25, 2012.

Appendix A
Figures

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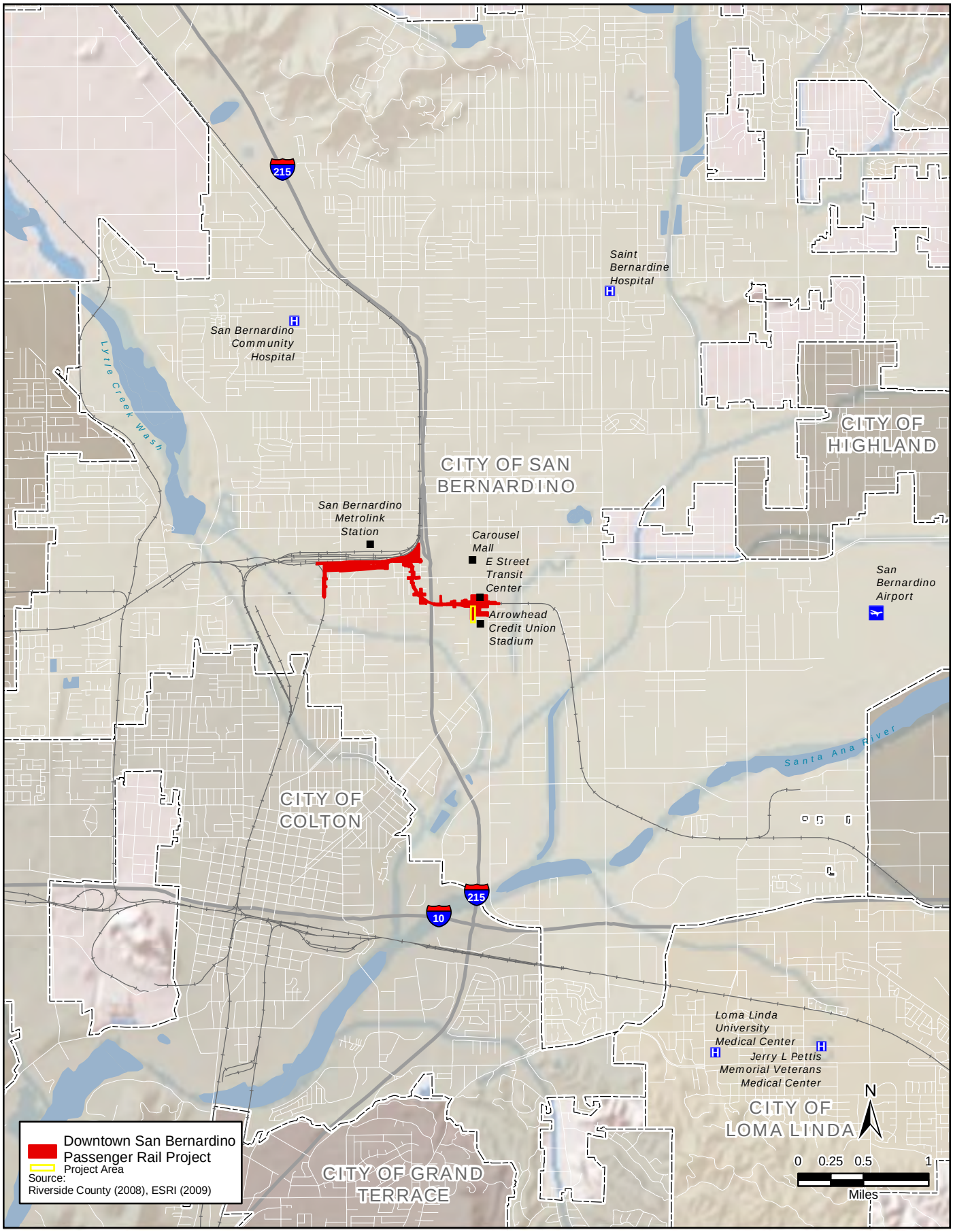

Figure 1
Phase I Environmental Site Assessment
Dentention Pond Locations

Figure 2
Phase I Environmental Site Assessment
Detention Pond Locations

Appendix B
Photographic Documentation

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Photo 1: Proposed location of the storm drain at northern end of project area. View is toward the north.

Photo 2: Proposed location of storm drain located in the parking lot to the west of the San Bernardino Stadium. View is toward the south.

Photo 3: Proposed location of the westernmost detention pond. View is toward the west.

Photo 4: Proposed location of southernmost detention pond. View is toward the east.

Appendix C
EDR Information

The EDR report is available for review on the CD for the EA/DEIR

Appendix D
Phase II ESA

HDR, 2011

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DOWNTOWN SAN BERNARDINO PASSENGER RAIL PROJECT

Assessor Parcel Number 0136-011-24

Phase II Environmental Site Assessment

San Bernardino, San Bernardino County, California

HDR Project No. 043/135119/122

July 2011

Prepared for:

San Bernardino Associated Governments
1170 W. 3rd Street, 2nd Floor
San Bernardino, CA 92602

Prepared by:

HDR Engineering, Inc.
3200 East Camelback Road, Suite 350
Phoenix, Arizona 85018

HDR Project No. 043/164490/012

July 15, 2011

San Bernardino County Associated Governments
Attn: Mitch Alderman
1170 W. 3rd Street, 2nd Floor
San Bernardino, CA 92602

Re: Phase II Environmental Site Assessment Report Submittal
San Bernardino County APN 0136-111-24
San Bernardino, San Bernardino County, California

Dear Mr. Alderman,

We are pleased to provide you with the above-referenced *Phase II Environmental Site Assessment* report. The attached report presents our methodology, findings, opinions, conclusions, and recommendations.

HDR appreciates the opportunity to serve the San Bernardino County Associated Governments (SANBAG) on this important project. If you have any questions or comments, please feel free to contact us at (602) 522-7700.

Cordially,

HDR ENGINEERING, INC.

David J. Atteberry
Geologist

Kelly W. Kading, CPG, CHMM
Senior Professional Associate

Distribution: Two electronic copies and two bound copies.
File: Two bound copies

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Appendix A – Boring Logs
Appendix B – Analytical Laboratory Report

EXECUTIVE SUMMARY

HDR Engineering, Inc. (HDR) was contracted by the San Bernardino Associated Governments (SANBAG) to perform a Phase II Environmental Site Assessment (ESA) to provide SANBAG with information regarding the location and severity of contaminants of concern (COC), if present, from historic operations at future intermodal transit facility (south) Site in San Bernardino, CA. This site will be identified by its Assessors Parcel Number, (APN) 0136-111-24.

The field investigation portion of this Phase II ESA was performed on February 7, 2011, according to the scope of work agreed to by HDR and SANBAG. The Phase II ESA scope included the advancement of three soil borings, which were advanced using a drill rig to depths of up to 10 ft below ground surface (bgs), with soil samples collected at various depths to assess vertical distribution of impacts contaminant impacts to site soils. Findings and Conclusions of the PSI included the following:

Findings and Conclusions of the Phase II ESA included the following:

- Historic land use for the site includes a rail service yard, where rail cars were repaired, maintained and serviced. The California Department of Toxic Substances and Control (DTSC) conducted a Targeted Site Investigation of the property in 2009 to evaluate potential contamination impacts resulting form historic land use. The 2009 Targeted Site Investigation found low levels of total petroleum hydrocarbons (TPHs), metals (arsenic, cadmium, copper, lead mercury, and zinc), and 1,3-butadiene in soil.
- The subsurface at the site is characterized by interbedded silts, clays and sands to a depth of 25 ft bgs. All soils encountered are representative of distal alluvial fan systems, irregularly reworked by fluvial processes. Groundwater was not encountered during the field investigation and is documented at a depth of approximately 35 ft bgs.
- Analytical results show that arsenic concentrations reported in all three soil samples exceeded the California Human Health Screening Level (CHHSL) of 0.24 mg/kg. The concentrations detected in soil samples SB-1, SB-2 and SB-3 range from a low of 1.9 mg/kg to a high of 6.2 mg/kg. All of these concentrations were below the regional background concentration of 12 mg/kg (DTSC 2005, USGS 1984).
- All arsenic concentrations were below the DTSC hazardous waste criteria Total Threshold Limit Concentration (TTLC) of 500 mg/kg, therefore site soils may be disposed of as a Class III Municipal Solid Waste at any landfill that accepts such waste.
- Organic compounds listed on the Method 8260 (VOCs), Method 8270 (SVOCs), and Method 8082 (PCBs) method lists were not detected in onsite soil samples in concentrations exceeding regulatory action levels.

The Findings and Conclusions listed above are the result of investigative procedures outlined in the Section 3.1, Methodology of this report, and the contracted scope of work. These conclusions led to the following recommendations:

Recommendation 1

The results of this Phase II ESA indicated arsenic in concentrations exceeding the California CHHSL for industrial and commercial properties. However, all concentrations of arsenic detected at the site were below background guidance and were considered naturally occurring. Therefore, no special provisions for the handling of soil during construction will need to be made in the construction plans.

1.0 INTRODUCTION

1.1 PURPOSE AND SCOPE

The purpose of this Phase II Environmental Site Assessment, (ESA) is to provide the San Bernardino Associated Governments (SANBAG) with information regarding the location and severity of contaminants of concern (COC), if present, from operations at parcel number 0136-111-24 located in San Bernardino, CA. This Future Intermodal Transit facility HDR conducted a Phase I ESA for the property and designed this Phase II ESA scope based upon the data provided in that report.

The scope of the Phase II included the advancement of a total of three soil borings at the site. Borings were advanced to depths of approximately 10 ft bgs, with soil samples collected at various depths to assess vertical distribution of contamination.

1.2 LIMITATIONS

This Phase II ESA has been prepared for use by SANBAG. The information presented in this report is based on the SANBAG-approved scope of work, which included advancement of SBs, collection of soil samples to determine the presence of COCs. HDR makes no warranties or guarantees regarding the accuracy or completeness of the information provided or compiled by others.

As with any investigation that uses sampling points to characterize a larger area, it is possible that the sampling locations did not intersect all potentially impacted areas. HDR determined that three sampling locations would be sufficient to characterize the site for the identified COCs. Given the size of the area and the laboratory results reported, HDR is confident that the site has been adequately characterized within the limitations described in Section 3.1, Methodology.

In addition, some substances may be present at the site or in the vicinity in quantities below those categorized as actionable by current environmental regulations. HDR cannot be responsible if regulatory standards are changed in the future in a manner that renders the current site conditions actionable.

2.0 PROJECT DESCRIPTION

2.1 DESCRIPTION OF STUDY AREA

The San Bernardino Associated Governments (SANBAG) is proposing to extend Metrolink regional passenger rail service approximately one mile east from its current terminus at the existing San Bernardino Metrolink Station/Santa Fe Depot (Depot) to new Metrolink commuter rail platforms proposed near the intersection of Rialto Avenue and E Street in the City of San Bernardino, California. The Project is known as the Downtown San Bernardino Passenger Rail Project (DSBPRP). The Project's primary features include construction of a second track, rail platforms, parking lots, a pedestrian overpass at the Depot, grade crossing improvements to support Quiet Zones, railroad signalization, and roadway closures. The Project's secondary features include construction of drainage improvements, utility accommodation, and implementation of safety controls.

Primary project components include double tracking of rail within the project area, the construction of the rail platforms, a rail station and parking near Rialto Avenue and E Street (i.e., E Street Rail Station), grade crossing improvements, railroad signalization, bridge widening, and roadway closures. The project will also involve culvert replacements and extensions, utility replacements and relocations, noise, retaining, and landscape walls/barriers, relocation of monitoring wells and implementation of safety controls. Site Description

2.2 SITE DESCRIPTION

The project site is San Bernardino County Assessors Parcel Number (APN) 0136-111-24, this. This site will be acquired by SANBAG, and is planned to be the future home of the Intermodal Transit Facility. The site is located adjacent to the existing BNSF right of way to the south. The site is located to the north of the San Bernardino minor league baseball stadium, west of the former Bekins facility and strip mall, and east of the Southern California Gas Company property. Access to the site is through a gate along southern property boundary with the minor league baseball stadium. A Site Location Map is included as Figure 1, and a Soil Boring Location Map is included as Figure 2.

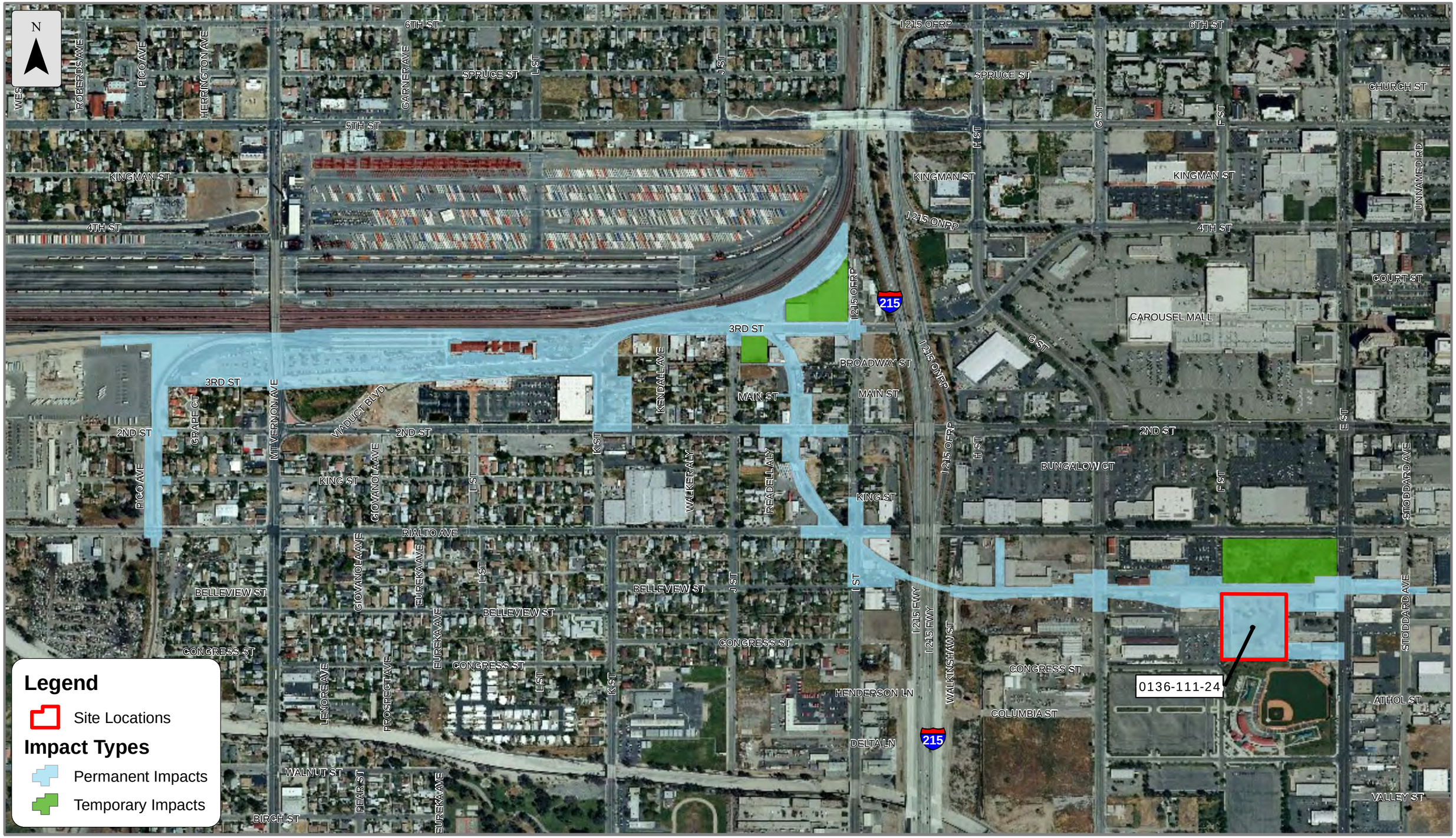
The site currently consists of a vacant lot, which includes a north-south access road located on the western side of the property. Historic land use for the site includes a rail service yard where rail cars were repaired, maintained and serviced. The California Department of Toxic Substances and Control (DTSC) conducted a site assessment of the property in 2009 to evaluate potential contamination impacts resulting form historic land use. The 2009 Targeted Site Investigation found low levels of total petroleum hydrocarbons (TPHs), metals (arsenic, cadmium, copper, lead mercury, and zinc), and 1,3-butadiene in soil.

The project site is surrounded by urban development, including commercial property, residential housing, and transportation corridors (rail, city streets, and interstate highways).

2.3 GEOLOGY AND HYDROLOGY

The project area is located in the northeast portion of the Peninsular Ranges physiographic province, near the border of the Transverse Ranges (located to the north). The province is characterized by predominantly north-south trending mountain ranges of Mesozoic granitic rocks that derived from the same batholith which formed the core of the Sierra Nevada Mountains in California. The San Bernardino Mountains, a short transverse mountain range, are located to the north of the project corridor. These mountains are the sediment source for the project area, which is located within the Upper Santa Ana River Valley. Unconsolidated sediments in this area are characterized by the Recent Age alluvial deposits derived from the Santa Ana River and its tributaries. Soils in the project area consist primarily of silty

sand and sand with some clay. Depth to groundwater within the project area ranges from approximately 30 to 38 ft., and is anticipated to flow to the southeast (Bergeron, 1995).



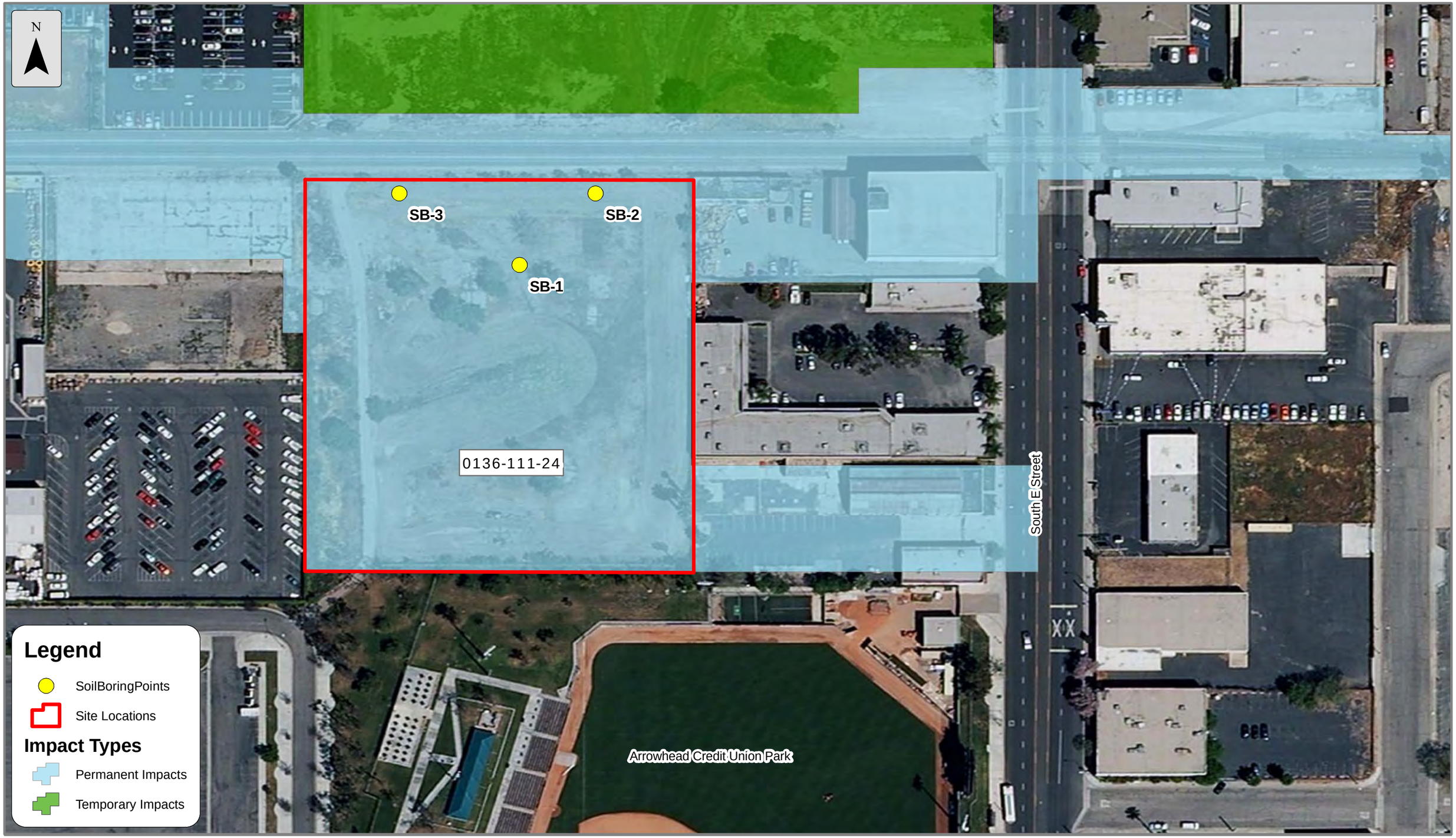
Source: Server: http://services.arcgisonline.com/v92 Name: I3_Imagery_Prime_World_2D Collected: 06-10-2011

1 inch = 600 feet

HDR

Site Location Map
APN 0136-111-24 Future Intermodal Facility
San Bernardino, California

Figure 1



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1 inch = 100 feet

HDR

Soil Boring Location Map
Future Intermodal Facility(South)
San Bernardino, California

Figure 2
Parcel 0136-111-24

3.0 FIELD INVESTIGATION

3.1 METHODOLOGY

In order to assess current conditions at the future intermodal transit facility , HDR developed a drilling and sampling plan for the site that was pre-approved by SANBAG. The Phase II ESA scope of work includes advancement of soil borings, collection of soil samples for laboratory analysis for laboratory analysis, interpretation of results, and preparation of a final report. Regional geologic literature and well surveys show that groundwater is approximately 35 ft bgs, therefore groundwater sampling was not included in the scope of this Phase II ESA.

Soil borings were completed at the locations identified on Figure 2. Boring locations were selected to identify and delineate impacts from the historic land use of the site, as a railroad maintenance yard. Constraints in the placement of the soil borings included locations of underground and overhead utilities, physical barriers such as fences and right-of-way access.

Drilling was performed by Cascade Drilling LP (Cascade). A GeoProbe 7822 DT direct push drill rig was used to drill and sample each soil borings. The soil borings were advanced to depths of 10 ft bgs using a 2 ½ inch outside diameter macro-core sampler and direct push drill rods. Each boring was sampled continuously using a decontaminated 5 ft long macro-core sampler. Samples were collected for field screening at continuous intervals between ground surface and the terminal depth of each boring, 25 ft bgs. After drilling through surface asphalt, borings located in areas where piping or utilities might exist were hand-augured to a depth of 5 ft where possible. All drilling and sampling tools were decontaminated prior to use with a non-phosphate detergent wash and deionized water rinse by Cascade staff.

Soil samples were collected from undisturbed soils by advancing a clean 5-ft macro-core sampler. Semi volatile organic compound (SVOC), Poly Chlorinated Biphenyls (PCBs), and Total Petroleum Hydrocarbon (TPH) samples were collected for laboratory submittal by collecting representative samples from the macro-core directly into pre-cleaned 4 oz soil jars, labeling the sample, and immediately placing it on ice for preservation. Volatile organic compound (VOC) samples were collected using the methanol field extraction method. California metals (Cal Metals) were collected in a 4 oz pre-cleaned glass jar. All samples were delivered to the laboratory for analysis within 72 hours, allowing for laboratory extraction in a controlled setting. Samples were collected, preserved, and transported to the laboratory under chain-of-custody protocols and within Quality Control standards established by HDR, in compliance with EPA Region 9 data quality objectives.

Each sample interval was field-screened by using a segment of sample directly adjacent to the laboratory sample (where a laboratory sample was collected) for field headspace analysis. The field headspace analysis was performed by placing a sample of the soil into a dedicated plastic bag, allowing the sample to volatilize under agitation for several minutes, then sampling the headspace air from the bag using a Perkin-Elmer Photovac 20/20 photoionization detector (PID). The PID was calibrated with 100 parts per million (ppm) isobutylene at the beginning of each field day. PID results were used to choose the sample intervals that would be submitted for VOC and SVOC analysis. Records of calibrations were recorded in the site field book. The remaining soil in each split spoon was used for geologic characterization of the interval. Soil Boring Logs were completed for each boring, and are included in Appendix A.

3.1.1 Soil Analytical Program

One soil sample from each boring was selected for laboratory analysis for VOCs by EPA Test Method 8260, SVOCs by EPA Test Method 8270, California 17 Metals analysis by EPA Test Method 6010, including mercury which is run by EPA Test Method 7071A, PCBs by EPA Test Method 8082, and total petroleum hydrocarbons (TPH).

The soil sample exhibiting the highest PID reading was submitted to the laboratory. If no vapors were detected in any of the samples, then a soil sample was collected from 5 ft bgs for analysis.

No groundwater samples were submitted for analysis, since groundwater is encountered at approximately 35 ft bgs and the investigation was scoped to address subsurface material that will be encountered during construction activities at the site.

4.0 ANALYTICAL PROGRAM RESULTS

4.1 SOIL ANALYTICAL RESULTS

HDR received the analytical results from Orange Coast Analytical, Inc. on February 18, 2011. The summarized results are presented in the following tables, Table 1 summarizes inorganic constituent detections and Table 2 summarizes the detections of organic compounds, along with the California or EPA action levels, where applicable, for each regulated compound or analyte. The full report from the analytical laboratory is included as Appendix B.

Table 1 - Soil Sample Analytical Results Inorganic Constituent

Sample Description				111-24 SB-1 (0-5)	111-24 SB-2 (5-10)	111-24 SB-3 (0-5)
Date Sampled				2/7/2011	2/7/2011	2/7/2011
Analyte	Method	Units	CHHSL (Commercial/ Industrial)	Results		
Antimony	6010B Soil	mg/kg	380.0	<5	<5	<5
Arsenic	6010B Soil	mg/kg	0.24	1.9	2.6	6.2
Barium	6010B Soil	mg/kg	63000.0	49	57	80
Beryllium	6010B Soil	mg/kg	1700.0	<0.5	<0.5	<0.5
Cadmium	6010B Soil	mg/kg	7.5	<0.5	<0.5	<0.5
Chromium*	6010B Soil	mg/kg	NS	12	14	22
Cobalt	6010B Soil	mg/kg	3200.0	6.9	8.2	8.2
Copper	6010B Soil	mg/kg	38000.0	7.7	9.2	17
Lead	6010B Soil	mg/kg	3500.0	2.8	4	47
Molybdenum	6010B Soil	mg/kg	4800.0	<1	<1	<1
Nickel	6010B Soil	mg/kg	16000.0	9.4	11	14
Selenium	6010B Soil	mg/kg	4800.0	<5	<5	<5
Silver	6010B Soil	mg/kg	4800.0	<0.5	<0.5	<0.5
Thallium	6010B Soil	mg/kg	63.0	6.1	6.6	5.7
Vanadium	6010B Soil	mg/kg	6700.0	33	39	34
Zinc	6010B Soil	mg/kg	10000.0	33	41	64
Mercury	7471A	mg/kg	1800.0	<0.1	<0.1	<0.1

Notes:

mg/kg = milligrams per kilogram

Bolded values exceed commercial cleanup criteria

NS = No Standard

*Total chromium result.

The state of California does not list a CHHSL for total chromium. Total results were compared to California Department of Toxic Substances hazardous waste criteria of 2500 mg/kg.

Laboratory analysis of the collected samples indicates that arsenic concentrations reported in all three soil samples exceeded the California Human Health Screening Level (CHHSL) of 0.24 mg/kg. The concentrations detected in soil samples SB-1, SB-2 and SB-3 range from a low of 1.9 mg/kg to a high of 6.2 mg/kg. All of these concentrations were below the accepted background concentration of 12 mg/kg (DTSC 2005, USGS 1984). All arsenic concentrations were below the DTSC hazardous waste criteria Total Threshold Limit Concentration (TTLC) of 500 mg/kg, therefore site soils may be disposed of as a Class III Municipal Solid Waste at any landfill that accepts such waste.

Other metals including barium, chromium, cobalt, copper, lead, nickel, thallium, vanadium, and zinc were detected at levels exceeding the laboratory detection limit but lower than the CHHSL.

Table 2 - Soil Sample Analytical Results Organic Compounds

			Sample Description	111-24 SB-1 (0-5)	111-24 SB-2 (5-10)	111-24 SB-3 (0-5)
			Date Sampled	2/7/2011	2/7/2011	2/7/2011
Analyte	Method	Units	EPA Region 9 Soil PRGs	Results		
PCB-1016	8082 PCB	µg/kg	2100.0	<25	<25	<250
PCB-1221	8082 PCB	µg/kg	5400.0	<25	<25	<250
PCB-1232	8082 PCB	µg/kg	5400.0	<25	<25	<250
PCB-1242	8082 PCB	µg/kg	7400.0	<25	<25	<250
PCB-1248	8082 PCB	µg/kg	7400.0	<25	<25	<250
PCB-1254	8082 PCB	µg/kg	7400.0	<25	<25	<250
PCB-1260	8082 PCB	µg/kg	7400.0	<25	<25	<250
PCB-1262	8082 PCB	µg/kg	7400.0	<25	<25	<250
1,1,1,2-Tetrachloroethane	8260B	µg/kg	9,300.0	<2.5	<2.5	<2.5
1,1,1-Trichloroethane	8260B	µg/kg	51,000.0	<2.5	<2.5	<2.5
1,1,2,2-Tetrachloroethane	8260B	µg/kg	2,800.0	<2.5	<2.5	<2.5
1,1,2-Trichloroethane	8260B	µg/kg	5,300.0	<2.5	<2.5	<2.5
1,1-Dichloroethane	8260B	µg/kg	1,100.0	<2.5	<2.5	<2.5
1,1-Dichloroethene	8260B	µg/kg	1,000,000.0	<2.5	<2.5	<2.5
1,1-Dichloropropene	8260B	µg/kg	8,100.0	<2.5	<2.5	<2.5
1,2,3-Trichlorobenzene	8260B	µg/kg	490,000.0	<2.5	<2.5	<2.5
1,2,3-Trichloropropane	8260B	µg/kg	950,000.0	<2.5	<2.5	<2.5
1,2,4-Trichlorobenzene	8260B	µg/kg	99,000.0	<2.5	<2.5	<2.5
1,2,4-Trimethylbenzene	8260B	µg/kg	260,000.0	<2.5	<2.5	<2.5
1,2-Dibromo-3-chloropropane	8260B	µg/kg	26,000.0	<5.0	<5.0	<5.0
1,2-Dibromoethane	8260B	µg/kg	1,700.0	<2.5	<2.5	<2.5
1,2-Dichlorobenzene	8260B	µg/kg	9,800,000.0	<2.5	<2.5	<2.5
1,2-Dichloroethane	8260B	µg/kg	2,200.0	<2.5	<2.5	<2.5
1,2-Dichloropropane	8260B	µg/kg	450.0	<2.5	<2.5	<2.5
1,3,5-Trimethylbenzene	8260B	µg/kg	1,000,000.0	<2.5	<2.5	<2.5
1,3-Dichlorobenzene	8260B	µg/kg	NS	<2.5	<2.5	<2.5
1,3-Dichloropropane	8260B	µg/kg	2,000,000.0	<2.5	<2.5	<2.5
1,4-Dichlorobenzene	8260B	µg/kg	1,200.0	<2.5	<2.5	<2.5
2,2-Dichloropropane	8260B	µg/kg	NS	<2.5	<2.5	<2.5
2-Chlorotoluene	8260B	µg/kg	20,000,000.0	<2.5	<2.5	<2.5
4-Chlorotoluene	8260B	µg/kg	72,000,000.0	<2.5	<2.5	<2.5
4-Isopropyltoluene	8260B	µg/kg	NS	<2.5	<2.5	<2.5
Benzene	8260B	µg/kg	5,400.0	<2.5	<2.5	<2.5

			Sample Description	111-24 SB-1 (0-5)	111-24 SB-2 (5-10)	111-24 SB-3 (0-5)
			Date Sampled	2/7/2011	2/7/2011	2/7/2011
Analyte	Method	Units	EPA Region 9 Soil PRGs	Results		
Bromobenzene	8260B	µg/kg	1,800,000.0	<2.5	<2.5	<2.5
Bromochloromethane	8260B	µg/kg	NS	<2.5	<2.5	<2.5
Bromodichloromethane	8260B	µg/kg	2,000,000.0	<2.5	<2.5	<2.5
Bromoform	8260B	µg/kg	220,000.0	<2.5	<2.5	<2.5
Bromomethane	8260B	µg/kg	32,000.0	<10	<10	<10
Carbon tetrachloride	8260B	µg/kg	97.0	<2.5	<2.5	<2.5
Chlorobenzene	8260B	µg/kg	1,400,000.0	<2.5	<2.5	<2.5
Chloroethane	8260B	µg/kg	NS	<5.0	<5.0	<5.0
Chloroform	8260B	µg/kg	1,500.0	<2.5	<2.5	<2.5
Chloromethane	8260B	µg/kg	50,000.0	<5.0	<5.0	<5.0
cis-1,2-Dichloroethene	8260B	µg/kg	1,950.0	<2.5	<2.5	<2.5
cis-1,3-Dichloropropene	8260B	µg/kg	8,100.0	<2.5	<2.5	<2.5
Dibromochloromethane	8260B	µg/kg	330.0	<2.5	<2.5	<2.5
Dibromomethane	8260B	µg/kg	110,000.0	<2.5	<2.5	<2.5
Dichlorodifluoromethane	8260B	µg/kg	780,000.0	<2.5	<2.5	<2.5
Diisopropyl ether (DIPE)	8260B	µg/kg	5,800,000.0	<10	<10	<10
Ethyl t-butyl ether (ETBE)	8260B	µg/kg	NS	<10	<10	<10
Ethylbenzene	8260B	µg/kg	2,700.0	<2.5	<2.5	<2.5
Hexachlorobutadiene	8260B	µg/kg	2,200.0	<2.5	<2.5	<2.5
Isopropylbenzene	8260B	µg/kg	NS	<2.5	<2.5	<2.5
Methyl t-butyl ether (MTBE)	8260B	µg/kg	220,000.0	<5.0	<5.0	<5.0
Methylene chloride	8260B	µg/kg	53,000.0	<10	<10	<10
n-Butylbenzene	8260B	µg/kg	NS	<2.5	<2.5	<2.5
n-Propylbenzene	8260B	µg/kg	NS	<2.5	<2.5	<2.5
Naphthalene	8260B	µg/kg	1,800.0	<2.5	<2.5	<2.5
sec-Butylbenzene	8260B	µg/kg	NS	<2.5	<2.5	<2.5
Styrene	8260B	µg/kg	36,000,000.0	<2.5	<2.5	<2.5
t-Amyl methyl ether (TAME)	8260B	µg/kg	NS	<10	<10	<10
tert-Butyl alcohol (TBA)	8260B	µg/kg	NS	<50	<50	<50
tert-Butylbenzene	8260B	µg/kg	NS	<2.5	<2.5	<2.5
Tetrachloroethene	8260B	µg/kg	26.0	<2.5	<2.5	<2.5
Toluene	8260B	µg/kg	45,000,000.0	<2.5	<2.5	<2.5
Total Xylenes	8260B	µg/kg	270,000.0	<5.0	<5.0	<5.0
trans-1,2-Dichloroethene	8260B	µg/kg	690,000.0	<2.5	<2.5	<2.5

			Sample Description	111-24 SB-1 (0-5)	111-24 SB-2 (5-10)	111-24 SB-3 (0-5)
			Date Sampled	2/7/2011	2/7/2011	2/7/2011
Analyte	Method	Units	EPA Region 9 Soil PRGs	Results		
trans-1,3-Dichloropropene	8260B	µg/kg	810.0	<2.5	<2.5	<2.5
Trichloroethene	8260B	µg/kg	13.0	<2.5	<2.5	<2.5
Trichlorofluoromethane	8260B	µg/kg	3,400,000.0	<5.0	<5.0	<5.0
Vinyl Chloride	8260B	µg/kg	52.4	<2.5	<2.5	<2.5
1,2,4-Trichlorobenzene	8270C	µg/kg	99,000.0	<3.0	<3.0	<60
1,2-Dichlorobenzene	8270C	µg/kg	9,800,000.0	<100	<100	<2000
1,3-Dichlorobenzene	8270C	µg/kg	NS	<100	<100	<2000
1,4-Dichlorobenzene	8270C	µg/kg	1,200.0	<100	<100	<2000
2,4,5-Trichlorophenol	8270C	µg/kg	62,000,000.0	<100	<100	<2000
2,4,6-Trichlorophenol	8270C	µg/kg	620,000.0	<100	<100	<2000
2,4-Dichlorophenol	8270C	µg/kg	1,800,000.0	<100	<100	<2000
2,4-Dimethylphenol	8270C	µg/kg	12,000,000.0	<100	<100	<2000
2,4-Dinitrophenol	8270C	µg/kg	1,200,000.0	<1000	<1000	<20000
2,4-Dinitrotoluene	8270C	µg/kg	550.0	<250	<250	<5000
2,6-Dinitrotoluene	8270C	µg/kg	620,000.0	<250	<250	<5000
2-Chloronaphthalene	8270C	µg/kg	82,000,000.0	<100	<100	<2000
2-Chlorophenol	8270C	µg/kg	5,100,000.0	<100	<100	<2000
2-Methylnaphthalene	8270C	µg/kg	4,100,000.0	<100	<100	<2000
2-Methylphenol	8270C	µg/kg	NS	<100	<100	<2000
2-Nitroaniline	8270C	µg/kg	6,000,000.0	<250	<250	<5000
2-Nitrophenol	8270C	µg/kg	NS	<100	<100	<2000
3 & 4-Methylphenol	8270C	µg/kg	NS	<100	<100	<2000
3-Nitroaniline	8270C	µg/kg	86,000.0	<250	<250	<5000
4,6-Dinitro-2-methylphenol	8270C	µg/kg	1,200,000.0	<1000	<1000	<20000
4-Bromophenyl phenyl ether	8270C	µg/kg	NS	<100	<100	<2000
4-Chloro-3-methylphenol	8270C	µg/kg	62,000,000.0	<100	<100	<2000
4-Chloroaniline	8270C	µg/kg	860.0	<100	<100	<2000
4-Chlorophenyl phenyl ether	8270C	µg/kg	920.0	<100	<100	<2000
4-Nitroaniline	8270C	µg/kg	8,600.0	<250	<250	<5000
4-Nitrophenol	8270C	µg/kg	NS	<1000	<1000	<20000
Acenaphthene	8270C	µg/kg	3,300,000.0	<100	<100	<2000
Acenaphthylene	8270C	µg/kg	3,300,000.0	<100	<100	<2000
Aniline	8270C	µg/kg	4,300,000.0	<100	<100	<2000
Anthracene	8270C	µg/kg	17,000,000.0	<100	<100	<2000

			Sample Description	111-24 SB-1 (0-5)	111-24 SB-2 (5-10)	111-24 SB-3 (0-5)
			Date Sampled	2/7/2011	2/7/2011	2/7/2011
Analyte	Method	Units	EPA Region 9 Soil PRGs	Results		
Benz(a)anthracene	8270C	µg/kg	210.0	<100	<100	<2000
Benzo(a)pyrene	8270C	µg/kg	210,000.0	<250	<250	<5000
Benzo(b)fluoranthene	8270C	µg/kg	210.0	<250	<250	<5000
Benzo(g,h,i)perylene	8270C	µg/kg	NS	<250	<250	<5000
Benzo(k)fluoranthene	8270C	µg/kg	2,100.0	<250	<250	<5000
Benzoic acid	8270C	µg/kg	250,000,000.0	<1000	<1000	<20000
benzyl alcohol	8270C	µg/kg	6,100,000.0	<100	<100	<2000
bis-(2-chloroethoxy) methane	8270C	µg/kg	180,000.0	<100	<100	<2000
bis-(2-chloroethyl) ether	8270C	µg/kg	100.0	<100	<100	<2000
bis-(2-chloroisopropyl) ether	8270C	µg/kg	22,000.0	<100	<100	<2000
bis-(2-ethylhexyl) phthalate	8270C	µg/kg	12,000,000.0	<100	<100	<2000
Butyl benzyl phthalate	8270C	µg/kg	12,000,000.0	<100	<100	<2000
Chrysene	8270C	µg/kg	210,000.0	<100	<100	<2000
Di-n-butyl phthalate	8270C	µg/kg	NS	<250	<250	<5000
Di-n-octyl phthalate	8270C	µg/kg	NS	<250	<250	<5000
Dibenz(a,h)anthracene	8270C	µg/kg	21,000.0	<100	<100	<2000
Dibenzofuran	8270C	µg/kg	1,000,000.0	<100	<100	<2000
Diethyl phthalate	8270C	µg/kg	49,000,000.0	<100	<100	<2000
Dimethyl phthalate	8270C	µg/kg	7,800,000.0	<100	<100	<2000
Fluoranthene	8270C	µg/kg	22,000,000.0	<100	<100	<2000
Fluorene	8270C	µg/kg	22,000,000.0	<100	<100	<2000
Hexachlorobenzene	8270C	µg/kg	110,000.0	<100	<100	<2000
Hexachlorobutadiene	8270C	µg/kg	22,000.0	<100	<100	<2000
Hexachlorocyclopentadiene	8270C	µg/kg	370,000.0	<500	<500	<10000
Hexachloroethane	8270C	µg/kg	120,000.0	<100	<100	<2000
Indeno(1,2,3-cd)pyrene	8270C	µg/kg	2,100.0	<250	<250	<5000
Isophorone	8270C	µg/kg	1,800,000.0	<100	<100	<2000
N-Nitrosodi-n-propylamine	8270C	µg/kg	25,000.0	<100	<100	<2000
N-Nitrosodimethylamine	8270C	µg/kg	110,000.0	<100	<100	<2000
N-Nitrosodiphenylamine	8270C	µg/kg	340,000.0	<100	<100	<2000
Naphthalene	8270C	µg/kg	1,800.0	<100	<100	<2000
Nitrobenzene	8270C	µg/kg	2,400.0	<100	<100	<2000
Pentachlorophenol	8270C	µg/kg	2,700.0	<1000	<1000	<20000
Phenanthrene	8270C	µg/kg	NS	<100	<100	<2000

			Sample Description	111-24 SB-1 (0-5)	111-24 SB-2 (5-10)	111-24 SB-3 (0-5)
			Date Sampled	2/7/2011	2/7/2011	2/7/2011
Analyte	Method	Units	EPA Region 9 Soil PRGs	Results		
Phenol	8270C	µg/kg	18,000,000.0	<100	<100	<2000
Pyrene	8270C	µg/kg	1,700,000.0	<100	<100	<2000
C10-11	CCID	mg/kg	NS	<ND	<ND	<ND
C12-13	CCID	mg/kg	NS	<ND	<ND	<ND
C14-15	CCID	mg/kg	NS	<ND	<ND	0.55
C16-17	CCID	mg/kg	NS	<ND	<ND	0.84
C18-19	CCID	mg/kg	NS	<ND	<ND	<ND
C20-21	CCID	mg/kg	NS	<ND	<ND	<ND
C22-23	CCID	mg/kg	NS	<ND	<ND	<ND
C24-25	CCID	mg/kg	NS	<ND	<ND	<ND
C26-27	CCID	mg/kg	NS	<ND	<ND	1.5
C28-30	CCID	mg/kg	NS	<ND	<ND	4
C31-32	CCID	mg/kg	NS	<ND	<ND	7.3
C33-34	CCID	mg/kg	NS	<ND	<ND	12
C35-36	CCID	mg/kg	NS	<ND	<ND	9.9
C37-44	CCID	mg/kg	NS	<ND	<ND	4.1
Total EFH	CCID	mg/kg	NS	<10	<10	40

Notes:

mg/kg = milligrams per kilogram

Bolded values exceed commercial cleanup criteria

NS = No Standard

Organic compounds listed on the Method 8260 (VOCs), Method 8270 (SVOCs), and Method 8082 (PCBs) method lists were not detected in onsite soil samples in concentrations exceeding laboratory detection limits.

5.0 FINDINGS AND CONCLUSIONS

The Phase II ESA investigation resulted in the following Findings and Conclusions:

- Historic land use for the site includes a rail service yard, where rail cars were repaired, maintained and serviced. The California DTSC conducted a Targeted Site Investigation of the property in 2009 to evaluate potential contamination impacts resulting form historic land use. The 2009 Targeted Site Investigation found low levels of TPHs, metals (arsenic, cadmium, copper, lead mercury, and zinc), and 1,3-butadiene in soil.
- The subsurface at the site is characterized by interbedded silts, clays and sands to a depth of 25 ft bgs. All soils encountered are representative of distal alluvial fan systems, irregularly reworked by fluvial processes. Groundwater was not encountered during the field investigation and is documented at a depth of approximately 35 ft bgs.
- Analytical results show that arsenic concentrations reported in all three soil samples exceeded the CHHSL of 0.24 mg/kg for industrial and commercial properties. The concentrations detected in soil samples SB-1, SB-2 and SB-3 range from a low of 1.9 mg/kg to a high of 6.2 mg/kg. All of these concentrations were below the regional background concentration of 12 mg/kg (DTSC 2005, USGS 1984) and are likely indicative of naturally occurring levels.
- All arsenic concentrations were below the DTSC hazardous waste criteria Total Threshold Limit Concentration (TTLC) of 500 mg/kg, therefore site soils may be disposed of as a Class III Municipal Solid Waste at any landfill that accepts such waste.
- Organic compounds listed on the Method 8260 (VOCs), Method 8270 (SVOCs), and Method 8082 (PCBs) method lists were not detected in onsite soil samples in concentrations exceeding regulatory action levels.

6.0 RECOMMENDATIONS

The Findings and Conclusions listed above are the result of investigative procedures outlined in the Section 3.1, Methodology of this report, and the contracted scope of work. These conclusions led to the following recommendations:

Recommendation 1

The results of this Phase II ESA indicated arsenic in concentrations exceeding the California CHHSL for industrial and commercial properties. However all concentrations of arsenic detected at the site were below background guidance and were considered naturally occurring. Therefore, no special provisions for the handling of soil during construction will need to be made in the construction plans.

7.0 SIGNATURES AND QUALIFICATIONS OF ENVIRONMENTAL PROFESSIONALS

The preceding Phase II ESA has been prepared in general conformance with standard industry practice for performance of environmental investigations, and within the requirements of SANBAG. The end user of this report may rely on the contents, findings, and conclusions to be accurate within the limitations stated herein.

David Atteberry,
Project Geologist
HDR Engineering, Inc

Kelly W. Kading CPG CHMM
Hazardous Materials Specialist III
Senior Professional Associate
HDR Engineering, Inc.

7.1 QUALIFICATIONS

Mr. David Atteberry has over 10 years of experience in geologic and hydrogeologic investigations, supporting various environmental and water supply efforts. His areas of expertise include contamination assessment, remediation, site characterization, aquifer characterization, RCRA compliance and field sampling techniques. Mr. Atteberry has extensive experience managing multi-disciplined investigations involving various aspects of site characterization and remedial construction for various private, municipal and federal clients. Mr. Atteberry serves on the HDR Phase I ESA Best Practices Team.

Mr. Kelly W. Kading, CPG, CHMM is a qualified Environmental Professional as defined by ASTM Practice E 1527-05, and leads HDR's hazardous materials practice in the Western Region of HDR. He has more than 22 years of experience in the assessment and remediation of impacted properties and compliance with environmental regulations. He has a B.S. in Geology from Colorado State University and is a Certified Professional Geologist (#9173, American Institute of Professional Geologists), and a Certified Hazardous Materials Manager (#1995, Institute of Certified Hazardous Materials Managers). Mr. Kading specializes in the forensic investigation of hazardous materials-impacted properties for municipal and state agencies, as well as for commercial clients. His experience includes the assessment of more than 3,000 properties, ranging from agricultural land to multigenerational industrial properties in 34 states and 2 foreign countries. He is highly knowledgeable of federal, state, and local environmental regulations and standards and has served on the National Board of Directors of the Certified Hazardous Materials Managers organization.

8.0 REFERENCES

Bergeron, Pete B. 22 May 1995. *Work Plan for Site Closure: Verification Boring Advancement*

California Environmental Protection Agency (Cal EPA), 2005. Human-Exposure-Based Screening Numbers Developed to Aid Estimation of Cleanup Costs for Contaminated Soil. November 2004, Revised January 2005.

DTSC, 2005. *Final Report, Background Metals at Los Angeles Unified School Sites – Arsenic*. State of California, Environmental Protection Agency, Department of Toxic Substances Control, Sacramento, California. June 6.

HDR Engineering Inc, July 2010. "Phase I Environmental Site Assessment; Redlands First Mile.

U.S. Geological Survey Professional Paper 1270, 1984. "Element Concentrations in Soils and Other Surficial Materials of the Coterminous United States".

APPENDIX A
Boring Logs

APPENDIX B
Analytical Laboratory Reports

ORANGE COAST ANALYTICAL, INC.
3002 Dow, Suite 532, Tustin, CA 92780 (714) 832-0064 Fax (714) 832-0067
4620 E. Elwood, Suite 4, Phoenix, AZ 85040 (480) 736-0960 Fax (480) 736-0970

LABORATORY REPORT FORM

ORANGE COAST ANALYTICAL, INC.

3002 Dow Suite 532 Tustin, CA 92780

(714) 832-0064

Laboratory Certification (ELAP) No.: 2576
Expiration Date: 2013
Los Angeles County Sanitation District Lab ID# 10206

Laboratory Director's Name:
Mark Noorani

Client: HDR Engineering, Inc.

Laboratory Reference: HDR 17800

Project Name: SANBAG RFM

Project Number:

Date Received: 2/9/2011

Date Reported: 2/18/2011

Chain of Custody Received: ☑

Analytical Method: 8082, 8015M, 8260B, 8270C, 6010B, 7471A,

Mark Noorani, Laboratory Director

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Mr. Kelly Kading
HDR Engineering, Inc.
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Phoenix, AZ, 85018

Lab Reference #: HDR 17800
Project Name: SANBAG RFM
Project #:

Case Narrative

Sample Receipt:

All samples on the Chain of Custody were received by OCA at 2°C, on ice.

Holding Times:

All samples were analyzed within required holding times unless otherwise noted in the data qualifier section of the report.

Analytical Methods:

Sample analysis was performed following the analytical methods listed on the cover page.

Data Qualifiers:

Within this report, data qualifiers may have been assigned to clarify deviations in common laboratory procedures or any divergence from laboratory QA/QC criteria. If a data qualifier has been used, it will appear in the back of the report along with its description. All method QA/QC criteria have been met unless otherwise noted in the data qualifier section.

Definition of Terms:

The definitions of common terms and acronyms used in the report have been placed at the back of the report to assist data users.

Comments:

None

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Lab Reference #: HDR 17800
Project Name: SANBAG RFM
Project #:

Client Sample Summary

Client Sample ID	Lab Sample Number	Date Received	Date Sampled	Matrix
111-24 SB-1 (0-5)	17800-001	2/9/2011	2/7/2011	Soil
111-24 SB-2 (5-10)	17800-002	2/9/2011	2/7/2011	Soil
111-24 SB-3 (0-5)	17800-003	2/9/2011	2/7/2011	Soil
021-12 SB-1 (20-25)	17800-004	2/9/2011	2/7/2011	Soil
BNSF 011-22 SB-1 (5-10)	17800-005	2/9/2011	2/7/2011	Soil
BNSF 011-22 SB-2 (5-10)	17800-006	2/9/2011	2/7/2011	Soil
BNSF 011-22 SB-3 (5-10)	17800-007	2/9/2011	2/7/2011	Soil
021-25 SB-1 (5-10)	17800-008	2/9/2011	2/7/2011	Soil
091-11 SB-1 (0-5)	17800-009	2/9/2011	2/8/2011	Soil
091-11 SB-5 (0-5)	17800-010	2/9/2011	2/8/2011	Soil
091-11 SB-5 (15-20)	17800-011	2/9/2011	2/8/2011	Soil
091-11 SB-3 (0-5)	17800-012	2/9/2011	2/8/2011	Soil
091-11 SB-3 (5-10)	17800-013	2/9/2011	2/8/2011	Soil
091-11 SB-4 (5-10)	17800-014	2/9/2011	2/8/2011	Soil
091-11 SB-4 (10-15)	17800-015	2/9/2011	2/8/2011	Soil
091-11 SB-2 (10)	17800-016	2/9/2011	2/8/2011	Soil
091-11 SB-2 (10-15)	17800-017	2/9/2011	2/8/2011	Soil
BNSF 011-22 SB-4 (10)	17800-018	2/9/2011	2/8/2011	Soil
BNSF 011-19 SB-1 (10)	17800-019	2/9/2011	2/8/2011	Soil
BNSF 011-19 SB-2 (10)	17800-020	2/9/2011	2/8/2011	Soil
111-01 SB-1 (15-20)	17800-021	2/9/2011	2/9/2011	Soil
111-01 SB-2 (5-10)	17800-022	2/9/2011	2/9/2011	Soil
111-01 SB-3 (15-20)	17800-023	2/9/2011	2/9/2011	Soil

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Lab Reference #: HDR 17800
Project Name: SANBAG RFM
Project #:

Polychlorinated Biphenyl's (EPA 8082)

Client Sample ID	Lab Sample Number	Date Received	Date Sampled	Date Extracted	Date Analyzed	Matrix
111-24 SB-1 (0-5)	17800-001	2/9/2011	2/7/2011	2/10/2011	2/10/2011	Soil

ANALYTE	CAS #	µg/kg
PCB-1016	12674-11-2	<25
PCB-1221	11104-28-2	<25
PCB-1232	11141-16-5	<25
PCB-1242	53469-21-9	<25
PCB-1248	12672-29-6	<25
PCB-1254	11097-69-1	<25
PCB-1260	11096-82-5	<25
PCB-1262	37324-23-5	<25

Surrogate:	% RC*
Decachlorobiphenyl	100

* Acceptable Recovery: 26-162 %

Dilution Factor: 1

Data Qualifiers: None

Client Sample ID	Lab Sample Number	Date Received	Date Sampled	Date Extracted	Date Analyzed	Matrix
111-24 SB-2 (5-10)	17800-002	2/9/2011	2/7/2011	2/10/2011	2/10/2011	Soil

ANALYTE	CAS #	µg/kg
PCB-1016	12674-11-2	<25
PCB-1221	11104-28-2	<25
PCB-1232	11141-16-5	<25
PCB-1242	53469-21-9	<25
PCB-1248	12672-29-6	<25
PCB-1254	11097-69-1	<25
PCB-1260	11096-82-5	<25
PCB-1262	37324-23-5	<25

Surrogate:	% RC*
Decachlorobiphenyl	105

* Acceptable Recovery: 26-162 %

Dilution Factor: 1

Data Qualifiers: None

Client Sample ID	Lab Sample Number	Date Received	Date Sampled	Date Extracted	Date Analyzed	Matrix
111-24 SB-3 (0-5)	17800-003	2/9/2011	2/7/2011	2/10/2011	2/10/2011	Soil

ANALYTE	CAS #	µg/kg
PCB-1016	12674-11-2	<250
PCB-1221	11104-28-2	<250
PCB-1232	11141-16-5	<250
PCB-1242	53469-21-9	<250
PCB-1248	12672-29-6	<250
PCB-1254	11097-69-1	<250
PCB-1260	11096-82-5	<250
PCB-1262	37324-23-5	<250

Surrogate:	% RC*
Decachlorobiphenyl	Diluted

* Acceptable Recovery: 26-162 %

Dilution Factor: 10

Data Qualifiers: D1, S8,

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Lab Reference #: HDR 17800
Project Name: SANBAG RFM
Project #:

Polychlorinated Biphenyl's (EPA 8082)

Client Sample ID	Lab Sample Number	Date Received	Date Sampled	Date Extracted	Date Analyzed	Matrix
Method Blank	MBIN0210111			2/10/2011	2/10/2011	Soil

ANALYTE	CAS #	µg/kg
PCB-1016	12674-11-2	<25
PCB-1221	11104-28-2	<25
PCB-1232	11141-16-5	<25
PCB-1242	53469-21-9	<25
PCB-1248	12672-29-6	<25
PCB-1254	11097-69-1	<25
PCB-1260	11096-82-5	<25
PCB-1262	37324-23-5	<25

Surrogate:	% RC*
Decachlorobiphenyl	97

* Acceptable Recovery: 26-162 %

Dilution Factor: 1

Data Qualifiers: None

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Lab Reference #: HDR 17800
Project Name: SANBAG RFM
Project #:

Extractable Fuel Hydrocarbons (EPA 8015M): CCID

Client Sample ID	Lab Sample Number	Date Received	Date Sampled	Date Extracted	Date Analyzed	Matrix
111-24 SB-1 (0-5)	17800-001	2/9/2011	2/7/2011	2/15/2011	2/15/2011	Soil

ANALYTE	mg/kg
C10-11	N.D.
C12-13	N.D.
C14-15	N.D.
C16-17	N.D.
C18-19	N.D.
C20-21	N.D.
C22-23	N.D.
C24-25	N.D.
C26-27	N.D.
C28-30	N.D.
C31-32	N.D.
C33-34	N.D.
C35-36	N.D.
C37-44	N.D.
Total	<10

Surrogate:	% RC*
Octacosane	36

* Acceptable Recovery: 29-164 %

Dilution Factor: 1

Data Qualifiers: None

111-24 SB-2 (5-10)	17800-002	2/9/2011	2/7/2011	2/15/2011	2/15/2011	Soil

ANALYTE	mg/kg
C10-11	N.D.
C12-13	N.D.
C14-15	N.D.
C16-17	N.D.
C18-19	N.D.
C20-21	N.D.
C22-23	N.D.
C24-25	N.D.
C26-27	N.D.
C28-30	N.D.
C31-32	N.D.
C33-34	N.D.
C35-36	N.D.
C37-44	N.D.
Total	<10

Surrogate:	% RC*
Octacosane	51

* Acceptable Recovery: 29-164 %

Dilution Factor: 1

Data Qualifiers: None

* Extractable Fuel Hydrocarbons (EFH) are quantitated against a #2 diesel standard.

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Lab Reference #: HDR 17800
Project Name: SANBAG RFM
Project #:

Extractable Fuel Hydrocarbons (EPA 8015M): CCID

Client Sample ID	Lab Sample Number	Date Received	Date Sampled	Date Extracted	Date Analyzed	Matrix
111-24 SB-3 (0-5)	17800-003	2/9/2011	2/7/2011	2/15/2011	2/15/2011	Soil

ANALYTE	mg/kg
C10-11	N.D.
C12-13	N.D.
C14-15	0.55
C16-17	0.84
C18-19	N.D.
C20-21	N.D.
C22-23	N.D.
C24-25	N.D.
C26-27	1.5
C28-30	4.0
C31-32	7.3
C33-34	12
C35-36	9.9
C37-44	4.1
Total	40

Surrogate:	% RC*
Octacosane	132

* Acceptable Recovery: 29-164 %

Dilution Factor: 1

Data Qualifiers: None

Method Blank	MBCR0215111			2/15/2011	2/15/2011	Soil

ANALYTE	mg/kg
C10-11	N.D.
C12-13	N.D.
C14-15	N.D.
C16-17	N.D.
C18-19	N.D.
C20-21	N.D.
C22-23	N.D.
C24-25	N.D.
C26-27	N.D.
C28-30	N.D.
C31-32	N.D.
C33-34	N.D.
C35-36	N.D.
C37-44	N.D.
Total	<10

Surrogate:	% RC*
Octacosane	53

* Acceptable Recovery: 29-164 %

Dilution Factor: 1

Data Qualifiers: None

* Extractable Fuel Hydrocarbons (EFH) are quantitated against a #2 diesel standard.

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Lab Reference #: HDR 17800
Project Name: SANBAG RFM
Project #:

Volatile Organics by GC/MS (EPA 8260B)

Client Sample ID	Lab Sample Number	Date Received	Date Sampled	Date Extracted	Date Analyzed	Matrix
111-24 SB-1 (0-5)	17800-001	2/9/2011	2/7/2011	2/7/2011	2/9/2011	Soil

ANALYTE	CAS #	µg/kg	ANALYTE	CAS #	µg/kg
t-Amyl methyl ether (TAME)	994-05-8	<10	2,2-Dichloropropane	594-20-7	<2.5
Benzene	71-43-2	<2.5	1,1-Dichloropropene	563-58-6	<2.5
Bromobenzene	108-86-1	<2.5	cis-1,3-Dichloropropene	10061-01-5	<2.5
Bromochloromethane	74-97-5	<2.5	trans-1,3-Dichloropropene	10061-02-6	<2.5
Bromodichloromethane	75-27-4	<2.5	Diisopropyl ether (DIPE)	108-20-3	<10
Bromoform	75-25-2	<2.5	Ethyl t-butyl ether (ETBE)	637-92-3	<10
Bromomethane	74-83-9	<10	Ethylbenzene	100-41-4	<2.5
tert-Butyl alcohol (TBA)	75-65-0	<50	Hexachlorobutadiene	87-68-3	<2.5
n-Butylbenzene	104-51-8	<2.5	Isopropylbenzene	98-82-8	<2.5
sec-Butylbenzene	135-98-8	<2.5	4-Isopropyltoluene	99-87-6	<2.5
tert-Butylbenzene	98-06-6	<2.5	Methyl t-butyl ether (MTBE)	1634-04-4	<5.0
Carbon tetrachloride	56-23-5	<2.5	Methylene chloride	75-09-2	<10
Chlorobenzene	108-90-7	<2.5	Naphthalene	91-20-3	<2.5
Chloroethane	75-00-3	<5.0	n-Propylbenzene	103-65-1	<2.5
Chloroform	67-66-3	<2.5	Styrene	100-42-5	<2.5
Chloromethane	74-87-3	<5.0	1,1,1,2-Tetrachloroethane	630-20-6	<2.5
2-Chlorotoluene	95-49-8	<2.5	1,1,2,2-Tetrachloroethane	79-34-5	<2.5
4-Chlorotoluene	106-43-4	<2.5	Tetrachloroethene	127-18-4	<2.5
Dibromochloromethane	124-48-1	<2.5	Toluene	108-88-3	<2.5
1,2-Dibromo-3-chloropropane	96-12-8	<5.0	1,2,3-Trichlorobenzene	87-61-6	<2.5
1,2-Dibromoethane	106-93-4	<2.5	1,2,4-Trichlorobenzene	120-82-1	<2.5
Dibromomethane	74-95-3	<2.5	1,1,1-Trichloroethane	71-55-6	<2.5
1,2-Dichlorobenzene	95-50-1	<2.5	1,1,2-Trichloroethane	79-00-5	<2.5
1,3-Dichlorobenzene	541-73-1	<2.5	Trichloroethene	79-01-6	<2.5
1,4-Dichlorobenzene	106-46-7	<2.5	Trichlorofluoromethane	75-69-4	<5.0
Dichlorodifluoromethane	75-71-8	<2.5	1,2,3-Trichloropropane	96-18-4	<2.5
1,1-Dichloroethane	75-34-3	<2.5	1,2,4-Trimethylbenzene	95-63-6	<2.5
1,2-Dichloroethane	107-06-2	<2.5	1,3,5-Trimethylbenzene	108-67-8	<2.5
1,1-Dichloroethene	75-35-4	<2.5	Vinyl Chloride	75-01-4	<2.5
cis-1,2-Dichloroethene	156-59-2	<2.5	Total Xylenes	1330-20-7	<5.0
trans-1,2-Dichloroethene	156-60-5	<2.5			
1,2-Dichloropropane	78-87-5	<2.5			
1,3-Dichloropropane	142-28-9	<2.5			

Surrogate:	% RC	Acceptable % RC
Dibromofluoromethane:	86	57-130 %
Toluene-d8:	91	70-130 %
4-Bromofluorobenzene:	84	70-130 %

Dilution Factor: 1

Data Qualifiers: None

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Lab Reference #: HDR 17800
Project Name: SANBAG RFM
Project #:

Volatile Organics by GC/MS (EPA 8260B)

Client Sample ID	Lab Sample Number	Date Received	Date Sampled	Date Extracted	Date Analyzed	Matrix
111-24 SB-2 (5-10)	17800-002	2/9/2011	2/7/2011	2/7/2011	2/9/2011	Soil

ANALYTE	CAS #	µg/kg	ANALYTE	CAS #	µg/kg
t-Amyl methyl ether (TAME)	994-05-8	<10	2,2-Dichloropropane	594-20-7	<2.5
Benzene	71-43-2	<2.5	1,1-Dichloropropene	563-58-6	<2.5
Bromobenzene	108-86-1	<2.5	cis-1,3-Dichloropropene	10061-01-5	<2.5
Bromochloromethane	74-97-5	<2.5	trans-1,3-Dichloropropene	10061-02-6	<2.5
Bromodichloromethane	75-27-4	<2.5	Diisopropyl ether (DIPE)	108-20-3	<10
Bromoform	75-25-2	<2.5	Ethyl t-butyl ether (ETBE)	637-92-3	<10
Bromomethane	74-83-9	<10	Ethylbenzene	100-41-4	<2.5
tert-Butyl alcohol (TBA)	75-65-0	<50	Hexachlorobutadiene	87-68-3	<2.5
n-Butylbenzene	104-51-8	<2.5	Isopropylbenzene	98-82-8	<2.5
sec-Butylbenzene	135-98-8	<2.5	4-Isopropyltoluene	99-87-6	<2.5
tert-Butylbenzene	98-06-6	<2.5	Methyl t-butyl ether (MTBE)	1634-04-4	<5.0
Carbon tetrachloride	56-23-5	<2.5	Methylene chloride	75-09-2	<10
Chlorobenzene	108-90-7	<2.5	Naphthalene	91-20-3	<2.5
Chloroethane	75-00-3	<5.0	n-Propylbenzene	103-65-1	<2.5
Chloroform	67-66-3	<2.5	Styrene	100-42-5	<2.5
Chloromethane	74-87-3	<5.0	1,1,1,2-Tetrachloroethane	630-20-6	<2.5
2-Chlorotoluene	95-49-8	<2.5	1,1,2,2-Tetrachloroethane	79-34-5	<2.5
4-Chlorotoluene	106-43-4	<2.5	Tetrachloroethene	127-18-4	<2.5
Dibromochloromethane	124-48-1	<2.5	Toluene	108-88-3	<2.5
1,2-Dibromo-3-chloropropane	96-12-8	<5.0	1,2,3-Trichlorobenzene	87-61-6	<2.5
1,2-Dibromoethane	106-93-4	<2.5	1,2,4-Trichlorobenzene	120-82-1	<2.5
Dibromomethane	74-95-3	<2.5	1,1,1-Trichloroethane	71-55-6	<2.5
1,2-Dichlorobenzene	95-50-1	<2.5	1,1,2-Trichloroethane	79-00-5	<2.5
1,3-Dichlorobenzene	541-73-1	<2.5	Trichloroethene	79-01-6	<2.5
1,4-Dichlorobenzene	106-46-7	<2.5	Trichlorofluoromethane	75-69-4	<5.0
Dichlorodifluoromethane	75-71-8	<2.5	1,2,3-Trichloropropane	96-18-4	<2.5
1,1-Dichloroethane	75-34-3	<2.5	1,2,4-Trimethylbenzene	95-63-6	<2.5
1,2-Dichloroethane	107-06-2	<2.5	1,3,5-Trimethylbenzene	108-67-8	<2.5
1,1-Dichloroethene	75-35-4	<2.5	Vinyl Chloride	75-01-4	<2.5
cis-1,2-Dichloroethene	156-59-2	<2.5	Total Xylenes	1330-20-7	<5.0
trans-1,2-Dichloroethene	156-60-5	<2.5			
1,2-Dichloropropane	78-87-5	<2.5			
1,3-Dichloropropane	142-28-9	<2.5			

Surrogate:	% RC	Acceptable % RC
Dibromofluoromethane:	76	57-130 %
Toluene-d8:	78	70-130 %
4-Bromofluorobenzene:	74	70-130 %

Dilution Factor: 1

Data Qualifiers: None

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Lab Reference #: HDR 17800
Project Name: SANBAG RFM
Project #:

Volatile Organics by GC/MS (EPA 8260B)

Client Sample ID	Lab Sample Number	Date Received	Date Sampled	Date Extracted	Date Analyzed	Matrix
111-24 SB-3 (0-5)	17800-003	2/9/2011	2/7/2011	2/7/2011	2/9/2011	Soil

ANALYTE	CAS #	µg/kg	ANALYTE	CAS #	µg/kg
t-Amyl methyl ether (TAME)	994-05-8	<10	2,2-Dichloropropane	594-20-7	<2.5
Benzene	71-43-2	<2.5	1,1-Dichloropropene	563-58-6	<2.5
Bromobenzene	108-86-1	<2.5	cis-1,3-Dichloropropene	10061-01-5	<2.5
Bromochloromethane	74-97-5	<2.5	trans-1,3-Dichloropropene	10061-02-6	<2.5
Bromodichloromethane	75-27-4	<2.5	Diisopropyl ether (DIPE)	108-20-3	<10
Bromoform	75-25-2	<2.5	Ethyl t-butyl ether (ETBE)	637-92-3	<10
Bromomethane	74-83-9	<10	Ethylbenzene	100-41-4	<2.5
tert-Butyl alcohol (TBA)	75-65-0	<50	Hexachlorobutadiene	87-68-3	<2.5
n-Butylbenzene	104-51-8	<2.5	Isopropylbenzene	98-82-8	<2.5
sec-Butylbenzene	135-98-8	<2.5	4-Isopropyltoluene	99-87-6	<2.5
tert-Butylbenzene	98-06-6	<2.5	Methyl t-butyl ether (MTBE)	1634-04-4	<5.0
Carbon tetrachloride	56-23-5	<2.5	Methylene chloride	75-09-2	<10
Chlorobenzene	108-90-7	<2.5	Naphthalene	91-20-3	<2.5
Chloroethane	75-00-3	<5.0	n-Propylbenzene	103-65-1	<2.5
Chloroform	67-66-3	<2.5	Styrene	100-42-5	<2.5
Chloromethane	74-87-3	<5.0	1,1,1,2-Tetrachloroethane	630-20-6	<2.5
2-Chlorotoluene	95-49-8	<2.5	1,1,2,2-Tetrachloroethane	79-34-5	<2.5
4-Chlorotoluene	106-43-4	<2.5	Tetrachloroethene	127-18-4	<2.5
Dibromochloromethane	124-48-1	<2.5	Toluene	108-88-3	<2.5
1,2-Dibromo-3-chloropropane	96-12-8	<5.0	1,2,3-Trichlorobenzene	87-61-6	<2.5
1,2-Dibromoethane	106-93-4	<2.5	1,2,4-Trichlorobenzene	120-82-1	<2.5
Dibromomethane	74-95-3	<2.5	1,1,1-Trichloroethane	71-55-6	<2.5
1,2-Dichlorobenzene	95-50-1	<2.5	1,1,2-Trichloroethane	79-00-5	<2.5
1,3-Dichlorobenzene	541-73-1	<2.5	Trichloroethene	79-01-6	<2.5
1,4-Dichlorobenzene	106-46-7	<2.5	Trichlorofluoromethane	75-69-4	<5.0
Dichlorodifluoromethane	75-71-8	<2.5	1,2,3-Trichloropropane	96-18-4	<2.5
1,1-Dichloroethane	75-34-3	<2.5	1,2,4-Trimethylbenzene	95-63-6	<2.5
1,2-Dichloroethane	107-06-2	<2.5	1,3,5-Trimethylbenzene	108-67-8	<2.5
1,1-Dichloroethene	75-35-4	<2.5	Vinyl Chloride	75-01-4	<2.5
cis-1,2-Dichloroethene	156-59-2	<2.5	Total Xylenes	1330-20-7	<5.0
trans-1,2-Dichloroethene	156-60-5	<2.5			
1,2-Dichloropropane	78-87-5	<2.5			
1,3-Dichloropropane	142-28-9	<2.5			

Surrogate:	% RC	Acceptable % RC
Dibromofluoromethane:	91	57-130 %
Toluene-d8:	90	70-130 %
4-Bromofluorobenzene:	84	70-130 %

Dilution Factor: 1

Data Qualifiers: None

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Project Name: SANBAG RFM
Project #:

Volatile Organics by GC/MS (EPA 8260B)

Client Sample ID	Lab Sample Number	Date Received	Date Sampled	Date Extracted	Date Analyzed	Matrix
021-12 SB-1 (20-25)	17800-004	2/9/2011	2/7/2011	2/7/2011	2/9/2011	Soil

ANALYTE	CAS #	µg/kg	ANALYTE	CAS #	µg/kg
t-Amyl methyl ether (TAME)	994-05-8	<10	2,2-Dichloropropane	594-20-7	<2.5
Benzene	71-43-2	<2.5	1,1-Dichloropropene	563-58-6	<2.5
Bromobenzene	108-86-1	<2.5	cis-1,3-Dichloropropene	10061-01-5	<2.5
Bromochloromethane	74-97-5	<2.5	trans-1,3-Dichloropropene	10061-02-6	<2.5
Bromodichloromethane	75-27-4	<2.5	Diisopropyl ether (DIPE)	108-20-3	<10
Bromoform	75-25-2	<2.5	Ethyl t-butyl ether (ETBE)	637-92-3	<10
Bromomethane	74-83-9	<10	Ethylbenzene	100-41-4	<2.5
tert-Butyl alcohol (TBA)	75-65-0	<50	Hexachlorobutadiene	87-68-3	<2.5
n-Butylbenzene	104-51-8	<2.5	Isopropylbenzene	98-82-8	<2.5
sec-Butylbenzene	135-98-8	<2.5	4-Isopropyltoluene	99-87-6	<2.5
tert-Butylbenzene	98-06-6	<2.5	Methyl t-butyl ether (MTBE)	1634-04-4	<5.0
Carbon tetrachloride	56-23-5	<2.5	Methylene chloride	75-09-2	<10
Chlorobenzene	108-90-7	<2.5	Naphthalene	91-20-3	<2.5
Chloroethane	75-00-3	<5.0	n-Propylbenzene	103-65-1	<2.5
Chloroform	67-66-3	<2.5	Styrene	100-42-5	<2.5
Chloromethane	74-87-3	<5.0	1,1,1,2-Tetrachloroethane	630-20-6	<2.5
2-Chlorotoluene	95-49-8	<2.5	1,1,2,2-Tetrachloroethane	79-34-5	<2.5
4-Chlorotoluene	106-43-4	<2.5	Tetrachloroethene	127-18-4	<2.5
Dibromochloromethane	124-48-1	<2.5	Toluene	108-88-3	<2.5
1,2-Dibromo-3-chloropropane	96-12-8	<5.0	1,2,3-Trichlorobenzene	87-61-6	<2.5
1,2-Dibromoethane	106-93-4	<2.5	1,2,4-Trichlorobenzene	120-82-1	<2.5
Dibromomethane	74-95-3	<2.5	1,1,1-Trichloroethane	71-55-6	<2.5
1,2-Dichlorobenzene	95-50-1	<2.5	1,1,2-Trichloroethane	79-00-5	<2.5
1,3-Dichlorobenzene	541-73-1	<2.5	Trichloroethene	79-01-6	<2.5
1,4-Dichlorobenzene	106-46-7	<2.5	Trichlorofluoromethane	75-69-4	<5.0
Dichlorodifluoromethane	75-71-8	<2.5	1,2,3-Trichloropropane	96-18-4	<2.5
1,1-Dichloroethane	75-34-3	<2.5	1,2,4-Trimethylbenzene	95-63-6	<2.5
1,2-Dichloroethane	107-06-2	<2.5	1,3,5-Trimethylbenzene	108-67-8	<2.5
1,1-Dichloroethene	75-35-4	<2.5	Vinyl Chloride	75-01-4	<2.5
cis-1,2-Dichloroethene	156-59-2	<2.5	Total Xylenes	1330-20-7	<5.0
trans-1,2-Dichloroethene	156-60-5	<2.5			
1,2-Dichloropropane	78-87-5	<2.5			
1,3-Dichloropropane	142-28-9	<2.5			

Surrogate:	% RC	Acceptable % RC
Dibromofluoromethane:	88	57-130 %
Toluene-d8:	91	70-130 %
4-Bromofluorobenzene:	84	70-130 %

Dilution Factor: 1

Data Qualifiers: None

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Lab Reference #: HDR 17800
Project Name: SANBAG RFM
Project #:

Volatile Organics by GC/MS (EPA 8260B)

Client Sample ID	Lab Sample Number	Date Received	Date Sampled	Date Extracted	Date Analyzed	Matrix
BNSF 011-22 SB-1 (5-10)	17800-005	2/9/2011	2/7/2011	2/7/2011	2/9/2011	Soil

ANALYTE	CAS #	µg/kg	ANALYTE	CAS #	µg/kg
t-Amyl methyl ether (TAME)	994-05-8	<10	2,2-Dichloropropane	594-20-7	<2.5
Benzene	71-43-2	<2.5	1,1-Dichloropropene	563-58-6	<2.5
Bromobenzene	108-86-1	<2.5	cis-1,3-Dichloropropene	10061-01-5	<2.5
Bromochloromethane	74-97-5	<2.5	trans-1,3-Dichloropropene	10061-02-6	<2.5
Bromodichloromethane	75-27-4	<2.5	Diisopropyl ether (DIPE)	108-20-3	<10
Bromoform	75-25-2	<2.5	Ethyl t-butyl ether (ETBE)	637-92-3	<10
Bromomethane	74-83-9	<10	Ethylbenzene	100-41-4	<2.5
tert-Butyl alcohol (TBA)	75-65-0	<50	Hexachlorobutadiene	87-68-3	<2.5
n-Butylbenzene	104-51-8	<2.5	Isopropylbenzene	98-82-8	<2.5
sec-Butylbenzene	135-98-8	<2.5	4-Isopropyltoluene	99-87-6	<2.5
tert-Butylbenzene	98-06-6	<2.5	Methyl t-butyl ether (MTBE)	1634-04-4	<5.0
Carbon tetrachloride	56-23-5	<2.5	Methylene chloride	75-09-2	<10
Chlorobenzene	108-90-7	<2.5	Naphthalene	91-20-3	<2.5
Chloroethane	75-00-3	<5.0	n-Propylbenzene	103-65-1	<2.5
Chloroform	67-66-3	<2.5	Styrene	100-42-5	<2.5
Chloromethane	74-87-3	<5.0	1,1,1,2-Tetrachloroethane	630-20-6	<2.5
2-Chlorotoluene	95-49-8	<2.5	1,1,2,2-Tetrachloroethane	79-34-5	<2.5
4-Chlorotoluene	106-43-4	<2.5	Tetrachloroethene	127-18-4	<2.5
Dibromochloromethane	124-48-1	<2.5	Toluene	108-88-3	<2.5
1,2-Dibromo-3-chloropropane	96-12-8	<5.0	1,2,3-Trichlorobenzene	87-61-6	<2.5
1,2-Dibromoethane	106-93-4	<2.5	1,2,4-Trichlorobenzene	120-82-1	<2.5
Dibromomethane	74-95-3	<2.5	1,1,1-Trichloroethane	71-55-6	<2.5
1,2-Dichlorobenzene	95-50-1	<2.5	1,1,2-Trichloroethane	79-00-5	<2.5
1,3-Dichlorobenzene	541-73-1	<2.5	Trichloroethene	79-01-6	<2.5
1,4-Dichlorobenzene	106-46-7	<2.5	Trichlorofluoromethane	75-69-4	<5.0
Dichlorodifluoromethane	75-71-8	<2.5	1,2,3-Trichloropropane	96-18-4	<2.5
1,1-Dichloroethane	75-34-3	<2.5	1,2,4-Trimethylbenzene	95-63-6	<2.5
1,2-Dichloroethane	107-06-2	<2.5	1,3,5-Trimethylbenzene	108-67-8	<2.5
1,1-Dichloroethene	75-35-4	<2.5	Vinyl Chloride	75-01-4	<2.5
cis-1,2-Dichloroethene	156-59-2	<2.5	Total Xylenes	1330-20-7	<5.0
trans-1,2-Dichloroethene	156-60-5	<2.5			
1,2-Dichloropropane	78-87-5	<2.5			
1,3-Dichloropropane	142-28-9	<2.5			

Surrogate:	% RC	Acceptable % RC
Dibromofluoromethane:	91	57-130 %
Toluene-d8:	89	70-130 %
4-Bromofluorobenzene:	84	70-130 %

Dilution Factor: 1

Data Qualifiers: None

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Lab Reference #: HDR 17800
Project Name: SANBAG RFM
Project #:

Volatile Organics by GC/MS (EPA 8260B)

Client Sample ID	Lab Sample Number	Date Received	Date Sampled	Date Extracted	Date Analyzed	Matrix
BNSF 011-22 SB-2 (5-10)	17800-006	2/9/2011	2/7/2011	2/7/2011	2/9/2011	Soil

ANALYTE	CAS #	µg/kg	ANALYTE	CAS #	µg/kg
t-Amyl methyl ether (TAME)	994-05-8	<10	2,2-Dichloropropane	594-20-7	<2.5
Benzene	71-43-2	<2.5	1,1-Dichloropropene	563-58-6	<2.5
Bromobenzene	108-86-1	<2.5	cis-1,3-Dichloropropene	10061-01-5	<2.5
Bromochloromethane	74-97-5	<2.5	trans-1,3-Dichloropropene	10061-02-6	<2.5
Bromodichloromethane	75-27-4	<2.5	Diisopropyl ether (DIPE)	108-20-3	<10
Bromoform	75-25-2	<2.5	Ethyl t-butyl ether (ETBE)	637-92-3	<10
Bromomethane	74-83-9	<10	Ethylbenzene	100-41-4	<2.5
tert-Butyl alcohol (TBA)	75-65-0	<50	Hexachlorobutadiene	87-68-3	<2.5
n-Butylbenzene	104-51-8	<2.5	Isopropylbenzene	98-82-8	<2.5
sec-Butylbenzene	135-98-8	<2.5	4-Isopropyltoluene	99-87-6	<2.5
tert-Butylbenzene	98-06-6	<2.5	Methyl t-butyl ether (MTBE)	1634-04-4	<5.0
Carbon tetrachloride	56-23-5	<2.5	Methylene chloride	75-09-2	<10
Chlorobenzene	108-90-7	<2.5	Naphthalene	91-20-3	<2.5
Chloroethane	75-00-3	<5.0	n-Propylbenzene	103-65-1	<2.5
Chloroform	67-66-3	<2.5	Styrene	100-42-5	<2.5
Chloromethane	74-87-3	<5.0	1,1,1,2-Tetrachloroethane	630-20-6	<2.5
2-Chlorotoluene	95-49-8	<2.5	1,1,2,2-Tetrachloroethane	79-34-5	<2.5
4-Chlorotoluene	106-43-4	<2.5	Tetrachloroethene	127-18-4	<2.5
Dibromochloromethane	124-48-1	<2.5	Toluene	108-88-3	<2.5
1,2-Dibromo-3-chloropropane	96-12-8	<5.0	1,2,3-Trichlorobenzene	87-61-6	<2.5
1,2-Dibromoethane	106-93-4	<2.5	1,2,4-Trichlorobenzene	120-82-1	<2.5
Dibromomethane	74-95-3	<2.5	1,1,1-Trichloroethane	71-55-6	<2.5
1,2-Dichlorobenzene	95-50-1	<2.5	1,1,2-Trichloroethane	79-00-5	<2.5
1,3-Dichlorobenzene	541-73-1	<2.5	Trichloroethene	79-01-6	<2.5
1,4-Dichlorobenzene	106-46-7	<2.5	Trichlorofluoromethane	75-69-4	<5.0
Dichlorodifluoromethane	75-71-8	<2.5	1,2,3-Trichloropropane	96-18-4	<2.5
1,1-Dichloroethane	75-34-3	<2.5	1,2,4-Trimethylbenzene	95-63-6	<2.5
1,2-Dichloroethane	107-06-2	<2.5	1,3,5-Trimethylbenzene	108-67-8	<2.5
1,1-Dichloroethene	75-35-4	<2.5	Vinyl Chloride	75-01-4	<2.5
cis-1,2-Dichloroethene	156-59-2	<2.5	Total Xylenes	1330-20-7	<5.0
trans-1,2-Dichloroethene	156-60-5	<2.5			
1,2-Dichloropropane	78-87-5	<2.5			
1,3-Dichloropropane	142-28-9	<2.5			

Surrogate:	% RC	Acceptable % RC
Dibromofluoromethane:	89	57-130 %
Toluene-d8:	90	70-130 %
4-Bromofluorobenzene:	84	70-130 %

Dilution Factor: 1

Data Qualifiers: None

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Lab Reference #: HDR 17800
Project Name: SANBAG RFM
Project #:

Volatile Organics by GC/MS (EPA 8260B)

Client Sample ID	Lab Sample Number	Date Received	Date Sampled	Date Extracted	Date Analyzed	Matrix
BNSF 011-22 SB-3 (5-10)	17800-007	2/9/2011	2/7/2011	2/7/2011	2/9/2011	Soil

ANALYTE	CAS #	µg/kg	ANALYTE	CAS #	µg/kg
t-Amyl methyl ether (TAME)	994-05-8	<10	2,2-Dichloropropane	594-20-7	<2.5
Benzene	71-43-2	<2.5	1,1-Dichloropropene	563-58-6	<2.5
Bromobenzene	108-86-1	<2.5	cis-1,3-Dichloropropene	10061-01-5	<2.5
Bromochloromethane	74-97-5	<2.5	trans-1,3-Dichloropropene	10061-02-6	<2.5
Bromodichloromethane	75-27-4	<2.5	Diisopropyl ether (DIPE)	108-20-3	<10
Bromoform	75-25-2	<2.5	Ethyl t-butyl ether (ETBE)	637-92-3	<10
Bromomethane	74-83-9	<10	Ethylbenzene	100-41-4	<2.5
tert-Butyl alcohol (TBA)	75-65-0	<50	Hexachlorobutadiene	87-68-3	<2.5
n-Butylbenzene	104-51-8	<2.5	Isopropylbenzene	98-82-8	<2.5
sec-Butylbenzene	135-98-8	<2.5	4-Isopropyltoluene	99-87-6	<2.5
tert-Butylbenzene	98-06-6	<2.5	Methyl t-butyl ether (MTBE)	1634-04-4	<5.0
Carbon tetrachloride	56-23-5	<2.5	Methylene chloride	75-09-2	<10
Chlorobenzene	108-90-7	<2.5	Naphthalene	91-20-3	<2.5
Chloroethane	75-00-3	<5.0	n-Propylbenzene	103-65-1	<2.5
Chloroform	67-66-3	<2.5	Styrene	100-42-5	<2.5
Chloromethane	74-87-3	<5.0	1,1,1,2-Tetrachloroethane	630-20-6	<2.5
2-Chlorotoluene	95-49-8	<2.5	1,1,2,2-Tetrachloroethane	79-34-5	<2.5
4-Chlorotoluene	106-43-4	<2.5	Tetrachloroethene	127-18-4	<2.5
Dibromochloromethane	124-48-1	<2.5	Toluene	108-88-3	<2.5
1,2-Dibromo-3-chloropropane	96-12-8	<5.0	1,2,3-Trichlorobenzene	87-61-6	<2.5
1,2-Dibromoethane	106-93-4	<2.5	1,2,4-Trichlorobenzene	120-82-1	<2.5
Dibromomethane	74-95-3	<2.5	1,1,1-Trichloroethane	71-55-6	<2.5
1,2-Dichlorobenzene	95-50-1	<2.5	1,1,2-Trichloroethane	79-00-5	<2.5
1,3-Dichlorobenzene	541-73-1	<2.5	Trichloroethene	79-01-6	<2.5
1,4-Dichlorobenzene	106-46-7	<2.5	Trichlorofluoromethane	75-69-4	<5.0
Dichlorodifluoromethane	75-71-8	<2.5	1,2,3-Trichloropropane	96-18-4	<2.5
1,1-Dichloroethane	75-34-3	<2.5	1,2,4-Trimethylbenzene	95-63-6	<2.5
1,2-Dichloroethane	107-06-2	<2.5	1,3,5-Trimethylbenzene	108-67-8	<2.5
1,1-Dichloroethene	75-35-4	<2.5	Vinyl Chloride	75-01-4	<2.5
cis-1,2-Dichloroethene	156-59-2	<2.5	Total Xylenes	1330-20-7	<5.0
trans-1,2-Dichloroethene	156-60-5	<2.5			
1,2-Dichloropropane	78-87-5	<2.5			
1,3-Dichloropropane	142-28-9	<2.5			

Surrogate:	% RC	Acceptable % RC
Dibromofluoromethane:	89	57-130 %
Toluene-d8:	89	70-130 %
4-Bromofluorobenzene:	84	70-130 %

Dilution Factor: 1

Data Qualifiers: None

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Project Name: SANBAG RFM
Project #:

Volatile Organics by GC/MS (EPA 8260B)

Client Sample ID	Lab Sample Number	Date Received	Date Sampled	Date Extracted	Date Analyzed	Matrix
021-25 SB-1 (5-10)	17800-008	2/9/2011	2/7/2011	2/7/2011	2/9/2011	Soil

ANALYTE	CAS #	µg/kg	ANALYTE	CAS #	µg/kg
t-Amyl methyl ether (TAME)	994-05-8	<10	2,2-Dichloropropane	594-20-7	<2.5
Benzene	71-43-2	<2.5	1,1-Dichloropropene	563-58-6	<2.5
Bromobenzene	108-86-1	<2.5	cis-1,3-Dichloropropene	10061-01-5	<2.5
Bromochloromethane	74-97-5	<2.5	trans-1,3-Dichloropropene	10061-02-6	<2.5
Bromodichloromethane	75-27-4	<2.5	Diisopropyl ether (DIPE)	108-20-3	<10
Bromoform	75-25-2	<2.5	Ethyl t-butyl ether (ETBE)	637-92-3	<10
Bromomethane	74-83-9	<10	Ethylbenzene	100-41-4	<2.5
tert-Butyl alcohol (TBA)	75-65-0	<50	Hexachlorobutadiene	87-68-3	<2.5
n-Butylbenzene	104-51-8	<2.5	Isopropylbenzene	98-82-8	<2.5
sec-Butylbenzene	135-98-8	<2.5	4-Isopropyltoluene	99-87-6	<2.5
tert-Butylbenzene	98-06-6	<2.5	Methyl t-butyl ether (MTBE)	1634-04-4	<5.0
Carbon tetrachloride	56-23-5	<2.5	Methylene chloride	75-09-2	<10
Chlorobenzene	108-90-7	<2.5	Naphthalene	91-20-3	<2.5
Chloroethane	75-00-3	<5.0	n-Propylbenzene	103-65-1	<2.5
Chloroform	67-66-3	<2.5	Styrene	100-42-5	<2.5
Chloromethane	74-87-3	<5.0	1,1,1,2-Tetrachloroethane	630-20-6	<2.5
2-Chlorotoluene	95-49-8	<2.5	1,1,2,2-Tetrachloroethane	79-34-5	<2.5
4-Chlorotoluene	106-43-4	<2.5	Tetrachloroethene	127-18-4	<2.5
Dibromochloromethane	124-48-1	<2.5	Toluene	108-88-3	<2.5
1,2-Dibromo-3-chloropropane	96-12-8	<5.0	1,2,3-Trichlorobenzene	87-61-6	<2.5
1,2-Dibromoethane	106-93-4	<2.5	1,2,4-Trichlorobenzene	120-82-1	<2.5
Dibromomethane	74-95-3	<2.5	1,1,1-Trichloroethane	71-55-6	<2.5
1,2-Dichlorobenzene	95-50-1	<2.5	1,1,2-Trichloroethane	79-00-5	<2.5
1,3-Dichlorobenzene	541-73-1	<2.5	Trichloroethene	79-01-6	<2.5
1,4-Dichlorobenzene	106-46-7	<2.5	Trichlorofluoromethane	75-69-4	<5.0
Dichlorodifluoromethane	75-71-8	<2.5	1,2,3-Trichloropropane	96-18-4	<2.5
1,1-Dichloroethane	75-34-3	<2.5	1,2,4-Trimethylbenzene	95-63-6	<2.5
1,2-Dichloroethane	107-06-2	<2.5	1,3,5-Trimethylbenzene	108-67-8	<2.5
1,1-Dichloroethene	75-35-4	<2.5	Vinyl Chloride	75-01-4	<2.5
cis-1,2-Dichloroethene	156-59-2	<2.5	Total Xylenes	1330-20-7	<5.0
trans-1,2-Dichloroethene	156-60-5	<2.5			
1,2-Dichloropropane	78-87-5	<2.5			
1,3-Dichloropropane	142-28-9	<2.5			

Surrogate:	% RC	Acceptable % RC
Dibromofluoromethane:	90	57-130 %
Toluene-d8:	87	70-130 %
4-Bromofluorobenzene:	81	70-130 %

Dilution Factor: 1

Data Qualifiers: None

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Project Name: SANBAG RFM
Project #:

Volatile Organics by GC/MS (EPA 8260B)

Client Sample ID	Lab Sample Number	Date Received	Date Sampled	Date Extracted	Date Analyzed	Matrix
091-11 SB-1 (0-5)	17800-009	2/9/2011	2/8/2011	2/8/2011	2/9/2011	Soil

ANALYTE	CAS #	µg/kg	ANALYTE	CAS #	µg/kg
t-Amyl methyl ether (TAME)	994-05-8	<10	2,2-Dichloropropane	594-20-7	<2.5
Benzene	71-43-2	<2.5	1,1-Dichloropropene	563-58-6	<2.5
Bromobenzene	108-86-1	<2.5	cis-1,3-Dichloropropene	10061-01-5	<2.5
Bromochloromethane	74-97-5	<2.5	trans-1,3-Dichloropropene	10061-02-6	<2.5
Bromodichloromethane	75-27-4	<2.5	Diisopropyl ether (DIPE)	108-20-3	<10
Bromoform	75-25-2	<2.5	Ethyl t-butyl ether (ETBE)	637-92-3	<10
Bromomethane	74-83-9	<10	Ethylbenzene	100-41-4	<2.5
tert-Butyl alcohol (TBA)	75-65-0	<50	Hexachlorobutadiene	87-68-3	<2.5
n-Butylbenzene	104-51-8	<2.5	Isopropylbenzene	98-82-8	<2.5
sec-Butylbenzene	135-98-8	<2.5	4-Isopropyltoluene	99-87-6	<2.5
tert-Butylbenzene	98-06-6	<2.5	Methyl t-butyl ether (MTBE)	1634-04-4	<5.0
Carbon tetrachloride	56-23-5	<2.5	Methylene chloride	75-09-2	<10
Chlorobenzene	108-90-7	<2.5	Naphthalene	91-20-3	<2.5
Chloroethane	75-00-3	<5.0	n-Propylbenzene	103-65-1	<2.5
Chloroform	67-66-3	<2.5	Styrene	100-42-5	<2.5
Chloromethane	74-87-3	<5.0	1,1,1,2-Tetrachloroethane	630-20-6	<2.5
2-Chlorotoluene	95-49-8	<2.5	1,1,2,2-Tetrachloroethane	79-34-5	<2.5
4-Chlorotoluene	106-43-4	<2.5	Tetrachloroethene	127-18-4	<2.5
Dibromochloromethane	124-48-1	<2.5	Toluene	108-88-3	<2.5
1,2-Dibromo-3-chloropropane	96-12-8	<5.0	1,2,3-Trichlorobenzene	87-61-6	<2.5
1,2-Dibromoethane	106-93-4	<2.5	1,2,4-Trichlorobenzene	120-82-1	<2.5
Dibromomethane	74-95-3	<2.5	1,1,1-Trichloroethane	71-55-6	<2.5
1,2-Dichlorobenzene	95-50-1	<2.5	1,1,2-Trichloroethane	79-00-5	<2.5
1,3-Dichlorobenzene	541-73-1	<2.5	Trichloroethene	79-01-6	<2.5
1,4-Dichlorobenzene	106-46-7	<2.5	Trichlorofluoromethane	75-69-4	<5.0
Dichlorodifluoromethane	75-71-8	<2.5	1,2,3-Trichloropropane	96-18-4	<2.5
1,1-Dichloroethane	75-34-3	<2.5	1,2,4-Trimethylbenzene	95-63-6	<2.5
1,2-Dichloroethane	107-06-2	<2.5	1,3,5-Trimethylbenzene	108-67-8	<2.5
1,1-Dichloroethene	75-35-4	<2.5	Vinyl Chloride	75-01-4	<2.5
cis-1,2-Dichloroethene	156-59-2	<2.5	Total Xylenes	1330-20-7	<5.0
trans-1,2-Dichloroethene	156-60-5	<2.5			
1,2-Dichloropropane	78-87-5	<2.5			
1,3-Dichloropropane	142-28-9	<2.5			

Surrogate:	% RC	Acceptable % RC
Dibromofluoromethane:	93	57-130 %
Toluene-d8:	89	70-130 %
4-Bromofluorobenzene:	84	70-130 %

Dilution Factor: 1

Data Qualifiers: None

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Project Name: SANBAG RFM
Project #:

Volatile Organics by GC/MS (EPA 8260B)

Client Sample ID	Lab Sample Number	Date Received	Date Sampled	Date Extracted	Date Analyzed	Matrix
091-11 SB-5 (15-20)	17800-011	2/9/2011	2/8/2011	2/8/2011	2/9/2011	Soil

ANALYTE	CAS #	µg/kg	ANALYTE	CAS #	µg/kg
t-Amyl methyl ether (TAME)	994-05-8	<10	2,2-Dichloropropane	594-20-7	<2.5
Benzene	71-43-2	<2.5	1,1-Dichloropropene	563-58-6	<2.5
Bromobenzene	108-86-1	<2.5	cis-1,3-Dichloropropene	10061-01-5	<2.5
Bromochloromethane	74-97-5	<2.5	trans-1,3-Dichloropropene	10061-02-6	<2.5
Bromodichloromethane	75-27-4	<2.5	Diisopropyl ether (DIPE)	108-20-3	<10
Bromoform	75-25-2	<2.5	Ethyl t-butyl ether (ETBE)	637-92-3	<10
Bromomethane	74-83-9	<10	Ethylbenzene	100-41-4	<2.5
tert-Butyl alcohol (TBA)	75-65-0	<50	Hexachlorobutadiene	87-68-3	<2.5
n-Butylbenzene	104-51-8	<2.5	Isopropylbenzene	98-82-8	<2.5
sec-Butylbenzene	135-98-8	<2.5	4-Isopropyltoluene	99-87-6	<2.5
tert-Butylbenzene	98-06-6	<2.5	Methyl t-butyl ether (MTBE)	1634-04-4	<5.0
Carbon tetrachloride	56-23-5	<2.5	Methylene chloride	75-09-2	<10
Chlorobenzene	108-90-7	<2.5	Naphthalene	91-20-3	<2.5
Chloroethane	75-00-3	<5.0	n-Propylbenzene	103-65-1	<2.5
Chloroform	67-66-3	<2.5	Styrene	100-42-5	<2.5
Chloromethane	74-87-3	<5.0	1,1,1,2-Tetrachloroethane	630-20-6	<2.5
2-Chlorotoluene	95-49-8	<2.5	1,1,2,2-Tetrachloroethane	79-34-5	<2.5
4-Chlorotoluene	106-43-4	<2.5	Tetrachloroethene	127-18-4	<2.5
Dibromochloromethane	124-48-1	<2.5	Toluene	108-88-3	<2.5
1,2-Dibromo-3-chloropropane	96-12-8	<5.0	1,2,3-Trichlorobenzene	87-61-6	<2.5
1,2-Dibromoethane	106-93-4	<2.5	1,2,4-Trichlorobenzene	120-82-1	<2.5
Dibromomethane	74-95-3	<2.5	1,1,1-Trichloroethane	71-55-6	<2.5
1,2-Dichlorobenzene	95-50-1	<2.5	1,1,2-Trichloroethane	79-00-5	<2.5
1,3-Dichlorobenzene	541-73-1	<2.5	Trichloroethene	79-01-6	<2.5
1,4-Dichlorobenzene	106-46-7	<2.5	Trichlorofluoromethane	75-69-4	<5.0
Dichlorodifluoromethane	75-71-8	<2.5	1,2,3-Trichloropropane	96-18-4	<2.5
1,1-Dichloroethane	75-34-3	<2.5	1,2,4-Trimethylbenzene	95-63-6	<2.5
1,2-Dichloroethane	107-06-2	<2.5	1,3,5-Trimethylbenzene	108-67-8	<2.5
1,1-Dichloroethene	75-35-4	<2.5	Vinyl Chloride	75-01-4	<2.5
cis-1,2-Dichloroethene	156-59-2	<2.5	Total Xylenes	1330-20-7	<5.0
trans-1,2-Dichloroethene	156-60-5	<2.5			
1,2-Dichloropropane	78-87-5	<2.5			
1,3-Dichloropropane	142-28-9	<2.5			

Surrogate:	% RC	Acceptable % RC
Dibromofluoromethane:	90	57-130 %
Toluene-d8:	88	70-130 %
4-Bromofluorobenzene:	83	70-130 %

Dilution Factor: 1

Data Qualifiers: None

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Lab Reference #: HDR 17800
Project Name: SANBAG RFM
Project #:

Volatile Organics by GC/MS (EPA 8260B)

Client Sample ID	Lab Sample Number	Date Received	Date Sampled	Date Extracted	Date Analyzed	Matrix
091-11 SB-3 (5-10)	17800-013	2/9/2011	2/8/2011	2/8/2011	2/9/2011	Soil

ANALYTE	CAS #	µg/kg	ANALYTE	CAS #	µg/kg
t-Amyl methyl ether (TAME)	994-05-8	<10	2,2-Dichloropropane	594-20-7	<2.5
Benzene	71-43-2	<2.5	1,1-Dichloropropene	563-58-6	<2.5
Bromobenzene	108-86-1	<2.5	cis-1,3-Dichloropropene	10061-01-5	<2.5
Bromochloromethane	74-97-5	<2.5	trans-1,3-Dichloropropene	10061-02-6	<2.5
Bromodichloromethane	75-27-4	<2.5	Diisopropyl ether (DIPE)	108-20-3	<10
Bromoform	75-25-2	<2.5	Ethyl t-butyl ether (ETBE)	637-92-3	<10
Bromomethane	74-83-9	<10	Ethylbenzene	100-41-4	<2.5
tert-Butyl alcohol (TBA)	75-65-0	<50	Hexachlorobutadiene	87-68-3	<2.5
n-Butylbenzene	104-51-8	<2.5	Isopropylbenzene	98-82-8	<2.5
sec-Butylbenzene	135-98-8	<2.5	4-Isopropyltoluene	99-87-6	<2.5
tert-Butylbenzene	98-06-6	<2.5	Methyl t-butyl ether (MTBE)	1634-04-4	<5.0
Carbon tetrachloride	56-23-5	<2.5	Methylene chloride	75-09-2	<10
Chlorobenzene	108-90-7	<2.5	Naphthalene	91-20-3	<2.5
Chloroethane	75-00-3	<5.0	n-Propylbenzene	103-65-1	<2.5
Chloroform	67-66-3	<2.5	Styrene	100-42-5	<2.5
Chloromethane	74-87-3	<5.0	1,1,1,2-Tetrachloroethane	630-20-6	<2.5
2-Chlorotoluene	95-49-8	<2.5	1,1,2,2-Tetrachloroethane	79-34-5	<2.5
4-Chlorotoluene	106-43-4	<2.5	Tetrachloroethene	127-18-4	<2.5
Dibromochloromethane	124-48-1	<2.5	Toluene	108-88-3	<2.5
1,2-Dibromo-3-chloropropane	96-12-8	<5.0	1,2,3-Trichlorobenzene	87-61-6	<2.5
1,2-Dibromoethane	106-93-4	<2.5	1,2,4-Trichlorobenzene	120-82-1	<2.5
Dibromomethane	74-95-3	<2.5	1,1,1-Trichloroethane	71-55-6	<2.5
1,2-Dichlorobenzene	95-50-1	<2.5	1,1,2-Trichloroethane	79-00-5	<2.5
1,3-Dichlorobenzene	541-73-1	<2.5	Trichloroethene	79-01-6	<2.5
1,4-Dichlorobenzene	106-46-7	<2.5	Trichlorofluoromethane	75-69-4	<5.0
Dichlorodifluoromethane	75-71-8	<2.5	1,2,3-Trichloropropane	96-18-4	<2.5
1,1-Dichloroethane	75-34-3	<2.5	1,2,4-Trimethylbenzene	95-63-6	<2.5
1,2-Dichloroethane	107-06-2	<2.5	1,3,5-Trimethylbenzene	108-67-8	<2.5
1,1-Dichloroethene	75-35-4	<2.5	Vinyl Chloride	75-01-4	<2.5
cis-1,2-Dichloroethene	156-59-2	<2.5	Total Xylenes	1330-20-7	<5.0
trans-1,2-Dichloroethene	156-60-5	<2.5			
1,2-Dichloropropane	78-87-5	<2.5			
1,3-Dichloropropane	142-28-9	<2.5			

Surrogate:	% RC	Acceptable % RC
Dibromofluoromethane:	91	57-130 %
Toluene-d8:	89	70-130 %
4-Bromofluorobenzene:	84	70-130 %

Dilution Factor: 1

Data Qualifiers: None

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Lab Reference #: HDR 17800
Project Name: SANBAG RFM
Project #:

Volatile Organics by GC/MS (EPA 8260B)

Client Sample ID	Lab Sample Number	Date Received	Date Sampled	Date Extracted	Date Analyzed	Matrix
091-11 SB-4 (10-15)	17800-015	2/9/2011	2/8/2011	2/8/2011	2/9/2011	Soil

ANALYTE	CAS #	µg/kg	ANALYTE	CAS #	µg/kg
t-Amyl methyl ether (TAME)	994-05-8	<10	2,2-Dichloropropane	594-20-7	<2.5
Benzene	71-43-2	<2.5	1,1-Dichloropropene	563-58-6	<2.5
Bromobenzene	108-86-1	<2.5	cis-1,3-Dichloropropene	10061-01-5	<2.5
Bromochloromethane	74-97-5	<2.5	trans-1,3-Dichloropropene	10061-02-6	<2.5
Bromodichloromethane	75-27-4	<2.5	Diisopropyl ether (DIPE)	108-20-3	<10
Bromoform	75-25-2	<2.5	Ethyl t-butyl ether (ETBE)	637-92-3	<10
Bromomethane	74-83-9	<10	Ethylbenzene	100-41-4	<2.5
tert-Butyl alcohol (TBA)	75-65-0	<50	Hexachlorobutadiene	87-68-3	<2.5
n-Butylbenzene	104-51-8	<2.5	Isopropylbenzene	98-82-8	<2.5
sec-Butylbenzene	135-98-8	<2.5	4-Isopropyltoluene	99-87-6	<2.5
tert-Butylbenzene	98-06-6	<2.5	Methyl t-butyl ether (MTBE)	1634-04-4	<5.0
Carbon tetrachloride	56-23-5	<2.5	Methylene chloride	75-09-2	<10
Chlorobenzene	108-90-7	<2.5	Naphthalene	91-20-3	<2.5
Chloroethane	75-00-3	<5.0	n-Propylbenzene	103-65-1	<2.5
Chloroform	67-66-3	<2.5	Styrene	100-42-5	<2.5
Chloromethane	74-87-3	<5.0	1,1,1,2-Tetrachloroethane	630-20-6	<2.5
2-Chlorotoluene	95-49-8	<2.5	1,1,2,2-Tetrachloroethane	79-34-5	<2.5
4-Chlorotoluene	106-43-4	<2.5	Tetrachloroethene	127-18-4	<2.5
Dibromochloromethane	124-48-1	<2.5	Toluene	108-88-3	<2.5
1,2-Dibromo-3-chloropropane	96-12-8	<5.0	1,2,3-Trichlorobenzene	87-61-6	<2.5
1,2-Dibromoethane	106-93-4	<2.5	1,2,4-Trichlorobenzene	120-82-1	<2.5
Dibromomethane	74-95-3	<2.5	1,1,1-Trichloroethane	71-55-6	<2.5
1,2-Dichlorobenzene	95-50-1	<2.5	1,1,2-Trichloroethane	79-00-5	<2.5
1,3-Dichlorobenzene	541-73-1	<2.5	Trichloroethene	79-01-6	<2.5
1,4-Dichlorobenzene	106-46-7	<2.5	Trichlorofluoromethane	75-69-4	<5.0
Dichlorodifluoromethane	75-71-8	<2.5	1,2,3-Trichloropropane	96-18-4	<2.5
1,1-Dichloroethane	75-34-3	<2.5	1,2,4-Trimethylbenzene	95-63-6	<2.5
1,2-Dichloroethane	107-06-2	<2.5	1,3,5-Trimethylbenzene	108-67-8	<2.5
1,1-Dichloroethene	75-35-4	<2.5	Vinyl Chloride	75-01-4	<2.5
cis-1,2-Dichloroethene	156-59-2	<2.5	Total Xylenes	1330-20-7	<5.0
trans-1,2-Dichloroethene	156-60-5	<2.5			
1,2-Dichloropropane	78-87-5	<2.5			
1,3-Dichloropropane	142-28-9	<2.5			

Surrogate:	% RC	Acceptable % RC
Dibromofluoromethane:	92	57-130 %
Toluene-d8:	89	70-130 %
4-Bromofluorobenzene:	84	70-130 %

Dilution Factor: 1

Data Qualifiers: None

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Lab Reference #: HDR 17800
Project Name: SANBAG RFM
Project #:

Volatile Organics by GC/MS (EPA 8260B)

Client Sample ID	Lab Sample Number	Date Received	Date Sampled	Date Extracted	Date Analyzed	Matrix
091-11 SB-2 (10-15)	17800-017	2/9/2011	2/8/2011	2/8/2011	2/9/2011	Soil

ANALYTE	CAS #	µg/kg	ANALYTE	CAS #	µg/kg
t-Amyl methyl ether (TAME)	994-05-8	<10	2,2-Dichloropropane	594-20-7	<2.5
Benzene	71-43-2	<2.5	1,1-Dichloropropene	563-58-6	<2.5
Bromobenzene	108-86-1	<2.5	cis-1,3-Dichloropropene	10061-01-5	<2.5
Bromochloromethane	74-97-5	<2.5	trans-1,3-Dichloropropene	10061-02-6	<2.5
Bromodichloromethane	75-27-4	<2.5	Diisopropyl ether (DIPE)	108-20-3	<10
Bromoform	75-25-2	<2.5	Ethyl t-butyl ether (ETBE)	637-92-3	<10
Bromomethane	74-83-9	<10	Ethylbenzene	100-41-4	<2.5
tert-Butyl alcohol (TBA)	75-65-0	<50	Hexachlorobutadiene	87-68-3	<2.5
n-Butylbenzene	104-51-8	<2.5	Isopropylbenzene	98-82-8	<2.5
sec-Butylbenzene	135-98-8	<2.5	4-Isopropyltoluene	99-87-6	<2.5
tert-Butylbenzene	98-06-6	<2.5	Methyl t-butyl ether (MTBE)	1634-04-4	<5.0
Carbon tetrachloride	56-23-5	<2.5	Methylene chloride	75-09-2	<10
Chlorobenzene	108-90-7	<2.5	Naphthalene	91-20-3	<2.5
Chloroethane	75-00-3	<5.0	n-Propylbenzene	103-65-1	<2.5
Chloroform	67-66-3	<2.5	Styrene	100-42-5	<2.5
Chloromethane	74-87-3	<5.0	1,1,1,2-Tetrachloroethane	630-20-6	<2.5
2-Chlorotoluene	95-49-8	<2.5	1,1,2,2-Tetrachloroethane	79-34-5	<2.5
4-Chlorotoluene	106-43-4	<2.5	Tetrachloroethene	127-18-4	<2.5
Dibromochloromethane	124-48-1	<2.5	Toluene	108-88-3	<2.5
1,2-Dibromo-3-chloropropane	96-12-8	<5.0	1,2,3-Trichlorobenzene	87-61-6	<2.5
1,2-Dibromoethane	106-93-4	<2.5	1,2,4-Trichlorobenzene	120-82-1	<2.5
Dibromomethane	74-95-3	<2.5	1,1,1-Trichloroethane	71-55-6	<2.5
1,2-Dichlorobenzene	95-50-1	<2.5	1,1,2-Trichloroethane	79-00-5	<2.5
1,3-Dichlorobenzene	541-73-1	<2.5	Trichloroethene	79-01-6	<2.5
1,4-Dichlorobenzene	106-46-7	<2.5	Trichlorofluoromethane	75-69-4	<5.0
Dichlorodifluoromethane	75-71-8	<2.5	1,2,3-Trichloropropane	96-18-4	<2.5
1,1-Dichloroethane	75-34-3	<2.5	1,2,4-Trimethylbenzene	95-63-6	<2.5
1,2-Dichloroethane	107-06-2	<2.5	1,3,5-Trimethylbenzene	108-67-8	<2.5
1,1-Dichloroethene	75-35-4	<2.5	Vinyl Chloride	75-01-4	<2.5
cis-1,2-Dichloroethene	156-59-2	<2.5	Total Xylenes	1330-20-7	<5.0
trans-1,2-Dichloroethene	156-60-5	<2.5			
1,2-Dichloropropane	78-87-5	<2.5			
1,3-Dichloropropane	142-28-9	<2.5			

Surrogate:	% RC	Acceptable % RC
Dibromofluoromethane:	90	57-130 %
Toluene-d8:	87	70-130 %
4-Bromofluorobenzene:	83	70-130 %

Dilution Factor: 1

Data Qualifiers: None

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Lab Reference #: HDR 17800
Project Name: SANBAG RFM
Project #:

Volatile Organics by GC/MS (EPA 8260B)

Client Sample ID	Lab Sample Number	Date Received	Date Sampled	Date Extracted	Date Analyzed	Matrix
BNSF 011-22 SB-4 (10)	17800-018	2/9/2011	2/8/2011	2/8/2011	2/9/2011	Soil

ANALYTE	CAS #	µg/kg	ANALYTE	CAS #	µg/kg
t-Amyl methyl ether (TAME)	994-05-8	<10	2,2-Dichloropropane	594-20-7	<2.5
Benzene	71-43-2	<2.5	1,1-Dichloropropene	563-58-6	<2.5
Bromobenzene	108-86-1	<2.5	cis-1,3-Dichloropropene	10061-01-5	<2.5
Bromochloromethane	74-97-5	<2.5	trans-1,3-Dichloropropene	10061-02-6	<2.5
Bromodichloromethane	75-27-4	<2.5	Diisopropyl ether (DIPE)	108-20-3	<10
Bromoform	75-25-2	<2.5	Ethyl t-butyl ether (ETBE)	637-92-3	<10
Bromomethane	74-83-9	<10	Ethylbenzene	100-41-4	<2.5
tert-Butyl alcohol (TBA)	75-65-0	<50	Hexachlorobutadiene	87-68-3	<2.5
n-Butylbenzene	104-51-8	<2.5	Isopropylbenzene	98-82-8	<2.5
sec-Butylbenzene	135-98-8	<2.5	4-Isopropyltoluene	99-87-6	<2.5
tert-Butylbenzene	98-06-6	<2.5	Methyl t-butyl ether (MTBE)	1634-04-4	<5.0
Carbon tetrachloride	56-23-5	<2.5	Methylene chloride	75-09-2	<10
Chlorobenzene	108-90-7	<2.5	Naphthalene	91-20-3	<2.5
Chloroethane	75-00-3	<5.0	n-Propylbenzene	103-65-1	<2.5
Chloroform	67-66-3	<2.5	Styrene	100-42-5	<2.5
Chloromethane	74-87-3	<5.0	1,1,1,2-Tetrachloroethane	630-20-6	<2.5
2-Chlorotoluene	95-49-8	<2.5	1,1,2,2-Tetrachloroethane	79-34-5	<2.5
4-Chlorotoluene	106-43-4	<2.5	Tetrachloroethene	127-18-4	<2.5
Dibromochloromethane	124-48-1	<2.5	Toluene	108-88-3	<2.5
1,2-Dibromo-3-chloropropane	96-12-8	<5.0	1,2,3-Trichlorobenzene	87-61-6	<2.5
1,2-Dibromoethane	106-93-4	<2.5	1,2,4-Trichlorobenzene	120-82-1	<2.5
Dibromomethane	74-95-3	<2.5	1,1,1-Trichloroethane	71-55-6	<2.5
1,2-Dichlorobenzene	95-50-1	<2.5	1,1,2-Trichloroethane	79-00-5	<2.5
1,3-Dichlorobenzene	541-73-1	<2.5	Trichloroethene	79-01-6	<2.5
1,4-Dichlorobenzene	106-46-7	<2.5	Trichlorofluoromethane	75-69-4	<5.0
Dichlorodifluoromethane	75-71-8	<2.5	1,2,3-Trichloropropane	96-18-4	<2.5
1,1-Dichloroethane	75-34-3	<2.5	1,2,4-Trimethylbenzene	95-63-6	<2.5
1,2-Dichloroethane	107-06-2	<2.5	1,3,5-Trimethylbenzene	108-67-8	<2.5
1,1-Dichloroethene	75-35-4	<2.5	Vinyl Chloride	75-01-4	<2.5
cis-1,2-Dichloroethene	156-59-2	<2.5	Total Xylenes	1330-20-7	<5.0
trans-1,2-Dichloroethene	156-60-5	<2.5			
1,2-Dichloropropane	78-87-5	<2.5			
1,3-Dichloropropane	142-28-9	<2.5			

Surrogate:	% RC	Acceptable % RC
Dibromofluoromethane:	90	57-130 %
Toluene-d8:	89	70-130 %
4-Bromofluorobenzene:	84	70-130 %

Dilution Factor: 1

Data Qualifiers: None

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Lab Reference #: HDR 17800
Project Name: SANBAG RFM
Project #:

Volatile Organics by GC/MS (EPA 8260B)

Client Sample ID	Lab Sample Number	Date Received	Date Sampled	Date Extracted	Date Analyzed	Matrix
BNSF 011-19 SB-1 (10)	17800-019	2/9/2011	2/8/2011	2/8/2011	2/9/2011	Soil

ANALYTE	CAS #	µg/kg	ANALYTE	CAS #	µg/kg
t-Amyl methyl ether (TAME)	994-05-8	<10	2,2-Dichloropropane	594-20-7	<2.5
Benzene	71-43-2	<2.5	1,1-Dichloropropene	563-58-6	<2.5
Bromobenzene	108-86-1	<2.5	cis-1,3-Dichloropropene	10061-01-5	<2.5
Bromochloromethane	74-97-5	<2.5	trans-1,3-Dichloropropene	10061-02-6	<2.5
Bromodichloromethane	75-27-4	<2.5	Diisopropyl ether (DIPE)	108-20-3	<10
Bromoform	75-25-2	<2.5	Ethyl t-butyl ether (ETBE)	637-92-3	<10
Bromomethane	74-83-9	<10	Ethylbenzene	100-41-4	<2.5
tert-Butyl alcohol (TBA)	75-65-0	<50	Hexachlorobutadiene	87-68-3	<2.5
n-Butylbenzene	104-51-8	<2.5	Isopropylbenzene	98-82-8	<2.5
sec-Butylbenzene	135-98-8	<2.5	4-Isopropyltoluene	99-87-6	<2.5
tert-Butylbenzene	98-06-6	<2.5	Methyl t-butyl ether (MTBE)	1634-04-4	<5.0
Carbon tetrachloride	56-23-5	<2.5	Methylene chloride	75-09-2	<10
Chlorobenzene	108-90-7	<2.5	Naphthalene	91-20-3	<2.5
Chloroethane	75-00-3	<5.0	n-Propylbenzene	103-65-1	<2.5
Chloroform	67-66-3	<2.5	Styrene	100-42-5	<2.5
Chloromethane	74-87-3	<5.0	1,1,1,2-Tetrachloroethane	630-20-6	<2.5
2-Chlorotoluene	95-49-8	<2.5	1,1,2,2-Tetrachloroethane	79-34-5	<2.5
4-Chlorotoluene	106-43-4	<2.5	Tetrachloroethene	127-18-4	<2.5
Dibromochloromethane	124-48-1	<2.5	Toluene	108-88-3	<2.5
1,2-Dibromo-3-chloropropane	96-12-8	<5.0	1,2,3-Trichlorobenzene	87-61-6	<2.5
1,2-Dibromoethane	106-93-4	<2.5	1,2,4-Trichlorobenzene	120-82-1	<2.5
Dibromomethane	74-95-3	<2.5	1,1,1-Trichloroethane	71-55-6	<2.5
1,2-Dichlorobenzene	95-50-1	<2.5	1,1,2-Trichloroethane	79-00-5	<2.5
1,3-Dichlorobenzene	541-73-1	<2.5	Trichloroethene	79-01-6	<2.5
1,4-Dichlorobenzene	106-46-7	<2.5	Trichlorofluoromethane	75-69-4	<5.0
Dichlorodifluoromethane	75-71-8	<2.5	1,2,3-Trichloropropane	96-18-4	<2.5
1,1-Dichloroethane	75-34-3	<2.5	1,2,4-Trimethylbenzene	95-63-6	<2.5
1,2-Dichloroethane	107-06-2	<2.5	1,3,5-Trimethylbenzene	108-67-8	<2.5
1,1-Dichloroethene	75-35-4	<2.5	Vinyl Chloride	75-01-4	<2.5
cis-1,2-Dichloroethene	156-59-2	<2.5	Total Xylenes	1330-20-7	<5.0
trans-1,2-Dichloroethene	156-60-5	<2.5			
1,2-Dichloropropane	78-87-5	<2.5			
1,3-Dichloropropane	142-28-9	<2.5			

Surrogate:	% RC	Acceptable % RC
Dibromofluoromethane:	90	57-130 %
Toluene-d8:	87	70-130 %
4-Bromofluorobenzene:	83	70-130 %

Dilution Factor: 1

Data Qualifiers: None

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Lab Reference #: HDR 17800
Project Name: SANBAG RFM
Project #:

Volatile Organics by GC/MS (EPA 8260B)

Client Sample ID	Lab Sample Number	Date Received	Date Sampled	Date Extracted	Date Analyzed	Matrix
BNSF 011-19 SB-2 (10)	17800-020	2/9/2011	2/8/2011	2/8/2011	2/9/2011	Soil

ANALYTE	CAS #	µg/kg	ANALYTE	CAS #	µg/kg
t-Amyl methyl ether (TAME)	994-05-8	<10	2,2-Dichloropropane	594-20-7	<2.5
Benzene	71-43-2	<2.5	1,1-Dichloropropene	563-58-6	<2.5
Bromobenzene	108-86-1	<2.5	cis-1,3-Dichloropropene	10061-01-5	<2.5
Bromochloromethane	74-97-5	<2.5	trans-1,3-Dichloropropene	10061-02-6	<2.5
Bromodichloromethane	75-27-4	<2.5	Diisopropyl ether (DIPE)	108-20-3	<10
Bromoform	75-25-2	<2.5	Ethyl t-butyl ether (ETBE)	637-92-3	<10
Bromomethane	74-83-9	<10	Ethylbenzene	100-41-4	<2.5
tert-Butyl alcohol (TBA)	75-65-0	<50	Hexachlorobutadiene	87-68-3	<2.5
n-Butylbenzene	104-51-8	<2.5	Isopropylbenzene	98-82-8	<2.5
sec-Butylbenzene	135-98-8	<2.5	4-Isopropyltoluene	99-87-6	<2.5
tert-Butylbenzene	98-06-6	<2.5	Methyl t-butyl ether (MTBE)	1634-04-4	<5.0
Carbon tetrachloride	56-23-5	<2.5	Methylene chloride	75-09-2	<10
Chlorobenzene	108-90-7	<2.5	Naphthalene	91-20-3	<2.5
Chloroethane	75-00-3	<5.0	n-Propylbenzene	103-65-1	<2.5
Chloroform	67-66-3	<2.5	Styrene	100-42-5	<2.5
Chloromethane	74-87-3	<5.0	1,1,1,2-Tetrachloroethane	630-20-6	<2.5
2-Chlorotoluene	95-49-8	<2.5	1,1,2,2-Tetrachloroethane	79-34-5	<2.5
4-Chlorotoluene	106-43-4	<2.5	Tetrachloroethene	127-18-4	<2.5
Dibromochloromethane	124-48-1	<2.5	Toluene	108-88-3	<2.5
1,2-Dibromo-3-chloropropane	96-12-8	<5.0	1,2,3-Trichlorobenzene	87-61-6	<2.5
1,2-Dibromoethane	106-93-4	<2.5	1,2,4-Trichlorobenzene	120-82-1	<2.5
Dibromomethane	74-95-3	<2.5	1,1,1-Trichloroethane	71-55-6	<2.5
1,2-Dichlorobenzene	95-50-1	<2.5	1,1,2-Trichloroethane	79-00-5	<2.5
1,3-Dichlorobenzene	541-73-1	<2.5	Trichloroethene	79-01-6	<2.5
1,4-Dichlorobenzene	106-46-7	<2.5	Trichlorofluoromethane	75-69-4	<5.0
Dichlorodifluoromethane	75-71-8	<2.5	1,2,3-Trichloropropane	96-18-4	<2.5
1,1-Dichloroethane	75-34-3	<2.5	1,2,4-Trimethylbenzene	95-63-6	<2.5
1,2-Dichloroethane	107-06-2	<2.5	1,3,5-Trimethylbenzene	108-67-8	<2.5
1,1-Dichloroethene	75-35-4	<2.5	Vinyl Chloride	75-01-4	<2.5
cis-1,2-Dichloroethene	156-59-2	<2.5	Total Xylenes	1330-20-7	<5.0
trans-1,2-Dichloroethene	156-60-5	<2.5			
1,2-Dichloropropane	78-87-5	<2.5			
1,3-Dichloropropane	142-28-9	<2.5			

Surrogate:	% RC	Acceptable % RC
Dibromofluoromethane:	89	57-130 %
Toluene-d8:	88	70-130 %
4-Bromofluorobenzene:	83	70-130 %

Dilution Factor: 1

Data Qualifiers: None

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Lab Reference #: HDR 17800
Project Name: SANBAG RFM
Project #:

Volatile Organics by GC/MS (EPA 8260B)

Client Sample ID	Lab Sample Number	Date Received	Date Sampled	Date Extracted	Date Analyzed	Matrix
111-01 SB-1 (15-20)	17800-021	2/9/2011	2/9/2011	2/9/2011	2/10/2011	Soil

ANALYTE	CAS #	µg/kg	ANALYTE	CAS #	µg/kg
t-Amyl methyl ether (TAME)	994-05-8	<10	2,2-Dichloropropane	594-20-7	<2.5
Benzene	71-43-2	<2.5	1,1-Dichloropropene	563-58-6	<2.5
Bromobenzene	108-86-1	<2.5	cis-1,3-Dichloropropene	10061-01-5	<2.5
Bromochloromethane	74-97-5	<2.5	trans-1,3-Dichloropropene	10061-02-6	<2.5
Bromodichloromethane	75-27-4	<2.5	Diisopropyl ether (DIPE)	108-20-3	<10
Bromoform	75-25-2	<2.5	Ethyl t-butyl ether (ETBE)	637-92-3	<10
Bromomethane	74-83-9	<10	Ethylbenzene	100-41-4	<2.5
tert-Butyl alcohol (TBA)	75-65-0	<50	Hexachlorobutadiene	87-68-3	<2.5
n-Butylbenzene	104-51-8	<2.5	Isopropylbenzene	98-82-8	<2.5
sec-Butylbenzene	135-98-8	<2.5	4-Isopropyltoluene	99-87-6	<2.5
tert-Butylbenzene	98-06-6	<2.5	Methyl t-butyl ether (MTBE)	1634-04-4	<5.0
Carbon tetrachloride	56-23-5	<2.5	Methylene chloride	75-09-2	<10
Chlorobenzene	108-90-7	<2.5	Naphthalene	91-20-3	<2.5
Chloroethane	75-00-3	<5.0	n-Propylbenzene	103-65-1	<2.5
Chloroform	67-66-3	<2.5	Styrene	100-42-5	<2.5
Chloromethane	74-87-3	<5.0	1,1,1,2-Tetrachloroethane	630-20-6	<2.5
2-Chlorotoluene	95-49-8	<2.5	1,1,2,2-Tetrachloroethane	79-34-5	<2.5
4-Chlorotoluene	106-43-4	<2.5	Tetrachloroethene	127-18-4	<2.5
Dibromochloromethane	124-48-1	<2.5	Toluene	108-88-3	<2.5
1,2-Dibromo-3-chloropropane	96-12-8	<5.0	1,2,3-Trichlorobenzene	87-61-6	<2.5
1,2-Dibromoethane	106-93-4	<2.5	1,2,4-Trichlorobenzene	120-82-1	<2.5
Dibromomethane	74-95-3	<2.5	1,1,1-Trichloroethane	71-55-6	<2.5
1,2-Dichlorobenzene	95-50-1	<2.5	1,1,2-Trichloroethane	79-00-5	<2.5
1,3-Dichlorobenzene	541-73-1	<2.5	Trichloroethene	79-01-6	<2.5
1,4-Dichlorobenzene	106-46-7	<2.5	Trichlorofluoromethane	75-69-4	<5.0
Dichlorodifluoromethane	75-71-8	<2.5	1,2,3-Trichloropropane	96-18-4	<2.5
1,1-Dichloroethane	75-34-3	<2.5	1,2,4-Trimethylbenzene	95-63-6	<2.5
1,2-Dichloroethane	107-06-2	<2.5	1,3,5-Trimethylbenzene	108-67-8	<2.5
1,1-Dichloroethene	75-35-4	<2.5	Vinyl Chloride	75-01-4	<2.5
cis-1,2-Dichloroethene	156-59-2	<2.5	Total Xylenes	1330-20-7	<5.0
trans-1,2-Dichloroethene	156-60-5	<2.5			
1,2-Dichloropropane	78-87-5	<2.5			
1,3-Dichloropropane	142-28-9	<2.5			

Surrogate:	% RC	Acceptable % RC
Dibromofluoromethane:	90	57-130 %
Toluene-d8:	89	70-130 %
4-Bromofluorobenzene:	82	70-130 %

Dilution Factor: 1

Data Qualifiers: None

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Lab Reference #: HDR 17800
Project Name: SANBAG RFM
Project #:

Volatile Organics by GC/MS (EPA 8260B)

Client Sample ID	Lab Sample Number	Date Received	Date Sampled	Date Extracted	Date Analyzed	Matrix
111-01 SB-2 (5-10)	17800-022	2/9/2011	2/9/2011	2/9/2011	2/11/2011	Soil

ANALYTE	CAS #	µg/kg	ANALYTE	CAS #	µg/kg
t-Amyl methyl ether (TAME)	994-05-8	<10	2,2-Dichloropropane	594-20-7	<2.5
Benzene	71-43-2	<2.5	1,1-Dichloropropene	563-58-6	<2.5
Bromobenzene	108-86-1	<2.5	cis-1,3-Dichloropropene	10061-01-5	<2.5
Bromochloromethane	74-97-5	<2.5	trans-1,3-Dichloropropene	10061-02-6	<2.5
Bromodichloromethane	75-27-4	<2.5	Diisopropyl ether (DIPE)	108-20-3	<10
Bromoform	75-25-2	<2.5	Ethyl t-butyl ether (ETBE)	637-92-3	<10
Bromomethane	74-83-9	<10	Ethylbenzene	100-41-4	<2.5
tert-Butyl alcohol (TBA)	75-65-0	<50	Hexachlorobutadiene	87-68-3	<2.5
n-Butylbenzene	104-51-8	<2.5	Isopropylbenzene	98-82-8	<2.5
sec-Butylbenzene	135-98-8	<2.5	4-Isopropyltoluene	99-87-6	<2.5
tert-Butylbenzene	98-06-6	<2.5	Methyl t-butyl ether (MTBE)	1634-04-4	<5.0
Carbon tetrachloride	56-23-5	<2.5	Methylene chloride	75-09-2	<10
Chlorobenzene	108-90-7	<2.5	Naphthalene	91-20-3	<2.5
Chloroethane	75-00-3	<5.0	n-Propylbenzene	103-65-1	<2.5
Chloroform	67-66-3	<2.5	Styrene	100-42-5	<2.5
Chloromethane	74-87-3	<5.0	1,1,1,2-Tetrachloroethane	630-20-6	<2.5
2-Chlorotoluene	95-49-8	<2.5	1,1,2,2-Tetrachloroethane	79-34-5	<2.5
4-Chlorotoluene	106-43-4	<2.5	Tetrachloroethene	127-18-4	<2.5
Dibromochloromethane	124-48-1	<2.5	Toluene	108-88-3	<2.5
1,2-Dibromo-3-chloropropane	96-12-8	<5.0	1,2,3-Trichlorobenzene	87-61-6	<2.5
1,2-Dibromoethane	106-93-4	<2.5	1,2,4-Trichlorobenzene	120-82-1	<2.5
Dibromomethane	74-95-3	<2.5	1,1,1-Trichloroethane	71-55-6	<2.5
1,2-Dichlorobenzene	95-50-1	<2.5	1,1,2-Trichloroethane	79-00-5	<2.5
1,3-Dichlorobenzene	541-73-1	<2.5	Trichloroethene	79-01-6	<2.5
1,4-Dichlorobenzene	106-46-7	<2.5	Trichlorofluoromethane	75-69-4	<5.0
Dichlorodifluoromethane	75-71-8	<2.5	1,2,3-Trichloropropane	96-18-4	<2.5
1,1-Dichloroethane	75-34-3	<2.5	1,2,4-Trimethylbenzene	95-63-6	<2.5
1,2-Dichloroethane	107-06-2	<2.5	1,3,5-Trimethylbenzene	108-67-8	<2.5
1,1-Dichloroethene	75-35-4	<2.5	Vinyl Chloride	75-01-4	<2.5
cis-1,2-Dichloroethene	156-59-2	<2.5	Total Xylenes	1330-20-7	<5.0
trans-1,2-Dichloroethene	156-60-5	<2.5			
1,2-Dichloropropane	78-87-5	<2.5			
1,3-Dichloropropane	142-28-9	<2.5			

Surrogate:	% RC	Acceptable % RC
Dibromofluoromethane:	95	57-130 %
Toluene-d8:	81	70-130 %
4-Bromofluorobenzene:	84	70-130 %

Dilution Factor: 1

Data Qualifiers: None

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Lab Reference #: HDR 17800
Project Name: SANBAG RFM
Project #:

Volatile Organics by GC/MS (EPA 8260B)

Client Sample ID	Lab Sample Number	Date Received	Date Sampled	Date Extracted	Date Analyzed	Matrix
111-01 SB-3 (15-20)	17800-023	2/9/2011	2/9/2011	2/9/2011	2/11/2011	Soil

ANALYTE	CAS #	µg/kg	ANALYTE	CAS #	µg/kg
t-Amyl methyl ether (TAME)	994-05-8	<10	2,2-Dichloropropane	594-20-7	<2.5
Benzene	71-43-2	<2.5	1,1-Dichloropropene	563-58-6	<2.5
Bromobenzene	108-86-1	<2.5	cis-1,3-Dichloropropene	10061-01-5	<2.5
Bromochloromethane	74-97-5	<2.5	trans-1,3-Dichloropropene	10061-02-6	<2.5
Bromodichloromethane	75-27-4	<2.5	Diisopropyl ether (DIPE)	108-20-3	<10
Bromoform	75-25-2	<2.5	Ethyl t-butyl ether (ETBE)	637-92-3	<10
Bromomethane	74-83-9	<10	Ethylbenzene	100-41-4	<2.5
tert-Butyl alcohol (TBA)	75-65-0	<50	Hexachlorobutadiene	87-68-3	<2.5
n-Butylbenzene	104-51-8	<2.5	Isopropylbenzene	98-82-8	<2.5
sec-Butylbenzene	135-98-8	<2.5	4-Isopropyltoluene	99-87-6	<2.5
tert-Butylbenzene	98-06-6	<2.5	Methyl t-butyl ether (MTBE)	1634-04-4	<5.0
Carbon tetrachloride	56-23-5	<2.5	Methylene chloride	75-09-2	<10
Chlorobenzene	108-90-7	<2.5	Naphthalene	91-20-3	<2.5
Chloroethane	75-00-3	<5.0	n-Propylbenzene	103-65-1	<2.5
Chloroform	67-66-3	<2.5	Styrene	100-42-5	<2.5
Chloromethane	74-87-3	<5.0	1,1,1,2-Tetrachloroethane	630-20-6	<2.5
2-Chlorotoluene	95-49-8	<2.5	1,1,2,2-Tetrachloroethane	79-34-5	<2.5
4-Chlorotoluene	106-43-4	<2.5	Tetrachloroethene	127-18-4	<2.5
Dibromochloromethane	124-48-1	<2.5	Toluene	108-88-3	<2.5
1,2-Dibromo-3-chloropropane	96-12-8	<5.0	1,2,3-Trichlorobenzene	87-61-6	<2.5
1,2-Dibromoethane	106-93-4	<2.5	1,2,4-Trichlorobenzene	120-82-1	<2.5
Dibromomethane	74-95-3	<2.5	1,1,1-Trichloroethane	71-55-6	<2.5
1,2-Dichlorobenzene	95-50-1	<2.5	1,1,2-Trichloroethane	79-00-5	<2.5
1,3-Dichlorobenzene	541-73-1	<2.5	Trichloroethene	79-01-6	<2.5
1,4-Dichlorobenzene	106-46-7	<2.5	Trichlorofluoromethane	75-69-4	<5.0
Dichlorodifluoromethane	75-71-8	<2.5	1,2,3-Trichloropropane	96-18-4	<2.5
1,1-Dichloroethane	75-34-3	<2.5	1,2,4-Trimethylbenzene	95-63-6	<2.5
1,2-Dichloroethane	107-06-2	<2.5	1,3,5-Trimethylbenzene	108-67-8	<2.5
1,1-Dichloroethene	75-35-4	<2.5	Vinyl Chloride	75-01-4	<2.5
cis-1,2-Dichloroethene	156-59-2	<2.5	Total Xylenes	1330-20-7	<5.0
trans-1,2-Dichloroethene	156-60-5	<2.5			
1,2-Dichloropropane	78-87-5	<2.5			
1,3-Dichloropropane	142-28-9	<2.5			

Surrogate:	% RC	Acceptable % RC
Dibromofluoromethane:	92	57-130 %
Toluene-d8:	79	70-130 %
4-Bromofluorobenzene:	82	70-130 %

Dilution Factor: 1

Data Qualifiers: None

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Lab Reference #: HDR 17800
Project Name: SANBAG RFM
Project #:

Volatile Organics by GC/MS (EPA 8260B)

Client Sample ID	Lab Sample Number	Date Received	Date Sampled	Date Extracted	Date Analyzed	Matrix
Method Blank	MBTT0209112			2/9/2011	2/9/2011	Soil

ANALYTE	CAS #	µg/kg	ANALYTE	CAS #	µg/kg
t-Amyl methyl ether (TAME)	994-05-8	<10	2,2-Dichloropropane	594-20-7	<2.5
Benzene	71-43-2	<2.5	1,1-Dichloropropene	563-58-6	<2.5
Bromobenzene	108-86-1	<2.5	cis-1,3-Dichloropropene	10061-01-5	<2.5
Bromochloromethane	74-97-5	<2.5	trans-1,3-Dichloropropene	10061-02-6	<2.5
Bromodichloromethane	75-27-4	<2.5	Diisopropyl ether (DIPE)	108-20-3	<10
Bromoform	75-25-2	<2.5	Ethyl t-butyl ether (ETBE)	637-92-3	<10
Bromomethane	74-83-9	<10	Ethylbenzene	100-41-4	<2.5
tert-Butyl alcohol (TBA)	75-65-0	<50	Hexachlorobutadiene	87-68-3	<2.5
n-Butylbenzene	104-51-8	<2.5	Isopropylbenzene	98-82-8	<2.5
sec-Butylbenzene	135-98-8	<2.5	4-Isopropyltoluene	99-87-6	<2.5
tert-Butylbenzene	98-06-6	<2.5	Methyl t-butyl ether (MTBE)	1634-04-4	<5.0
Carbon tetrachloride	56-23-5	<2.5	Methylene chloride	75-09-2	<10
Chlorobenzene	108-90-7	<2.5	Naphthalene	91-20-3	<2.5
Chloroethane	75-00-3	<5.0	n-Propylbenzene	103-65-1	<2.5
Chloroform	67-66-3	<2.5	Styrene	100-42-5	<2.5
Chloromethane	74-87-3	<5.0	1,1,1,2-Tetrachloroethane	630-20-6	<2.5
2-Chlorotoluene	95-49-8	<2.5	1,1,2,2-Tetrachloroethane	79-34-5	<2.5
4-Chlorotoluene	106-43-4	<2.5	Tetrachloroethene	127-18-4	<2.5
Dibromochloromethane	124-48-1	<2.5	Toluene	108-88-3	<2.5
1,2-Dibromo-3-chloropropane	96-12-8	<5.0	1,2,3-Trichlorobenzene	87-61-6	<2.5
1,2-Dibromoethane	106-93-4	<2.5	1,2,4-Trichlorobenzene	120-82-1	<2.5
Dibromomethane	74-95-3	<2.5	1,1,1-Trichloroethane	71-55-6	<2.5
1,2-Dichlorobenzene	95-50-1	<2.5	1,1,2-Trichloroethane	79-00-5	<2.5
1,3-Dichlorobenzene	541-73-1	<2.5	Trichloroethene	79-01-6	<2.5
1,4-Dichlorobenzene	106-46-7	<2.5	Trichlorofluoromethane	75-69-4	<5.0
1,1-Dichloroethane	75-34-3	<2.5	1,2,3-Trichloropropane	96-18-4	<2.5
1,2-Dichloroethane	107-06-2	<2.5	1,2,4-Trimethylbenzene	95-63-6	<2.5
1,1-Dichloroethene	75-35-4	<2.5	1,3,5-Trimethylbenzene	108-67-8	<2.5
cis-1,2-Dichloroethene	156-59-2	<2.5	Vinyl Chloride	75-01-4	<2.5
trans-1,2-Dichloroethene	156-60-5	<2.5	Total Xylenes	1330-20-7	<5.0
Dichlorodifluoromethane	75-71-8	<2.5			
1,2-Dichloropropane	78-87-5	<2.5			
1,3-Dichloropropane	142-28-9	<2.5			

Surrogate:	% RC	Acceptable % RC
Dibromofluoromethane:	84	57-130 %
Toluene-d8:	92	70-130 %
4-Bromofluorobenzene:	82	70-130 %

Dilution Factor: 1

Data Qualifiers: None

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Lab Reference #: HDR 17800
Project Name: SANBAG RFM
Project #:

Volatile Organics by GC/MS (EPA 8260B)

Client Sample ID	Lab Sample Number	Date Received	Date Sampled	Date Extracted	Date Analyzed	Matrix
Method Blank	MBTT0211111			2/11/2011	2/11/2011	Soil

ANALYTE	CAS #	µg/kg	ANALYTE	CAS #	µg/kg
t-Amyl methyl ether (TAME)	994-05-8	<10	2,2-Dichloropropane	594-20-7	<2.5
Benzene	71-43-2	<2.5	1,1-Dichloropropene	563-58-6	<2.5
Bromobenzene	108-86-1	<2.5	cis-1,3-Dichloropropene	10061-01-5	<2.5
Bromochloromethane	74-97-5	<2.5	trans-1,3-Dichloropropene	10061-02-6	<2.5
Bromodichloromethane	75-27-4	<2.5	Diisopropyl ether (DIPE)	108-20-3	<10
Bromoform	75-25-2	<2.5	Ethyl t-butyl ether (ETBE)	637-92-3	<10
Bromomethane	74-83-9	<10	Ethylbenzene	100-41-4	<2.5
tert-Butyl alcohol (TBA)	75-65-0	<50	Hexachlorobutadiene	87-68-3	<2.5
n-Butylbenzene	104-51-8	<2.5	Isopropylbenzene	98-82-8	<2.5
sec-Butylbenzene	135-98-8	<2.5	4-Isopropyltoluene	99-87-6	<2.5
tert-Butylbenzene	98-06-6	<2.5	Methyl t-butyl ether (MTBE)	1634-04-4	<5.0
Carbon tetrachloride	56-23-5	<2.5	Methylene chloride	75-09-2	<10
Chlorobenzene	108-90-7	<2.5	Naphthalene	91-20-3	<2.5
Chloroethane	75-00-3	<5.0	n-Propylbenzene	103-65-1	<2.5
Chloroform	67-66-3	<2.5	Styrene	100-42-5	<2.5
Chloromethane	74-87-3	<5.0	1,1,1,2-Tetrachloroethane	630-20-6	<2.5
2-Chlorotoluene	95-49-8	<2.5	1,1,2,2-Tetrachloroethane	79-34-5	<2.5
4-Chlorotoluene	106-43-4	<2.5	Tetrachloroethene	127-18-4	<2.5
Dibromochloromethane	124-48-1	<2.5	Toluene	108-88-3	<2.5
1,2-Dibromo-3-chloropropane	96-12-8	<5.0	1,2,3-Trichlorobenzene	87-61-6	<2.5
1,2-Dibromoethane	106-93-4	<2.5	1,2,4-Trichlorobenzene	120-82-1	<2.5
Dibromomethane	74-95-3	<2.5	1,1,1-Trichloroethane	71-55-6	<2.5
1,2-Dichlorobenzene	95-50-1	<2.5	1,1,2-Trichloroethane	79-00-5	<2.5
1,3-Dichlorobenzene	541-73-1	<2.5	Trichloroethene	79-01-6	<2.5
1,4-Dichlorobenzene	106-46-7	<2.5	Trichlorofluoromethane	75-69-4	<5.0
1,1-Dichloroethane	75-34-3	<2.5	1,2,3-Trichloropropane	96-18-4	<2.5
1,2-Dichloroethane	107-06-2	<2.5	1,2,4-Trimethylbenzene	95-63-6	<2.5
1,1-Dichloroethene	75-35-4	<2.5	1,3,5-Trimethylbenzene	108-67-8	<2.5
cis-1,2-Dichloroethene	156-59-2	<2.5	Vinyl Chloride	75-01-4	<2.5
trans-1,2-Dichloroethene	156-60-5	<2.5	Total Xylenes	1330-20-7	<5.0
Dichlorodifluoromethane	75-71-8	<2.5			
1,2-Dichloropropane	78-87-5	<2.5			
1,3-Dichloropropane	142-28-9	<2.5			

Surrogate:	% RC	Acceptable % RC
Dibromofluoromethane:	87	57-130 %
Toluene-d8:	86	70-130 %
4-Bromofluorobenzene:	80	70-130 %

Dilution Factor: 1

Data Qualifiers: None

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Lab Reference #: HDR 17800
Project Name: SANBAG RFM
Project #:

Semi Volatile Organics by GC/MS (EPA 8270C)

Client Sample ID	Lab Sample Number	Date Received	Date Sampled	Date Extracted	Date Analyzed	Matrix
111-24 SB-1 (0-5)	17800-001	2/9/2011	2/7/2011	2/11/2011	2/14/2011	Soil

ANALYTE	CAS #	µg/kg	ANALYTE	CAS #	µg/kg
Acenaphthene:	83-32-9	<100	4,6-Dinitro-2-methylphenol:	534-52-1	<1000
Acenaphthylene:	208-96-8	<100	2,4-Dinitrophenol:	51-28-5	<1000
Aniline:	62-53-3	<100	2,4-Dinitrotoluene:	121-14-2	<250
Anthracene:	120-12-7	<100	2,6-Dinitrotoluene:	606-20-2	<250
Benzoic acid:	65-85-0	<1000	Di-n-octyl phthalate:	117-84-0	<250
Benz(a)anthracene:	56-55-3	<100	Fluoranthene:	206-44-0	<100
Benzo(b)fluoranthene:	205-99-2	<250	Fluorene:	86-73-7	<100
Benzo(k)fluoranthene:	207-08-9	<250	Hexachlorobenzene:	118-74-1	<100
Benzo(g,h,i)perylene:	191-24-2	<250	Hexachlorobutadiene:	87-68-3	<100
Benzo(a)pyrene:	50-32-8	<250	Hexachlorocyclopentadiene:	77-47-4	<500
Benzyl alcohol:	100-51-6	<100	Hexachloroethane:	67-72-1	<100
bis-(2-chloroethoxy) methane:	111-91-1	<100	Indeno(1,2,3-cd)pyrene:	193-39-5	<250
bis-(2-chloroethyl) ether:	111-44-4	<100	Isophorone:	78-59-1	<100
bis-(2-chloroisopropyl) ether:	39638-32-9	<100	2-Methylnaphthalene:	91-57-6	<100
bis-(2-ethylhexyl) phthalate:	117-81-7	<100	2-Methylphenol:	95-48-7	<100
4-Bromophenyl phenyl ether:	101-55-3	<100	3 & 4-Methylphenol:	108-39-4, 106-44-5	<100
Butyl benzyl phthalate:	85-68-7	<100	Naphthalene:	91-20-3	<100
4-Chloroaniline:	106-47-8	<100	2-Nitroaniline:	88-74-4	<250
2-Chloronaphthalene:	91-58-7	<100	3-Nitroaniline:	99-09-2	<250
4-Chloro-3-methylphenol:	59-50-7	<100	4-Nitroaniline:	100-01-6	<250
2-Chlorophenol:	95-57-8	<100	Nitrobenzene:	98-95-3	<100
4-Chlorophenyl phenyl ether:	7005-72-3	<100	2-Nitrophenol:	88-75-5	<100
Chrysene:	218-01-9	<100	4-Nitrophenol:	100-02-7	<1000
Dibenz(a,h)anthracene:	53-70-3	<100	N-Nitrosodiphenylamine:	86-30-6	<100
Dibenzofuran:	132-64-9	<100	N-Nitrosodi-n-propylamine:	621-64-7	<100
Di-n-butyl phthalate:	84-74-2	<250	N-Nitrosodimethylamine:	62-75-9	<100
1,2-Dichlorobenzene:	95-50-1	<100	Pentachlorophenol:	87-86-5	<1000
1,3-Dichlorobenzene:	541-73-1	<100	Phenanthrene:	85-01-8	<100
1,4-Dichlorobenzene:	106-46-7	<100	Phenol:	108-95-2	<100
2,4-Dichlorophenol:	120-83-2	<100	Pyrene:	129-00-0	<100
Diethyl phthalate:	84-66-2	<100	1,2,4-Trichlorobenzene:	120-82-1	<100
2,4-Dimethylphenol:	105-67-9	<100	2,4,5-Trichlorophenol:	95-95-4	<100
Dimethyl phthalate:	131-11-3	<100	2,4,6-Trichlorophenol:	88-06-2	<100

Surrogate:	% RC	Acceptable % RC
2-Fluorophenol:	79	28-125 %
Phenol-d6:	81	27-129 %
Nitrobenzene-d5:	72	28-132 %
2-Fluorobiphenyl:	79	26-141 %
2,4,6-Tribromophenol:	86	26-138 %
Terphenyl-d14:	75	36-130 %

Dilution Factor: 1

Data Qualifiers: None

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Lab Reference #: HDR 17800
Project Name: SANBAG RFM
Project #:

Semi Volatile Organics by GC/MS (EPA 8270C)

Client Sample ID	Lab Sample Number	Date Received	Date Sampled	Date Extracted	Date Analyzed	Matrix
111-24 SB-2 (5-10)	17800-002	2/9/2011	2/7/2011	2/11/2011	2/14/2011	Soil

ANALYTE	CAS #	µg/kg	ANALYTE	CAS #	µg/kg
Acenaphthene:	83-32-9	<100	4,6-Dinitro-2-methylphenol:	534-52-1	<1000
Acenaphthylene:	208-96-8	<100	2,4-Dinitrophenol:	51-28-5	<1000
Aniline:	62-53-3	<100	2,4-Dinitrotoluene:	121-14-2	<250
Anthracene:	120-12-7	<100	2,6-Dinitrotoluene:	606-20-2	<250
Benzoic acid:	65-85-0	<1000	Di-n-octyl phthalate:	117-84-0	<250
Benz(a)anthracene:	56-55-3	<100	Fluoranthene:	206-44-0	<100
Benzo(b)fluoranthene:	205-99-2	<250	Fluorene:	86-73-7	<100
Benzo(k)fluoranthene:	207-08-9	<250	Hexachlorobenzene:	118-74-1	<100
Benzo(g,h,i)perylene:	191-24-2	<250	Hexachlorobutadiene:	87-68-3	<100
Benzo(a)pyrene:	50-32-8	<250	Hexachlorocyclopentadiene:	77-47-4	<500
Benzyl alcohol:	100-51-6	<100	Hexachloroethane:	67-72-1	<100
bis-(2-chloroethoxy) methane:	111-91-1	<100	Indeno(1,2,3-cd)pyrene:	193-39-5	<250
bis-(2-chloroethyl) ether:	111-44-4	<100	Isophorone:	78-59-1	<100
bis-(2-chloroisopropyl) ether:	39638-32-9	<100	2-Methylnaphthalene:	91-57-6	<100
bis-(2-ethylhexyl) phthalate:	117-81-7	<100	2-Methylphenol:	95-48-7	<100
4-Bromophenyl phenyl ether:	101-55-3	<100	3 & 4-Methylphenol:	108-39-4, 106-44-5	<100
Butyl benzyl phthalate:	85-68-7	<100	Naphthalene:	91-20-3	<100
4-Chloroaniline:	106-47-8	<100	2-Nitroaniline:	88-74-4	<250
2-Chloronaphthalene:	91-58-7	<100	3-Nitroaniline:	99-09-2	<250
4-Chloro-3-methylphenol:	59-50-7	<100	4-Nitroaniline:	100-01-6	<250
2-Chlorophenol:	95-57-8	<100	Nitrobenzene:	98-95-3	<100
4-Chlorophenyl phenyl ether:	7005-72-3	<100	2-Nitrophenol:	88-75-5	<100
Chrysene:	218-01-9	<100	4-Nitrophenol:	100-02-7	<1000
Dibenz(a,h)anthracene:	53-70-3	<100	N-Nitrosodiphenylamine:	86-30-6	<100
Dibenzofuran:	132-64-9	<100	N-Nitrosodi-n-propylamine:	621-64-7	<100
Di-n-butyl phthalate:	84-74-2	<250	N-Nitrosodimethylamine:	62-75-9	<100
1,2-Dichlorobenzene:	95-50-1	<100	Pentachlorophenol:	87-86-5	<1000
1,3-Dichlorobenzene:	541-73-1	<100	Phenanthrene:	85-01-8	<100
1,4-Dichlorobenzene:	106-46-7	<100	Phenol:	108-95-2	<100
2,4-Dichlorophenol:	120-83-2	<100	Pyrene:	129-00-0	<100
Diethyl phthalate:	84-66-2	<100	1,2,4-Trichlorobenzene:	120-82-1	<100
2,4-Dimethylphenol:	105-67-9	<100	2,4,5-Trichlorophenol:	95-95-4	<100
Dimethyl phthalate:	131-11-3	<100	2,4,6-Trichlorophenol:	88-06-2	<100

Surrogate:	% RC	Acceptable % RC
2-Fluorophenol:	74	28-125 %
Phenol-d6:	73	27-129 %
Nitrobenzene-d5:	66	28-132 %
2-Fluorobiphenyl:	71	26-141 %
2,4,6-Tribromophenol:	74	26-138 %
Terphenyl-d14:	67	36-130 %

Dilution Factor: 1

Data Qualifiers: None

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Lab Reference #: HDR 17800
Project Name: SANBAG RFM
Project #:

Semi Volatile Organics by GC/MS (EPA 8270C)

Client Sample ID	Lab Sample Number	Date Received	Date Sampled	Date Extracted	Date Analyzed	Matrix
111-24 SB-3 (0-5)	17800-003	2/9/2011	2/7/2011	2/16/2011	2/17/2011	Soil

ANALYTE	CAS #	µg/kg	ANALYTE	CAS #	µg/kg
Acenaphthene:	83-32-9	<2000	4,6-Dinitro-2-methylphenol:	534-52-1	<20000
Acenaphthylene:	208-96-8	<2000	2,4-Dinitrophenol:	51-28-5	<20000
Aniline:	62-53-3	<2000	2,4-Dinitrotoluene:	121-14-2	<5000
Anthracene:	120-12-7	<2000	2,6-Dinitrotoluene:	606-20-2	<5000
Benzoic acid:	65-85-0	<20000	Di-n-octyl phthalate:	117-84-0	<5000
Benz(a)anthracene:	56-55-3	<2000	Fluoranthene:	206-44-0	<2000
Benzo(b)fluoranthene:	205-99-2	<5000	Fluorene:	86-73-7	<2000
Benzo(k)fluoranthene:	207-08-9	<5000	Hexachlorobenzene:	118-74-1	<2000
Benzo(g,h,i)perylene:	191-24-2	<5000	Hexachlorobutadiene:	87-68-3	<2000
Benzo(a)pyrene:	50-32-8	<5000	Hexachlorocyclopentadiene:	77-47-4	<10000
Benzyl alcohol:	100-51-6	<2000	Hexachloroethane:	67-72-1	<2000
bis-(2-chloroethoxy) methane:	111-91-1	<2000	Indeno(1,2,3-cd)pyrene:	193-39-5	<5000
bis-(2-chloroethyl) ether:	111-44-4	<2000	Isophorone:	78-59-1	<2000
bis-(2-chloroisopropyl) ether:	39638-32-9	<2000	2-Methylnaphthalene:	91-57-6	<2000
bis-(2-ethylhexyl) phthalate:	117-81-7	<2000	2-Methylphenol:	95-48-7	<2000
4-Bromophenyl phenyl ether:	101-55-3	<2000	3 & 4-Methylphenol:	108-39-4, 106-44-5	<2000
Butyl benzyl phthalate:	85-68-7	<2000	Naphthalene:	91-20-3	<2000
4-Chloroaniline:	106-47-8	<2000	2-Nitroaniline:	88-74-4	<5000
2-Chloronaphthalene:	91-58-7	<2000	3-Nitroaniline:	99-09-2	<5000
4-Chloro-3-methylphenol:	59-50-7	<2000	4-Nitroaniline:	100-01-6	<5000
2-Chlorophenol:	95-57-8	<2000	Nitrobenzene:	98-95-3	<2000
4-Chlorophenyl phenyl ether:	7005-72-3	<2000	2-Nitrophenol:	88-75-5	<2000
Chrysene:	218-01-9	<2000	4-Nitrophenol:	100-02-7	<20000
Dibenz(a,h)anthracene:	53-70-3	<2000	N-Nitrosodiphenylamine:	86-30-6	<2000
Dibenzofuran:	132-64-9	<2000	N-Nitrosodi-n-propylamine:	621-64-7	<2000
Di-n-butyl phthalate:	84-74-2	<5000	N-Nitrosodimethylamine:	62-75-9	<2000
1,2-Dichlorobenzene:	95-50-1	<2000	Pentachlorophenol:	87-86-5	<20000
1,3-Dichlorobenzene:	541-73-1	<2000	Phenanthrene:	85-01-8	<2000
1,4-Dichlorobenzene:	106-46-7	<2000	Phenol:	108-95-2	<2000
2,4-Dichlorophenol:	120-83-2	<2000	Pyrene:	129-00-0	<2000
Diethyl phthalate:	84-66-2	<2000	1,2,4-Trichlorobenzene:	120-82-1	<2000
2,4-Dimethylphenol:	105-67-9	<2000	2,4,5-Trichlorophenol:	95-95-4	<2000
Dimethyl phthalate:	131-11-3	<2000	2,4,6-Trichlorophenol:	88-06-2	<2000

Surrogate:	% RC	Acceptable % RC
2-Fluorophenol:	Diluted	28-125 %
Phenol-d6:	Diluted	27-129 %
Nitrobenzene-d5:	Diluted	28-132 %
2-Fluorobiphenyl:	Diluted	26-141 %
2,4,6-Tribromophenol:	Diluted	26-138 %
Terphenyl-d14:	Diluted	36-130 %

Dilution Factor: 20

Data Qualifiers: D1, S8,

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Project Name: SANBAG RFM
Project #:

Semi Volatile Organics by GC/MS (EPA 8270C)

Client Sample ID	Lab Sample Number	Date Received	Date Sampled	Date Extracted	Date Analyzed	Matrix
021-12 SB-1 (20-25)	17800-004	2/9/2011	2/7/2011	2/11/2011	2/15/2011	Soil

ANALYTE	CAS #	µg/kg	ANALYTE	CAS #	µg/kg
Acenaphthene:	83-32-9	<100	4,6-Dinitro-2-methylphenol:	534-52-1	<1000
Acenaphthylene:	208-96-8	<100	2,4-Dinitrophenol:	51-28-5	<1000
Aniline:	62-53-3	<100	2,4-Dinitrotoluene:	121-14-2	<250
Anthracene:	120-12-7	<100	2,6-Dinitrotoluene:	606-20-2	<250
Benzoic acid:	65-85-0	<1000	Di-n-octyl phthalate:	117-84-0	<250
Benz(a)anthracene:	56-55-3	<100	Fluoranthene:	206-44-0	<100
Benzo(b)fluoranthene:	205-99-2	<250	Fluorene:	86-73-7	<100
Benzo(k)fluoranthene:	207-08-9	<250	Hexachlorobenzene:	118-74-1	<100
Benzo(g,h,i)perylene:	191-24-2	<250	Hexachlorobutadiene:	87-68-3	<100
Benzo(a)pyrene:	50-32-8	<250	Hexachlorocyclopentadiene:	77-47-4	<500
Benzyl alcohol:	100-51-6	<100	Hexachloroethane:	67-72-1	<100
bis-(2-chloroethoxy) methane:	111-91-1	<100	Indeno(1,2,3-cd)pyrene:	193-39-5	<250
bis-(2-chloroethyl) ether:	111-44-4	<100	Isophorone:	78-59-1	<100
bis-(2-chloroisopropyl) ether:	39638-32-9	<100	2-Methylnaphthalene:	91-57-6	<100
bis-(2-ethylhexyl) phthalate:	117-81-7	<100	2-Methylphenol:	95-48-7	<100
4-Bromophenyl phenyl ether:	101-55-3	<100	3 & 4-Methylphenol:	108-39-4, 106-44-5	<100
Butyl benzyl phthalate:	85-68-7	<100	Naphthalene:	91-20-3	<100
4-Chloroaniline:	106-47-8	<100	2-Nitroaniline:	88-74-4	<250
2-Chloronaphthalene:	91-58-7	<100	3-Nitroaniline:	99-09-2	<250
4-Chloro-3-methylphenol:	59-50-7	<100	4-Nitroaniline:	100-01-6	<250
2-Chlorophenol:	95-57-8	<100	Nitrobenzene:	98-95-3	<100
4-Chlorophenyl phenyl ether:	7005-72-3	<100	2-Nitrophenol:	88-75-5	<100
Chrysene:	218-01-9	<100	4-Nitrophenol:	100-02-7	<1000
Dibenz(a,h)anthracene:	53-70-3	<100	N-Nitrosodiphenylamine:	86-30-6	<100
Dibenzofuran:	132-64-9	<100	N-Nitrosodi-n-propylamine:	621-64-7	<100
Di-n-butyl phthalate:	84-74-2	<250	N-Nitrosodimethylamine:	62-75-9	<100
1,2-Dichlorobenzene:	95-50-1	<100	Pentachlorophenol:	87-86-5	<1000
1,3-Dichlorobenzene:	541-73-1	<100	Phenanthrene:	85-01-8	<100
1,4-Dichlorobenzene:	106-46-7	<100	Phenol:	108-95-2	<100
2,4-Dichlorophenol:	120-83-2	<100	Pyrene:	129-00-0	<100
Diethyl phthalate:	84-66-2	<100	1,2,4-Trichlorobenzene:	120-82-1	<100
2,4-Dimethylphenol:	105-67-9	<100	2,4,5-Trichlorophenol:	95-95-4	<100
Dimethyl phthalate:	131-11-3	<100	2,4,6-Trichlorophenol:	88-06-2	<100

Surrogate:	% RC	Acceptable % RC
2-Fluorophenol:	84	28-125 %
Phenol-d6:	84	27-129 %
Nitrobenzene-d5:	74	28-132 %
2-Fluorobiphenyl:	77	26-141 %
2,4,6-Tribromophenol:	85	26-138 %
Terphenyl-d14:	75	36-130 %

Dilution Factor: 1

Data Qualifiers: None

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Lab Reference #: HDR 17800
Project Name: SANBAG RFM
Project #:

Semi Volatile Organics by GC/MS (EPA 8270C)

Client Sample ID	Lab Sample Number	Date Received	Date Sampled	Date Extracted	Date Analyzed	Matrix
BNSF 011-22 SB-1 (5-10)	17800-005	2/9/2011	2/7/2011	2/11/2011	2/14/2011	Soil

ANALYTE	CAS #	µg/kg	ANALYTE	CAS #	µg/kg
Acenaphthene:	83-32-9	<100	4,6-Dinitro-2-methylphenol:	534-52-1	<1000
Acenaphthylene:	208-96-8	<100	2,4-Dinitrophenol:	51-28-5	<1000
Aniline:	62-53-3	<100	2,4-Dinitrotoluene:	121-14-2	<250
Anthracene:	120-12-7	<100	2,6-Dinitrotoluene:	606-20-2	<250
Benzoic acid:	65-85-0	<1000	Di-n-octyl phthalate:	117-84-0	<250
Benz(a)anthracene:	56-55-3	<100	Fluoranthene:	206-44-0	<100
Benzo(b)fluoranthene:	205-99-2	<250	Fluorene:	86-73-7	<100
Benzo(k)fluoranthene:	207-08-9	<250	Hexachlorobenzene:	118-74-1	<100
Benzo(g,h,i)perylene:	191-24-2	<250	Hexachlorobutadiene:	87-68-3	<100
Benzo(a)pyrene:	50-32-8	<250	Hexachlorocyclopentadiene:	77-47-4	<500
Benzyl alcohol:	100-51-6	<100	Hexachloroethane:	67-72-1	<100
bis-(2-chloroethoxy) methane:	111-91-1	<100	Indeno(1,2,3-cd)pyrene:	193-39-5	<250
bis-(2-chloroethyl) ether:	111-44-4	<100	Isophorone:	78-59-1	<100
bis-(2-chloroisopropyl) ether:	39638-32-9	<100	2-Methylnaphthalene:	91-57-6	<100
bis-(2-ethylhexyl) phthalate:	117-81-7	<100	2-Methylphenol:	95-48-7	<100
4-Bromophenyl phenyl ether:	101-55-3	<100	3 & 4-Methylphenol:	108-39-4, 106-44-5	<100
Butyl benzyl phthalate:	85-68-7	<100	Naphthalene:	91-20-3	<100
4-Chloroaniline:	106-47-8	<100	2-Nitroaniline:	88-74-4	<250
2-Chloronaphthalene:	91-58-7	<100	3-Nitroaniline:	99-09-2	<250
4-Chloro-3-methylphenol:	59-50-7	<100	4-Nitroaniline:	100-01-6	<250
2-Chlorophenol:	95-57-8	<100	Nitrobenzene:	98-95-3	<100
4-Chlorophenyl phenyl ether:	7005-72-3	<100	2-Nitrophenol:	88-75-5	<100
Chrysene:	218-01-9	<100	4-Nitrophenol:	100-02-7	<1000
Dibenz(a,h)anthracene:	53-70-3	<100	N-Nitrosodiphenylamine:	86-30-6	<100
Dibenzofuran:	132-64-9	<100	N-Nitrosodi-n-propylamine:	621-64-7	<100
Di-n-butyl phthalate:	84-74-2	<250	N-Nitrosodimethylamine:	62-75-9	<100
1,2-Dichlorobenzene:	95-50-1	<100	Pentachlorophenol:	87-86-5	<1000
1,3-Dichlorobenzene:	541-73-1	<100	Phenanthrene:	85-01-8	<100
1,4-Dichlorobenzene:	106-46-7	<100	Phenol:	108-95-2	<100
2,4-Dichlorophenol:	120-83-2	<100	Pyrene:	129-00-0	<100
Diethyl phthalate:	84-66-2	<100	1,2,4-Trichlorobenzene:	120-82-1	<100
2,4-Dimethylphenol:	105-67-9	<100	2,4,5-Trichlorophenol:	95-95-4	<100
Dimethyl phthalate:	131-11-3	<100	2,4,6-Trichlorophenol:	88-06-2	<100

Surrogate:	% RC	Acceptable % RC
2-Fluorophenol:	74	28-125 %
Phenol-d6:	75	27-129 %
Nitrobenzene-d5:	69	28-132 %
2-Fluorobiphenyl:	73	26-141 %
2,4,6-Tribromophenol:	78	26-138 %
Terphenyl-d14:	70	36-130 %

Dilution Factor: 1

Data Qualifiers: None

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Lab Reference #: HDR 17800
Project Name: SANBAG RFM
Project #:

Semi Volatile Organics by GC/MS (EPA 8270C)

Client Sample ID	Lab Sample Number	Date Received	Date Sampled	Date Extracted	Date Analyzed	Matrix
BNSF 011-22 SB-2 (5-10)	17800-006	2/9/2011	2/7/2011	2/11/2011	2/14/2011	Soil

ANALYTE	CAS #	µg/kg	ANALYTE	CAS #	µg/kg
Acenaphthene:	83-32-9	<100	4,6-Dinitro-2-methylphenol:	534-52-1	<1000
Acenaphthylene:	208-96-8	<100	2,4-Dinitrophenol:	51-28-5	<1000
Aniline:	62-53-3	<100	2,4-Dinitrotoluene:	121-14-2	<250
Anthracene:	120-12-7	<100	2,6-Dinitrotoluene:	606-20-2	<250
Benzoic acid:	65-85-0	<1000	Di-n-octyl phthalate:	117-84-0	<250
Benz(a)anthracene:	56-55-3	<100	Fluoranthene:	206-44-0	<100
Benzo(b)fluoranthene:	205-99-2	<250	Fluorene:	86-73-7	<100
Benzo(k)fluoranthene:	207-08-9	<250	Hexachlorobenzene:	118-74-1	<100
Benzo(g,h,i)perylene:	191-24-2	<250	Hexachlorobutadiene:	87-68-3	<100
Benzo(a)pyrene:	50-32-8	<250	Hexachlorocyclopentadiene:	77-47-4	<500
Benzyl alcohol:	100-51-6	<100	Hexachloroethane:	67-72-1	<100
bis-(2-chloroethoxy) methane:	111-91-1	<100	Indeno(1,2,3-cd)pyrene:	193-39-5	<250
bis-(2-chloroethyl) ether:	111-44-4	<100	Isophorone:	78-59-1	<100
bis-(2-chloroisopropyl) ether:	39638-32-9	<100	2-Methylnaphthalene:	91-57-6	<100
bis-(2-ethylhexyl) phthalate:	117-81-7	<100	2-Methylphenol:	95-48-7	<100
4-Bromophenyl phenyl ether:	101-55-3	<100	3 & 4-Methylphenol:	108-39-4, 106-44-5	<100
Butyl benzyl phthalate:	85-68-7	<100	Naphthalene:	91-20-3	<100
4-Chloroaniline:	106-47-8	<100	2-Nitroaniline:	88-74-4	<250
2-Chloronaphthalene:	91-58-7	<100	3-Nitroaniline:	99-09-2	<250
4-Chloro-3-methylphenol:	59-50-7	<100	4-Nitroaniline:	100-01-6	<250
2-Chlorophenol:	95-57-8	<100	Nitrobenzene:	98-95-3	<100
4-Chlorophenyl phenyl ether:	7005-72-3	<100	2-Nitrophenol:	88-75-5	<100
Chrysene:	218-01-9	<100	4-Nitrophenol:	100-02-7	<1000
Dibenz(a,h)anthracene:	53-70-3	<100	N-Nitrosodiphenylamine:	86-30-6	<100
Dibenzofuran:	132-64-9	<100	N-Nitrosodi-n-propylamine:	621-64-7	<100
Di-n-butyl phthalate:	84-74-2	<250	N-Nitrosodimethylamine:	62-75-9	<100
1,2-Dichlorobenzene:	95-50-1	<100	Pentachlorophenol:	87-86-5	<1000
1,3-Dichlorobenzene:	541-73-1	<100	Phenanthrene:	85-01-8	<100
1,4-Dichlorobenzene:	106-46-7	<100	Phenol:	108-95-2	<100
2,4-Dichlorophenol:	120-83-2	<100	Pyrene:	129-00-0	<100
Diethyl phthalate:	84-66-2	<100	1,2,4-Trichlorobenzene:	120-82-1	<100
2,4-Dimethylphenol:	105-67-9	<100	2,4,5-Trichlorophenol:	95-95-4	<100
Dimethyl phthalate:	131-11-3	<100	2,4,6-Trichlorophenol:	88-06-2	<100

Surrogate:	% RC	Acceptable % RC
2-Fluorophenol:	78	28-125 %
Phenol-d6:	79	27-129 %
Nitrobenzene-d5:	71	28-132 %
2-Fluorobiphenyl:	75	26-141 %
2,4,6-Tribromophenol:	78	26-138 %
Terphenyl-d14:	69	36-130 %

Dilution Factor: 1

Data Qualifiers: None

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Lab Reference #: HDR 17800
Project Name: SANBAG RFM
Project #:

Semi Volatile Organics by GC/MS (EPA 8270C)

Client Sample ID	Lab Sample Number	Date Received	Date Sampled	Date Extracted	Date Analyzed	Matrix
BNSF 011-22 SB-3 (5-10)	17800-007	2/9/2011	2/7/2011	2/11/2011	2/14/2011	Soil

ANALYTE	CAS #	µg/kg	ANALYTE	CAS #	µg/kg
Acenaphthene:	83-32-9	<100	4,6-Dinitro-2-methylphenol:	534-52-1	<1000
Acenaphthylene:	208-96-8	<100	2,4-Dinitrophenol:	51-28-5	<1000
Aniline:	62-53-3	<100	2,4-Dinitrotoluene:	121-14-2	<250
Anthracene:	120-12-7	<100	2,6-Dinitrotoluene:	606-20-2	<250
Benzoic acid:	65-85-0	<1000	Di-n-octyl phthalate:	117-84-0	<250
Benz(a)anthracene:	56-55-3	<100	Fluoranthene:	206-44-0	<100
Benzo(b)fluoranthene:	205-99-2	<250	Fluorene:	86-73-7	<100
Benzo(k)fluoranthene:	207-08-9	<250	Hexachlorobenzene:	118-74-1	<100
Benzo(g,h,i)perylene:	191-24-2	<250	Hexachlorobutadiene:	87-68-3	<100
Benzo(a)pyrene:	50-32-8	<250	Hexachlorocyclopentadiene:	77-47-4	<500
Benzyl alcohol:	100-51-6	<100	Hexachloroethane:	67-72-1	<100
bis-(2-chloroethoxy) methane:	111-91-1	<100	Indeno(1,2,3-cd)pyrene:	193-39-5	<250
bis-(2-chloroethyl) ether:	111-44-4	<100	Isophorone:	78-59-1	<100
bis-(2-chloroisopropyl) ether:	39638-32-9	<100	2-Methylnaphthalene:	91-57-6	<100
bis-(2-ethylhexyl) phthalate:	117-81-7	<100	2-Methylphenol:	95-48-7	<100
4-Bromophenyl phenyl ether:	101-55-3	<100	3 & 4-Methylphenol:	108-39-4, 106-44-5	<100
Butyl benzyl phthalate:	85-68-7	<100	Naphthalene:	91-20-3	<100
4-Chloroaniline:	106-47-8	<100	2-Nitroaniline:	88-74-4	<250
2-Chloronaphthalene:	91-58-7	<100	3-Nitroaniline:	99-09-2	<250
4-Chloro-3-methylphenol:	59-50-7	<100	4-Nitroaniline:	100-01-6	<250
2-Chlorophenol:	95-57-8	<100	Nitrobenzene:	98-95-3	<100
4-Chlorophenyl phenyl ether:	7005-72-3	<100	2-Nitrophenol:	88-75-5	<100
Chrysene:	218-01-9	<100	4-Nitrophenol:	100-02-7	<1000
Dibenz(a,h)anthracene:	53-70-3	<100	N-Nitrosodiphenylamine:	86-30-6	<100
Dibenzofuran:	132-64-9	<100	N-Nitrosodi-n-propylamine:	621-64-7	<100
Di-n-butyl phthalate:	84-74-2	<250	N-Nitrosodimethylamine:	62-75-9	<100
1,2-Dichlorobenzene:	95-50-1	<100	Pentachlorophenol:	87-86-5	<1000
1,3-Dichlorobenzene:	541-73-1	<100	Phenanthrene:	85-01-8	<100
1,4-Dichlorobenzene:	106-46-7	<100	Phenol:	108-95-2	<100
2,4-Dichlorophenol:	120-83-2	<100	Pyrene:	129-00-0	<100
Diethyl phthalate:	84-66-2	<100	1,2,4-Trichlorobenzene:	120-82-1	<100
2,4-Dimethylphenol:	105-67-9	<100	2,4,5-Trichlorophenol:	95-95-4	<100
Dimethyl phthalate:	131-11-3	<100	2,4,6-Trichlorophenol:	88-06-2	<100

Surrogate:	% RC	Acceptable % RC
2-Fluorophenol:	72	28-125 %
Phenol-d6:	72	27-129 %
Nitrobenzene-d5:	68	28-132 %
2-Fluorobiphenyl:	69	26-141 %
2,4,6-Tribromophenol:	70	26-138 %
Terphenyl-d14:	65	36-130 %

Dilution Factor: 1

Data Qualifiers: None

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Lab Reference #: HDR 17800
Project Name: SANBAG RFM
Project #:

Semi Volatile Organics by GC/MS (EPA 8270C)

Client Sample ID	Lab Sample Number	Date Received	Date Sampled	Date Extracted	Date Analyzed	Matrix
021-25 SB-1 (5-10)	17800-008	2/9/2011	2/7/2011	2/11/2011	2/14/2011	Soil

ANALYTE	CAS #	µg/kg	ANALYTE	CAS #	µg/kg
Acenaphthene:	83-32-9	<100	4,6-Dinitro-2-methylphenol:	534-52-1	<1000
Acenaphthylene:	208-96-8	<100	2,4-Dinitrophenol:	51-28-5	<1000
Aniline:	62-53-3	<100	2,4-Dinitrotoluene:	121-14-2	<250
Anthracene:	120-12-7	<100	2,6-Dinitrotoluene:	606-20-2	<250
Benzoic acid:	65-85-0	<1000	Di-n-octyl phthalate:	117-84-0	<250
Benz(a)anthracene:	56-55-3	<100	Fluoranthene:	206-44-0	<100
Benzo(b)fluoranthene:	205-99-2	<250	Fluorene:	86-73-7	<100
Benzo(k)fluoranthene:	207-08-9	<250	Hexachlorobenzene:	118-74-1	<100
Benzo(g,h,i)perylene:	191-24-2	<250	Hexachlorobutadiene:	87-68-3	<100
Benzo(a)pyrene:	50-32-8	<250	Hexachlorocyclopentadiene:	77-47-4	<500
Benzyl alcohol:	100-51-6	<100	Hexachloroethane:	67-72-1	<100
bis-(2-chloroethoxy) methane:	111-91-1	<100	Indeno(1,2,3-cd)pyrene:	193-39-5	<250
bis-(2-chloroethyl) ether:	111-44-4	<100	Isophorone:	78-59-1	<100
bis-(2-chloroisopropyl) ether:	39638-32-9	<100	2-Methylnaphthalene:	91-57-6	<100
bis-(2-ethylhexyl) phthalate:	117-81-7	<100	2-Methylphenol:	95-48-7	<100
4-Bromophenyl phenyl ether:	101-55-3	<100	3 & 4-Methylphenol:	108-39-4, 106-44-5	<100
Butyl benzyl phthalate:	85-68-7	<100	Naphthalene:	91-20-3	<100
4-Chloroaniline:	106-47-8	<100	2-Nitroaniline:	88-74-4	<250
2-Chloronaphthalene:	91-58-7	<100	3-Nitroaniline:	99-09-2	<250
4-Chloro-3-methylphenol:	59-50-7	<100	4-Nitroaniline:	100-01-6	<250
2-Chlorophenol:	95-57-8	<100	Nitrobenzene:	98-95-3	<100
4-Chlorophenyl phenyl ether:	7005-72-3	<100	2-Nitrophenol:	88-75-5	<100
Chrysene:	218-01-9	<100	4-Nitrophenol:	100-02-7	<1000
Dibenz(a,h)anthracene:	53-70-3	<100	N-Nitrosodiphenylamine:	86-30-6	<100
Dibenzofuran:	132-64-9	<100	N-Nitrosodi-n-propylamine:	621-64-7	<100
Di-n-butyl phthalate:	84-74-2	<250	N-Nitrosodimethylamine:	62-75-9	<100
1,2-Dichlorobenzene:	95-50-1	<100	Pentachlorophenol:	87-86-5	<1000
1,3-Dichlorobenzene:	541-73-1	<100	Phenanthrene:	85-01-8	<100
1,4-Dichlorobenzene:	106-46-7	<100	Phenol:	108-95-2	<100
2,4-Dichlorophenol:	120-83-2	<100	Pyrene:	129-00-0	<100
Diethyl phthalate:	84-66-2	<100	1,2,4-Trichlorobenzene:	120-82-1	<100
2,4-Dimethylphenol:	105-67-9	<100	2,4,5-Trichlorophenol:	95-95-4	<100
Dimethyl phthalate:	131-11-3	<100	2,4,6-Trichlorophenol:	88-06-2	<100

Surrogate:	% RC	Acceptable % RC
2-Fluorophenol:	85	28-125 %
Phenol-d6:	86	27-129 %
Nitrobenzene-d5:	77	28-132 %
2-Fluorobiphenyl:	81	26-141 %
2,4,6-Tribromophenol:	87	26-138 %
Terphenyl-d14:	77	36-130 %

Dilution Factor: 1

Data Qualifiers: None

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Lab Reference #: HDR 17800
Project Name: SANBAG RFM
Project #:

Semi Volatile Organics by GC/MS (EPA 8270C)

Client Sample ID	Lab Sample Number	Date Received	Date Sampled	Date Extracted	Date Analyzed	Matrix
BNSF 011-22 SB-4 (10)	17800-018	2/9/2011	2/8/2011	2/11/2011	2/14/2011	Soil

ANALYTE	CAS #	µg/kg	ANALYTE	CAS #	µg/kg
Acenaphthene:	83-32-9	<100	4,6-Dinitro-2-methylphenol:	534-52-1	<1000
Acenaphthylene:	208-96-8	<100	2,4-Dinitrophenol:	51-28-5	<1000
Aniline:	62-53-3	<100	2,4-Dinitrotoluene:	121-14-2	<250
Anthracene:	120-12-7	<100	2,6-Dinitrotoluene:	606-20-2	<250
Benzoic acid:	65-85-0	<1000	Di-n-octyl phthalate:	117-84-0	<250
Benz(a)anthracene:	56-55-3	<100	Fluoranthene:	206-44-0	<100
Benzo(b)fluoranthene:	205-99-2	<250	Fluorene:	86-73-7	<100
Benzo(k)fluoranthene:	207-08-9	<250	Hexachlorobenzene:	118-74-1	<100
Benzo(g,h,i)perylene:	191-24-2	<250	Hexachlorobutadiene:	87-68-3	<100
Benzo(a)pyrene:	50-32-8	<250	Hexachlorocyclopentadiene:	77-47-4	<500
Benzyl alcohol:	100-51-6	<100	Hexachloroethane:	67-72-1	<100
bis-(2-chloroethoxy) methane:	111-91-1	<100	Indeno(1,2,3-cd)pyrene:	193-39-5	<250
bis-(2-chloroethyl) ether:	111-44-4	<100	Isophorone:	78-59-1	<100
bis-(2-chloroisopropyl) ether:	39638-32-9	<100	2-Methylnaphthalene:	91-57-6	<100
bis-(2-ethylhexyl) phthalate:	117-81-7	200	2-Methylphenol:	95-48-7	<100
4-Bromophenyl phenyl ether:	101-55-3	<100	3 & 4-Methylphenol:	108-39-4, 106-44-5	<100
Butyl benzyl phthalate:	85-68-7	<100	Naphthalene:	91-20-3	<100
4-Chloroaniline:	106-47-8	<100	2-Nitroaniline:	88-74-4	<250
2-Chloronaphthalene:	91-58-7	<100	3-Nitroaniline:	99-09-2	<250
4-Chloro-3-methylphenol:	59-50-7	<100	4-Nitroaniline:	100-01-6	<250
2-Chlorophenol:	95-57-8	<100	Nitrobenzene:	98-95-3	<100
4-Chlorophenyl phenyl ether:	7005-72-3	<100	2-Nitrophenol:	88-75-5	<100
Chrysene:	218-01-9	<100	4-Nitrophenol:	100-02-7	<1000
Dibenz(a,h)anthracene:	53-70-3	<100	N-Nitrosodiphenylamine:	86-30-6	<100
Dibenzofuran:	132-64-9	<100	N-Nitrosodi-n-propylamine:	621-64-7	<100
Di-n-butyl phthalate:	84-74-2	<250	N-Nitrosodimethylamine:	62-75-9	<100
1,2-Dichlorobenzene:	95-50-1	<100	Pentachlorophenol:	87-86-5	<1000
1,3-Dichlorobenzene:	541-73-1	<100	Phenanthrene:	85-01-8	<100
1,4-Dichlorobenzene:	106-46-7	<100	Phenol:	108-95-2	<100
2,4-Dichlorophenol:	120-83-2	<100	Pyrene:	129-00-0	<100
Diethyl phthalate:	84-66-2	<100	1,2,4-Trichlorobenzene:	120-82-1	<100
2,4-Dimethylphenol:	105-67-9	<100	2,4,5-Trichlorophenol:	95-95-4	<100
Dimethyl phthalate:	131-11-3	<100	2,4,6-Trichlorophenol:	88-06-2	<100

Surrogate:	% RC	Acceptable % RC
2-Fluorophenol:	72	28-125 %
Phenol-d6:	72	27-129 %
Nitrobenzene-d5:	60	28-132 %
2-Fluorobiphenyl:	66	26-141 %
2,4,6-Tribromophenol:	72	26-138 %
Terphenyl-d14:	61	36-130 %

Dilution Factor: 1

Data Qualifiers: None

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Lab Reference #: HDR 17800
Project Name: SANBAG RFM
Project #:

Semi Volatile Organics by GC/MS (EPA 8270C)

Client Sample ID	Lab Sample Number	Date Received	Date Sampled	Date Extracted	Date Analyzed	Matrix
BNSF 011-19 SB-1 (10)	17800-019	2/9/2011	2/8/2011	2/11/2011	2/14/2011	Soil

ANALYTE	CAS #	µg/kg	ANALYTE	CAS #	µg/kg
Acenaphthene:	83-32-9	<100	4,6-Dinitro-2-methylphenol:	534-52-1	<1000
Acenaphthylene:	208-96-8	<100	2,4-Dinitrophenol:	51-28-5	<1000
Aniline:	62-53-3	<100	2,4-Dinitrotoluene:	121-14-2	<250
Anthracene:	120-12-7	<100	2,6-Dinitrotoluene:	606-20-2	<250
Benzoic acid:	65-85-0	<1000	Di-n-octyl phthalate:	117-84-0	<250
Benz(a)anthracene:	56-55-3	<100	Fluoranthene:	206-44-0	<100
Benzo(b)fluoranthene:	205-99-2	<250	Fluorene:	86-73-7	<100
Benzo(k)fluoranthene:	207-08-9	<250	Hexachlorobenzene:	118-74-1	<100
Benzo(g,h,i)perylene:	191-24-2	<250	Hexachlorobutadiene:	87-68-3	<100
Benzo(a)pyrene:	50-32-8	<250	Hexachlorocyclopentadiene:	77-47-4	<500
Benzyl alcohol:	100-51-6	<100	Hexachloroethane:	67-72-1	<100
bis-(2-chloroethoxy) methane:	111-91-1	<100	Indeno(1,2,3-cd)pyrene:	193-39-5	<250
bis-(2-chloroethyl) ether:	111-44-4	<100	Isophorone:	78-59-1	<100
bis-(2-chloroisopropyl) ether:	39638-32-9	<100	2-Methylnaphthalene:	91-57-6	<100
bis-(2-ethylhexyl) phthalate:	117-81-7	<100	2-Methylphenol:	95-48-7	<100
4-Bromophenyl phenyl ether:	101-55-3	<100	3 & 4-Methylphenol:	108-39-4, 106-44-5	<100
Butyl benzyl phthalate:	85-68-7	<100	Naphthalene:	91-20-3	<100
4-Chloroaniline:	106-47-8	<100	2-Nitroaniline:	88-74-4	<250
2-Chloronaphthalene:	91-58-7	<100	3-Nitroaniline:	99-09-2	<250
4-Chloro-3-methylphenol:	59-50-7	<100	4-Nitroaniline:	100-01-6	<250
2-Chlorophenol:	95-57-8	<100	Nitrobenzene:	98-95-3	<100
4-Chlorophenyl phenyl ether:	7005-72-3	<100	2-Nitrophenol:	88-75-5	<100
Chrysene:	218-01-9	<100	4-Nitrophenol:	100-02-7	<1000
Dibenz(a,h)anthracene:	53-70-3	<100	N-Nitrosodiphenylamine:	86-30-6	<100
Dibenzofuran:	132-64-9	<100	N-Nitrosodi-n-propylamine:	621-64-7	<100
Di-n-butyl phthalate:	84-74-2	<250	N-Nitrosodimethylamine:	62-75-9	<100
1,2-Dichlorobenzene:	95-50-1	<100	Pentachlorophenol:	87-86-5	<1000
1,3-Dichlorobenzene:	541-73-1	<100	Phenanthrene:	85-01-8	<100
1,4-Dichlorobenzene:	106-46-7	<100	Phenol:	108-95-2	<100
2,4-Dichlorophenol:	120-83-2	<100	Pyrene:	129-00-0	<100
Diethyl phthalate:	84-66-2	<100	1,2,4-Trichlorobenzene:	120-82-1	<100
2,4-Dimethylphenol:	105-67-9	<100	2,4,5-Trichlorophenol:	95-95-4	<100
Dimethyl phthalate:	131-11-3	<100	2,4,6-Trichlorophenol:	88-06-2	<100

Surrogate:	% RC	Acceptable % RC
2-Fluorophenol:	76	28-125 %
Phenol-d6:	76	27-129 %
Nitrobenzene-d5:	69	28-132 %
2-Fluorobiphenyl:	71	26-141 %
2,4,6-Tribromophenol:	76	26-138 %
Terphenyl-d14:	67	36-130 %

Dilution Factor: 1

Data Qualifiers: None

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Lab Reference #: HDR 17800
Project Name: SANBAG RFM
Project #:

Semi Volatile Organics by GC/MS (EPA 8270C)

Client Sample ID	Lab Sample Number	Date Received	Date Sampled	Date Extracted	Date Analyzed	Matrix
BNSF 011-19 SB-2 (10)	17800-020	2/9/2011	2/8/2011	2/11/2011	2/14/2011	Soil

ANALYTE	CAS #	µg/kg	ANALYTE	CAS #	µg/kg
Acenaphthene:	83-32-9	<100	4,6-Dinitro-2-methylphenol:	534-52-1	<1000
Acenaphthylene:	208-96-8	<100	2,4-Dinitrophenol:	51-28-5	<1000
Aniline:	62-53-3	<100	2,4-Dinitrotoluene:	121-14-2	<250
Anthracene:	120-12-7	<100	2,6-Dinitrotoluene:	606-20-2	<250
Benzoic acid:	65-85-0	<1000	Di-n-octyl phthalate:	117-84-0	<250
Benz(a)anthracene:	56-55-3	<100	Fluoranthene:	206-44-0	<100
Benzo(b)fluoranthene:	205-99-2	<250	Fluorene:	86-73-7	<100
Benzo(k)fluoranthene:	207-08-9	<250	Hexachlorobenzene:	118-74-1	<100
Benzo(g,h,i)perylene:	191-24-2	<250	Hexachlorobutadiene:	87-68-3	<100
Benzo(a)pyrene:	50-32-8	<250	Hexachlorocyclopentadiene:	77-47-4	<500
Benzyl alcohol:	100-51-6	<100	Hexachloroethane:	67-72-1	<100
bis-(2-chloroethoxy) methane:	111-91-1	<100	Indeno(1,2,3-cd)pyrene:	193-39-5	<250
bis-(2-chloroethyl) ether:	111-44-4	<100	Isophorone:	78-59-1	<100
bis-(2-chloroisopropyl) ether:	39638-32-9	<100	2-Methylnaphthalene:	91-57-6	<100
bis-(2-ethylhexyl) phthalate:	117-81-7	<100	2-Methylphenol:	95-48-7	<100
4-Bromophenyl phenyl ether:	101-55-3	<100	3 & 4-Methylphenol:	108-39-4, 106-44-5	<100
Butyl benzyl phthalate:	85-68-7	<100	Naphthalene:	91-20-3	<100
4-Chloroaniline:	106-47-8	<100	2-Nitroaniline:	88-74-4	<250
2-Chloronaphthalene:	91-58-7	<100	3-Nitroaniline:	99-09-2	<250
4-Chloro-3-methylphenol:	59-50-7	<100	4-Nitroaniline:	100-01-6	<250
2-Chlorophenol:	95-57-8	<100	Nitrobenzene:	98-95-3	<100
4-Chlorophenyl phenyl ether:	7005-72-3	<100	2-Nitrophenol:	88-75-5	<100
Chrysene:	218-01-9	<100	4-Nitrophenol:	100-02-7	<1000
Dibenz(a,h)anthracene:	53-70-3	<100	N-Nitrosodiphenylamine:	86-30-6	<100
Dibenzofuran:	132-64-9	<100	N-Nitrosodi-n-propylamine:	621-64-7	<100
Di-n-butyl phthalate:	84-74-2	<250	N-Nitrosodimethylamine:	62-75-9	<100
1,2-Dichlorobenzene:	95-50-1	<100	Pentachlorophenol:	87-86-5	<1000
1,3-Dichlorobenzene:	541-73-1	<100	Phenanthrene:	85-01-8	<100
1,4-Dichlorobenzene:	106-46-7	<100	Phenol:	108-95-2	<100
2,4-Dichlorophenol:	120-83-2	<100	Pyrene:	129-00-0	<100
Diethyl phthalate:	84-66-2	<100	1,2,4-Trichlorobenzene:	120-82-1	<100
2,4-Dimethylphenol:	105-67-9	<100	2,4,5-Trichlorophenol:	95-95-4	<100
Dimethyl phthalate:	131-11-3	<100	2,4,6-Trichlorophenol:	88-06-2	<100

Surrogate:	% RC	Acceptable % RC
2-Fluorophenol:	73	28-125 %
Phenol-d6:	74	27-129 %
Nitrobenzene-d5:	67	28-132 %
2-Fluorobiphenyl:	70	26-141 %
2,4,6-Tribromophenol:	75	26-138 %
Terphenyl-d14:	66	36-130 %

Dilution Factor: 1

Data Qualifiers: None

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Lab Reference #: HDR 17800
Project Name: SANBAG RFM
Project #:

Semi Volatile Organics by GC/MS (EPA 8270C)

Client Sample ID	Lab Sample Number	Date Received	Date Sampled	Date Extracted	Date Analyzed	Matrix
111-01 SB-1 (15-20)	17800-021	2/9/2011	2/9/2011	2/11/2011	2/14/2011	Soil

ANALYTE	CAS #	µg/kg	ANALYTE	CAS #	µg/kg
Acenaphthene:	83-32-9	<100	4,6-Dinitro-2-methylphenol:	534-52-1	<1000
Acenaphthylene:	208-96-8	<100	2,4-Dinitrophenol:	51-28-5	<1000
Aniline:	62-53-3	<100	2,4-Dinitrotoluene:	121-14-2	<250
Anthracene:	120-12-7	<100	2,6-Dinitrotoluene:	606-20-2	<250
Benzoic acid:	65-85-0	<1000	Di-n-octyl phthalate:	117-84-0	<250
Benz(a)anthracene:	56-55-3	<100	Fluoranthene:	206-44-0	<100
Benzo(b)fluoranthene:	205-99-2	<250	Fluorene:	86-73-7	<100
Benzo(k)fluoranthene:	207-08-9	<250	Hexachlorobenzene:	118-74-1	<100
Benzo(g,h,i)perylene:	191-24-2	<250	Hexachlorobutadiene:	87-68-3	<100
Benzo(a)pyrene:	50-32-8	<250	Hexachlorocyclopentadiene:	77-47-4	<500
Benzyl alcohol:	100-51-6	<100	Hexachloroethane:	67-72-1	<100
bis-(2-chloroethoxy) methane:	111-91-1	<100	Indeno(1,2,3-cd)pyrene:	193-39-5	<250
bis-(2-chloroethyl) ether:	111-44-4	<100	Isophorone:	78-59-1	<100
bis-(2-chloroisopropyl) ether:	39638-32-9	<100	2-Methylnaphthalene:	91-57-6	<100
bis-(2-ethylhexyl) phthalate:	117-81-7	<100	2-Methylphenol:	95-48-7	<100
4-Bromophenyl phenyl ether:	101-55-3	<100	3 & 4-Methylphenol:	108-39-4, 106-44-5	<100
Butyl benzyl phthalate:	85-68-7	<100	Naphthalene:	91-20-3	<100
4-Chloroaniline:	106-47-8	<100	2-Nitroaniline:	88-74-4	<250
2-Chloronaphthalene:	91-58-7	<100	3-Nitroaniline:	99-09-2	<250
4-Chloro-3-methylphenol:	59-50-7	<100	4-Nitroaniline:	100-01-6	<250
2-Chlorophenol:	95-57-8	<100	Nitrobenzene:	98-95-3	<100
4-Chlorophenyl phenyl ether:	7005-72-3	<100	2-Nitrophenol:	88-75-5	<100
Chrysene:	218-01-9	<100	4-Nitrophenol:	100-02-7	<1000
Dibenz(a,h)anthracene:	53-70-3	<100	N-Nitrosodiphenylamine:	86-30-6	<100
Dibenzofuran:	132-64-9	<100	N-Nitrosodi-n-propylamine:	621-64-7	<100
Di-n-butyl phthalate:	84-74-2	<250	N-Nitrosodimethylamine:	62-75-9	<100
1,2-Dichlorobenzene:	95-50-1	<100	Pentachlorophenol:	87-86-5	<1000
1,3-Dichlorobenzene:	541-73-1	<100	Phenanthrene:	85-01-8	<100
1,4-Dichlorobenzene:	106-46-7	<100	Phenol:	108-95-2	<100
2,4-Dichlorophenol:	120-83-2	<100	Pyrene:	129-00-0	<100
Diethyl phthalate:	84-66-2	<100	1,2,4-Trichlorobenzene:	120-82-1	<100
2,4-Dimethylphenol:	105-67-9	<100	2,4,5-Trichlorophenol:	95-95-4	<100
Dimethyl phthalate:	131-11-3	<100	2,4,6-Trichlorophenol:	88-06-2	<100

Surrogate:	% RC	Acceptable % RC
2-Fluorophenol:	67	28-125 %
Phenol-d6:	70	27-129 %
Nitrobenzene-d5:	64	28-132 %
2-Fluorobiphenyl:	69	26-141 %
2,4,6-Tribromophenol:	68	26-138 %
Terphenyl-d14:	65	36-130 %

Dilution Factor: 1

Data Qualifiers: None

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Lab Reference #: HDR 17800
Project Name: SANBAG RFM
Project #:

Semi Volatile Organics by GC/MS (EPA 8270C)

Client Sample ID	Lab Sample Number	Date Received	Date Sampled	Date Extracted	Date Analyzed	Matrix
111-01 SB-2 (5-10)	17800-022	2/9/2011	2/9/2011	2/11/2011	2/14/2011	Soil

ANALYTE	CAS #	µg/kg	ANALYTE	CAS #	µg/kg
Acenaphthene:	83-32-9	<100	4,6-Dinitro-2-methylphenol:	534-52-1	<1000
Acenaphthylene:	208-96-8	<100	2,4-Dinitrophenol:	51-28-5	<1000
Aniline:	62-53-3	<100	2,4-Dinitrotoluene:	121-14-2	<250
Anthracene:	120-12-7	<100	2,6-Dinitrotoluene:	606-20-2	<250
Benzoic acid:	65-85-0	<1000	Di-n-octyl phthalate:	117-84-0	<250
Benz(a)anthracene:	56-55-3	<100	Fluoranthene:	206-44-0	<100
Benzo(b)fluoranthene:	205-99-2	<250	Fluorene:	86-73-7	<100
Benzo(k)fluoranthene:	207-08-9	<250	Hexachlorobenzene:	118-74-1	<100
Benzo(g,h,i)perylene:	191-24-2	<250	Hexachlorobutadiene:	87-68-3	<100
Benzo(a)pyrene:	50-32-8	<250	Hexachlorocyclopentadiene:	77-47-4	<500
Benzyl alcohol:	100-51-6	<100	Hexachloroethane:	67-72-1	<100
bis-(2-chloroethoxy) methane:	111-91-1	<100	Indeno(1,2,3-cd)pyrene:	193-39-5	<250
bis-(2-chloroethyl) ether:	111-44-4	<100	Isophorone:	78-59-1	<100
bis-(2-chloroisopropyl) ether:	39638-32-9	<100	2-Methylnaphthalene:	91-57-6	<100
bis-(2-ethylhexyl) phthalate:	117-81-7	<100	2-Methylphenol:	95-48-7	<100
4-Bromophenyl phenyl ether:	101-55-3	<100	3 & 4-Methylphenol:	108-39-4, 106-44-5	<100
Butyl benzyl phthalate:	85-68-7	<100	Naphthalene:	91-20-3	<100
4-Chloroaniline:	106-47-8	<100	2-Nitroaniline:	88-74-4	<250
2-Chloronaphthalene:	91-58-7	<100	3-Nitroaniline:	99-09-2	<250
4-Chloro-3-methylphenol:	59-50-7	<100	4-Nitroaniline:	100-01-6	<250
2-Chlorophenol:	95-57-8	<100	Nitrobenzene:	98-95-3	<100
4-Chlorophenyl phenyl ether:	7005-72-3	<100	2-Nitrophenol:	88-75-5	<100
Chrysene:	218-01-9	<100	4-Nitrophenol:	100-02-7	<1000
Dibenz(a,h)anthracene:	53-70-3	<100	N-Nitrosodiphenylamine:	86-30-6	<100
Dibenzofuran:	132-64-9	<100	N-Nitrosodi-n-propylamine:	621-64-7	<100
Di-n-butyl phthalate:	84-74-2	<250	N-Nitrosodimethylamine:	62-75-9	<100
1,2-Dichlorobenzene:	95-50-1	<100	Pentachlorophenol:	87-86-5	<1000
1,3-Dichlorobenzene:	541-73-1	<100	Phenanthrene:	85-01-8	<100
1,4-Dichlorobenzene:	106-46-7	<100	Phenol:	108-95-2	<100
2,4-Dichlorophenol:	120-83-2	<100	Pyrene:	129-00-0	<100
Diethyl phthalate:	84-66-2	<100	1,2,4-Trichlorobenzene:	120-82-1	<100
2,4-Dimethylphenol:	105-67-9	<100	2,4,5-Trichlorophenol:	95-95-4	<100
Dimethyl phthalate:	131-11-3	<100	2,4,6-Trichlorophenol:	88-06-2	<100

Surrogate:	% RC	Acceptable % RC
2-Fluorophenol:	75	28-125 %
Phenol-d6:	77	27-129 %
Nitrobenzene-d5:	68	28-132 %
2-Fluorobiphenyl:	73	26-141 %
2,4,6-Tribromophenol:	81	26-138 %
Terphenyl-d14:	69	36-130 %

Dilution Factor: 1

Data Qualifiers: None

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Lab Reference #: HDR 17800
Project Name: SANBAG RFM
Project #:

Semi Volatile Organics by GC/MS (EPA 8270C)

Client Sample ID	Lab Sample Number	Date Received	Date Sampled	Date Extracted	Date Analyzed	Matrix
111-01 SB-3 (15-20)	17800-023	2/9/2011	2/9/2011	2/11/2011	2/14/2011	Soil

ANALYTE	CAS #	µg/kg	ANALYTE	CAS #	µg/kg
Acenaphthene:	83-32-9	<100	4,6-Dinitro-2-methylphenol:	534-52-1	<1000
Acenaphthylene:	208-96-8	<100	2,4-Dinitrophenol:	51-28-5	<1000
Aniline:	62-53-3	<100	2,4-Dinitrotoluene:	121-14-2	<250
Anthracene:	120-12-7	<100	2,6-Dinitrotoluene:	606-20-2	<250
Benzoic acid:	65-85-0	<1000	Di-n-octyl phthalate:	117-84-0	<250
Benz(a)anthracene:	56-55-3	<100	Fluoranthene:	206-44-0	<100
Benzo(b)fluoranthene:	205-99-2	<250	Fluorene:	86-73-7	<100
Benzo(k)fluoranthene:	207-08-9	<250	Hexachlorobenzene:	118-74-1	<100
Benzo(g,h,i)perylene:	191-24-2	<250	Hexachlorobutadiene:	87-68-3	<100
Benzo(a)pyrene:	50-32-8	<250	Hexachlorocyclopentadiene:	77-47-4	<500
Benzyl alcohol:	100-51-6	<100	Hexachloroethane:	67-72-1	<100
bis-(2-chloroethoxy) methane:	111-91-1	<100	Indeno(1,2,3-cd)pyrene:	193-39-5	<250
bis-(2-chloroethyl) ether:	111-44-4	<100	Isophorone:	78-59-1	<100
bis-(2-chloroisopropyl) ether:	39638-32-9	<100	2-Methylnaphthalene:	91-57-6	<100
bis-(2-ethylhexyl) phthalate:	117-81-7	<100	2-Methylphenol:	95-48-7	<100
4-Bromophenyl phenyl ether:	101-55-3	<100	3 & 4-Methylphenol:	108-39-4, 106-44-5	<100
Butyl benzyl phthalate:	85-68-7	<100	Naphthalene:	91-20-3	<100
4-Chloroaniline:	106-47-8	<100	2-Nitroaniline:	88-74-4	<250
2-Chloronaphthalene:	91-58-7	<100	3-Nitroaniline:	99-09-2	<250
4-Chloro-3-methylphenol:	59-50-7	<100	4-Nitroaniline:	100-01-6	<250
2-Chlorophenol:	95-57-8	<100	Nitrobenzene:	98-95-3	<100
4-Chlorophenyl phenyl ether:	7005-72-3	<100	2-Nitrophenol:	88-75-5	<100
Chrysene:	218-01-9	<100	4-Nitrophenol:	100-02-7	<1000
Dibenz(a,h)anthracene:	53-70-3	<100	N-Nitrosodiphenylamine:	86-30-6	<100
Dibenzofuran:	132-64-9	<100	N-Nitrosodi-n-propylamine:	621-64-7	<100
Di-n-butyl phthalate:	84-74-2	<250	N-Nitrosodimethylamine:	62-75-9	<100
1,2-Dichlorobenzene:	95-50-1	<100	Pentachlorophenol:	87-86-5	<1000
1,3-Dichlorobenzene:	541-73-1	<100	Phenanthrene:	85-01-8	<100
1,4-Dichlorobenzene:	106-46-7	<100	Phenol:	108-95-2	<100
2,4-Dichlorophenol:	120-83-2	<100	Pyrene:	129-00-0	<100
Diethyl phthalate:	84-66-2	<100	1,2,4-Trichlorobenzene:	120-82-1	<100
2,4-Dimethylphenol:	105-67-9	<100	2,4,5-Trichlorophenol:	95-95-4	<100
Dimethyl phthalate:	131-11-3	<100	2,4,6-Trichlorophenol:	88-06-2	<100

Surrogate:	% RC	Acceptable % RC
2-Fluorophenol:	66	28-125 %
Phenol-d6:	68	27-129 %
Nitrobenzene-d5:	61	28-132 %
2-Fluorobiphenyl:	65	26-141 %
2,4,6-Tribromophenol:	68	26-138 %
Terphenyl-d14:	62	36-130 %

Dilution Factor: 1

Data Qualifiers: None

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Lab Reference #: HDR 17800
Project Name: SANBAG RFM
Project #:

Semi Volatile Organics by GC/MS (EPA 8270C)

Client Sample ID	Lab Sample Number	Date Received	Date Sampled	Date Extracted	Date Analyzed	Matrix
Method Blank	MBCN0211111			2/11/2011	2/14/2011	Soil

ANALYTE	CAS #	µg/kg	ANALYTE	CAS #	µg/kg
Acenaphthene:	83-32-9	<100	4,6-Dinitro-2-methylphenol:	534-52-1	<1000
Acenaphthylene:	208-96-8	<100	2,4-Dinitrophenol:	51-28-5	<1000
Aniline:	62-53-3	<100	2,4-Dinitrotoluene:	121-14-2	<250
Anthracene:	120-12-7	<100	2,6-Dinitrotoluene:	606-20-2	<250
Benzoic acid:	65-85-0	<1000	Di-n-octyl phthalate:	117-84-0	<250
Benz(a)anthracene:	56-55-3	<100	Fluoranthene:	206-44-0	<100
Benzo(b)fluoranthene:	205-99-2	<250	Fluorene:	86-73-7	<100
Benzo(k)fluoranthene:	207-08-9	<250	Hexachlorobenzene:	118-74-1	<100
Benzo(g,h,i)perylene:	191-24-2	<250	Hexachlorobutadiene:	87-68-3	<100
Benzo(a)pyrene:	50-32-8	<250	Hexachlorocyclopentadiene:	77-47-4	<500
Benzyl alcohol:	100-51-6	<100	Hexachloroethane:	67-72-1	<100
bis-(2-chloroethoxy) methane:	111-91-1	<100	Indeno(1,2,3-cd)pyrene:	193-39-5	<250
bis-(2-chloroethyl) ether:	111-44-4	<100	Isophorone:	78-59-1	<100
bis-(2-chloroisopropyl) ether:	39638-32-9	<100	2-Methylnaphthalene:	91-57-6	<100
bis-(2-ethylhexyl) phthalate:	117-81-7	<100	2-Methylphenol:	95-48-7	<100
4-Bromophenyl phenyl ether:	101-55-3	<100	3 & 4-Methylphenol:	108-39-4, 106-44-5	<100
Butyl benzyl phthalate:	85-68-7	<100	Naphthalene:	91-20-3	<100
4-Chloroaniline:	106-47-8	<100	2-Nitroaniline:	88-74-4	<250
2-Chloronaphthalene:	91-58-7	<100	3-Nitroaniline:	99-09-2	<250
4-Chloro-3-methylphenol:	59-50-7	<100	4-Nitroaniline:	100-01-6	<250
2-Chlorophenol:	95-57-8	<100	Nitrobenzene:	98-95-3	<100
4-Chlorophenyl phenyl ether:	7005-72-3	<100	2-Nitrophenol:	88-75-5	<100
Chrysene:	218-01-9	<100	4-Nitrophenol:	100-02-7	<1000
Dibenz(a,h)anthracene:	53-70-3	<100	N-Nitrosodiphenylamine:	86-30-6	<100
Dibenzofuran:	132-64-9	<100	N-Nitrosodi-n-propylamine:	621-64-7	<100
Di-n-butyl phthalate:	84-74-2	<250	N-Nitrosodimethylamine:	62-75-9	<100
1,2-Dichlorobenzene:	95-50-1	<100	Pentachlorophenol:	87-86-5	<1000
1,3-Dichlorobenzene:	541-73-1	<100	Phenanthrene:	85-01-8	<100
1,4-Dichlorobenzene:	106-46-7	<100	Phenol:	108-95-2	<100
2,4-Dichlorophenol:	120-83-2	<100	Pyrene:	129-00-0	<100
Diethyl phthalate:	84-66-2	<100	1,2,4-Trichlorobenzene:	120-82-1	<100
2,4-Dimethylphenol:	105-67-9	<100	2,4,5-Trichlorophenol:	95-95-4	<100
Dimethyl phthalate:	131-11-3	<100	2,4,6-Trichlorophenol:	88-06-2	<100

Surrogate:	% RC	Acceptable % RC
2-Fluorophenol:	77	28-125 %
Phenol-d6:	76	27-129 %
Nitrobenzene-d5:	70	28-132 %
2-Fluorobiphenyl:	76	26-141 %
2,4,6-Tribromophenol:	79	26-138 %
Terphenyl-d14:	72	36-130 %

Dilution Factor: 1

Data Qualifiers: None

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Lab Reference #: HDR 17800
Project Name: SANBAG RFM
Project #:

Semi Volatile Organics by GC/MS (EPA 8270C)

Client Sample ID	Lab Sample Number	Date Received	Date Sampled	Date Extracted	Date Analyzed	Matrix
Method Blank	MBIN0216111			2/16/2011	2/17/2011	Soil

ANALYTE	CAS #	µg/kg	ANALYTE	CAS #	µg/kg
Acenaphthene:	83-32-9	<100	4,6-Dinitro-2-methylphenol:	534-52-1	<1000
Acenaphthylene:	208-96-8	<100	2,4-Dinitrophenol:	51-28-5	<1000
Aniline:	62-53-3	<100	2,4-Dinitrotoluene:	121-14-2	<250
Anthracene:	120-12-7	<100	2,6-Dinitrotoluene:	606-20-2	<250
Benzoic acid:	65-85-0	<1000	Di-n-octyl phthalate:	117-84-0	<250
Benz(a)anthracene:	56-55-3	<100	Fluoranthene:	206-44-0	<100
Benzo(b)fluoranthene:	205-99-2	<250	Fluorene:	86-73-7	<100
Benzo(k)fluoranthene:	207-08-9	<250	Hexachlorobenzene:	118-74-1	<100
Benzo(g,h,i)perylene:	191-24-2	<250	Hexachlorobutadiene:	87-68-3	<100
Benzo(a)pyrene:	50-32-8	<250	Hexachlorocyclopentadiene:	77-47-4	<500
Benzyl alcohol:	100-51-6	<100	Hexachloroethane:	67-72-1	<100
bis-(2-chloroethoxy) methane:	111-91-1	<100	Indeno(1,2,3-cd)pyrene:	193-39-5	<250
bis-(2-chloroethyl) ether:	111-44-4	<100	Isophorone:	78-59-1	<100
bis-(2-chloroisopropyl) ether:	39638-32-9	<100	2-Methylnaphthalene:	91-57-6	<100
bis-(2-ethylhexyl) phthalate:	117-81-7	<100	2-Methylphenol:	95-48-7	<100
4-Bromophenyl phenyl ether:	101-55-3	<100	3 & 4-Methylphenol:	108-39-4, 106-44-5	<100
Butyl benzyl phthalate:	85-68-7	<100	Naphthalene:	91-20-3	<100
4-Chloroaniline:	106-47-8	<100	2-Nitroaniline:	88-74-4	<250
2-Chloronaphthalene:	91-58-7	<100	3-Nitroaniline:	99-09-2	<250
4-Chloro-3-methylphenol:	59-50-7	<100	4-Nitroaniline:	100-01-6	<250
2-Chlorophenol:	95-57-8	<100	Nitrobenzene:	98-95-3	<100
4-Chlorophenyl phenyl ether:	7005-72-3	<100	2-Nitrophenol:	88-75-5	<100
Chrysene:	218-01-9	<100	4-Nitrophenol:	100-02-7	<1000
Dibenz(a,h)anthracene:	53-70-3	<100	N-Nitrosodiphenylamine:	86-30-6	<100
Dibenzofuran:	132-64-9	<100	N-Nitrosodi-n-propylamine:	621-64-7	<100
Di-n-butyl phthalate:	84-74-2	<250	N-Nitrosodimethylamine:	62-75-9	<100
1,2-Dichlorobenzene:	95-50-1	<100	Pentachlorophenol:	87-86-5	<1000
1,3-Dichlorobenzene:	541-73-1	<100	Phenanthrene:	85-01-8	<100
1,4-Dichlorobenzene:	106-46-7	<100	Phenol:	108-95-2	<100
2,4-Dichlorophenol:	120-83-2	<100	Pyrene:	129-00-0	<100
Diethyl phthalate:	84-66-2	<100	1,2,4-Trichlorobenzene:	120-82-1	<100
2,4-Dimethylphenol:	105-67-9	<100	2,4,5-Trichlorophenol:	95-95-4	<100
Dimethyl phthalate:	131-11-3	<100	2,4,6-Trichlorophenol:	88-06-2	<100

Surrogate:	% RC	Acceptable % RC
2-Fluorophenol:	60	28-125 %
Phenol-d6:	62	27-129 %
Nitrobenzene-d5:	57	28-132 %
2-Fluorobiphenyl:	60	26-141 %
2,4,6-Tribromophenol:	58	26-138 %
Terphenyl-d14:	54	36-130 %

Dilution Factor: 1

Data Qualifiers: None

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Lab Reference #: HDR 17800
Project Name: SANBAG RFM
Project #:

Metals

Client Sample ID	Lab Sample Number	Date Received	Date Sampled	Matrix
111-24 SB-1 (0-5)	17800-001	2/9/2011	2/7/2011	Soil

ANALYTE	EPA Method	Date Extracted	Date Analyzed	Result	Units	Qual
Antimony	6010B	2/10/2011	2/10/2011	<5	mg/kg	--
Arsenic	6010B	2/10/2011	2/10/2011	1.9	mg/kg	--
Barium	6010B	2/10/2011	2/10/2011	49	mg/kg	--
Beryllium	6010B	2/10/2011	2/10/2011	<0.5	mg/kg	--
Cadmium	6010B	2/10/2011	2/10/2011	<0.5	mg/kg	--
Chromium	6010B	2/10/2011	2/10/2011	12	mg/kg	--
Cobalt	6010B	2/10/2011	2/10/2011	6.9	mg/kg	--
Copper	6010B	2/10/2011	2/10/2011	7.7	mg/kg	--
Lead	6010B	2/10/2011	2/10/2011	2.8	mg/kg	--
Mercury	7471A	2/10/2011	2/10/2011	<0.1	mg/kg	--
Molybdenum	6010B	2/10/2011	2/10/2011	<1	mg/kg	--
Nickel	6010B	2/10/2011	2/10/2011	9.4	mg/kg	--
Selenium	6010B	2/10/2011	2/10/2011	<5	mg/kg	--
Silver	6010B	2/10/2011	2/10/2011	<0.5	mg/kg	--
Thallium	6010B	2/10/2011	2/10/2011	6.1	mg/kg	--
Vanadium	6010B	2/10/2011	2/10/2011	33	mg/kg	--
Zinc	6010B	2/10/2011	2/10/2011	33	mg/kg	--

Client Sample ID	Lab Sample Number	Date Received	Date Sampled	Matrix
111-24 SB-2 (5-10)	17800-002	2/9/2011	2/7/2011	Soil

ANALYTE	EPA Method	Date Extracted	Date Analyzed	Result	Units	Qual
Antimony	6010B	2/10/2011	2/10/2011	<5	mg/kg	--
Arsenic	6010B	2/10/2011	2/10/2011	2.6	mg/kg	--
Barium	6010B	2/10/2011	2/10/2011	57	mg/kg	--
Beryllium	6010B	2/10/2011	2/10/2011	<0.5	mg/kg	--
Cadmium	6010B	2/10/2011	2/10/2011	<0.5	mg/kg	--
Chromium	6010B	2/10/2011	2/10/2011	14	mg/kg	--
Cobalt	6010B	2/10/2011	2/10/2011	8.2	mg/kg	--
Copper	6010B	2/10/2011	2/10/2011	9.2	mg/kg	--
Lead	6010B	2/10/2011	2/10/2011	4.0	mg/kg	--
Mercury	7471A	2/10/2011	2/10/2011	<0.1	mg/kg	--
Molybdenum	6010B	2/10/2011	2/10/2011	<1	mg/kg	--
Nickel	6010B	2/10/2011	2/10/2011	11	mg/kg	--
Selenium	6010B	2/10/2011	2/10/2011	<5	mg/kg	--
Silver	6010B	2/10/2011	2/10/2011	<0.5	mg/kg	--
Thallium	6010B	2/10/2011	2/10/2011	6.6	mg/kg	--
Vanadium	6010B	2/10/2011	2/10/2011	39	mg/kg	--
Zinc	6010B	2/10/2011	2/10/2011	41	mg/kg	--

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Lab Reference #: HDR 17800
Project Name: SANBAG RFM
Project #:

Metals

Client Sample ID	Lab Sample Number	Date Received	Date Sampled	Matrix
111-24 SB-3 (0-5)	17800-003	2/9/2011	2/7/2011	Soil

ANALYTE	EPA Method	Date Extracted	Date Analyzed	Result	Units	Qual
Antimony	6010B	2/10/2011	2/10/2011	<5	mg/kg	--
Arsenic	6010B	2/10/2011	2/10/2011	6.2	mg/kg	--
Barium	6010B	2/10/2011	2/10/2011	80	mg/kg	--
Beryllium	6010B	2/10/2011	2/10/2011	<0.5	mg/kg	--
Cadmium	6010B	2/10/2011	2/10/2011	<0.5	mg/kg	--
Chromium	6010B	2/10/2011	2/10/2011	22	mg/kg	--
Cobalt	6010B	2/10/2011	2/10/2011	8.2	mg/kg	--
Copper	6010B	2/10/2011	2/10/2011	17	mg/kg	--
Lead	6010B	2/10/2011	2/10/2011	47	mg/kg	--
Mercury	7471A	2/10/2011	2/10/2011	<0.1	mg/kg	--
Molybdenum	6010B	2/10/2011	2/10/2011	<1	mg/kg	--
Nickel	6010B	2/10/2011	2/10/2011	14	mg/kg	--
Selenium	6010B	2/10/2011	2/10/2011	<5	mg/kg	--
Silver	6010B	2/10/2011	2/10/2011	<0.5	mg/kg	--
Thallium	6010B	2/10/2011	2/10/2011	5.7	mg/kg	--
Vanadium	6010B	2/10/2011	2/10/2011	34	mg/kg	--
Zinc	6010B	2/10/2011	2/10/2011	64	mg/kg	--

Client Sample ID	Lab Sample Number	Date Received	Date Sampled	Matrix
BNSF 011-22 SB-1 (5-10)	17800-005	2/9/2011	2/7/2011	Soil

ANALYTE	EPA Method	Date Extracted	Date Analyzed	Result	Units	Qual
Antimony	6010B	2/10/2011	2/10/2011	<5	mg/kg	--
Arsenic	6010B	2/10/2011	2/10/2011	2.8	mg/kg	--
Barium	6010B	2/10/2011	2/10/2011	160	mg/kg	--
Beryllium	6010B	2/10/2011	2/10/2011	<0.5	mg/kg	--
Cadmium	6010B	2/10/2011	2/10/2011	<0.5	mg/kg	--
Chromium	6010B	2/10/2011	2/10/2011	39	mg/kg	--
Cobalt	6010B	2/10/2011	2/10/2011	15	mg/kg	--
Copper	6010B	2/10/2011	2/10/2011	30	mg/kg	--
Lead	6010B	2/10/2011	2/10/2011	7.3	mg/kg	--
Mercury	7471A	2/10/2011	2/10/2011	<0.1	mg/kg	--
Molybdenum	6010B	2/10/2011	2/10/2011	<1	mg/kg	--
Nickel	6010B	2/10/2011	2/10/2011	37	mg/kg	--
Selenium	6010B	2/10/2011	2/10/2011	<5	mg/kg	--
Silver	6010B	2/10/2011	2/10/2011	<0.5	mg/kg	--
Thallium	6010B	2/10/2011	2/10/2011	9.1	mg/kg	--
Vanadium	6010B	2/10/2011	2/10/2011	49	mg/kg	--
Zinc	6010B	2/10/2011	2/10/2011	74	mg/kg	--

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Client Sample ID	Lab Sample Number	Date Received	Date Sampled	Matrix
BNSF 011-22 SB-2 (5-10)	17800-006	2/9/2011	2/7/2011	Soil

ANALYTE	EPA Method	Date Extracted	Date Analyzed	Result	Units	Qual
Antimony	6010B	2/10/2011	2/11/2011	<5	mg/kg	--
Arsenic	6010B	2/10/2011	2/11/2011	5.3	mg/kg	--
Barium	6010B	2/10/2011	2/11/2011	52	mg/kg	--
Beryllium	6010B	2/10/2011	2/11/2011	<0.5	mg/kg	--
Cadmium	6010B	2/10/2011	2/11/2011	<0.5	mg/kg	--
Chromium	6010B	2/10/2011	2/11/2011	14	mg/kg	--
Cobalt	6010B	2/10/2011	2/11/2011	7.9	mg/kg	--
Copper	6010B	2/10/2011	2/11/2011	9.1	mg/kg	--
Lead	6010B	2/10/2011	2/11/2011	3.2	mg/kg	--
Mercury	7471A	2/10/2011	2/10/2011	<0.1	mg/kg	--
Molybdenum	6010B	2/10/2011	2/11/2011	<1	mg/kg	--
Nickel	6010B	2/10/2011	2/11/2011	11	mg/kg	--
Selenium	6010B	2/10/2011	2/11/2011	<5	mg/kg	--
Silver	6010B	2/10/2011	2/11/2011	<0.5	mg/kg	--
Thallium	6010B	2/10/2011	2/11/2011	<5	mg/kg	--
Vanadium	6010B	2/10/2011	2/11/2011	37	mg/kg	--
Zinc	6010B	2/10/2011	2/11/2011	35	mg/kg	--

Client Sample ID	Lab Sample Number	Date Received	Date Sampled	Matrix
BNSF 011-22 SB-3 (5-10)	17800-007	2/9/2011	2/7/2011	Soil

ANALYTE	EPA Method	Date Extracted	Date Analyzed	Result	Units	Qual
Antimony	6010B	2/10/2011	2/11/2011	<5	mg/kg	--
Arsenic	6010B	2/10/2011	2/11/2011	7.3	mg/kg	--
Barium	6010B	2/10/2011	2/11/2011	49	mg/kg	--
Beryllium	6010B	2/10/2011	2/11/2011	<0.5	mg/kg	--
Cadmium	6010B	2/10/2011	2/11/2011	<0.5	mg/kg	--
Chromium	6010B	2/10/2011	2/11/2011	23	mg/kg	--
Cobalt	6010B	2/10/2011	2/11/2011	12	mg/kg	--
Copper	6010B	2/10/2011	2/11/2011	15	mg/kg	--
Lead	6010B	2/10/2011	2/11/2011	4.7	mg/kg	--
Mercury	7471A	2/10/2011	2/10/2011	<0.1	mg/kg	--
Molybdenum	6010B	2/10/2011	2/11/2011	<1	mg/kg	--
Nickel	6010B	2/10/2011	2/11/2011	18	mg/kg	--
Selenium	6010B	2/10/2011	2/11/2011	<5	mg/kg	--
Silver	6010B	2/10/2011	2/11/2011	<0.5	mg/kg	--
Thallium	6010B	2/10/2011	2/11/2011	<5	mg/kg	--
Vanadium	6010B	2/10/2011	2/11/2011	51	mg/kg	--
Zinc	6010B	2/10/2011	2/11/2011	56	mg/kg	--

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Client Sample ID	Lab Sample Number	Date Received	Date Sampled	Matrix
091-11 SB-1 (0-5)	17800-009	2/9/2011	2/8/2011	Soil

ANALYTE	EPA Method	Date Extracted	Date Analyzed	Result	Units	Qual
Antimony	6010B	2/10/2011	2/11/2011	<5	mg/kg	--
Arsenic	6010B	2/10/2011	2/11/2011	5.2	mg/kg	--
Barium	6010B	2/10/2011	2/11/2011	100	mg/kg	--
Beryllium	6010B	2/10/2011	2/11/2011	<0.5	mg/kg	--
Cadmium	6010B	2/10/2011	2/11/2011	<0.5	mg/kg	--
Chromium	6010B	2/10/2011	2/11/2011	21	mg/kg	--
Cobalt	6010B	2/10/2011	2/11/2011	11	mg/kg	--
Copper	6010B	2/10/2011	2/11/2011	22	mg/kg	--
Lead	6010B	2/10/2011	2/11/2011	6.3	mg/kg	--
Mercury	7471A	2/10/2011	2/10/2011	<0.1	mg/kg	--
Molybdenum	6010B	2/10/2011	2/11/2011	<1	mg/kg	--
Nickel	6010B	2/10/2011	2/11/2011	15	mg/kg	--
Selenium	6010B	2/10/2011	2/11/2011	<5	mg/kg	--
Silver	6010B	2/10/2011	2/11/2011	<0.5	mg/kg	--
Thallium	6010B	2/10/2011	2/11/2011	<5	mg/kg	--
Vanadium	6010B	2/10/2011	2/11/2011	49	mg/kg	--
Zinc	6010B	2/10/2011	2/11/2011	57	mg/kg	--

Client Sample ID	Lab Sample Number	Date Received	Date Sampled	Matrix
091-11 SB-5 (0-5)	17800-010	2/9/2011	2/8/2011	Soil

ANALYTE	EPA Method	Date Extracted	Date Analyzed	Result	Units	Qual
Antimony	6010B	2/10/2011	2/11/2011	<5	mg/kg	--
Arsenic	6010B	2/10/2011	2/11/2011	7.2	mg/kg	--
Barium	6010B	2/10/2011	2/11/2011	250	mg/kg	--
Beryllium	6010B	2/10/2011	2/11/2011	<0.5	mg/kg	--
Cadmium	6010B	2/10/2011	2/11/2011	8.3	mg/kg	--
Chromium	6010B	2/10/2011	2/11/2011	32	mg/kg	--
Cobalt	6010B	2/10/2011	2/11/2011	13	mg/kg	--
Copper	6010B	2/10/2011	2/11/2011	260	mg/kg	--
Lead	6010B	2/10/2011	2/11/2011	370	mg/kg	--
Mercury	7471A	2/10/2011	2/10/2011	0.28	mg/kg	--
Molybdenum	6010B	2/10/2011	2/11/2011	<1	mg/kg	--
Nickel	6010B	2/10/2011	2/11/2011	120	mg/kg	--
Selenium	6010B	2/10/2011	2/11/2011	<5	mg/kg	--
Silver	6010B	2/10/2011	2/11/2011	<0.5	mg/kg	--
Thallium	6010B	2/10/2011	2/11/2011	<5	mg/kg	--
Vanadium	6010B	2/10/2011	2/11/2011	30	mg/kg	--
Zinc	6010B	2/10/2011	2/11/2011	3000	mg/kg	--

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Client Sample ID	Lab Sample Number	Date Received	Date Sampled	Matrix
091-11 SB-3 (0-5)	17800-012	2/9/2011	2/8/2011	Soil

ANALYTE	EPA Method	Date Extracted	Date Analyzed	Result	Units	Qual
Antimony	6010B	2/10/2011	2/11/2011	<5	mg/kg	--
Arsenic	6010B	2/10/2011	2/11/2011	3.7	mg/kg	--
Barium	6010B	2/10/2011	2/11/2011	94	mg/kg	--
Beryllium	6010B	2/10/2011	2/11/2011	<0.5	mg/kg	--
Cadmium	6010B	2/10/2011	2/11/2011	<0.5	mg/kg	--
Chromium	6010B	2/10/2011	2/11/2011	18	mg/kg	--
Cobalt	6010B	2/10/2011	2/11/2011	11	mg/kg	--
Copper	6010B	2/10/2011	2/11/2011	19	mg/kg	--
Lead	6010B	2/10/2011	2/11/2011	13	mg/kg	--
Mercury	7471A	2/10/2011	2/10/2011	<0.1	mg/kg	--
Molybdenum	6010B	2/10/2011	2/11/2011	<1	mg/kg	--
Nickel	6010B	2/10/2011	2/11/2011	18	mg/kg	--
Selenium	6010B	2/10/2011	2/11/2011	<5	mg/kg	--
Silver	6010B	2/10/2011	2/11/2011	<0.5	mg/kg	--
Thallium	6010B	2/10/2011	2/11/2011	<5	mg/kg	--
Vanadium	6010B	2/10/2011	2/11/2011	39	mg/kg	--
Zinc	6010B	2/10/2011	2/11/2011	140	mg/kg	--

Client Sample ID	Lab Sample Number	Date Received	Date Sampled	Matrix
091-11 SB-4 (5-10)	17800-014	2/9/2011	2/8/2011	Soil

ANALYTE	EPA Method	Date Extracted	Date Analyzed	Result	Units	Qual
Antimony	6010B	2/10/2011	2/11/2011	<5	mg/kg	--
Arsenic	6010B	2/10/2011	2/11/2011	2.5	mg/kg	--
Barium	6010B	2/10/2011	2/11/2011	50	mg/kg	--
Beryllium	6010B	2/10/2011	2/11/2011	<0.5	mg/kg	--
Cadmium	6010B	2/10/2011	2/11/2011	<0.5	mg/kg	--
Chromium	6010B	2/10/2011	2/11/2011	14	mg/kg	--
Cobalt	6010B	2/10/2011	2/11/2011	7.9	mg/kg	--
Copper	6010B	2/10/2011	2/11/2011	12	mg/kg	--
Lead	6010B	2/10/2011	2/11/2011	6.4	mg/kg	--
Mercury	7471A	2/10/2011	2/10/2011	<0.1	mg/kg	--
Molybdenum	6010B	2/10/2011	2/11/2011	<1	mg/kg	--
Nickel	6010B	2/10/2011	2/11/2011	11	mg/kg	--
Selenium	6010B	2/10/2011	2/11/2011	<5	mg/kg	--
Silver	6010B	2/10/2011	2/11/2011	<0.5	mg/kg	--
Thallium	6010B	2/10/2011	2/11/2011	<5	mg/kg	--
Vanadium	6010B	2/10/2011	2/11/2011	36	mg/kg	--
Zinc	6010B	2/10/2011	2/11/2011	44	mg/kg	--

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Client Sample ID	Lab Sample Number	Date Received	Date Sampled	Matrix
091-11 SB-2 (10)	17800-016	2/9/2011	2/8/2011	Soil

ANALYTE	EPA Method	Date Extracted	Date Analyzed	Result	Units	Qual
Antimony	6010B	2/10/2011	2/11/2011	<5	mg/kg	--
Arsenic	6010B	2/10/2011	2/11/2011	26	mg/kg	--
Barium	6010B	2/10/2011	2/11/2011	86	mg/kg	--
Beryllium	6010B	2/10/2011	2/11/2011	<0.5	mg/kg	--
Cadmium	6010B	2/10/2011	2/11/2011	<0.5	mg/kg	--
Chromium	6010B	2/10/2011	2/11/2011	23	mg/kg	--
Cobalt	6010B	2/10/2011	2/11/2011	13	mg/kg	--
Copper	6010B	2/10/2011	2/11/2011	15	mg/kg	--
Lead	6010B	2/10/2011	2/11/2011	5.7	mg/kg	--
Mercury	7471A	2/10/2011	2/10/2011	<0.1	mg/kg	--
Molybdenum	6010B	2/10/2011	2/11/2011	<1	mg/kg	--
Nickel	6010B	2/10/2011	2/11/2011	18	mg/kg	--
Selenium	6010B	2/10/2011	2/11/2011	<5	mg/kg	--
Silver	6010B	2/10/2011	2/11/2011	<0.5	mg/kg	--
Thallium	6010B	2/10/2011	2/11/2011	<5	mg/kg	--
Vanadium	6010B	2/10/2011	2/11/2011	55	mg/kg	--
Zinc	6010B	2/10/2011	2/11/2011	56	mg/kg	--

BNSF 011-22 SB-4 (10)	17800-018	2/9/2011	2/8/2011	Soil

ANALYTE	EPA Method	Date Extracted	Date Analyzed	Result	Units	Qual
Antimony	6010B	2/10/2011	2/11/2011	<5	mg/kg	--
Arsenic	6010B	2/10/2011	2/11/2011	5.4	mg/kg	--
Barium	6010B	2/10/2011	2/11/2011	79	mg/kg	--
Beryllium	6010B	2/10/2011	2/11/2011	<0.5	mg/kg	--
Cadmium	6010B	2/10/2011	2/11/2011	<0.5	mg/kg	--
Chromium	6010B	2/10/2011	2/11/2011	22	mg/kg	--
Cobalt	6010B	2/10/2011	2/11/2011	11	mg/kg	--
Copper	6010B	2/10/2011	2/11/2011	13	mg/kg	--
Lead	6010B	2/10/2011	2/11/2011	4.7	mg/kg	--
Mercury	7471A	2/10/2011	2/10/2011	<0.1	mg/kg	--
Molybdenum	6010B	2/10/2011	2/11/2011	<1	mg/kg	--
Nickel	6010B	2/10/2011	2/11/2011	19	mg/kg	--
Selenium	6010B	2/10/2011	2/11/2011	<5	mg/kg	--
Silver	6010B	2/10/2011	2/11/2011	<0.5	mg/kg	--
Thallium	6010B	2/10/2011	2/11/2011	<5	mg/kg	--
Vanadium	6010B	2/10/2011	2/11/2011	43	mg/kg	--
Zinc	6010B	2/10/2011	2/11/2011	49	mg/kg	--

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Client Sample ID	Lab Sample Number	Date Received	Date Sampled	Matrix
BNSF 011-19 SB-1 (10)	17800-019	2/9/2011	2/8/2011	Soil

ANALYTE	EPA Method	Date Extracted	Date Analyzed	Result	Units	Qual
Antimony	6010B	2/10/2011	2/11/2011	<5	mg/kg	--
Arsenic	6010B	2/10/2011	2/11/2011	4.7	mg/kg	--
Barium	6010B	2/10/2011	2/11/2011	97	mg/kg	--
Beryllium	6010B	2/10/2011	2/11/2011	<0.5	mg/kg	--
Cadmium	6010B	2/10/2011	2/11/2011	<0.5	mg/kg	--
Chromium	6010B	2/10/2011	2/11/2011	24	mg/kg	--
Cobalt	6010B	2/10/2011	2/11/2011	11	mg/kg	--
Copper	6010B	2/10/2011	2/11/2011	16	mg/kg	--
Lead	6010B	2/10/2011	2/11/2011	4.9	mg/kg	--
Mercury	7471A	2/10/2011	2/10/2011	<0.1	mg/kg	--
Molybdenum	6010B	2/10/2011	2/11/2011	<1	mg/kg	--
Nickel	6010B	2/10/2011	2/11/2011	21	mg/kg	--
Selenium	6010B	2/10/2011	2/11/2011	<5	mg/kg	--
Silver	6010B	2/10/2011	2/11/2011	<0.5	mg/kg	--
Thallium	6010B	2/10/2011	2/11/2011	<5	mg/kg	--
Vanadium	6010B	2/10/2011	2/11/2011	44	mg/kg	--
Zinc	6010B	2/10/2011	2/11/2011	53	mg/kg	--

Client Sample ID	Lab Sample Number	Date Received	Date Sampled	Matrix
BNSF 011-19 SB-2 (10)	17800-020	2/9/2011	2/8/2011	Soil

ANALYTE	EPA Method	Date Extracted	Date Analyzed	Result	Units	Qual
Antimony	6010B	2/10/2011	2/11/2011	<5	mg/kg	--
Arsenic	6010B	2/10/2011	2/11/2011	6.7	mg/kg	--
Barium	6010B	2/10/2011	2/11/2011	100	mg/kg	--
Beryllium	6010B	2/10/2011	2/11/2011	<0.5	mg/kg	--
Cadmium	6010B	2/10/2011	2/11/2011	<0.5	mg/kg	--
Chromium	6010B	2/10/2011	2/11/2011	28	mg/kg	--
Cobalt	6010B	2/10/2011	2/11/2011	12	mg/kg	--
Copper	6010B	2/10/2011	2/11/2011	19	mg/kg	--
Lead	6010B	2/10/2011	2/11/2011	5.5	mg/kg	--
Mercury	7471A	2/10/2011	2/10/2011	<0.1	mg/kg	--
Molybdenum	6010B	2/10/2011	2/11/2011	<1	mg/kg	--
Nickel	6010B	2/10/2011	2/11/2011	25	mg/kg	--
Selenium	6010B	2/10/2011	2/11/2011	<5	mg/kg	--
Silver	6010B	2/10/2011	2/11/2011	<0.5	mg/kg	--
Thallium	6010B	2/10/2011	2/11/2011	<5	mg/kg	--
Vanadium	6010B	2/10/2011	2/11/2011	53	mg/kg	--
Zinc	6010B	2/10/2011	2/11/2011	55	mg/kg	--

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Client Sample ID	Lab Sample Number	Date Received	Date Sampled	Matrix
Method Blank				Soil

ANALYTE	MB ID	EPA Method	Date Extracted	Date Analyzed	Result	Units	Qual
Antimony	MBHT0210111	6010B	2/10/2011	2/10/2011	<5	mg/kg	--
Arsenic	MBHT0210111	6010B	2/10/2011	2/10/2011	<1	mg/kg	--
Barium	MBHT0210111	6010B	2/10/2011	2/10/2011	<0.5	mg/kg	--
Beryllium	MBHT0210111	6010B	2/10/2011	2/10/2011	<0.5	mg/kg	--
Cadmium	MBHT0210111	6010B	2/10/2011	2/10/2011	<0.5	mg/kg	--
Chromium	MBHT0210111	6010B	2/10/2011	2/10/2011	<0.5	mg/kg	--
Cobalt	MBHT0210111	6010B	2/10/2011	2/10/2011	<0.5	mg/kg	--
Copper	MBHT0210111	6010B	2/10/2011	2/10/2011	<2	mg/kg	--
Lead	MBHT0210111	6010B	2/10/2011	2/10/2011	<1	mg/kg	--
Mercury	MBHT0210112	7471A	2/10/2011	2/10/2011	<0.1	mg/kg	--
Molybdenum	MBHT0210111	6010B	2/10/2011	2/10/2011	<1	mg/kg	--
Nickel	MBHT0210111	6010B	2/10/2011	2/10/2011	<0.5	mg/kg	--
Selenium	MBHT0210111	6010B	2/10/2011	2/10/2011	<5	mg/kg	--
Silver	MBHT0210111	6010B	2/10/2011	2/10/2011	<0.5	mg/kg	--
Thallium	MBHT0210111	6010B	2/10/2011	2/10/2011	<5	mg/kg	--
Vanadium	MBHT0210111	6010B	2/10/2011	2/10/2011	<0.5	mg/kg	--
Zinc	MBHT0210111	6010B	2/10/2011	2/10/2011	<2	mg/kg	--

QA/QC Report
for
Polychlorinated Biphenyl's (EPA 8082)

Reporting units: ppb

Matrix Spike (MS) / Matrix Spike Duplicate (MSD)

Date of Extraction: 2/10/2011
Date of Analysis: 2/10/2011
Dup Date of Analysis: 2/10/2011
Laboratory Sample #: 17800-002
MS/MSD Qualifiers: None
Reference #: HDR 17800

Analyte	R1	SPC CONC	MS	MSD	%MS	%MSD	RPD	ACP %MS	ACP RPD	Qual
PCB-1016	0.00	250	133	173	53	69	26	29-144	39	☐
PCB-1260	0.00	250	140	181	56	72	26	16-154	39	☐

Surrogate Recoveries for Spike Samples

Surrogate (%RC)	MS	MSD	Qual
Decachlorobiphenyl	57	95	☐

LCS	Qual
65	☐

ACP % RC
26-162

Laboratory Control Sample

Date of Extraction: 2/10/2011
Date of Analysis: 2/10/2011
Laboratory Sample #: IN0210111
LCS Qualifiers: None

Analyte	SPC CONC	LCS	%LCS	ACP %LCS	Qual
PCB-1016	250	169	68	25-140	☐
PCB-1260	250	162	65	15-162	☐

QA/QC Report
for
Extactable Fuel Hydrocarbons: CCID (EPA 8015M)

Reporting units: ppm

Matrix Spike (MS) / Matrix Spike Duplicate (MSD)

Date of Extraction: 2/15/2011
Date of Analysis: 2/15/2011
Dup Date of Analysis: 2/15/2011
Laboratory Sample #: 17800-001
MS/MSD Qualifiers: R5,
Reference #: HDR 17800

Analyte	R1	SPC CONC	MS	MSD	%MS	%MSD	RPD	ACP %MS	ACP RPD	Qual
EFH	0.00	100	90.0	59.4	90	59	41	33-145	33	☑

Surrogate Recoveries for Spike Samples

Surrogate (%RC)	MS	MSD	Qual	LCS	Qual	ACP % RC
Octacosane	37	48	☐	63	☐	29-164

Laboratory Control Sample

Date of Extraction: 2/15/2011
Date of Analysis: 2/15/2011
Laboratory Sample #: CR0215111
LCS Qualifiers: None

Analyte	SPC CONC	LCS	%LCS	ACP %LCS	Qual
EFH	100	109	109	29-142	☐

QA/QC Report
for
Volatile Organic Compounds (EPA 8260B)

Reporting units: ppb

Matrix Spike (MS) / Matrix Spike Duplicate (MSD)

Date of Extraction: 2/9/2011
Date of Analysis: 2/9/2011
Dup Date of Analysis: 2/9/2011
Laboratory Sample #: 17800-002
MS/MSD Qualifiers: None
Reference #: HDR 17800

Analyte	R1	SPC CONC	MS	MSD	%MS	%MSD	RPD	ACP %MS	ACP RPD	Qual
1,1-Dichloroethene	0.00	25.0	20.0	24.0	80	96	18	33-161	26	☐
Benzene	0.00	25.0	21.0	24.0	84	96	13	63-135	16	☐
Trichloroethene	0.00	25.0	22.0	24.0	88	96	9	57-143	17	☐
Toluene	0.00	25.0	21.0	23.0	84	92	9	60-133	16	☐
Chlorobenzene	0.00	25.0	23.0	25.0	92	100	8	61-132	16	☐

Surrogate Recoveries for Spike Samples

Surrogate (%RC)	MS	MSD	Qual	LCS	Qual	ACP % RC
Dibromofluoromethane	77	75	☐	72	☐	57-130
Toluene-d8	77	79	☐	81	☐	70-130
4-Bromofluorobenzene	74	74	☐	73	☐	70-130

Laboratory Control Sample

Date of Extraction: 2/9/2011
Date of Analysis: 2/9/2011
Laboratory Sample #: TT0209112
LCS Qualifiers: None

Analyte	SPC CONC	LCS	%LCS	ACP %LCS	Qual
1,1-Dichloroethene	25.0	19.0	76	55-150	☐
Benzene	25.0	23.0	92	70-130	☐
Trichloroethene	25.0	26.0	104	63-144	☐
Toluene	25.0	25.0	100	70-130	☐
Chlorobenzene	25.0	26.0	104	69-130	☐

QA/QC Report
for
Volatile Organic Compounds (EPA 8260B)

Reporting units: ppb

Matrix Spike (MS) / Matrix Spike Duplicate (MSD)

Date of Extraction: 2/11/2011
Date of Analysis: 2/11/2011
Dup Date of Analysis: 2/11/2011
Laboratory Sample #: 17802-001
MS/MSD Qualifiers: None
Reference #: HDR 17800

Analyte	R1	SPC CONC	MS	MSD	%MS	%MSD	RPD	ACP %MS	ACP RPD	Qual
1,1-Dichloroethene	0.00	25.0	32.0	33.0	128	132	3	33-161	26	☐
Benzene	0.00	25.0	28.0	30.0	112	120	7	63-135	16	☐
Trichloroethene	0.00	25.0	30.0	30.0	120	120	0	57-143	17	☐
Toluene	0.00	25.0	27.0	27.0	108	108	0	60-133	16	☐
Chlorobenzene	0.00	25.0	28.0	27.0	112	108	4	61-132	16	☐

Surrogate Recoveries for Spike Samples

Surrogate (%RC)	MS	MSD	Qual	LCS	Qual	ACP % RC
Dibromofluoromethane	95	90	☐	88	☐	57-130
Toluene-d8	86	86	☐	88	☐	70-130
4-Bromofluorobenzene	84	83	☐	82	☐	70-130

Laboratory Control Sample

Date of Extraction: 2/11/2011
Date of Analysis: 2/11/2011
Laboratory Sample #: TT0211111
LCS Qualifiers: None

Analyte	SPC CONC	LCS	%LCS	ACP %LCS	Qual
1,1-Dichloroethene	25.0	30.0	120	55-150	☐
Benzene	25.0	26.0	104	70-130	☐
Trichloroethene	25.0	29.0	116	63-144	☐
Toluene	25.0	27.0	108	70-130	☐
Chlorobenzene	25.0	28.0	112	69-130	☐

QA/QC Report
for
Semi-Volatile Organic Compounds (EPA 8270C)

Reporting units: ppb

Matrix Spike (MS) / Matrix Spike Duplicate (MSD)

Date of Extraction: 2/11/2011
Date of Analysis: 2/14/2011
Dup Date of Analysis: 2/14/2011
Laboratory Sample #: 17800-002
MS/MSD Qualifiers: None
Reference #: HDR 17800

Analyte	R1	SPC CONC	MS	MSD	%MS	%MSD	RPD	ACP %MS	ACP RPD	Qual
Phenol	0.00	2000	1260	1210	63	61	4	41-113	24	☐
2-Chlorophenol	0.00	2000	1300	1250	65	63	4	44-116	25	☐
1,4-Dichlorobenzene	0.00	1000	668	634	67	63	5	48-128	26	☐
N-Nitrosodi-n-propylamine	0.00	1000	672	642	67	64	5	49-121	45	☐
1,2,4-Trichlorobenzene	0.00	1000	647	609	65	61	6	51-123	25	☐
4-Chloro-3-methylphenol	0.00	2000	1370	1320	69	66	4	46-122	20	☐
Acenaphthene	0.00	1000	711	667	71	67	6	44-122	19	☐
4-Nitrophenol	0.00	2000	1020	962	51	48	6	23-123	37	☐
2,4-Dinitrotoluene	0.00	1000	624	585	62	58	6	41-124	25	☐
Pentachlorophenol	0.00	2000	1010	993	50	50	2	28-119	25	☐
Pyrene	0.00	1000	716	663	72	66	8	47-117	17	☐

Surrogate Recoveries for Spike Samples

Surrogate (%RC)	MS	MSD	Qual	LCS	Qual	ACP % RC
2-Fluorophenol	72	69	☐	82	☐	28-125
Phenol-d6	72	69	☐	82	☐	27-129
Nitrobenzene-d5	65	63	☐	75	☐	28-132
2-Fluorobiphenyl	68	66	☐	79	☐	26-141
2,4,6-Tribromophenol	76	74	☐	87	☐	26-138
Terphenyl-d14	67	61	☐	75	☐	36-130

Laboratory Control Sample

Date of Extraction: 2/11/2011
Date of Analysis: 2/14/2011
Laboratory Sample #: CN0211111
LCS Qualifiers: None

Analyte	SPC CONC	LCS	%LCS	ACP %LCS	Qual
Phenol	2000	1440	72	39-115	☐
2-Chlorophenol	2000	1490	75	43-118	☐
1,4-Dichlorobenzene	1000	750	75	46-129	☐
N-Nitrosodi-n-propylamine	1000	780	78	50-123	☐
1,2,4-Trichlorobenzene	1000	719	72	51-124	☐
4-Chloro-3-methylphenol	2000	1560	78	45-123	☐
Acenaphthene	1000	812	81	45-119	☐
4-Nitrophenol	2000	1300	65	28-119	☐
2,4-Dinitrotoluene	1000	730	73	40-128	☐
Pentachlorophenol	2000	1270	63	37-108	☐
Pyrene	1000	789	79	48-114	☐

QA/QC Report
for
Semi-Volatile Organic Compounds (EPA 8270C)

Reporting units: ppb

Matrix Spike (MS) / Matrix Spike Duplicate (MSD)

Date of Extraction: 2/16/2011
Date of Analysis: 2/17/2011
Dup Date of Analysis: 2/17/2011
Laboratory Sample #: 17808-002
MS/MSD Qualifiers: None
Reference #: HDR 17800

Analyte	R1	SPC CONC	MS	MSD	%MS	%MSD	RPD	ACP %MS	ACP RPD	Qual
Phenol	0.00	2000	1090	1020	55	51	7	41-113	24	☐
2-Chlorophenol	0.00	2000	1140	1060	57	53	7	44-116	25	☐
1,4-Dichlorobenzene	0.00	1000	572	553	57	55	3	48-128	26	☐
N-Nitrosodi-n-propylamine	0.00	1000	573	559	57	56	2	49-121	45	☐
1,2,4-Trichlorobenzene	0.00	1000	527	513	53	51	3	51-123	25	☐
4-Chloro-3-methylphenol	0.00	2000	1180	1090	59	55	8	46-122	20	☐
Acenaphthene	0.00	1000	582	565	58	56	3	44-122	19	☐
4-Nitrophenol	0.00	2000	905	831	45	42	9	23-123	37	☐
2,4-Dinitrotoluene	0.00	1000	528	519	53	52	2	41-124	25	☐
Pentachlorophenol	0.00	2000	914	853	46	43	7	28-119	25	☐
Pyrene	0.00	1000	524	506	52	51	3	47-117	17	☐

Surrogate Recoveries for Spike Samples

Surrogate (%RC)	MS	MSD	Qual	LCS	Qual	ACP % RC
2-Fluorophenol	58	55	☐	61	☐	28-125
Phenol-d6	57	55	☐	61	☐	27-129
Nitrobenzene-d5	57	53	☐	59	☐	28-132
2-Fluorobiphenyl	59	56	☐	63	☐	26-141
2,4,6-Tribromophenol	60	57	☐	64	☐	26-138
Terphenyl-d14	53	49	☐	55	☐	36-130

Laboratory Control Sample

Date of Extraction: 2/16/2011
Date of Analysis: 2/17/2011
Laboratory Sample #: IN0216111
LCS Qualifiers: None

Analyte	SPC CONC	LCS	%LCS	ACP %LCS	Qual
Phenol	2000	1150	57	39-115	☐
2-Chlorophenol	2000	1180	59	43-118	☐
1,4-Dichlorobenzene	1000	597	60	46-129	☐
N-Nitrosodi-n-propylamine	1000	611	61	50-123	☐
1,2,4-Trichlorobenzene	1000	556	56	51-124	☐
4-Chloro-3-methylphenol	2000	1250	63	45-123	☐
Acenaphthene	1000	618	62	45-119	☐
4-Nitrophenol	2000	962	48	28-119	☐
2,4-Dinitrotoluene	1000	552	55	40-128	☐
Pentachlorophenol	2000	949	47	37-108	☐
Pyrene	1000	564	56	48-114	☐

QA/QC Report
for
Metals

Reference #: HDR 17800

Reporting units: ppm

Matrix Spike (MS) / Matrix Spike Duplicate (MSD)

6010B Soil

Analyte	Date of Extraction	MS Date of Analysis	MSD Date of Analysis	Laboratory Sample #	R1	SPC CONC	MS	MSD	%MS	%MSD	RPD	ACP %MS	ACP RPD	Qual
Antimony	2/10/2011	2/10/2011	2/10/2011	17800-001	0.00	20.0	4.20	4.36	21	22	4	75-125	20	M2,
Arsenic	2/10/2011	2/10/2011	2/10/2011	17800-001	1.90	20.0	24.0	24.5	111	113	2	75-125	20	--
Barium	2/10/2011	2/10/2011	2/10/2011	17800-001	49.0	40.0	95.2	98.0	115	123	3	75-125	20	--
Beryllium	2/10/2011	2/10/2011	2/10/2011	17800-001	0.00	10.0	5.96	6.13	60	61	3	75-125	20	M2,
Cadmium	2/10/2011	2/10/2011	2/10/2011	17800-001	0.00	10.0	10.3	10.6	103	106	3	75-125	20	--
Chromium	2/10/2011	2/10/2011	2/10/2011	17800-001	12.0	20.0	34.0	34.6	110	113	2	75-125	20	--
Cobalt	2/10/2011	2/10/2011	2/10/2011	17800-001	6.90	20.0	26.8	27.3	100	102	2	75-125	20	--
Copper	2/10/2011	2/10/2011	2/10/2011	17800-001	7.70	20.0	30.0	31.3	112	118	4	75-125	20	--
Lead	2/10/2011	2/10/2011	2/10/2011	17800-001	2.80	20.0	22.3	22.9	98	100	3	75-125	20	--
Mercury	2/10/2011	2/10/2011	2/10/2011	17800-001	0.00	1.00	1.09	1.08	109	108	1	80-120	20	--
Molybdenum	2/10/2011	2/10/2011	2/10/2011	17800-001	0.00	20.0	20.7	21.1	104	106	2	75-125	20	--
Nickel	2/10/2011	2/10/2011	2/10/2011	17800-001	9.40	20.0	30.1	31.2	104	109	4	75-125	20	--
Selenium	2/10/2011	2/10/2011	2/10/2011	17800-001	0.00	20.0	14.6	15.6	73	78	7	75-125	20	M2,
Silver	2/10/2011	2/10/2011	2/10/2011	17800-001	0.00	20.0	12.5	13.1	63	66	5	75-125	20	M2,
Thallium	2/10/2011	2/10/2011	2/10/2011	17800-001	6.10	20.0	25.8	26.4	98	101	2	75-125	20	--
Vanadium	2/10/2011	2/10/2011	2/10/2011	17800-001	33.0	20.0	58.7	58.4	129	127	1	75-125	20	M1,
Zinc	2/10/2011	2/10/2011	2/10/2011	17800-001	33.0	40.0	78.4	81.0	113	120	3	75-125	20	--

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QA/QC Report
for
Metals

Reference #: HDR 17800

Reporting units: ppm

Laboratory Control Sample

Analyte	Date of Extraction	LCS Date of Analysis	Laboratory Sample #	SPC CONC	LCS	%LCS	ACP %LCS	Qual
Antimony	2/10/2011	2/10/2011	HT0210111	20.0	16.2	81	80-120	--
Arsenic	2/10/2011	2/10/2011	HT0210111	20.0	19.4	97	80-120	--
Barium	2/10/2011	2/10/2011	HT0210111	40.0	41.2	103	80-120	--
Beryllium	2/10/2011	2/10/2011	HT0210111	10.0	8.00	80	80-120	--
Cadmium	2/10/2011	2/10/2011	HT0210111	10.0	10.0	100	80-120	--
Chromium	2/10/2011	2/10/2011	HT0210111	20.0	21.4	107	80-120	--
Cobalt	2/10/2011	2/10/2011	HT0210111	20.0	20.3	101	80-120	--
Copper	2/10/2011	2/10/2011	HT0210111	20.0	19.7	99	80-120	--
Lead	2/10/2011	2/10/2011	HT0210111	20.0	20.3	101	80-120	--
Molybdenum	2/10/2011	2/10/2011	HT0210111	20.0	22.3	112	80-120	--
Nickel	2/10/2011	2/10/2011	HT0210111	20.0	20.3	101	80-120	--
Selenium	2/10/2011	2/10/2011	HT0210111	20.0	19.0	95	80-120	--
Silver	2/10/2011	2/10/2011	HT0210111	20.0	18.6	93	80-120	--
Thallium	2/10/2011	2/10/2011	HT0210111	20.0	20.0	100	80-120	--
Vanadium	2/10/2011	2/10/2011	HT0210111	20.0	21.3	106	80-120	--
Zinc	2/10/2011	2/10/2011	HT0210111	40.0	40.6	101	80-120	--
Mercury	2/10/2011	2/10/2011	HT0210112	1.00	0.982	98	80-120	--

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Data Qualifier Definitions

Qualifier

D1 = Sample required dilution due to matrix.

M1 = Matrix spike recovery was high, the associated blank spike recovery was acceptable.

17800-001	6010B	Vanadium	MS
17800-001	6010B	Vanadium	MSD

M2 = Matrix spike recovery was low, the associated blank spike recovery was acceptable.

17800-001	6010B	Antimony	MS
17800-001	6010B	Antimony	MSD
17800-001	6010B	Beryllium	MS
17800-001	6010B	Beryllium	MSD
17800-001	6010B	Selenium	MSD
17800-001	6010B	Silver	MS
17800-001	6010B	Silver	MSD

R5 = MS/MSD RPD exceeded the laboratory acceptance limit. Recovery met acceptance criteria.

17800-001	CCID	EFH	MS/MSD

S8 = The analysis of the sample required a dilution such that the surrogate recovery calculation does not provide any useful information. The associated blank spike recovery was acceptable.

Definition of terms:

R1	Results Of Laboratory Sample Number
SP CONC	Spike Concentration Added to Sample
MS	Matrix Spike Results
MSD	Matrix Spike Duplicate Results
%MS	Percent Recovery Of MS: {(MS-R1) / SP} x100
%MSD	Percent Recovery Of MSD: {(MSD-R1) / SP} x 100
RPD	Relative Percent Difference: {(MS-MSD) / (MS+MSD)} x 100 x 2
LCS	Laboratory Control Sample Results
LCSD	Laboratory Control Sample Duplicate Results
%LCS	Percent Recovery Of LCS: {(LCS-R1) / SP} x100
%LCSD	Percent Recovery Of LCSD: {(LCSD-R1) / SP} x 100
RPD (for LCS/LCSD)	Relative Percent Difference: {(LCS-LCSD) / (LCS+LCSD)} x 100 x 2
ACP %MS(MSD)	Acceptable Range of Percent
ACP RPD	Acceptable Relative Percent Difference
D	Detectable, result must be greater than zero
Qual	A checked box indicates a data qualifier was required for this analyte; see attached explanation.
ND	Analyte Not Detected

Analysis Request and Chain of Custody Record

ORANGE COAST ANALYTICAL, INC. www.ocalab.com

3002 Dow, Suite 532
Tustin, CA 92780
(714) 832-0064 Fax (714) 832-0067

4620 E. Elwood, Suite 4
Phoenix, AZ 85040
(480) 736-0960 Fax (480) 736-0970

Lab Job No: 17800
Page 1 of

REQUIRED TURN AROUND TIME: Standard: X
72 Hours: 48 Hours: 24 Hours:

CUSTOMER INFORMATION

COMPANY: HDR
SEND REPORT TO: Kelly Kading / D. Attebery
EMAIL: David.Attebery@HDRINC.com
ADDRESS: 3200 E. Camelback R
Phoenix Az 85018
PHONE: 904-885-9535 FAX:

PROJECT INFORMATION

PROJECT NAME: SANBAG RFM
NUMBER:
ADDRESS: 1 Mile Corridor
San Bernardino, CA
P.O. #:
SAMPLED BY:

ANALYSIS REQUEST / PRESERVATIVE

	SAMPLE ID	NO. OF CONTAINERS	SAMPLE DATE	SAMPLE TIME	SAMPLE MATRIX	CONTAINER TYPE	SVOC	PCB	CAL Metals	TPH	VOCs (H2O / Methanol)						REMARKS/PRECAUTIONS
1	111-24 SB-1 (0-5)	5	2/7	950	S	40ml-Bulk	X	X	X	X	X						
2	111-24 SB-2 (5-10)	5	2/7	1010	S		X	X	X	X	X						
3	111-24 SB-3 (0-5)	5	2/7	10:40	S		X	X	X	X	X						
4	021-12 SB-1 (20-25)	4	2/7	1300	S		X				X						
5	BNSF 011-22 SB-1 (5-10)	4	2/7	1444	S		X		X		X						
6	BNSF 011-22 SB-2 (5-10)	4	2/7	1431	S		X		X		X						
7	BNSF 011-22 SB-3 (5-10)	4	2/7	1422	S		X		X		X						
8	021-25 SB-1 (5-10)	5	2/7	1535	S		X				X						
9	091-11 SB-1 (~~5-10~~) DTA (0-5)	4	2/8	912	S				X		X						
10	091-11 SB-5 (0-5)	1	2/8	1010	S	Bulk			X								
11	091-11 SB-5 (15-20)	3	2/8	1010	S	40ml					X						
12	091-11 SB-3 (0-5)	1	2/8	1130	S	Bulk			X								
13	091-11 SB-3 (5-10)	3	2/8	1130	S	40ml					X						
14	091-11 SB-4 (5-10)	1	2/8	1215	S	Bulk			X								

Total No. of Samples: Method of Shipment: Preservative: 1 = Ice 2 = HCl 3 = HNO_3 4 = H_2SO_4 5 = NaOH 6 = Other

Relinquished By:	Date/Time:	Received By:	Date/Time:
D. Attebery	2/8/11 1155	Matthew Martinez	2/9/11 11:55
Relinquished By:	Date/Time:	Received By:	Date/Time:
Relinquished By:	Date/Time:	Received For Lab By:	Date/Time:

Sample Matrix:
DW - Drinking Water
GW - Groundwater
WW - Wastewater
SS - Soil/Solid
OT- Other

Sample Integrity:
Intact ✓ On Ice Yes 2 °C

By signing above, client acknowledges responsibility for payment of all services requested on this chain of custody form and any additional services provided in support of this project. Payment is due within 30 days of invoice date unless otherwise agreed upon, in writing, with Orange Coast Analytical, Inc. All samples remain the property of the client. A disposal fee may be imposed if client fails to pickup sample.

Analysis Request and Chain of Custody Record

ORANGE COAST ANALYTICAL, INC. www.ocalab.com

3002 Dow, Suite 532
Tustin, CA 92780
(714) 832-0064 Fax (714) 832-0067

4620 E. Elwood, Suite 4
Phoenix, AZ 85040
(480) 736-0960 Fax (480) 736-0970

Lab Job No: 17900
Page 2 of

REQUIRED TURN AROUND TIME: Standard: X
72 Hours: 48 Hours: 24 Hours:

CUSTOMER INFORMATION

COMPANY: HDR
SEND REPORT TO: Kelly Kalung / Dave Attebery
EMAIL: David.Attebery@HDRinc.com
ADDRESS: 3200 E. Camelback
Phoenix, AZ
PHONE: 904-885 9535 FAX:

PROJECT INFORMATION

PROJECT NAME: SANBAG RFM
NUMBER:
ADDRESS:
P.O. #:
SAMPLED BY: DJA / CM

ANALYSIS REQUEST / PRESERVATIVE

	SAMPLE ID	NO. OF CONTAINERS	SAMPLE DATE	SAMPLE TIME	SAMPLE MATRIX	CONTAINER TYPE	SVOC	PCB	Cal Metals	TPH	VOCs / H_2O - Method					REMARKS/PRECAUTIONS
15	091-11 SB-4(10-15)	3	2/8	1215	S	40ml				X						
16	091-11 SB-2(10)	1	2/8	1300	S	Bulk			X							
17	091-11 SB-2 (10-15)	3	2/8	1300	S	40ml				X						
18	BNSF 011-22 SB-4 (10)	4	2/8	1446	S	40ml Bulk	X		X	X						
19	BNSF 011-19 SB-1(10)	4	2/8	1315	S	↓	X		X	X						
20	BNSF 011-19 SB-2(10)	4	2/8	1315	S	↓	X		X	X						
21	11101 SB-1 (15-20)	4	2/9	915	S	↓	X			X						
22	111-01 SB-2 (5-10)	4	2/9	1035	S	↓	X			X						
23	111-01 SB-3 (15-20	4	2/9	1120	S	↓	X			X						

Total No. of Samples: Method of Shipment: Preservative: 1 = Ice 2 = HCl 3 = HNO_3 4 = H_2SO_4 5 = NaOH 6 = Other

Relinquished By:	Date/Time:	Received By:	Date/Time:
[signature]	2/9/11 1155	Matthew Martinez	2/9/11 1155
Relinquished By:	Date/Time:	Received By:	Date/Time:
Relinquished By:	Date/Time:	Received For Lab By:	Date/Time:

Sample Matrix:
DW - Drinking Water
GW - Groundwater
WW - Wastewater
SS - Soil/Solid
OT- Other

Sample Integrity:
Intact ✓ On Ice Yes 2 °C

By signing above, client acknowledges responsibility for payment of all services requested on this chain of custody form and any additional services provided in support of this project. Payment is due within 30 days of invoice date unless otherwise agreed upon, in writing, with Orange Coast Analytical, Inc. All samples remain the property of the client. A disposal fee may be imposed if client fails to pickup sample.

ADDITIONAL FINDINGS, DETENTION POND LOCATIONS PHASE I ESA UPDATE

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Technical Memorandum

To:	Mitch Alderman, San Bernardino County Associated Governments
From:	Colleen Murray Kelly W. Kading, CPG CHMM
Project:	Downtown San Bernardino Rail Project Basin Option 3
CC:	Clint Meyer, HDR Irvine Justin Wheeler, HDR Irvine
Date:	July 2, 2012

RE: Additional Findings, Detention Pond Locations Phase I ESA Update

The purpose of this memorandum is to provide the San Bernardino County Associated Governments (SANBAG) with additional findings related to the Detention Pond Locations Phase I Environmental Site Assessment (ESA) report, completed in January 2012. Specifically, this memorandum serves to update the report with information pertaining to the location of Optional Detention Basin 3, not evaluated in the original ESA. The following sections detail these updated findings.

BACKGROUND

The original ASTM-compliant ESA was conducted by HDR, Inc (HDR) in January 2012. At that time, the project area included two optional detention basin locations, one option located southwest of the San Bernardino Stadium and the second located to the south of the stadium. The report identified four sites considered to be of concern and seven additional sites with notable findings. In February 2012 a third optional detention basin location was added. The proposed location for Optional Detention Basin 3 is also located south of the stadium, and immediately south of Optional Detention Basin 2. See Attachment A for a figure depicting the location of the proposed detention basin locations.

UPDATE PROCEDURE

In order to update the findings of the January 2012 ESA with information pertaining to the location of Optional Detention Basin 3, HDR evaluated both current and historical aerial imagery and reviewed environmental regulatory database for the area.

UPDATED FINDINGS

- No additional sites of concern or notable findings were identified from a review of the environmental regulatory database report.
- No additional sites of concern/notable findings were identified from a review of current aerial imagery.
- No additional sites of concern were identified from a review of historical aerial imagery, dating from 1938 through 2005. While railroad tracks were previously located in the area of Optional Detention Basin 3, any prior railroad storage or maintenance facilities were located to the north of Basin 3's proposed location.

RECOMMENDED ACTIONS TO SUPPORT FINAL DESIGN

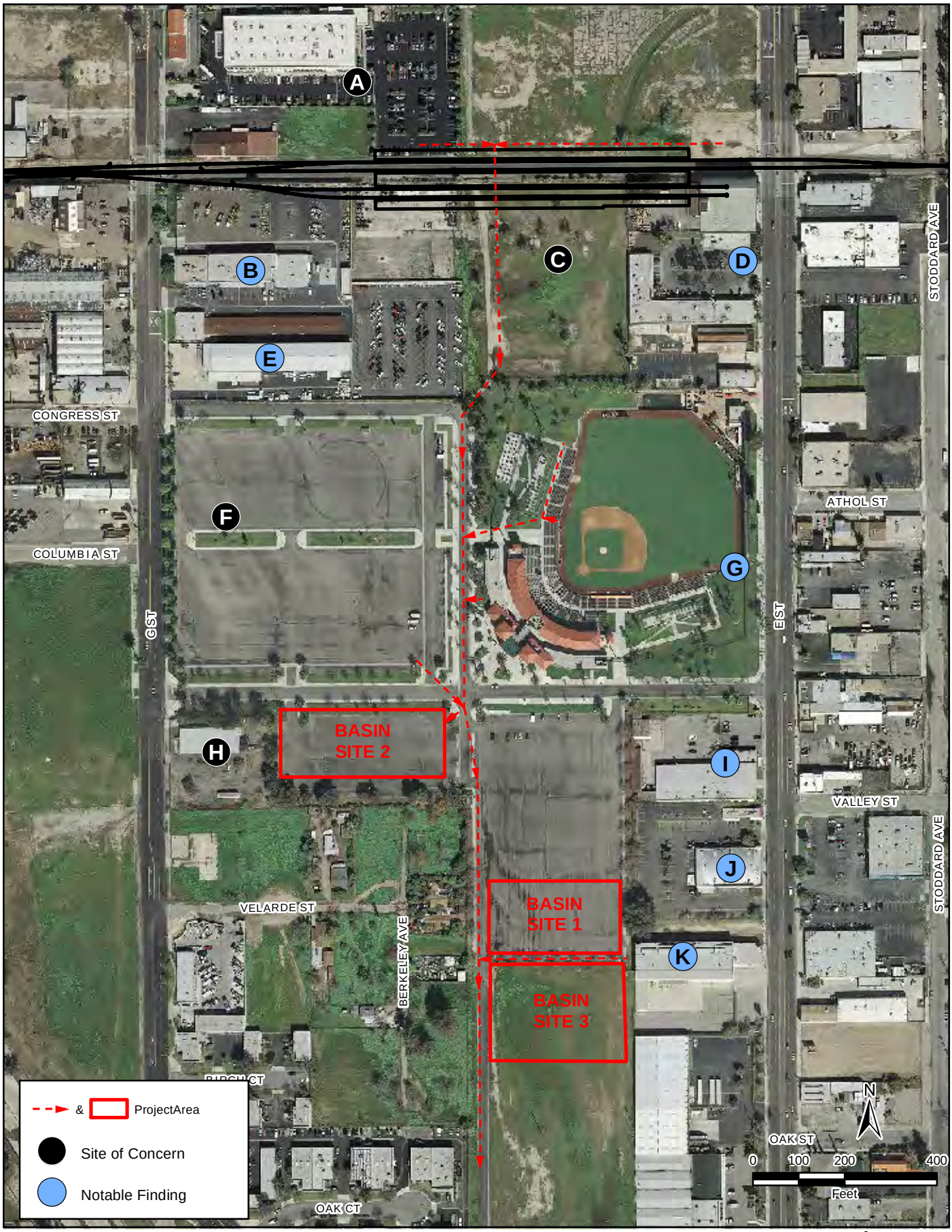
- Based on the review of current and historical aerial imagery and a review of environmental regulatory databases for the location of Optional Detention Basin 3, HDR determines that the conclusions of the original Phase I ESA report are also valid for the Option Detention Basin 3 location.
- No additional investigation is warranted, and the original report may be relied upon for the Option Detention Basin 3 location.

- As stated in the January 2012 report, HDR recommends that all construction contractors should be instructed to immediately stop all subsurface activities in the event that potentially hazardous materials are encountered, an odor is identified, or significantly stained soil is visible. Contractors should be instructed to follow all applicable regulations regarding discovery and response for hazardous materials encountered during the construction process.

The author of this Technical Memorandum is available for questions, if needed, at 602-522-7787.

Attachment A

Site Figure



Attachment A
Detention Basin Locations

APPENDIX G WATER QUALITY ASSESSMENT REPORT

DOWNTOWN SAN BERNARDINO PASSENGER RAIL
Water Quality Assessment Report

San Bernardino, California

FINAL

September 28, 2011

Prepared for:

San Bernardino Associated Governments
1170 W. 3rd Street, 2nd Floor
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Prepared by:

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Appendix A Reference Material

Acronyms and Abbreviations

ADA	Americans with Disabilities Act
AGR	Agricultural Supply
APE	Area of Potential Effect
BAT	Best Available Technology
BCT	Best Control Technology
BMPs	Best Management Practices
bgs	below ground surface
BNSF	Burlington Northern Santa Fe
Caltrans	California Department of Transportation
CCTV	closed-circuit television
CDFG	California Department of Fish and Game
COD	Chemical Oxygen Demand
COLD	Cold Freshwater Habitat
CSDP	Comprehensive Storm Drain Plan
CWA	Clean Water Act
DAMP	Drainage Area Management Plan
Depot	San Bernardino Metrolink Station/Santa Fe Depot
DPP	Design Pollution Prevention
DSBPRP	Downtown San Bernardino Passenger Rail Project
EPA	Environmental Protection Agency
F	Fahrenheit
FEMA	Federal Emergency Management Agency
FIRMS	Flood Insurance Rate Maps
GWR	Groundwater Recharge
HA	hydrologic area
H&H	hydrology and hydraulics
HAs	hydrologic subareas
IEMF	Inland Empire Maintenance Facility
Kf	Soil Erodibility Factor
LIP	Local Implementation Plan
MEP	Maximum Extent Practicable

MSWMP	Municipal Storm Water Management Plan
MUN	Municipal and Domestic Supply
NOI	Notice of Intent
NOT	Notice of Termination
NPDES	National Pollutant Discharge Elimination System
NRCS	Natural Resources Conservation Service
NWP	
PM	Post Mile
PWQMP	Preliminary Water Quality Management Plan
O&M	Operations and Maintenance
PCN	Preconstruction Notification
QSD	Qualified SWPPP Developer
RARE	Rare, Threatened and Endangered Species
REC1	Water Contact Recreation
REC2	Non-Water Contact Recreation
RTC	Rail Traffic Controller
RWQCB	Regional Water Quality Control Board
SANBAG	San Bernardino Association of Governments
SAR	Santa Ana River
SARWQCB	Santa Ana Regional Water Quality Control Board
SBCFCD	San Bernardino County Flood Control District
SWPPP	Storm Water Pollution Prevention Plan
SWRCB	State Water Resources Control Board
TDC	Targeted Design Constituent
TMDLs	Total Maximum Daily Loads
USEPA	United States Environmental Protection Agency
USGS	United States Geological Survey
WARM	Warm Freshwater Habitat
WILD	Wildlife Habitat
WoUS	Waters of the United States
WQAR	Water Quality Technical Analysis Notes
WQMP	Water Quality Management Plan

EXECUTIVE SUMMARY

San Bernardino Associated Governments (SANBAG) is proposing to extend Metrolink regional passenger rail service approximately one mile east from its current terminus at the existing San Bernardino Metrolink Station/Santa Fe Depot (Depot) to new Metrolink commuter rail platforms proposed near the intersection of Rialto Avenue and E Street in the City of San Bernardino, California. The Project is known as the Downtown San Bernardino Passenger Rail Project (DSBPRP). The Project's primary features include construction of a second track, rail platforms, parking lots, a pedestrian overpass at the Depot, and grade crossing improvements to support Quiet Zones; railroad signalization; and roadway closures. The Project's secondary features include construction of drainage improvements, utility accommodation, and implementation of safety controls. During construction activities, excavated soil would be exposed, and there would be an increased potential for soil erosion compared to existing conditions. In addition, chemicals, liquid products, and petroleum products (such as paints, solvents, and fuels), and concrete-related waste may be spilled or leaked as part of construction and could potentially be transported via storm runoff into receiving waters. The total disturbed area during construction of the project would be approximately 61 acres (ac).

A Storm Water Pollution Prevention Plan (SWPPP) would be prepared and implemented during construction of the proposed project. The construction SWPPP identifies the specific Best Management Practices (BMPs), such as Good Housekeeping, Erosion Control, and Sediment Control BMPs, to be implemented during project construction so as not to cause or contribute to an exceedance of any applicable water quality standards contained in the Santa Ana Regional Water Quality Control Board (RWQCB) Basin Plan. These BMPs would be designed to meet the technology requirement as stipulated in the Construction General Permit.

Implementation of the project would result in a permanent increase of impervious surfaces and a permanent increase in runoff and pollutant loading. Pollutants of concern from the railroad mainline include sediments, heavy metals, oil and grease, trash and debris, pesticides, and organic compounds. There is no significant change to the impervious surface area resulting from the project.

Currently, runoff from the project area is untreated. Source Control, Site Design, and Treatment BMPs would be incorporated into the design of the proposed project via a Water Quality Management Plan (WQMP) to address operational pollutants of concern. BMPs would be consistent with the San Bernardino County Stormwater Program Model Water Quality Management Plan Guidance (June 2005). Proposed Site Design BMPs include incorporating underdrain trench pipe systems along the corridor that allow the runoff from the track sections to infiltrate in the trench from the perforated pipes before the runoff is carried away. In the Depot area, increased areas of landscaping would provide opportunities to allow the pavement runoff to drain into the landscaping and undergo infiltration before it is collected downstream in the storm drain system. In addition, runoff from the corridor portion of the project area would drain to the adjoining graded ditches and would infiltrate directly into the underlying native soils. Proposed Source Control BMPs include education of property owners, activity restrictions, spill contingency plans, employee training and education program, common area catch basin inspection, protections of slopes and channels, storm drain signage, energy dissipaters (in culverts), and alternative building materials (concrete instead of wood ties). Proposed Treatment Control BMPs include non-

vegetated drainage swales, underdrain trench systems, detention/infiltration basin at the Transit Center area, and/or manufactured/proprietary devices at the Depot to treat runoff.

When Good Housekeeping, Erosion Control, and Sediment Control BMPs are implemented as stipulated in Water Quality Measure WQ-1, and Site Design, Source Control, and Treatment Control BMPs are implemented as stipulated in Water Quality Measure WQ-2, the proposed project should not result in any adverse impacts to water quality.

1.0 INTRODUCTION

The purpose of this report is to evaluate impacts of the proposed project on potentially affected water resources and their beneficial uses. This report is intended to address the existing surface and groundwater resources and the potential effects of the project on the existing water resources and to support the project's environmental document.

1.1 PROJECT DESCRIPTION

San Bernardino Associated Governments (SANBAG) is proposing to extend Metrolink regional passenger rail service approximately one mile east from its current terminus at the existing San Bernardino Metrolink Station/Santa Fe Depot (Depot) to new Metrolink commuter rail platforms proposed near the intersection of Rialto Avenue and E Street in the City of San Bernardino, California. The Project is known as the Downtown San Bernardino Passenger Rail Project (DSBPRP). The Project's primary features include construction of a second track, rail platforms, parking lots, a pedestrian overpass at the Depot, and grade crossing improvements to support Quiet Zones; railroad signalization; and roadway closures. The Project's secondary features include construction of drainage improvements, utility accommodation, and implementation of safety controls. Refer to Figures 1 and 2 for the project location and regional location map, respectively. The Project components are described below.

1.1.1 Track Improvements

Track improvements include realignment of the existing railroad track and construction of a second parallel railroad track extending from the Depot to the proposed rail platforms near Rialto Avenue and E Street. The Project also includes realignment and reconstruction of the two mainline tracks at the Depot and improvements to the BNSF Short Way. The existing Inland Empire Maintenance Facility (IEMF) will be decommissioned upon implementation of the Project.

1.1.2 San Bernardino Metrolink Station/Santa Fe Depot

The Project involves railroad track and platform, pedestrian access, and parking lot improvements at the existing San Bernardino Metrolink Station/Santa Fe Depot. An Americans with Disabilities Act (ADA) compliant pedestrian overpass bridge will be constructed at the existing Depot and may be designed in the Mission Revival architectural style. Two new platforms will also be constructed north of the Depot that will include new benches, canopies, platform amenities, ticket vending machines, lighting and closed-circuit television (CCTV) security cameras to serve both Metrolink and Amtrak passengers. The existing parking lot located directly east of the Depot will be reconfigured to provide additional parking and landscaping that will necessitate the realignment of 3rd Street.

1.1.3 Proposed Rail Platforms

The Project will include the installation of three new station platforms, canopies, platform amenities, ticket vending machines, lighting, and CCTV security cameras near the intersection of Rialto Avenue and E Street. A new 265-space parking lot will be constructed directly south of the platforms to accommodate both train crews and Metrolink passengers. The vacant site to the north of the proposed rail platforms may also be used as a potential staging area for the Project, and a temporary SCRRA crew building is also proposed during construction.

Source: HDR (2011), ESRI (2011)

Figure 1
Project Location
Downtown San Bernardino Passenger Rail Project

Figure 1. Project Location

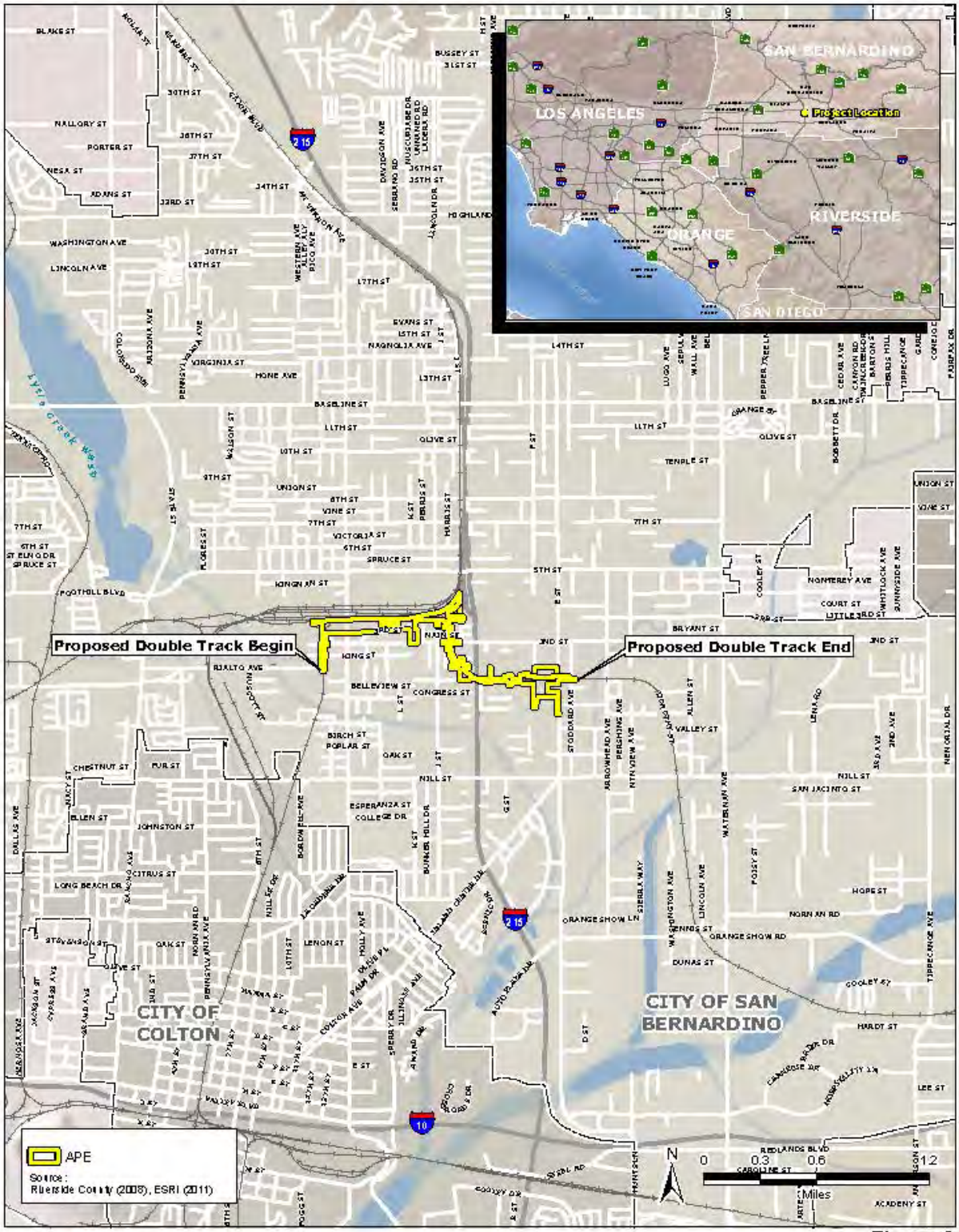

Figure 2
Regional Location Map
Downtown San Bernardino Passenger Rail Project

Figure 2. Regional Location Map

1.1.4 Pedestrian Connection to the Arrowhead Credit Union Park

A lighted pedestrian pathway including park benches, trash disposals, and bicycle racks connecting the proposed rail platforms to the Arrowhead Credit Union Park may be included as part of the Project.

1.1.5 Street Improvement[1]

- The intersection of K Street and 3rd Street will be reconfigured so that it becomes the west leg of a new T-intersection with K Street.
- "I" Street at Rialto Avenue will be converted to a cul-de-sac on the south side with the north leg of the intersection converted to a right-in/right-out configuration.

1.1.6 Grade Crossings

Four existing at-grade crossings will be reconstructed in order to accommodate the second track, raised medians, and widened sidewalks (3rd Street, 2nd Street, Rialto Avenue/I Street, and G Street).

1.1.7 Parcel Acquisitions and Relocations

Acquisition of additional right-of-way along the alignment is required, which may require 23 partial parcel acquisitions, 11 full parcel acquisitions, and easements (roadway, temporary construction, sidewalk, utility, and alley vacations) on an additional 19 parcels. Some parcels scheduled to be acquired contain active businesses requiring relocation.

1.1.8 Drainage Facility Improvements

A system of new perforated under drains and ditches will be constructed adjacent to the tracks to convey storm water into the existing storm drain system. Numerous catch basins located at the four crossings will also need to be relocated to accommodate proposed roadway improvements. (Figure 4)

1.1.9 Utility Replacement and Relocation

Existing subsurface water, sewer, storm drain, power, gas, fiber optic and telephone lines crossing the tracks will be evaluated for conformance with Metrolink Engineering Standards. Overhead crossing utilities such as power and communication lines will be raised if found to not adhere to Metrolink's overhead clearance requirements. Railroad signal houses and street lights will also be relocated in order to accommodate the second track.

1.1.10 Relocation of Monitoring Wells

Fourteen wells within the Project Area of Potential Effect (APE) are designated to remain in place, four wells may need to be closed, and four wells may need to be relocated.

1.1.11 Operational Controls (Rail Signals)

Safety controls, including but not limited to, new traffic signals, railroad signal equipment (compatible with Metrolink's and BNSF's new positive train control (PTC) systems), and railroad/pedestrian crossing equipment will be located at each at-grade railroad crossing.

[1] The Interstate 215 widening project under construction in 2010-2011 will convert I Street south of Third Street to a cul-de-sac, and is separate from the proposed project.

1.1.12 Rail Operations

An operating plan has been developed using Rail Traffic Controller (RTC) modeling and operational analysis based on input from SANBAG, Metrolink, Amtrak, and BNSF operations personnel. Metrolink operations between the Depot and the new rail platforms are projected to start in early 2014.

1.1.13 Maintenance

Typical railroad maintenance and inspections will be conducted throughout the operational phase of the Project in accordance with SCRRA/Metrolink, BNSF, and Amtrak standard practices.

1.2 General Approach

This Water Quality Assessment Report determines whether the construction and operation of the proposed project would have an adverse impact on water quality. The determination of impacts is based on the anticipated change in pollutant loads due to changes in land use and changes in the impervious area percentage between the existing condition and the post-project condition. The analysis includes consideration of BMPs to be implemented as part of the project. This assessment also discusses existing water quality regulations and SANBAG methods of complying with those regulations. The report format is generally based on the California Department of Transportation (Caltrans) Environmental Handbook Volume I, Chapter 9, Water Quality, which is currently being updated.

2.0 AFFECTED ENVIRONMENT

This chapter discusses the existing environmental setting related to water quality, surface waters, and groundwater.

2.1 GENERAL SETTING

2.1.1 Land Use

The land use is fully urbanized. Vegetation varies throughout the project and is basically non-existent with sporadic weeds in certain areas. The tributary drainage consists of dense residential areas, commercial and industrial developments, and railroad.

2.1.2 Topography

The project's topography is typical of lowland valley areas with gentle slopes. The general slope of the area is towards the Santa Ana River with slopes ranging from 1% to 3%. Topographical features include residential, commercial, and industrial development and some open space adjacent to the project.

2.1.3 Soil Classifications and Erosion Potential

NRCS Soil Classifications: According to the United States Geological Survey Map, the soil types for the project and adjacent lands are mostly Granville Fine Sandy Loam and Harford Sandy Loam. The tributary drainage areas also consist of urbanized alluvial fan areas emanating from the San Bernardino mountain ranges. The Natural Resources Conservation Service (NRCS) classifies soils into four different hydrologic soil groups. The project area is located in Hydrologic Soil Groups A and B, low and moderate runoff potential, respectively. These NRCS soil classifications are further described below:

- *Group A* – Low runoff potential. Soils having high infiltration rates even when thoroughly wetted and consisting chiefly of deep, well to excessively drained sands or gravels. The soils have a high rate of water transmission.
- *Group B* – Soils having moderate infiltration rates when thoroughly wetted and consisting chiefly of moderately deep to deep, moderately well to well drained soils with moderately fine to moderately coarse textures. These soils have a moderate rate of water transmission.

Erosion Potential: Per the NRCS soil survey, the Soil Erodibility Factor (K_f) within the Project limits ranges from 0.17 to 0.32. The estimates are based primarily on a percentage of silt, sand, and organic matter; on soil structure; and on saturated hydraulic conductivity. The higher the value, the more susceptible the soil is to sheet and rill erosion by water.

2.1.4 Geology

The project area is located in the central portion of the San Bernardino Valley just west of the former Norton Air Force Base (present-day San Bernardino Airport) and north of the Santa Ana River. This area is characterized as being a relatively flat-lying, alluvium-filled valley overlying crystalline basement rock.

The alignment is located near several perennial streams emanating from the nearby San Bernardino Mountains, including City Creek and Lytle Creek, just north of their confluence with the Santa Ana River and crosses City Creek.

The subject site is underlain by very young alluvium (designated Qya1 through Qya5, Morton, 2003), and the alluvial soils are composed primarily of sand and gravel with some local finer and coarse deposits.

2.1.5 Precipitation and Climate

The climate for the project area is Mediterranean with hot, dry summers and cooler, wetter winters. Rainfall season is from October 1 to May 1 with average annual rainfall depths of 14.5 inches to 25.1 inches. The state of California is prone to having thunderstorms at any time of year. These thunderstorms typically occur during the spring in response to low-pressure systems moving south out the Gulf of Alaska or when monsoonal conditions occur in the summer as the result of high-pressure systems that stall to the east and circulate subtropical moisture up from the south.

Average wind speeds in this region range between 5 and 6 mph. However, at times when high pressure stalls over the Great Basin, a wind phenomenon commonly known as the "Santa Ana Winds" develops. During these conditions, humidity levels are generally very low resulting in very dry conditions. These winds are often strong and gusty, sometimes exceeding 100 mph, particularly near the mouth of canyons oriented along the direction of airflow.

The average maximum temperature is 91.6˚ F, and the average minimum temperature is 40.0˚ F.

2.1.6 Drainage Features

General drainage flow patterns are from north to south or east to west depending on the location of the facility that is intercepting the drainage. Local storm drainage systems owned, operated, and maintained by the City of San Bernardino are responsible for conveying runoff from project tributary areas via surface flow or storm drain systems (e.g., catch basins). Sheet flow directed towards the north side of the railroad is collected either by parallel channels or directed easterly/westerly to tributary inlets or culverts. Any tributary stormwater runoff is carried either west or east to an interception point.

The existing drainage facilities within the project area appear to be adequate for collecting surface and subsurface flows. Within the City of San Bernardino, there are several local storm drain systems that capture and convey storm runoff away from the railroad. According to the Metrolink as-builts (Redlands Main Line), most of these drain inlets appear to be connected by on-site storm drains that outlet to public systems on intersected streets such as Third Street, Rialto Avenue, H Street Storm Drain, F Street, and Warm Creek (Historic). The project does not intersect flood control facilities or major washes.

Further hydrology and hydraulic studies need to be done to address the potential drainage challenges in the project.

2.2 Surface Water Resources

2.2.1 Regional Hydrology

The project area is located in the Santa Ana River Watershed. The Santa Ana River Watershed is divided into hydrologic areas (HA) that are subdivided into hydrologic subareas (HSA). The project area lies within the Bunker Hill HSA of the Upper Santa Ana River HA (Figure 3).

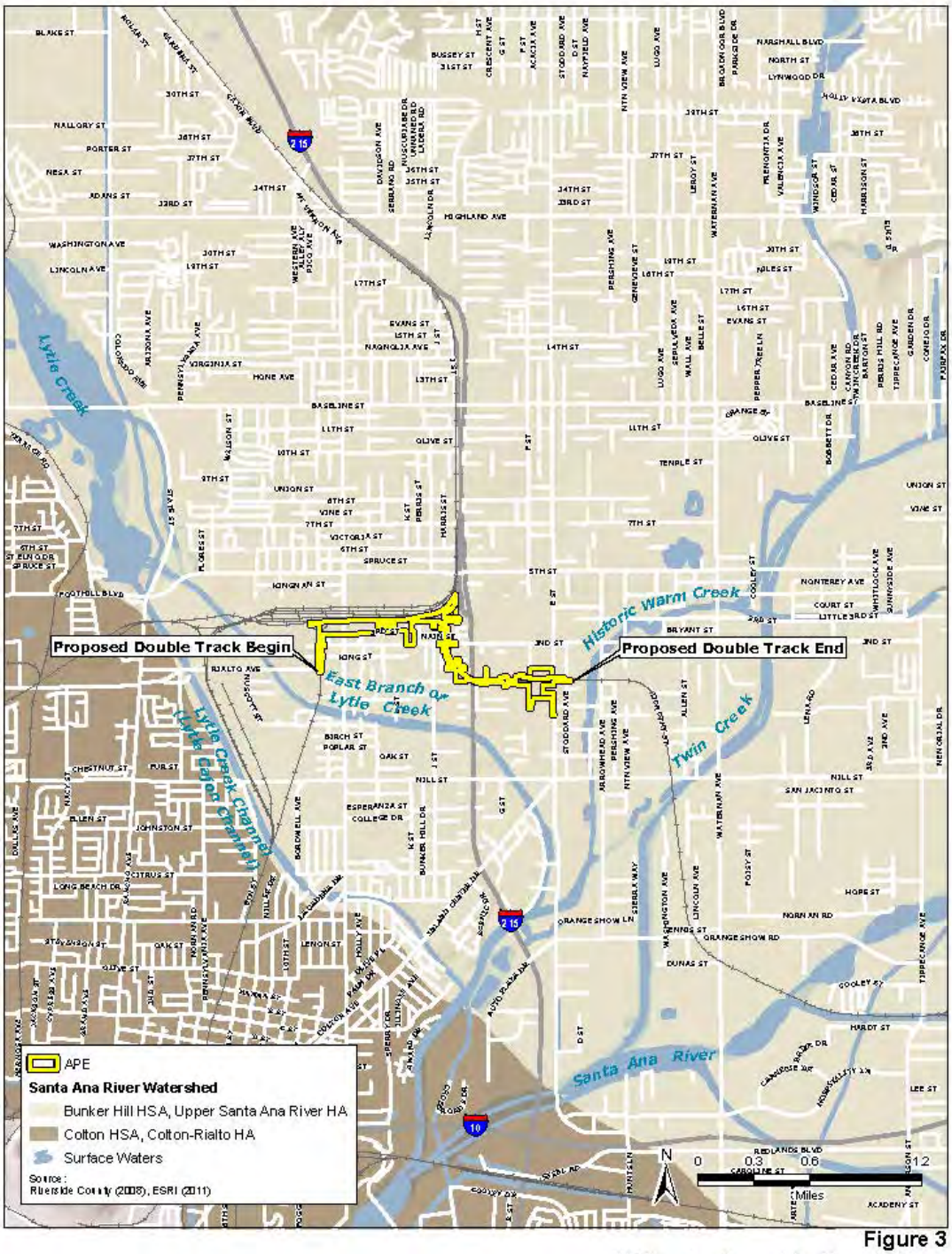

Figure 3
Watersheds and Surface Waters
Downtown San Bernardino Passenger Rail Project

Figure 3. Watersheds and Surface Waters

The Santa Ana River Watershed is approximately 2,650 square miles (sq mi), with more than 50 contributing tributaries. The Santa Ana River extends about 96 miles (mi) from its headwaters to where it drains into the Pacific Ocean. The headwaters for the Santa Ana River and its tributaries are in the San Gabriel and San Bernardino Mountains to the north and the San Gorgonio and San Jacinto Mountains to the east. From the San Bernardino and San Gabriel Mountains, the Santa Ana River flows through the Santa Ana Valley, then through the Prado Basin and a narrow pass in the Santa Ana Mountains. The Santa Ana River Watershed is divided into an upper and lower watershed at the Prado Dam. From the Santa Ana Mountains, the Santa Ana River flows southwest to the Pacific Ocean.

2.2.2 Local Hydrology

As shown in Figure 3, Lytle Creek Channel is located immediately south of the project area. Lytle Creek Channel is also referred to as Lytle Cajon Channel as well as the West Branch of the Lytle Creek System. The Santa Ana River transitions from Reach 5 to Reach 4 at the San Jacinto Fault, just east of the project area. Runoff from the project site is discharged to either the Lytle Creek Channel or the Historic Warm Creek Channel via local City storm drain systems. Historic Warm Creek Channel eventually confluences with Lytle Creek Channel before it discharges into Reach 4 of the Santa Ana River. Reach 4 is defined as the portion of the river from Mission Boulevard in Riverside to the San Jacinto Fault in San Bernardino.

2.2.3 Floodplains

According to Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map (FIRM) identified in Table 1, the project area is not located within a 100-year floodplain. The project area is located in a 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 sq mi, and areas protected by levees from 1% annual chance flood). The project is outside the area required by FEMA to consider development constraints.

All FIRMs that depict the Project corridor at which the FEMA flood plains intersect the Project's alignment are listed in Table 1.

Table 1. FEMA Flood Insurance Maps

Regional Water Quality Control Board	FIRM #
RWQCB, Santa Ana Region	06071C8681H
	06071C8683H
	06071C8584H
	06071C8703H
	06071C8704H
	06071C8712H
	06071C8716H

2.3 GROUNDWATER RESOURCES

The groundwater agency that covers the projects limits is San Bernardino Municipal Water Department. There are no current drinking water reservoirs or recharge facilities within the project limits. The current groundwater levels for the project are deeper than 70 feet below current grade; hence, groundwater is not anticipated to cause design issues for the proposed improvements. This information is extracted from the Geotechnical Investigation Report (prepared by Group Delta Consultants, March 29, 2011). Concurrence has been obtained from City of San Bernardino to consider use of infiltration basins consistent with Section XI.E.3 of permit order R8-2010-0036.

3.0 REGULATORY SETTING

Discharges into waters of the United States are subject to the regulatory authority of the USACE under Section 404 of the federal Clean Water Act (CWA); the State Water Resources Control Board (SWRCB) and the Santa Ana RWQCB under Sections 303(d), 401, and 402 of the CWA and the California Porter-Cologne Water Quality Control Act (Porter- Cologne Act); and by the California Department of Fish and Game (CDFG) under Sections 1602 of the California Fish and Game Code.

3.1 FEDERAL REGULATIONS

3.1.1 Section 404

The USACE regulates discharges or fills into waters of the United States under Section 404 of the CWA via the Nationwide Permit (NWP) or Individual Permit program. There are several categories of NWPs that can be used for projects that fall under specific categories. A Preconstruction Notification (PCN) to the USACE District Engineer is required for most activities that result in the loss of greater than 0.1 acre of waters of the United States. The USACE reviews PCNs on a case-by-case basis to determine whether the adverse effects of the proposed work on the aquatic environment are minimal. The USACE will also determine whether a particular drainage is considered waters of the United States and subject to regulation under Section 404.

3.1.2 Section 402 Permit

Direct discharges of pollutants into Waters of the United States (WoUS) are not allowed, except in accordance with the National Pollutant Discharge Elimination System (NPDES) program established in Section 402 of the CWA. The main goal of the NPDES program is to protect human health and the environment. Pursuant to the NPDES program, permits that apply to storm water discharges from municipal storm drain systems, specific industrial activities, and construction activities that disturb one acre or more have been issued. NPDES permits establish enforceable effluent limitations on discharges, require monitoring of discharges, and require the permittee to implement BMPs. Municipal permits are governed by the maximum extent practicable (MEP) or the best available technology (BAT)/best control technology (BCT) application of BMPs.

3.1.3 Section 401 Permit

Section 401 of the CWA specifies that any applicant for a federal license or permit to conduct any activity that may result in any discharge into navigable waters, including but not limited to the construction or operation of facilities, shall provide the federal licensing or permitting agency a certification from the state agency with jurisdiction over those waters (Santa Ana RWQCB) that the project will comply with water quality standards, including beneficial uses, water quality objectives, and the state antidegradation policy.

3.1.4 Section 303

Section 303 of the CWA requires that the state adopt water quality objectives for surface waters. The Santa Ana Regional Water Quality Control Board (SARWQCB) Basin Plan contains water quality objectives that are considered necessary to protect the specific beneficial uses it identifies. Section 303(d) specifically requires the state to develop a list of impaired water bodies and subsequent numeric Total Maximum Daily Loads (TMDLs) for constituents that impair a particular water body.

TMDLs have been identified for the water bodies that the Project is tributary to. Of the two 303(d) listed water bodies, the Santa Ana River Reach 4 has a TMDL for pathogens. The Santa Ana River Reach 3 has a TMDL for pathogens that is currently being addressed by (USEPA) for Approved TMDLs. BMPs to the MEP would be located along the Project corridor to ensure compliance to the TMDLs.

3.2 STATE WATER QUALITY REGULATIONS

3.2.1 Porter-Cologne Water Quality Control Act (Division 7 of the California Water Code)

The Porter-Cologne Act establishes a regulatory program to protect water quality and to protect beneficial uses of state waters. It empowers the RWQCBs to formulate and adopt, for all areas within the regions, Basin Plans that designate beneficial uses and establish such water quality objectives that in its judgment will ensure reasonable protection of beneficial uses. Each RWQCB establishes water quality objectives that will ensure the reasonable protection of beneficial uses and the prevention of nuisance. The California Water Code provides flexibility for some change in water quality, provided beneficial uses are not adversely affected.

3.2.2 California Fish and Game Code Section 1602

The CDFG, through provisions of California Fish and Game Code Section 1602, is empowered to issue agreements for any alteration of a river, stream, or lake where fish or wildlife resources may be adversely affected. Streams and rivers are defined by the presence of a channel bed and banks and at least an intermittent flow of water. The CDFG typically extends the limits of its jurisdiction laterally beyond the channel banks for streams that support riparian vegetation. In these situations, the outer edge of the riparian vegetation is generally used as the lateral extent of the stream and CDFG jurisdiction.

The California Fish and Game Code Section 1602 requires any person, state, or local governmental agency or public utility to notify the CDFG before beginning any activity that will result in one or more of the following: (1) substantially obstruct or divert the natural flow of a river, stream, or lake; (2) substantially change or use any material from the bed, channel, or bank of a river, stream, or lake; or (3) deposit or dispose of debris, waste, or other material containing crumbled, flaked, or ground pavement where it can pass into a river, stream, or lake. California Fish and Game Code Section 1602 applies to all perennial, intermittent, and ephemeral rivers, streams, and lakes in the state.

3.2.3 State Requirements under Section 402 of the CWA

Construction General Permit. On September 2, 2009, the SWRCB adopted the NPDES General Permit for Storm Water Discharges Associated with Construction and Land Disturbance Activities (Order No. 2009-0009-DWQ, NPDES No. CAS000002). In accordance with NPDES regulations, the State of California requires that any construction activity disturbing one acre or more of soil comply with the Construction General Permit. To obtain authorization for proposed storm water discharges pursuant to this permit, the landowner (discharger) is required to submit Permit Registration Documents, including a risk assessment, site map, SWPPP, annual fee, and signed certification statement to the SWRCB. Dischargers are required to implement BMPs meeting the technological standards of BAT and BCT to reduce or eliminate storm water pollution. BMPs include programs, technologies, processes, practices, and devices that control, prevent, or remove or reduce pollution. Permittees must also maintain BMPs and conduct inspection and sampling programs as required by the permit. Dischargers are also required to comply with monitoring and reporting requirements to ensure that discharges comply with the numeric

action levels and numeric effluent limitations specified in the permit. The proposed project is subject to the requirements of the Construction General Permit because it would disturb more than one acre of soil during construction.

3.3 REGIONAL REQUIREMENTS

3.3.1 General Waste Discharge Requirements for De Minimis Discharges

On March 27, 2009, the Santa Ana RWQCB adopted the General Waste Discharge Requirements for Discharges to Surface Waters that Pose an Insignificant (De Minimus) Threat to Water Quality (Order No. R8-2009-0003, NPDES No. CAG998001). This permit covers discharge of groundwater and non-storm water construction dewatering waste in the Santa Ana region. For coverage under this permit, a discharger is required to submit a Notice of Intent to the Santa Ana RWQCB. Under this permit, discharges must comply with discharge specifications, receiving water limitations, and monitoring and reporting requirements detailed in the permit. The proposed project is not subject to the requirements of the De Minimus Permit because groundwater and other non-storm water discharge are not anticipated during construction.

3.4 LOCAL REQUIREMENTS

3.4.1 MS4 NPDES Permit

The City of San Bernardino is a co-permittee under the NPDES Permit and Waste Discharge Requirements for the San Bernardino County Flood Control District, the County of San Bernardino, and the Incorporated Cities of San Bernardino County within the Santa Ana Region, Order No. R8-2010-0036 (NPDES No. CAS618036). The NPDES permit prohibits discharges, sets limits on pollutants being discharged into receiving waters, and requires implementation of technology-based standards.

Under the NPDES permit, the City as a co-permittee is responsible for the management of storm drain systems within its jurisdiction. Cities are required to implement management programs, monitoring programs, implementation plans, and all BMPs outlined in the Municipal Storm Water Management Program (MSWMP) (previously identified as the Drainage Area Management Plan [DAMP] in the County's two prior NPDES permits) and to take any other actions as may be necessary to protect water quality to the MEP. In addition, each city is required to implement a MSWMP and develop a long-term assessment strategy for effectiveness of the MSWMP.

Category Projects within the City are required to develop and implement Water Quality Management Plans (WQMPs) to reduce pollutants and maintain and reduce downstream erosion and stream habitat from all new development and significant redevelopment projects that fall into one of the categories of priority projects. The co-permittees must ensure that a Category Project meets WQMP requirements. Category Projects include significant redevelopment projects that create 5,000 square feet or more of impervious surface, home subdivisions of 10 units or more, industrial/commercial developments of 100,000 square feet or more, automotive repair shops, restaurants of 5,000 square feet or more, hillside developments of 10,000 square feet or more, developments of 2,500 square feet of impervious surface or more adjacent to or discharging directly into environmentally sensitive areas, or parking lots of 5,000 square feet or more. In addition, Non-Category Projects that have a precise plan of development (e.g., all commercial or industrial projects, residential projects <10 dwelling units, and all other land development projects with potential for significant adverse water quality impacts) or subdivision of land must prepare

and implement a WQMP. San Bernardino County has prepared a Model Water Quality Management Plan Guidance document for preparation of project-specific WQMPs. The Model Water Quality Management Plan Guidance document was approved by the Santa Ana RWQCB on April 30, 2004, and updated on June 9, 2005.

SANBAG is not a co-permittee of the NPDES permit; however, they are a potential discharger of urban runoff in the permitted areas. Under the permit, it is expected that SANBAG work cooperatively with the permittees to manage urban runoff. Pursuant to 40 CFR 122.26(a), the Santa Ana RWQCB has the authority to require non-cooperating entities to adhere to the requirements of the NPDES permit or issue individual discharge permits to those entities. Therefore, to comply with this requirement, a WQMP will be prepared for the proposed project that specifies the BMPs to be implemented during operation.

3.4.2 City of San Bernardino Municipal Code

Storm water discharge is also regulated under Title 8 - Health & Safety of the City of San Bernardino Code of Ordinances. Under Title 8, discharge of non-stormwater is permissible only when connection to the storm drain system is made in accordance with a valid city permit, approved construction plan, or a NPDES permit and/or Notice of Intent (NOI). In addition, projects within the City are required to comply with the requirements of the Construction General Permit and the Municipal NPDES Permit, which includes preparation of a SWPPP and implementation of construction and post-construction BMPs.

3.5 BENEFICIAL USES

Beneficial uses of water are defined in both RWQCB's Basin Plans as those uses necessary for the survival or well-being of humans, plants, and wildlife. Examples of beneficial uses include drinking water supplies, swimming, industrial and agricultural water supply, and the support of freshwater and marine habitats and their organisms. The 303(d) Listed Water Bodies' beneficial uses as they relate to the surface waters and groundwater in the different RWQCB jurisdictions are listed in Table 2.

Table 2. 303(d) Listed Water Bodies' Beneficial Uses

Jurisdiction	Water Body	Beneficial Uses	Use Status
RWQCB, Santa Ana Region	Santa Ana River Reach 3[1]	AGR, GWR, POW, REC1, REC2, WARM, WILD, RARE	Existing
	Santa Ana River Reach 4[1]	GWR, REC1[2], REC2, WARM, WILD	Existing

1 2006 303(d) Approved List
2 Access prohibited in some portions by San Bernardino County Flood Control
Source: http://endeavor.des.ucdavis.edu/wqsid

3.6 WATER QUALITY OBJECTIVES

Per the Porter-Cologne Act, water quality objectives need to be established by each RWQCB. Water quality objectives are defined as the limits or levels of water quality constituents or characteristics that are established for the reasonable protection of beneficial uses of water or the prevention of nuisance within a specific area. These objectives must satisfy all of the applicable requirements of the Porter-Cologne Act and the CWA. However, each RWQCB recognizes that the quality of water may be changed to some degree without unreasonably affecting beneficial uses.

The Basin Plans also established implementation programs to achieve these water quality objectives and require monitoring to evaluate the effectiveness of these programs.

3.6.1 Surface Waters

Per the Santa Ana Region RWQCB Basin Plan, the stipulated surface water quality objectives for inland surface waters which include streams, rivers, lakes, and wetlands are listed in Table 3.

Table 3. Surface Water Quality Objectives

Constituent	Concentration
Algae	Waste discharges shall not contribute to excessive algal growth in receiving waters.
Ammonia, un-ionized	Discharges shall not cause the concentration of un-ionized ammonia (as nitrogen) to exceed 0.098 mg/L.
Boron	Shall not exceed 0.75 mg/L.
Chemical Oxygen Demand (COD)	Waste discharges shall not result in increases in COD levels in inland surface waters which exceed 30 mg/L.
Chloride	Chloride levels shall not exceed 140mg/L.
Chlorine (residual)	Chlorine residual in wastewater discharged to inland surface waters shall not exceed 0.1 mg/L.
Coliform (fecal)	Based on a minimum of not less than five samples for any 30 day period, surface waters designated as REC1 shall not exceed 200 organisms/100ml, nor shall more than 10% of the samples exceed 400 organisms/100 ml. Surface waters designated as REC2 shall average less than 2000 organisms/100ml and not more than 10% of samples exceed 4000 organisms/100 ml. MUN shall not exceed 100 organisms/100 ml.
Color	Waste discharges shall not result in coloration of the receiving waters which causes a nuisance or adversely affects beneficial uses. The natural color of fish, shellfish, or other inland surface water resources used for human consumption shall not be impaired.
Floatables	Waste discharges shall not contain floating materials, including solids, liquids, foam or scum, which cause a nuisance or adversely affect beneficial uses.
Fluoride	Surface waters designated as MUN shall not exceed 0.7 to 1.2 mg/L as a result of controllable water quality factors depending on air temperature.
Hardness (as CaCO3)	Shall not exceed 350 mg/L.
Metals	Toxicity testing performed as part of the Santa Ana River Use-Attainability Analysis has demonstrated that the levels of Cd 4 µg/L, Cu 374 µg/L and Pb 284 µg/L are safe and non-toxic in Santa Ana River water.
Methylene blue activated substances	Waters designated as MUN shall not exceed 0.05 mg/L as a result of controllable water quality factors.
Nitrate	Waters designated as MUN shall not exceed 45 mg/L (as NO_3) or 10mg/L (as N) as a result of controllable water quality factors.
Nitrogen, Total Inorganic	Shall not exceed 103 mg/L.
Oil and grease	Waters shall not contain oils, greases, waxes, or other materials in concentrations which result in a visible film or coating on the surface of the water or on objects in the water, or which cause nuisance or which otherwise adversely affect beneficial uses.
Oxygen (dissolved)	The dissolved oxygen content of surface waters shall not be depressed below 5 mg/L for waters designated WARM, or 6 mg/L for waters designated COLD, as a result of controllable water quality factors. In addition, waste discharges shall not cause the median dissolved oxygen concentration to fall below 85% of saturation or the 95th percentile concentration or fall below 75% of saturation within a 30-day period.

Constituent	Concentration
pH	The pH of inland surface waters shall not be raised above 8.5 or depressed below 6.5 as a result of controllable water quality factors.
Radioactivity	Radioactive materials shall not be present in the waters of the region in concentrations which are deleterious to human, plant or animal life. Waters designated MUN shall meet the limits specified in the California Code of Regulations, Title 22.
Sodium	Shall not exceed 110 mg/L.
Solids (suspended and settleable)	Waters shall not contain suspended and settleable solids in amounts which cause nuisance or adversely affect beneficial uses as a result of controllable water quality factors.
Sulfate	Shall not exceed 150 mg/L.
Sulfides	The dissolved sulfide content of inland surface waters shall not be increased as a result of controllable water quality factors.
Surfactants	Waste discharges shall not contain concentrations of surfactants which result in foam in the course of flow or use of the receiving water, or which adversely affect aquatic life.
Taste and odor	The inland surface waters of the region shall not contain, as a result of controllable water quality factors, taste- or odor-producing substances at concentrations which cause a nuisance or adversely affect beneficial uses. The natural taste and odor of fish, shellfish, or other regional inland surface water resources used for human consumption shall not be impaired.
Temperature	The natural receiving water temperature of inland surface waters shall not be altered unless it can be demonstrated to the satisfaction of the Regional Board that such alteration in temperature does not adversely affect beneficial uses. The temperature of waters designated COLD shall not be increased by more than 5°F as a result of controllable water quality factors. The temperature of waters designated WARM shall not be raised above 90°F June through October or above 78°F during the rest of the year as a result of controllable water quality factors. Lake temperatures shall not be raised more than 4°F above established normal values as a result of controllable water quality factors.
Total dissolved solids	Objective of less than 700 mg/L.
Toxic substances	Shall not be discharged at levels that will bioaccumulate in aquatic resources to levels which are harmful to human health. The concentrations of contaminants in waters which are existing or potential sources of drinking water shall not occur at levels that are harmful to human health. Concentrations of toxic pollutants in the water column, sediments, or biota shall not adversely affect beneficial uses.
Turbidity	Where natural turbidity is between 0 and 50 NTU, increases shall not exceed 20%. Where natural turbidity is between 50 and 100 NTU, increases shall not exceed 10 NTU. Where natural turbidity is greater than 10 NTU, increases shall not exceed 10%. All inland surface waters of the region shall be free of changes in turbidity which adversely affect beneficial uses.

Source: Santa Ana Regional Water Quality Control Board Basin Plan

3.6.2 Groundwater

Per the SARWQCB Basin Plan, the stipulated water quality objectives for groundwater are listed below in Table 4.

Table 4. Groundwater Quality Objectives

Constituent	Concentration
Arsenic	Shall not exceed 0.05 mg/L because of controllable water quality factors.
Bacteria, Coliform	Total coliform numbers shall not exceed 2.2 organism/100 mL median over any seven day period in groundwaters designated MUN as a result of controllable water quality factors.

Constituent	Concentration
Boron	Shall not exceed 0.75 mg/L.
Barium	Barium concentrations shall not exceed 1.0 mg/L in groundwaters designated MUN as a result of controllable water quality factors.
Chloride	Chloride concentrations shall not exceed 500 mg/L in groundwaters of the region designated MUN as a result of controllable water quality factors.
Color	Waste discharges shall not result in coloration of the receiving waters that cause a nuisance or adversely affect beneficial uses.
Cyanide	Shall not exceed 0.2 mg/L because of controllable water quality factors.
Dissolved Solids, Total (TDS)	A benefit to consumers exists if water is supplied at or below 500 mg/L.
Fluoride	Shall not exceed 1.0 mg/L because of controllable water quality factors.
Hardness (as CaCO3)	Groundwaters designated as MUN shall not be increased as a result of waste discharge to levels that adversely affect beneficial uses.
Metal: Cadmium	Groundwaters designated as MUN shall not exceed 0.01 mg/L because of controllable water quality factors.
Metal: Chromium	Groundwaters designated as MUN shall not exceed 0.05 mg/L because of controllable water quality factors.
Metal: Cobalt	Groundwaters designated as MUN shall not exceed 0.2 mg/L because of controllable water quality factors.
Metal: Copper	Groundwaters designated as MUN shall not exceed 1.0 mg/L because of controllable water quality factors.
Metal: Iron	Groundwaters designated as MUN shall not exceed 0.3 mg/L because of controllable water quality factors.
Metal: Lead	Groundwaters designated as MUN shall not exceed 0.05 mg/L because of controllable water quality factors.
Metal: Manganese	Groundwaters designated as MUN shall not exceed 0.05 mg/L because of controllable water quality factors.
Metal: Mercury	Groundwaters designated as MUN shall not exceed 0.002 mg/L because of controllable water quality factors.
Metal: Selenium	Groundwaters designated as MUN shall not exceed 0.01 mg/L because of controllable water quality factors.
Metal: Silver	Groundwaters designated as MUN shall not exceed 0.05 mg/L because of controllable water quality factors.
Methylene blue activated substances	Groundwaters designated as MUN shall not exceed 0.05 mg/L because of controllable water quality factors.
Nitrate (as Nitrogen)	Shall not exceed 10 mg/L.
Oil and grease	Water discharges shall not result in deposition of oil, grease, wax, or other materials in concentrations that cause a nuisance or adversely affect beneficial uses.
pH	The pH of groundwater shall not be raised above 9 or depressed below 6 because of controllable water quality factors.
Radioactivity: Combined Radium-226 and Radium-228	Groundwaters designated as MUN shall not exceed 5 pCi/L.
Radioactivity: Gross Alpha particle activity	Groundwaters designated as MUN shall not exceed 15 pCi/L.
Radioactivity: Tritium	Groundwaters designated as MUN shall not exceed 20,000 pCi/L.

Constituent	Concentration
Radioactivity: Strontium-90	Groundwaters designated as MUN shall not exceed 8 pCi/L.
Radioactivity: Gross Beta particle activity	Groundwaters designated as MUN shall not exceed 50 pCi/L.
Radioactivity: Uranium	Groundwaters designated as MUN shall not exceed 20 pCi/L.
Sodium	Groundwaters designated as AGR shall not exceed a sodium absorption ration (SAR) of 9.
Sulfate	Groundwaters designated as MUN shall not exceed 500 mg/L.
Taste and Odor	Shall not contain taste- or odor-producing substances at concentrations that cause a nuisance or adversely affect beneficial uses.
Toxic Substances	All waters shall be maintained free of substances in concentrations that are toxic or that produce detrimental physiological responses in human, plant, animal, or aquatic life.

Source: Santa Ana Regional Water Quality Control Board Basin Plan

3.7 WATER QUALITY IMPAIRMENTS

3.7.1 Existing Water Quality

Regional Water Quality. In general, the quality of surface water and groundwater in the Santa Ana River Basin becomes progressively poorer as water moves along hydraulic flow paths. The highest quality water is typically associated with tributaries flowing from surrounding mountains and groundwater recharged by these streams. Water quality is altered by a number of factors including consumptive use, importation of water high in dissolved solids, runoff from urban and agricultural areas, and the recycling of water within the Santa Ana River Basin.[1]

Surface Water Quality. The most serious regional issue in the Santa Ana River Watershed is degradation of water quality by nitrogen and TDS. Historically, the Santa Ana River and its major tributaries flowed year-round; however, diversion for irrigation has resulted in decreased flow and groundwater recharge. Primary water quality concerns in the Middle Santa Ana River Management Area (which includes the Middle Santa Ana River HA and the Rialto-Colton HA) include TDS, total inorganic nitrogen levels, contaminant plumes in groundwater, bacterial quality of surface waters, and impacts from confined animal feeding operations.[2]

The United States Geological Survey (USGS) maintains several gauging stations in the Santa Ana River. However, most of the data collected are associated only with discharge measurements. Table C summarizes water quality measurements collected by the USGS at Gauge 11074000 in the Santa Ana River below Prado Dam for selected constituents. The data are summarized as averages by water year, which is defined by the USGS as October through September.

Table C: Average Santa Ana River Water Quality by Water Year

Constituent	Units	1998–1999	1999–2000	2000–2001	2001–2002	2002–2003	2003–2004	2004–2005	2005–2006	2006–2007	2007–2008	2008–2009
Alkalinity	mg/L	187.2	177.6	191.5	202.8	177.1	186.3	193.5	199.8	205	180	200
Ammonia	mg/L as N	0.3	0.2	0.3	0.06	0.1	0.07	0.14	0.11	0.06	0.061	0.49
Calcium	mg/L	71.0	65.2	70.0	—	—	—	—	—	—	—	—
Chloride	mg/L	91.0	93.5	100.6	107.9	—	97.8	95.7	108.3	117.9	106	119
Dissolved Organic Carbon	mg/L	5.9	5.8	4.8	—	—	—	—	—	—	—	—
Dissolved Oxygen	mg/L	9.4	8.7	8.7	9.0	8.7	8.9	9.5	9.8	9.9	10.3	9.9
Fluoride	mg/L	0.4	0.4	0.4	—	—	—	—	—	—	—	—
Hardness	mg/L as $CaCO_3$	244.7	229.3	244.5	—	—	—	—	—	—	—	—
Iron	µg/L	15.1	16.4	15.6	—	—	—	—	—	—	—	—
Magnesium	mg/L	16.6	16.1	16.9	—	—	—	—	—	—	—	—
Manganese	µg/L	96.7	73.0	76.2	—	—	—	—	—	—	—	—
Nitrate+Nitrite	mg/L as N	6.5	5.0	5.0	5.3	3.6	4.3	3.9	5.1	5.4	4.4	3.9
Nitrite	mg/L as N	0.09	0.08	0.11	0.07	0.09	0.13	0.07	0.06	0.05	0.05	0.06
Ortho-Phosphate	mg/L as P	0.8	0.7	0.8	0.78	0.6	0.52	0.58	0.68	0.92	1.02	0.97
pH	pH units	8.1	8.1	8.0	8.1	8.1	8.1	8.1	8.1	8.2	8.0	8.1
Phosphorus	mg/L as P	1.3	1.2	1.0	0.89	0.9	0.74	0.69	0.91	1.2	1.2	1.0
Potassium	mg/L	10.2	9.5	10.6	—	—	—	—	—	—	—	—
Silica	mg/L	20.0	18.4	19.5	—	—	—	—	—	—	—	—
Sodium	mg/L	79.1	80.0	86.9	—	—	—	—	—	—	—	—
Specific Conductance	µs/cm	932.8	896.9	911.1	943.4	817.4	884.3	855.4	921.8	1,019	919	1,000
Sulfate	mg/L	96.7	92.1	96.9	100.6	81.7	88.0	92.4	104.5	109.0	93.7	101.4
Temperature	°C	17.8	18.8	18.5	18.2	18.5	18.8	18.5	18.5	19.0	18.4	19.1
Total Dissolved Solids	mg/L	541.4	506.6	541.7	—	—	—	—	—	—	—	—

Constituent	Units	1998–1999	1999–2000	2000–2001	2001–2002	2002–2003	2003–2004	2004–2005	2005–2006	2006–2007	2007–2008	2008–2009
Total Suspended Organic Carbon	mg/L	2.1	1.9	3.0	—	—	—	—	—	—	—	—
Zinc	µg/L	20.8	41.3	16.7	—	—	—	—	—	—	—	—

Source: United States Geological Survey. *Water Data Reports*. 1998–2009.
Note: A water year is defined as the period from October to September. °C = degrees Celsius mg/L = milligrams per liter µg/L = micrograms per liter N = nitrogen CaCO3 = calcium carbonate P = phosphorus

Of the constituents listed in Table C, iron, manganese, pH, and sulfate have water quality objectives. The average concentration of chloride, iron, pH, and sulfate measured at Gauge 11074000 are all below the water quality objectives for these constituents. Data for manganese was only available from 1998 to 2001; however, the average concentration measured during these years exceeded the water quality objective of 0.5 mg/L (50 µg/L).

Ground Water Quality. TDS in the Colton Groundwater Management Zone ranges from 201 to 291 mg/L and averages 230 mg/L.[1] According to the Basin Plan, the ambient nitrate level in the Colton Groundwater Management Zone is 2.9 mg/L, which exceeds the 2.7 mg/L WQO.

3.7.2 Section 303(d) Listed Waters

The SWRCB approved the 2010 Integrated Report (Clean Water Act Section 303(d) List/305(b) Report on August 4, 2010. On November 12, 2010, the EPA approved the 2010 California 303(d) List of Water Quality Limited Segments. Reach 4 of the Santa Ana River is listed as impaired for pathogens and salinity/total dissolved solids/chlorides on the 2010 303(d) list. The potential source of the pathogen impairment is listed as nonpoint sources. The proposed TMDL completion date is January 1, 2019.

4.0 ENVIRONMENTAL CONSEQUENCES

This chapter discusses the potential environmental effects related to hydrology and water quality with implementation of the project, as well as the procedures and practices that will be applied to reduce those effects.

4.1 IMPACT ASSESSMENT METHODOLOGY

The purpose of this Water Quality Assessment Report is to analyze the differences between the existing condition and the project build condition with respect to water quality impacts. The assessment takes the following into consideration:

- Pollutant sources (change in land use);
- Impervious area and relation to amount of runoff (increase or decrease);
- Application of BMPs (number of BMPs, new technologies, effectiveness); and
- Discharges into impaired waters (listed pursuant to Section 303[d] of the Federal CWA).

4.2 POTENTIAL IMPACTS TO WATER QUALITY

4.2.1 Short-Term Impacts During Construction

Construction of the project would involve excavation, soil stockpiling, grading, and the installation of structural foundations, new rail, and auxiliary facilities. Pollutants of concern during construction include sediments, trash, petroleum products, concrete waste (dry and wet), sanitary waste, and chemicals. Each of these pollutants on its own or in combination with other pollutants can have a detrimental effect on water quality. During construction activities, excavated soil would be exposed, and there would be an increased potential for soil erosion and sedimentation compared to existing conditions. In addition, during storm events, erosion and sedimentation could occur at an accelerated rate. During construction, the total disturbed area would be approximately 61 acres. In addition, chemicals, liquid products, and petroleum products (such as paints, solvents, and fuels), concrete-related waste, and other construction debris and waste may be spilled or leaked, and have the potential to discharge into receiving waters. These effects could result in significant direct and indirect impacts to surface water quality.

Due to the depth to groundwater (greater than 70 feet bgs), groundwater dewatering is not anticipated during project construction. In addition, other non-stormwater dewatering discharges (e.g., pipe flushing) are not anticipated during construction. For these reasons, no significant adverse effects to groundwater quality are expected during construction.

The project would be subject to the requirements of the Construction General Permit, which will require the preparation of an SWPPP and implementation of construction BMPs during construction activities to minimize impacts to surface waters. Construction BMPs would include, but not be limited to, Erosion and Sediment Control BMPs designed to minimize erosion and retain sediment on-site and Good Housekeeping BMPs to prevent spills, leaks, and discharge of construction debris and waste into receiving waters.

The requirements of the Construction General Permit are based on the risk level of the project. The overall risk level is based on two factors: receiving water risk and sediment risk. Runoff from the project site would not discharge to a 303(d) listed waterbody impaired for sediment or discharge to a waterbody with designated beneficial uses of SPAWN, COLD, and MIGRATORY; therefore, the receiving water

risk is low. Based on the anticipated construction schedule (September 2012 through September 2114), the project sediment risk would be low (soil loss is approximately 5.5 tons/acre). Therefore the project would be classified as Risk Level 1. Risk Level 1 projects are required to implement Good Housekeeping, Erosion Control, and Sediment Control BMPs and perform quarterly non-storm water discharge observations and weekly, pre-storm, interim storm, and post-storm inspections as specified in the Construction General Permit.

When construction BMPs are properly designed, implemented, and maintained to address pollutants of concern, as presented in Measure WQ-1 in Section 5.0, adverse water quality impacts would be minimized during construction of the project to a less-than-significant level.

4.2.2 Long-Term Impacts During Operation

The future operation of the project would involve numerous activities that could introduce one or more pollutants of concern into runoff from the project and may include, but be limited to, sediments, heavy metals, oil and grease, trash and debris, pesticides, and organic compounds. The project area is generally developed and, therefore, a permanent increase in impervious surfaces would generally be limited to the E Street Platform and parking area. This component of the project would increase the impervious surface area by approximately 1.8 acres compared to existing conditions. An increase in impervious area would result in a corresponding increase in the volume of runoff generated during storm events and would be capable of transporting pollutants to local receiving waters. These direct and indirect impacts are considered significant.

This project will consider implementing low impact development to the maximum extent practicable. Low Impact Development (LID) is an approach to land development (or re-development) that works with nature to manage stormwater as close to its source as possible. LID employs principles such as preserving and recreating natural landscape features, minimizing effective imperviousness to create functional and appealing site drainage that treat stormwater as a resource rather than a waste product. There are many practices that have been used to adhere to these principles such as bioretention facilities, rain gardens, vegetated rooftops, rain barrels, and permeable pavements. By implementing LID principles and practices, water can be managed in a way that reduces the impact of built areas and promotes the natural movement of water within an ecosystem or watershed. Applied on a broad scale, LID can maintain or restore a watershed's hydrologic and ecological functions.

Currently, runoff from the railroad mainline in the project area is treated to some level, and runoff from the E Street Platform areas and Depot is untreated. To prevent degradation of receiving water quality with implementation of the proposed project, Source Control, Site Design, and Treatment Control BMPs would be implemented to target constituents of concern in runoff from the project area (see Figure 4). Site Design BMPs are planning methods and concepts that are taken into consideration during project design (e.g., reducing or disconnecting impervious surface areas). Source Control BMPs are pollution prevention practices that are designed to reduce pollutants in runoff from a project site (e.g., street sweeping, drainage system maintenance). Treatment Control BMPs are engineered systems that use physical, chemical, or biological processes to remove pollutants.

Proposed Site Design BMPs include minimizing impervious surface areas by constructing rail track sections using ballast, which is permeable and conducive to infiltration. In addition, runoff from the

project area would drain to the adjoining graded ditches and would infiltrate directly into the underlying native soils. Proposed Source Control BMPs would include education of property owners, activity restrictions, preparation of spill contingency plans, employee training and education program, common area catch basin inspection, protections of slopes and channels, storm drain signage, energy dissipaters (in culverts), trash storage areas and litter control, and alternative building materials (concrete instead of wood ties which are treated with creosote and other chemicals). Proposed Treatment Control BMPs include non-vegetated drainage swales, detention and/or infiltration basin, and/or manufactured/proprietary devices to treat runoff from the Depot area. The Treatment BMP design would be integrated into the final design of the project and is discussed in more detail below.

Figure 4. Conceptual BMP Layout

Drainage Swales. Swales are channels that convey storm water and remove pollutants by sedimentation, adsorption to soil particles, and infiltration through soil. Swales would be integrated into the project design to take advantage of their effectiveness at removing debris and solid particles, and, to a lesser extent, removal of dissolved constituents.

Detention Basins. Detention basins are designed to reduce sediment and particulate loading in storm water runoff. Water is temporarily detained in the basin to allow sediment and particulates to settle out before the runoff is discharged to receiving waters. Detention devices usually retain water for 24 to 72 hours depending on soil characteristics. Detention basins would be integrated into the project design to attenuate peak flows from new impervious surface areas and would facilitate the settling of soil particles prior to discharge into the drainage system.

Infiltration Basins. Infiltration basins are designed to remove pollutants by capturing storm water runoff and infiltrating it directly to the soil, instead of discharging into receiving waters. Infiltration basins remove a wider range of pollutants than detention basins, but are generally limited to the treatment capacity of the underlying soil. Infiltration basins would be integrated into the project design to remove suspended solids, nutrients, pesticides, particulate metals, dissolved metals, pathogens, litter, biochemical oxygen demand, and total dissolved solids. Geotechnical studies done for this project identify the project soils as A and B soils which are conducive to infiltration BMPs.

Manufactured/Proprietary Devices. Proprietary systems are manufactured storm water treatment systems that are available from commercial vendors. These systems include hydrodynamic systems such as gravity and vortex separators, filtration systems, catch basin media inserts, chemical treatment systems, package treatment plants, and prefabricated detention structures. Proprietary systems proposed for the project could include Contech StormFilter®, Filtera® Bioretention System (Planter Box), MWS-LINEAR Stormwater Filtration System, Hydro International Up-Flo™ Filter, AbTech Ultra-Urban® Filter, AquaShield Aqua-Guardian™ Catch Basin Insert, Bio Clean Curb Inlet Basket, ClearWater BMP Filtration System, Fabco StormPlex®, EcoSense™ Stormwater Filtration System, StormTreat™ System, or a media filter catch basin insert system. Final selection would be contingent on the completion of final drainage plans.

The Treatment Control BMPs would target constituents of concern from the railroad mainline (sediments, heavy metals, oil and grease, trash and debris, pesticides, and organic compounds) and the Depot and E Street Platform area (sediments, heavy metals, oil and grease, trash and debris, pesticides, nutrients, and organic compounds). Reach 4 of the Santa Ana River is listed as impaired for pathogens on the 2010 California 303(d) List of Water Quality Limited Segments. However, pathogens are not a constituent of concern from the railroad mainline. Therefore, the proposed project would address General Purpose Pollutant Removal.

As stated above, the Source Control, Site Design, and Treatment Control BMPs would target constituents of concern from the railroad mainline. Therefore, with the implementation of Site Design, Source Control, and Treatment Control BMPs as stipulated in Measure WQ-2 in Section 5.0, potential adverse impacts to water quality would be reduced to a less-than-significant level.

4.2.3 Cumulative Impact

The cumulative study area for water quality and storm water runoff is the Bunker Hill HSA of the Upper Santa Ana River HA within the Santa Ana River Watershed because the project site is tributary to this watershed. The Bunker Hill HSA is comprised of approximately 124,791 acres and, therefore, the project represents a very small fraction of the total watershed.

The existing trend of urbanization in the Santa Ana River Watershed is projected to continue. Conversion of undeveloped land to transportation, commercial/industrial, retail, and residential uses results in hydromodification (alteration of the hydrologic characteristics of coastal and non-coastal waters, which in turn could cause degradation of water resources) and increased loading of pollutants into surface waters and indirectly into groundwater. It also introduces new sources of pollutants associated with the new land uses.

To counteract the impacts associated with increased development, each project proposed in this watershed must undergo review by the applicable Lead Agency for compliance with NPDES permits for construction activities, groundwater dewatering, and project operations, as well as compliance with local urban runoff ordinances. For development projects, this includes compliance with the San Bernardino County WQMP, as specified in local ordinances. BMPs must be employed in site design to reduce sources of pollutants as well as to treat storm water runoff. For projects within Caltrans jurisdiction, this includes compliance with the Caltrans Stormwater Management Plan (SWMP) and local requirements of the Santa Ana RWQCB.

The purpose of the NPDES permit program and, by extension, the TMDL program, is to restore the beneficial uses of receiving waters. NPDES permits are updated every five years by the Santa Ana RWQCB based on the conditions of the watershed. Compliance with the NPDES program and mitigation requirements contained in this report is considered sufficient to mitigate impacts to water quality. Because the project involves improvements to an existing railroad facility within downtown San Bernardino and includes treatment measures that currently do not exist, the project would reduce existing adverse effects on water quality in the project area and therefore should not contribute to cumulatively considerable water quality impacts.

5.0 AVOIDANCE, MINIMIZATION, AND/OR MITIGATION MEASURES

Compliance with the standard requirements of the Municipal NPDES Permit, the Construction General Permit, and the City of San Bernardino Code of Ordinances and implementation of construction and post-construction BMPs to address pollutants of concern, as listed below in Measures WQ-1 and WQ-2, would minimize the potential project-related short- and long-term impacts to water quality.

WQ-1: Prepare and Implement a Stormwater Pollution Prevention Plan. During construction, SANBAG will comply with the provisions of the NPDES General Permit for Storm Water Discharges Associated with Construction and Land Disturbance Activities (Construction General Permit) (Order No. 2009-0009-DWQ, NPDES No. CAS000002), and any subsequent permits, as they relate to construction activities for the project. This will include submission of the Permit Registration Documents, including a Notice of Intent (NOI), risk assessment, site map, SWPPP, annual fee, and signed certification statement to the SWRCB via the Storm Water Multi-Application and Report Tracking System (SMARTS) at least 7 days prior to the start of construction.

The SWPPP will reflect localized surface hydrological conditions and will be reviewed and approved by SANBAG or its engineer prior to commencement of work and will be made conditions of the contract with the contractor selected to build the project. The SWPPP shall incorporate BMPs in the following categories:

- soil stabilization and erosion control practices (e.g., hydroseeding, erosion control blankets, mulching);
- sediment control practices (temporary sediment basins, fiber rolls);
- temporary and post-construction on- and off-site runoff controls;
- waste management, handling, and disposal control practices;
- corrective action and spill contingency measures;
- agency and responsible party contact information; and
- training procedures that shall be used to ensure that workers are aware of permit requirements and proper installation methods for BMPs specified in the SWPPP.

Construction activities will not commence until a Waste Discharger Identification (WDID) number is received from the SMARTS. The SWPPP will be prepared by a Qualified SWPPP Developer (QSD) that meets the requirements of the Construction General Permit. The BMPs identified in the SWPPP will be implemented throughout project construction. SANBAG will comply with the Risk Level 1 BMP implementation and monitoring requirements of the Construction General Permit. A Notice of Termination (NOT) will be submitted to the SWRCB within 90 days of completion of construction and stabilization of the site.

WQ-2: Prepare and Implement a Water Quality Management Plan for Post-Construction Runoff. During final design, SANBAG will prepare a final WQMP that details the Source Control, Site Design, and Treatment Control BMPs to be incorporated into the proposed project. The BMPs will be consistent with the San Bernardino County Stormwater Program *Model Water Quality Management Plan Guidance* and *Water Quality Management Plan Template* and will be properly designed, installed, and maintained

to target pollutants of concern. The project WQMP will include an operations and maintenance plan to ensure long-term effectiveness and maintenance of project-related Site Design and Treatment Control BMPs.

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Appendix A
Reference Material

APPENDIX H LAND USE TECHNICAL MEMORANDUM

DOWNTOWN SAN BERNARDINO PASSENGER RAIL PROJECT
Draft Land Use Technical Memorandum

DRAFT

September 22nd, 2011

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1.1 Introduction

The purpose of this section is to provide baseline data on the existing land use characteristics of the Downtown San Bernardino Passenger Rail Project (Project); to assess whether the Project is consistent with applicable land use plans and policies; to identify any potentially significant land use changes resulting from implementation of the proposed Downtown San Bernardino Passenger Rail Project (DSBPRP) and to determine any necessary project mitigation measures for land use impacts.

The project area for the land use analysis encompasses an area within approximately 300 feet of the centerline of the railroad tracks (Project alignment) and within a quarter-mile radius of the platform (platform area). This section analyzes the land use impacts associated with the No Project Alternative and the Project Alternative.

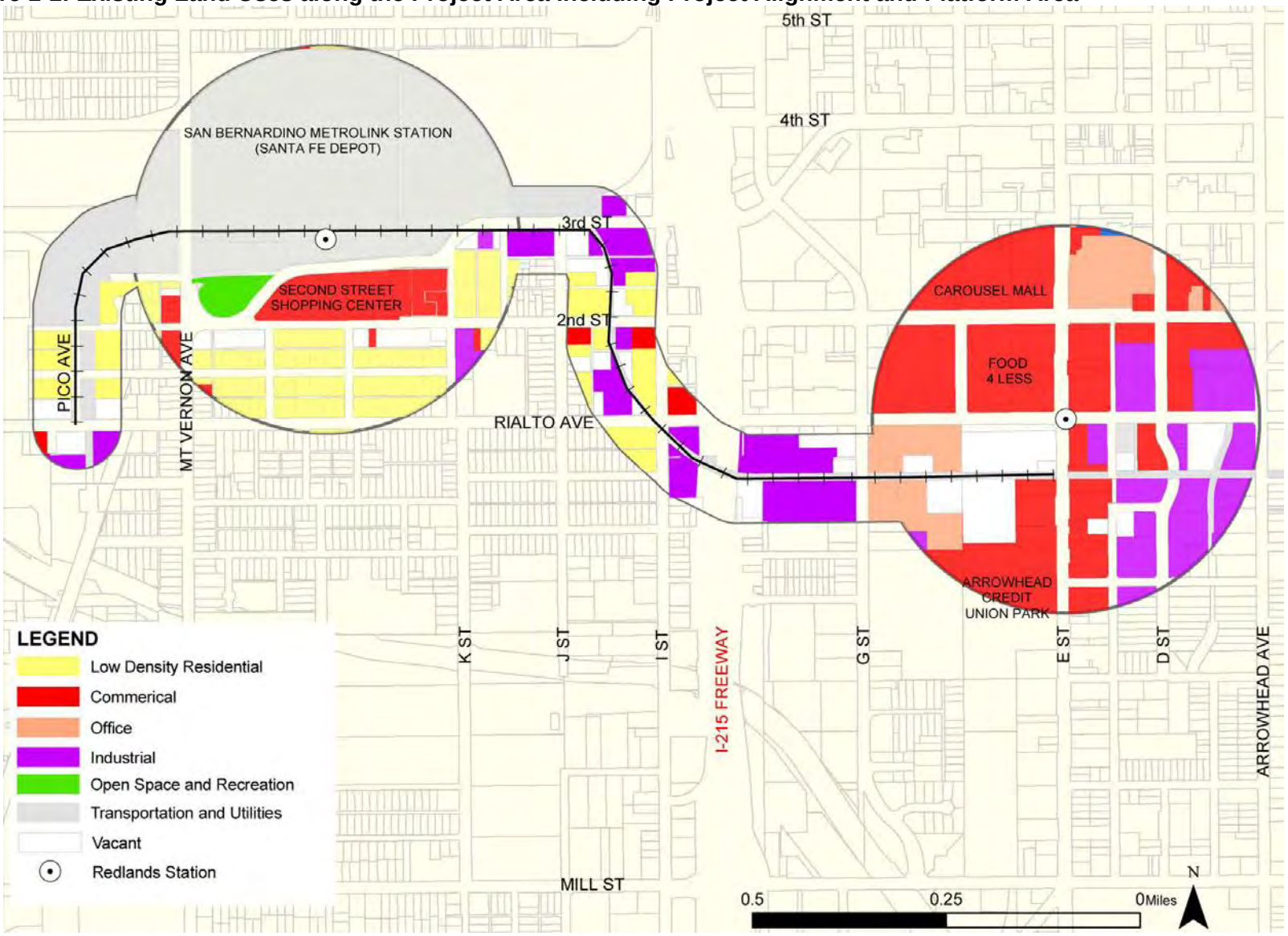
1.2 Regional Setting

The Project is located in the City of San Bernardino. The City of San Bernardino is part of a larger area called the San Bernardino Valley. The Valley encompasses approximately 500 square miles and contains approximately 75 percent of San Bernardino County's population. San Bernardino Associated Governments (SANBAG) acts as the transportation planning agency for San Bernardino County. San Bernardino County, along with five other counties (which include Ventura, Los Angeles, Orange, Riverside and Imperial counties) forms the Southern California Association of Governments' (SCAG) six-county region. The Valley is largely suburban in character with a concentration of commercial and industrial development particularly along the Interstate 10 (I-10), Interstate 15 (I-15), and Interstate 215 (I-215) freeways. Much of the Valley's residential development is concentrated on the blocks between major arterial streets. Single-family residential remains the primary housing type in much of the Valley, with apartments and condominiums comprising a small percentage. Commercial development in the Valley consists of a mix of strip retail developments and office buildings located along major arterials, as well as large shopping centers typically near freeways. Industrial uses are generally concentrated adjacent to I-10 and I-15 freeways in close proximity to the Ontario International Airport.

1.3 Existing Land Use along the Project Area

This section provides a more detailed discussion of the existing land uses along the project area. The project area comprises of the project alignment which includes area within 300 feet of the centerline of the railroad tracks and platform area which includes quarter-mile area around proposed platforms, as shown in Figure 1-1. The discussion of the existing land uses are based on San Bernardino Associated Governments' (SANBAG) 2008 land use data with refinements based on review of aerial photographs and field windshield surveys conducted by the consultant team during the months of June 2010 and July 2011.

Figure 1-1: Existing Land Uses along the Project Area including Project Alignment and Platform Area



Source: SANBAG 2008 land use data; prepared by Gruen Associates

The project area contains a diverse collection of land use types including commercial, storage/warehouse, office, industrial uses and residential uses. Major activity centers in the project area include the San Bernardino Metrolink Station, City and the County of San Bernardino Civic uses, Carousel Mall and Arrowhead Credit Union Baseball Park.

1.3.1 Land Uses along the Project Alignment

The alignment begins at the intersection of Rialto Avenue and Pico Avenue intersection and heads north towards the San Bernardino Metrolink Station. This part of the alignment is primarily lined with single-family residential uses, a few vacant parcels and industrial uses. The most prominent feature along the alignment is the San Bernardino Metrolink Station, which is a historical landmark listed on the National Register of Historic Places. The San Bernardino Metrolink Station currently serves one Amtrak and three Metrolink lines. A number of existing bus lines serve the San Bernardino Metrolink Station with bus stops located on 3rd Street. Directly south of 3rd Street is the newly constructed Second Street Shopping Center, a community shopping center. There are no direct pedestrian connections from this shopping center to the San Bernardino Metrolink Station.

View of the San Bernardino Metrolink Station

Second Street Shopping Center located south of the San Bernardino Metrolink Station

Extending from the San Bernardino Metrolink Station, the alignment is largely lined by industrial uses with a few vacant lots and some single-family residential uses. Between 3rd and 2nd Streets, primarily industrial uses are located north and south of 3rd Street with a few vacant parcels and residential uses near 2nd Street fronting the railroad. Single-family residential uses are located around these industrial uses. Between 2nd Street and Rialto Avenue, industrial uses and some residential uses are located along the railroad tracks with single-family residential and neighborhood commercial uses on one or two parcels away from the tracks.

View of railroad tracks looking south on 2nd Street

View of the diagonal railroad tracks near the intersection with I Street and Rialto Avenue

Between I-215 Freeway and G Street, industrial development lines the railroad tracks. Many vacant parcels are located at the southeast corner of railroad and I -215 Freeway intersection and northwest corner of G Street and Rialto Avenue intersection. East of G Street, the character changes to a mixture of retail, office and civic uses. Offices and civic uses including a lawyer's office and the Department of Homeland Security office are located at/near the southeast corner of G Street and Rialto Avenue. In this segment, older retail developments with their parking lots fronting the sidewalk are located along E Street.

Downtown San Bernardino Passenger Rail Project intersection with Rialto Avenue

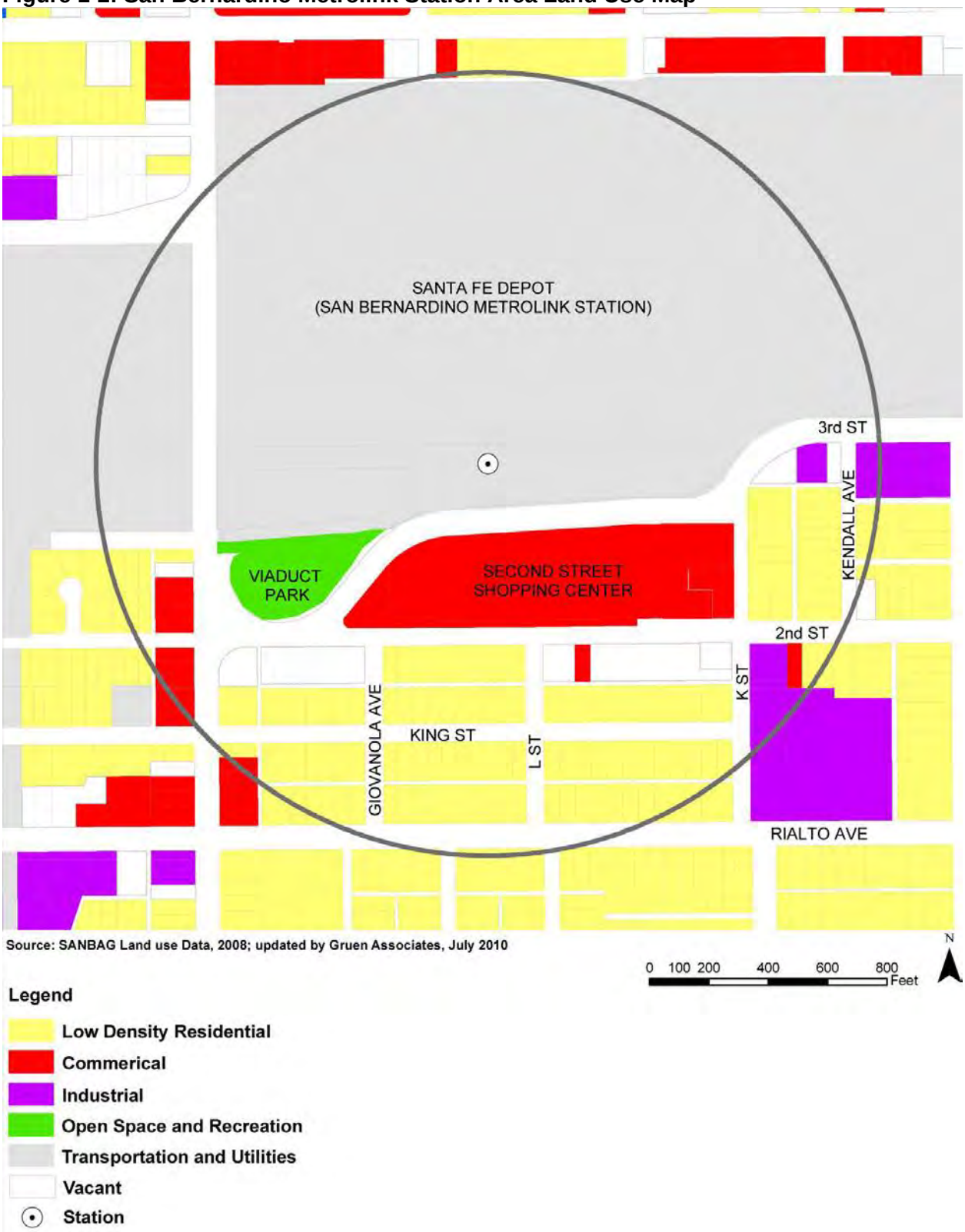
1.3.2 Land Uses within Platform Areas

For the Downtown San Bernardino Passenger Rail Project, platforms would be located at San Bernardino Metrolink Station and new platforms near the southwest corner of Rialto Avenue and E Street. On the existing land use maps included, intersections with potential platforms are noted, but the precise location of platform is not included. The land use character for the quarter-mile areas around the proposed platforms is discussed below:

- **San Bernardino Metrolink Station** - The proposed platforms would be located within the existing San Bernardino Metrolink Station site (see Figure 1-2). The historic depot is built in the Spanish Mission Revival Style with some Moorish influence. The San Bernardino Metrolink Station includes a passenger waiting area, a snack booth and offices on the first floor. SANBAG occupies the second floor of this historic depot. A significant portion of the platform area is occupied by the Depot tracks and to the south of the Depot is the Second Street Shopping Center, a newly constructed community shopping center anchored by the Superior Grocery Store. A few vacant parcels are located along 2nd Street, across from the Superior Grocery Store, between 1st Street and K Street. A single-family residential neighborhood with some interspersed cottages, townhomes and apartments are located primarily south of 2nd Street. A few industrial buildings are located at the southeast corner of 2nd Street and K Street and southwest corner of 3rd Street and J Street.

Commercial and vacant parcels located south of 2nd Street across the Second Street Shopping Center

Figure 1-2: San Bernardino Metrolink Station Area Land Use Map

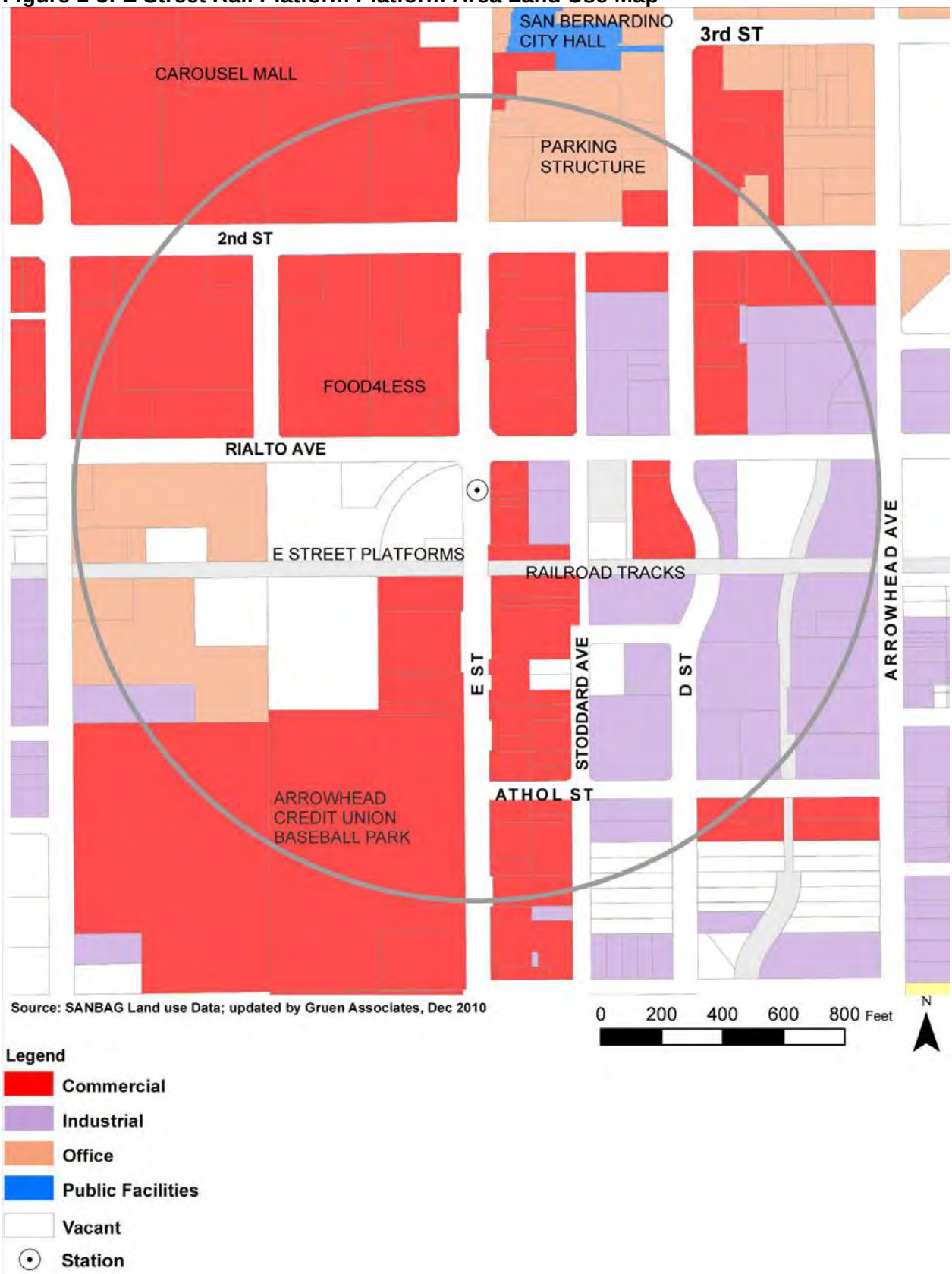


- **E Street Rail Platforms -** The platform would be located on the west side of E Street south of Rialto Avenue and just south of the railroad tracks (Figure 1-3). The quarter-mile platform area has predominantly commercial and industrial uses. A Food 4 Less is located at the northwest corner of E Street and Rialto Avenue intersection. The Astro Motel marks the southeast corner of this intersection. A Bekins storage facility is located south of the railroad tracks, on the west side of E Street. Industrial uses are located south of the railroad tracks, and east of Stoddard Avenue. A few vacant parcels are also located within the quarter mile of this platform location.

  North of Rialto Avenue, primarily commercial development lines E Street. Commercial uses consist of auto sales and vehicle repair shops, small-scale retail development, and restaurants. A large number of buildings are vacant and/or in poor condition. A portion of the Carousel Mall parking lot is located within the project area on the west side of E Street between 4th Street and 2nd Street. The San Bernardino City Hall is located on the east side of E Street, just outside the ¼ mile area, and is connected to the Carousel Mall via a pedestrian walkway over E Street. However, the City Hall parking structure is located within the ¼-mile area. Other commercial uses within the platform area north of Rialto Avenue include a Union Bank of California Building, a carwash, medical offices, restaurants, and a few vacant buildings. South of Rialto Avenue, the character of E Street changes to auto-oriented form of development, currently less supportive of transit. Primarily commercial and recreational uses occur in this part of the platform area. Commercial uses include small scale retail uses, auto serving uses such as sales and repair, warehouses, restaurants, medical offices and a motel. Recreational uses in this segment include the Arrowhead Credit Union Park, a minor baseball league stadium. Many industrial uses are located in the southeast quadrant of the platform area.

Arrowhead Credit Union Park

Figure 1-3: E Street Rail Platform Platform Area Land Use Map



1.4 Regulatory Framework

This section includes relevant goals, objectives, and policies from land use planning documents that apply to areas traversed by the Project. The following land use planning documents cover the area traversed by the alignment.

- SCAG Regional Comprehensive Plan and Guide
- SCAG Regional Transportation Plan
- SCAG Compass Blueprint 2% Strategy
- San Bernardino County Non-Motorized Transportation Plan
- City of San Bernardino General Plan
- City of San Bernardino Development Code
- Other Plans

1.4.1 SCAG Regional Comprehensive Plan and Guide

The Southern California Association of Governments (SCAG) is designated by the federal government as the Metropolitan Planning Organization (MPO) for the counties of Imperial, Los Angeles, Orange, Riverside, San Bernardino, and Ventura. SCAG's Regional Comprehensive Plan (RCP) adopted in 2008 provides a 20 year framework for local and regional development. The Plan suggests that the region's transportation and planning agencies in cooperation and coordination with local jurisdictions should promote policies and strategies that further integrate land use and transportation. The Vision of the Plan is *"To foster a Southern California region that addresses future needs while recognizing the interrelationship between economic prosperity natural resource sustainability and quality of life. Through measured performance and tangible outcomes, the RCP serves both as an action plan for implementation of short-term strategies and a call to action for strategic, long-term initiatives that are guided by the following Guiding Principles for sustaining a livable region."*

The following land use goals are from the RCP:

- Focus growth in existing and emerging centers and along major transportation corridors.
- Create significant areas of mixed-use development and walkable, "people-scaled" communities.
- Target growth in housing, employment and commercial development within walking distance of existing and planned transit stations.

1.4.2 SCAG Regional Transportation Plan

In addition to the RCP, SCAG is responsible for the Regional Transportation Plan (RTP). The 2008 RTP focuses on making the connections between land use and transportation and presents the transportation vision of the region through 2035. The following goals of the 2008 Plan encompass transportation security. SCAG is currently working on updating the RTP, which will released in 2012.

- Maximize mobility and accessibility for all people and goods in the region
- Ensure travel safety and reliability for all people and goods in the region
- Preserve and ensure a sustainable regional transportation system
- Maximize the productivity of our transportation system
- Protect the environment, improve air quality and promote energy efficiency
- Encourage land use and growth patterns that complement our transportation investments
- Maximize the security of the regional transportation system through improved system monitoring, rapid recovery planning, and coordination with other security agencies

1.4.3 SCAG Compass Blueprint 2% Strategy

SCAG Compass Blueprint 2% Strategy is a guideline to implement the Growth Vision for Southern California. It recommends "*modest changes to current land uses and transportation trends on only 2% of the land area of the region – the 2% Strategy Opportunity Areas*." The goals of the Growth Vision are mobility, livability, prosperity, and sustainability. To achieve these goals, the Growth Vision encourages:

- Focusing growth in existing and emerging centers and along major transportation corridors
- Creating significant areas of mixed-use development and walkable communities
- Targeting growth around existing and planned transit stations
- Preserving existing open space and stable residential areas

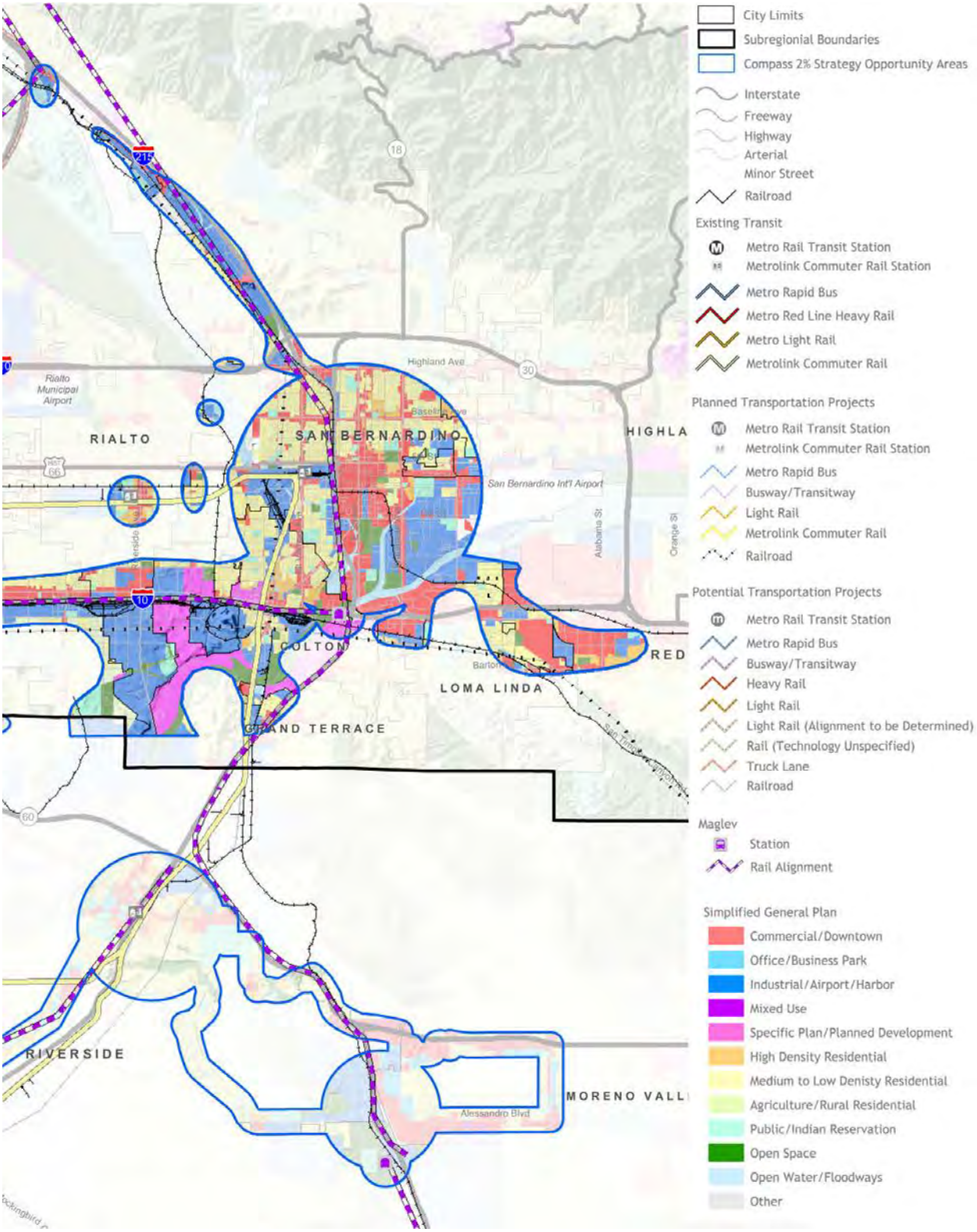
It increasingly relies on land use strategies and embodies the idea that "*small, incremental, and strategic changes in small parts of the region can yield great benefit to the region as a whole as well as to the individual cities*."

The identified 2% Opportunity Areas are key areas in the region for targeting growth, where projects, plans and policies are consistent with Compass Blueprint principles. The 2% Opportunity Areas are primarily composed of Metro Centers, City Centers, Rail Transit Stops, BRT Corridors, Airport, Ports and Industrial Centers and Priority Residential In-fill Areas. The Compass 2% Strategy Opportunity Area map for San Bernardino is shown in Figure 1-4. The entire Project is located within the Compass 2% Strategy Opportunity Area.

1.4.4 San Bernardino County Non-Motorized Transportation Plan – 2011 Update

The intent of the San Bernardino County Non-Motorized Transportation Plan – 2011 Update is to ensure the development of a cohesive, consistent, and quality bikeway system throughout the County and to coordinate and guide the provision of all bicycle related plans, programs and projects within the County. It emphasizes safety, access, quality of life and effective implementation as imperative elements for San Bernardino County's success as a bicycle-friendly county.

Figure 1-4: Compass Blueprint Strategy Map for San Bernardino and its Vicinity



Source: Southern California Association of Governments

The Plan policies emphasize on improving pedestrian and bicycle access to transit. One of the policy states that SANBAG should work with and encourage transit operators to provide end-of-trip pedestrian and bicycle-serving facilities, such as bike lockers, racks, and capacity on transit vehicles to carry bicycles and better facilitate the integration and use of nonmotorized transportation within the regional transportation system.

The Plan proposes expanding the existing bikeway system within the City. The first group of priority improvements within the City is within our project area which includes construction of bike lanes on Rialto Ave. from G St. to E St.

The City of San Bernardino has bike racks dispersed throughout the City, typically at retail centers, schools and multi-unit housing complexes. The City also has a series of bike lockers located at the San Bernardino Metrolink Station.

1.4.5 City of San Bernardino's General Plan

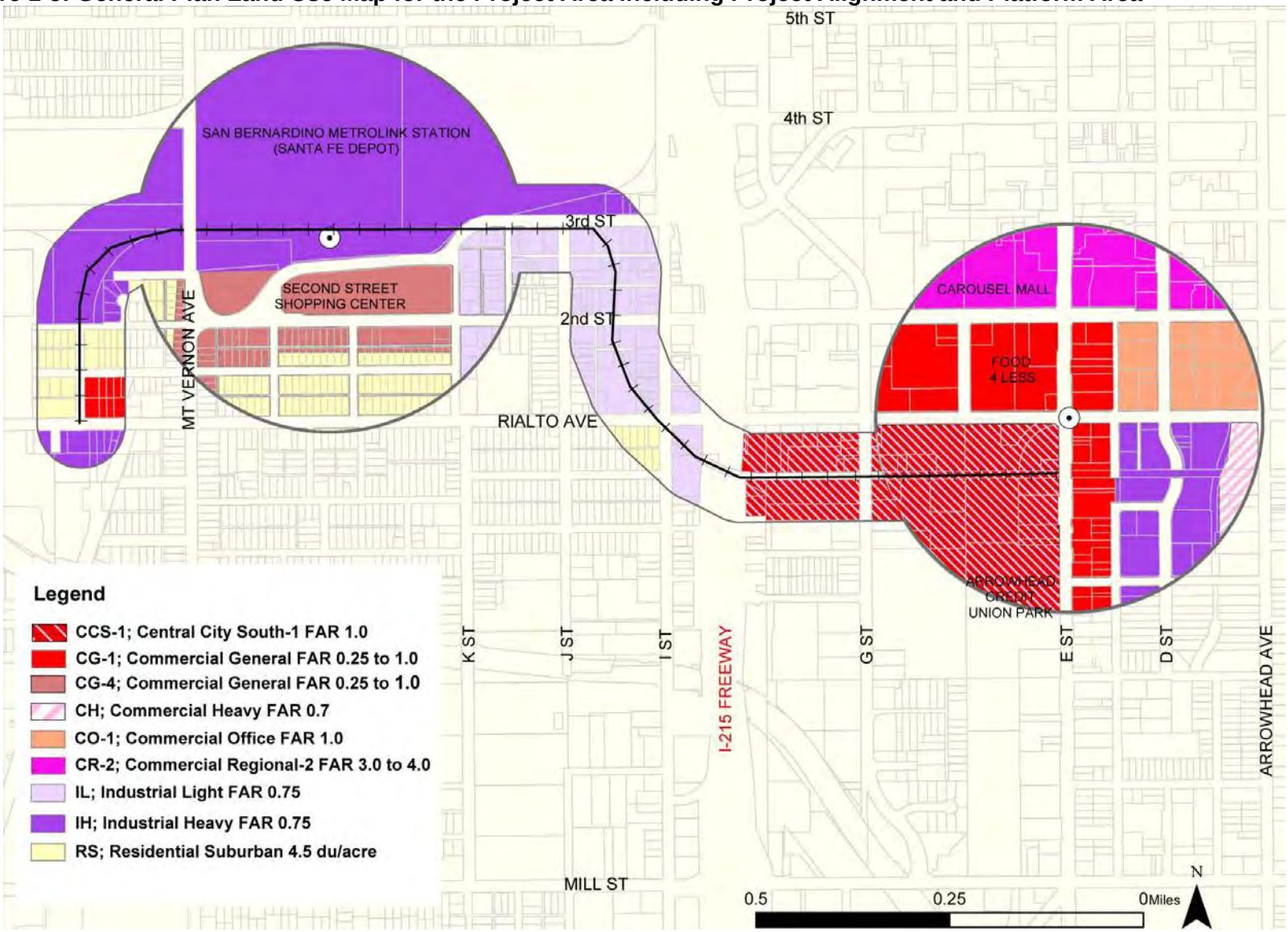
The City of San Bernardino's General Plan was adopted in November 2005. Planned land use and policies that support transit are included in the Land Use and Circulation Elements of the General Plan. The Parks, Recreation and Trails Element and the Economic Development Element have also been discussed in this section.

1.4.5.1 Land Use Element

The General Plan land use designations for the project area are shown in Figure 1-5. The alignment is lined primarily with industrial and commercial with some residential uses. The San Bernardino Metrolink Platform Area is dominated by commercial, industrial and single family uses (Figure 1-6). The existing single-family uses located adjacent to the alignment between Main Street and Rialto Avenue are non-conforming uses as these are designated Light Industrial in the General Plan. Primarily commercial, civic and industrial uses are located within ¼ mile of the E Street Rail Platform Area (Figure 1-7). General Plan land use policies that relate to transit are provided below:

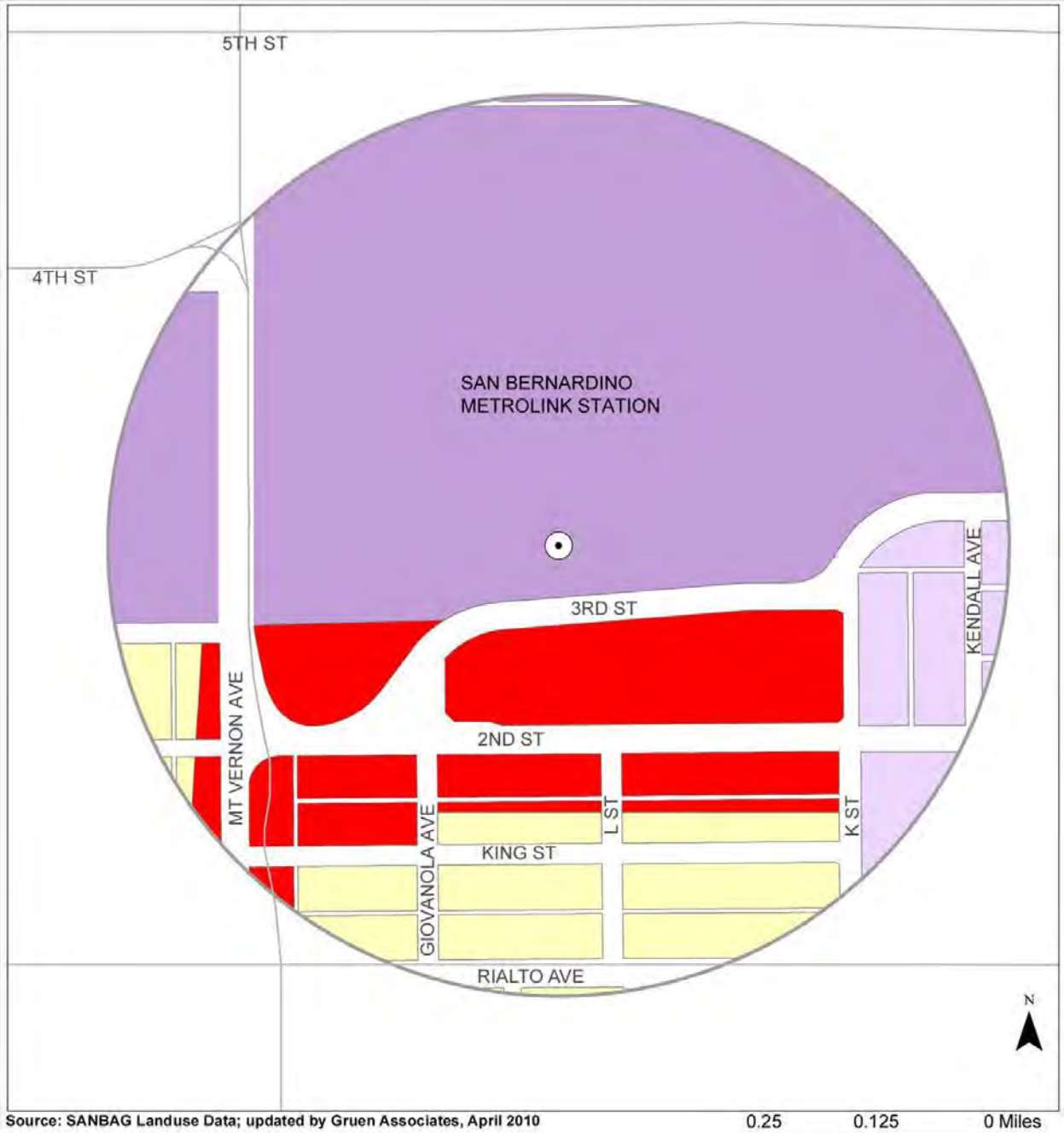
- Sensitively integrate regionally beneficial land uses such as transportation corridors, flood control systems, utility corridors, and recreational corridors into the community.
- Commercial centers, open spaces, educational facilities, and recreational facilities should be linked to residential neighborhoods.
- Circulation system improvements shall continue to be pursued that facilitate connectivity across freeway and rail corridors.

Figure 1-5: General Plan Land Use Map for the Project Area including Project Alignment and Platform Area



Source: City of San Bernardino General Plan, 2005

Figure 1-6: San Bernardino Metrolink Platform Area General Plan Land Use Map

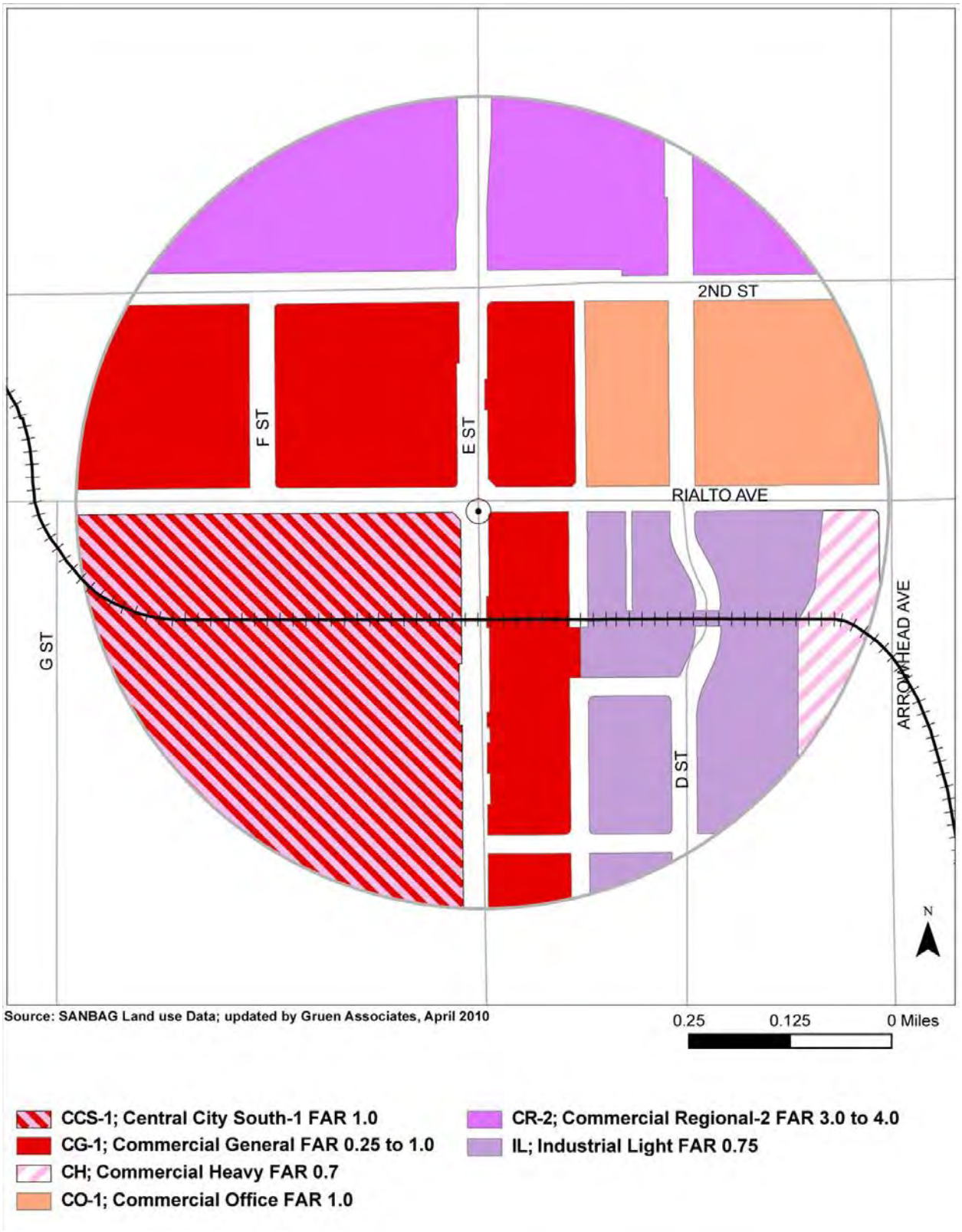


Source: SANBAG Landuse Data; updated by Gruen Associates, April 2010

Legend

- **CG-4; Commercial General FAR 0.25 to 1.0**
- **IH; Industrial Heavy FAR 0.75**
- **IL; Industrial Light FAR 0.75**
- **RS; Residential Suburban 4.5 du/acre**

Figure 1-7: E Street Rail Platform Area General Plan Land Use Map



- Promote development that is compact, pedestrian-friendly, and served by a variety of transportation options along major corridors and in key activity areas
- Improvements shall be made to transportation corridors that promote physical connectivity and reflect consistently high aesthetic values.
- Work with Omnitrans to explore initiatives that promote redevelopment near transit stops in order to encourage transit ridership, reduce vehicular trips, improve air quality, and improve traffic congestion:
  - Concentrate mixed use development, retail, employment, entertainment, educational, and civic/government uses within walking distance of transit stops.
  - Explore the use of incentives that can be awarded to projects that provide pedestrian amenities (wide sidewalks, public plazas, seating areas, etc.) and/or include desirable uses located within walking distance (1/2 mile) of transit stops. Incentives may include density bonuses, increases in non-residential floor area, reductions in parking requirements, and modified development standards.

The Land Use section also includes specialized strategies related to Strategic Areas of the City. The intent of the Strategic Areas is "to achieve a fundamental change in the land use pattern or quality of development." The Strategic Areas applicable to the Project area include:

- **Santa Fe Depot Strategic Area**. The Santa Fe Depot Strategic Area is located in the western portion of the City, immediately west of Downtown and I-215. The Strategic Area is bounded on the northern end by the Burlington Northern Santa Fe Railroad line, on the south by Rialto Avenue, on the east by I-215, and on the west by Viaduct and Giovanola Avenues. The goal of the Strategic Area is to integrate the Depot with the surrounding neighborhood and create an identifiable district, help the surrounding businesses become more economically viable and improve the aesthetics of the area. The strategies for this Strategic Area includes connecting and physically integrating the surrounding uses with the Depot through design, landscaping, entry features and pedestrian pathways to create a distinctive character.

- **Corridor Strategic Areas**. The Corridor Strategic Areas within the project area include the Mount Vernon Avenue and Downtown Strategic Areas. The Mount Vernon Avenue Strategic Area is located along Mount Vernon Avenue and is bounded by Highland Avenue on the northern end and Mill Street on the southern end. The Downtown Strategic Area is bounded by 9th Street on the north, Mill Street on the south, I-215 on the west, and Waterman Avenue on the east. The strategies that support transit in the Corridor Strategic Areas include:
  - Encourage the development of desired projects to provide public amenities through the use of incentives. The following incentives are not cumulative and the City can choose to award the greatest level of incentives to projects that incorporate numerous desirable features:
    - Proximity to transit. Projects with a residential component that are located within 500 feet of a designated transit stop are eligible to receive up to a 15% density bonus.

Mixed use projects would also receive a 10% increase in floor area ratio to accommodate the additional residential units.

- Shared parking. Projects that consolidate and combine individual parking lots into shared parking facilities are eligible to receive a 10% increase in floor area ratio and reduce the overall parking requirement by 25%.
- Pedestrian building orientation. Projects that orient the parking in the rear of the lot and orient the main entrance of the building toward the sidewalk are eligible to receive an increase of up to 5% in floor area ratio.
- Public plaza. Projects that include a public plaza of at least 625 square feet (no dimension less than 25 feet) adjacent to and accessible from the front sidewalk are eligible to receive an increase of 1 square foot in floor area for every square foot of public plaza.
- Public art. Projects that provide permanent, outdoor art that is viewable by the public from the front sidewalk are eligible to receive an increase of up to 5% in floor area ratio.

1.4.5.2 Circulation Element

The Circulation Element of the General Plan sets forth goals and policies to design and improve the circulation system to meet the current and future needs of the City's residents. A roadway functional classification system and typical cross-sections are also contained in the Circulation Element. The Circulation element states that the City plays a vital role in the use of transit through sound land planning efforts and ensuring that developments are designed in a manner that facilitates the provision of transit services. The Circulation Element establishes the following goals and policies applicable to the Project:

- Work with the railroads and other public agencies to develop and maintain railway facilities that minimize the impacts on adjacent land uses.
  - Accommodate railroad services that allow for the movement of people and goods while minimizing their impacts on adjacent land uses.
  - Coordinate with SANBAG, SCAG, the County and other regional, state or federal agencies and the railroads regarding plans for the provision of passenger, commuter and high-speed rail service.
  - Encourage the provision of a buffer between residential land uses and railway facilities and encourage the construction of sound walls or other mitigating noise barriers between railway facilities and adjacent land uses.
  - Identify existing and future high volume at-grade railroad crossings and pursue available sources of funding (e.g., California Public Utilities Commission) to implement grade separations where appropriate.
- Promote a network of multi-modal transportation facilities that are safe, efficient, and connected to various points of the City and the region.

- Promote the use of car-pools and vanpools by providing safe, convenient park-and-ride facilities.
- Consider the provision of incentives, such as reduced parking standards and density/intensity bonuses, to those projects near transit stops that include transit-friendly uses such as child care, convenience retail, and housing.

1.4.5.3 Economic Development Element

The Economic Development Element sets forth the goals and policies necessary to ensure a prosperous economic future and maintain the quality of life within the San Bernardino community. The Economic Development Element describes ten Redevelopment Project Areas within San Bernardino (Figure 1-8). The Project passes through three of the ten redevelopment areas, including Central City Projects, Mt Vernon Corridor and Uptown Redevelopment Project Areas. Some of the policies in the Economic Development element would directly or indirectly support transit service and transit-oriented development in Redevelopment Areas. These include:

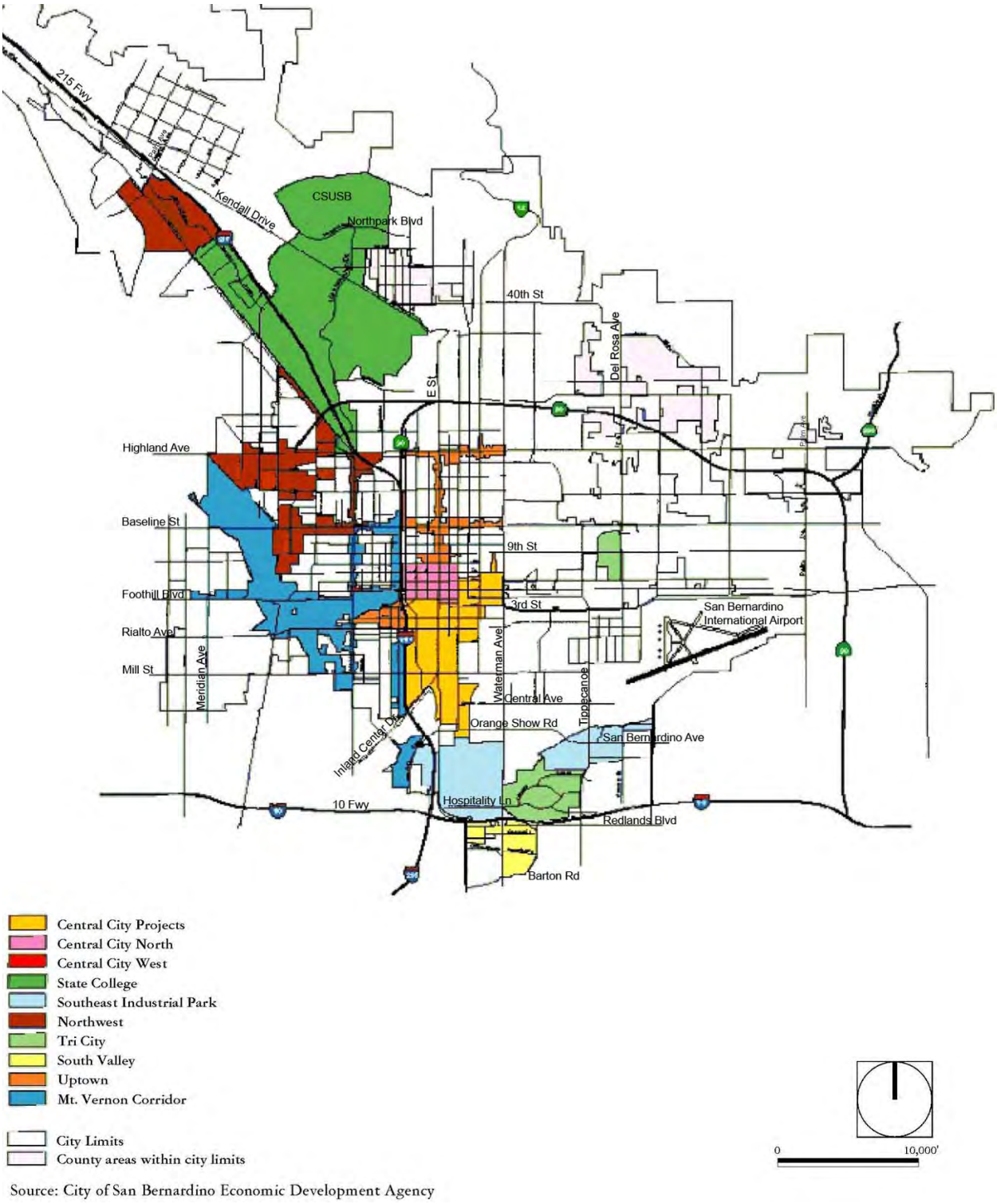
- Utilize all available redevelopment agency/City tools to revitalize and enhance strategic areas of the City.
- Market the City and proactively attract users by promoting revitalization of the Carousel Mall Downtown through a mixture of land uses, such as additional office and mixed-use space.
- Expand opportunities by encouraging an appropriate mix of revenue-generating land uses to maintain a competitive edge and a strong sales tax base.

The City of San Bernardino is currently making various amendments to the redevelopment plans to merge seven Redevelopment Project Areas.

1.4.6 City of San Bernardino Development Code

The purpose of the City of San Bernardino Development Code is “to promote the public health, safety, general welfare and preserve and enhance the aesthetic quality of the City by providing regulations to ensure an appropriate mix of land uses in an orderly manner.” The Development Code designates the City of San Bernardino into land use zoning districts to implement the General Plan. The General Plan land use designations are consistent with zoning districts. The San Bernardino Metrolink platform is zoned for Heavy Industrial uses (IH) and the E Street platform is zoned as Central City South (CCS). The Development Code includes development standards and uses permitted within these districts. The Development Code also includes Citywide landscaping standards and landscaping design guidelines to enhance the aesthetic appearance of development in all areas of the City by providing standards relating to quality, quantity and functional aspects of landscaping and landscape screening. No zoning or land use designation is applied to the actual railroad right-of-way, which is subject to the jurisdiction of the Federal Surface Transportation Board.

Figure 1-8: Redevelopment Areas in the City of San Bernardino



Source: City of San Bernardino General Plan, 2005

1.4.7 Other Plans

1.4.7.1 San Bernardino Intermodal Transit Station and Village and TOD Overlay

Pre-development, conceptual design and visioning services for a San Bernardino transit station and transit village were prepared by the City of San Bernardino, Omnitrans and SANBAG at the Rialto Avenue and E Street site. The San Bernardino Transit Station and transit village would improve bus and rail service to downtown San Bernardino and provide a seamless connection to the regional rail and bus transit services linking San Bernardino to the rest of the Southern California region. The station and village are planned to reduce non-transit vehicle usage and highway congestion, and improve air quality in the region. The goals of the visioning plan are to alleviate blight and revitalize the surrounding area, while serving as a catalyst for new residential and commercial development in downtown San Bernardino. The City of San Bernardino is currently preparing Transit-Oriented Development Overlay District for Redlands Rail Stations including station at E Street and Rialto Avenue and sbX stations.

1.4.7.2 Improvements to Transit Access for Cyclists and Pedestrians

The San Bernardino Associated Governments (SANBAG) and the Southern California Association of Governments (SCAG) have recently hired a consultant to develop station area non-motorized plans for the Southern California Regional Rail Authority (SCRRA) and Omnitrans within the San Bernardino Valley. Geographically, this study will span a distance of approximately 27 miles, from the City of Montclair to the west and the City of San Bernardino to the east. The Project is expected to be completed by June of 2012.

1.5 Impact Analysis

The impact analysis assesses if and how the Project would alter existing land use patterns and the overall development character of the project area. Land use impacts would primarily be associated with the introduction of new permanent facilities (platform facilities) into the project area. Impacts on land use are analyzed by focusing on the following land use impacts:

- Potential incompatibility with existing land uses, which cannot be addressed through buffering or other means
- Conflict with any applicable land use plans, policy or regulation of an agency with jurisdiction over the project over the project adopted for the purpose of avoiding or mitigating an environmental effect; and/or
- Potential for transit-supportive land uses in station areas.

1.5.1 Significance Criteria and Methodology

For each of the applied significance criteria, the impact analysis considers the No Project Alternative, the Project and individual facility components of the Project. Impacts were identified to existing uses through a review of conceptual engineering drawings for the alignment, conceptual platform area site plans, information regarding land acquisition, sensitive uses as well as commercial and industrial development along the alignment. Parcels that would be directly altered as a result of the Project were identified and the proposed future land uses were analyzed in terms of compatibility with uses in adjacent parcels. The existing land use, General Plan land use designations, as well as zoning classifications were analyzed to determine the potential for intensification of existing land uses in the platform areas.

1.5.1.1 Compatibility with Surrounding Land Uses

The assessment of impacts on land use focuses on the potential for land use incompatibility, which may result in conflicts between adjacent land uses. Land uses such as residential uses, schools, religious institutions, and open spaces are sensitive uses that could potentially be disturbed by changes in adjacent land uses. Likewise, adjacent commercial and industrial uses also could potentially be disrupted by impacts such as changes in access or increase in ambient noise.

An adverse land use impact would occur if the Project has the potential to result in physical division of an established community. Similarly, the Project could impact adjacent land uses that are not adequately buffered from or integrated with the project, thereby resulting in an incompatibility with adjacent and surrounding land uses.

The discussion of existing land uses is based on an evaluation of SANBAG's existing land use data, aerial photographs, and field windshield surveys. A few sensitive land uses i.e. single-family residential uses are located immediately adjacent to the alignment between Main Street and Rialto Avenue (see Figure 1-1). Potential impacts to existing land uses along the alignment were identified through an analysis of total sensitive land uses on the proposed route. Physical impacts associated with the proximity to sensitive land uses are also considered.

1.5.1.2 Consistency with Applicable Land Use Plans and Policies

Evaluation of Project consistency is considered in the context of whether, the Project is consistent with the intent of the jurisdiction's applicable planning documents. Policy conflicts identified by comparing the proposed land use under the Project with the planned land use as designated in applicable planning documents including the City of San Bernardino's General Plan. A significant policy inconsistency would occur if the Project uses are not consistent with applicable land use plans, policies and zoning ordinance of an agency with jurisdiction over the Project.

1.5.1.3 Transit-Supportive Development Potential at Platform Areas

The Federal Transit Administration (FTA) encourages establishment of transit-supportive land uses around transit facilities. FTA criteria for evaluating transit-supportive land uses include:

- Existing land use,
- Transit-supportive plans and policies, including supporting zoning regulations near transit platforms and potential to assist in containment of sprawl, and
- Performance of land use policies and impacts of transit Project on regional land use.

The potential for transit-supportive development at platform areas draws on Transit-Oriented Development (TOD) principles which focus on compact growth, a mix of land uses, and pedestrian-oriented design within walking distance of a transit station. The potential for the project area to reach higher concentrations of development than their surroundings is dependent primarily upon the planned land use and zoning designations around platforms.

The City of San Bernardino's General Plan land use designation(s) for each platform area were identified to determine the development potential for transit-supportive development within a quarter-mile radius of the proposed platforms. Portions of the platform areas are located within the City's redevelopment areas thereby providing build-out potential for new development. Platforms located in areas that are not currently developed to the extent possible under existing plans, but yet are designated for commercial, industrial or multi-family residential development would have the greatest potential to accept increased growth.

1.5.2 Impacts

1.5.2.1 Land Use (LU) Impact 1: Compatibility with surrounding land uses

Potential land use impacts related to compatibility with surrounding uses along the alignment for the No Project and Project Alternatives are described below:

No Project Alternative

Under the No Project Alternative, existing development patterns adjacent to the railroad would continue. As such, no adverse effects associated with local land use would result under the No Build Alternative.

Project Alternative

The project would operate within an existing rail corridor and its adjacent parcels are in an area where the railroad facilities have long been part of the local community setting. Although passenger rail service on the tracks has been dormant for many years, the reintroduction of passenger rail service

would not physically divide the communities, since they were originally established around the railroad. Other proposed facilities such as the platforms would not create physical divisions within neighborhoods or communities. The proposed passenger rail and associated facilities including platforms would not present a conflict with existing land uses or zoning in the project area. Existing land uses within the platform areas are generally compatible with transit facilities and would support commercial and residential activities in the area. The Project would include conversion of a few through streets into cul-de-sacs in some locations. Access to businesses located along these streets would still be maintained through routing of traffic to other local streets. The Project would maintain and upgrade the vehicular and pedestrian crossings at the intersections of a few major streets and the Project. Therefore, implementation of this Project would not restrict the movement of people or physically divide an established community and there will be no adverse land use impacts.

The improvements would include realignment of the existing tracks and construction of second parallel tracks. Partial acquisition(s) along the alignment would be required at some locations; however, these partial acquisitions would maintain the minimum setback required by the applicable zoning district or an appropriate buffer would be provided. Full acquisitions would be compensated by existing law and remove some non-conforming uses in the area. Therefore, no adverse land use impacts are anticipated. The components of the project and potential for land use impacts at individual facility sites are discussed below:

- **<u>Improvements at San Bernardino Metrolink Station/Santa Fe Depot Track:</u>**
  - *Track Improvements & Proposed Rail Platforms* – These improvements would occur along the existing transit route and would be primarily within the existing railroad right-of-way and would be consistent with the General Plan land use and zoning designations. No additional right-of-way acquisition would be required. Based on these circumstances, this project feature would not result in the placement of incompatible land uses. No impacts would occur.
  - *Pedestrian Overpass Alternative 2a and 2b*: The proposed pedestrian overpass alternatives would enhance connectivity and provide safe egress of platforms between the proposed Redlands platform and the existing San Bernardino Metrolink Station. The placement of this project feature would not be incompatible with the existing depot. No impacts would occur.
  - *Reconfigured Parking Lot:* The reconfigured parking lot would result in additional spaces, landscaping and necessitate the realignment of K Street and 3rd Street intersection. There are no sensitive uses located immediately adjacent to the reconfigured parking lot. Based on these conditions, this project feature would not change or have any impact on the adjacent land use. No impacts would occur.

- **Improvements at Rialto Avenue and E Street Platforms:**
  - *Track Improvements & Proposed Rail Platforms* – These improvements would occur along the existing transit route. The adjacent land uses are primarily commercial which were originally

established along the railroad right-of-way, therefore, would not be impacted by reintroduction of transit service on these tracks.

- *Pedestrian Connection to the Arrowhead Credit Union Park* - Currently no pedestrian connections exist from the Arrowhead Credit Union Park parking to the Railroad tracks except along the E Street sidewalk. The proposed pedestrian sidewalk, to be located south of the proposed parking lot, with landscaping and lighting would improve the pedestrian connectivity. No impacts would occur.

Currently there is no pedestrian access between the Arrowhead Credit Union Park parking lot and the railroad tracks, except along E Street sidewalk. The existing fire lane which provides limited access is fenced off.

- *Proposed Parking Lot* – The proposed parking lot would be located on a vacant lot directly south of the new platforms. Commercial uses and their parking lots are located in the immediate vicinity of this parking lot. Parking lots are identified as an allowed use on commercially-zoned parcels. The proposed parking lot would be buffered from adjacent uses by landscaping and would be compatible with surrounding uses, which already include parking facilities. No impact would occur.

- **Street Improvements and Closures:**
  - *3rd Street Closure* - The project would require conversion of 3rd Street into cul-de-sac. The area primarily has vacant and underutilized parcels. Access to existing businesses along this street on the west side of the tracks would still be maintained through routing of traffic to other local streets. The conversion of 3rd Street into a cul-de-sac on the east side of the tracks would require acquisition of a vacant building. Less than significant land use impacts are anticipated after compensation consistent with existing law.
  - *I street to a cul-de-sac* – The project would require conversion of I Street into cul-de-sac, which could affect the existing businesses located along this street. However, access to these businesses would still be maintained through routing of traffic to other local streets. In this context, less than significant land use impacts are anticipated.

View of I Street and Rialto Avenue intersection

- **Grade Crossings:**
  - The project includes the complete reconstruction of four grade crossings at 3rd Street, 2nd Street, Rialto Avenue/I Street and G Street. This would provide for safer crossings for pedestrians and vehicles. Uses directly adjacent to the Project include mostly vacant, industrial and some residential uses. There would be no adverse change in the function or access to adjacent uses as a result of these improvements. Considering the existing commercial/industrial oriented nature of the area there would be no adverse land use compatibility impacts.

Summary (LU-1)

The No Project Alternative will have no adverse land use impacts as it does not require any changes to existing or future land use.

The Project Alternative and components would not cause a physical division of an established community, because it allows for pedestrians and vehicle crossings at designated intersections and would be built on the existing railroad right-of-way. In addition, the reconfiguration or creation of a parking lot would be adjacent to the existing railroad right-of-way or other compatible land uses and would not restrict pedestrian and vehicular access. Partial acquisition(s) along the alignment would be required at some locations; however, these partial acquisitions would maintain the minimum setback required by the applicable zoning district or an appropriate buffer would be provided. Full acquisitions would be compensated by existing law. Therefore, no adverse impact would occur related to the compatibility of the Project with surrounding land uses.

1.5.2.2 LU Impact 2: Consistency with applicable land use plans and policies

Potential land use impact 2 along the alignment for the No Project and Project Alternatives are described below:

No Project Alternative

The No Project Alternative would not provide the land use benefits typical of transit projects, which the SCAG Regional Comprehensive Plan and Guide and SCAG Compass Blueprint 2% Strategy plans seek to achieve (e.g. , encouragement of livable spaces, sustainable travel patterns, and job growth).

Project Alternative

The following section discusses the consistency of the Project with stated policies of each of the applicable land use planning documents described previously in this chapter. The Project would generally be consistent with planned land uses and policies contained in most of the relevant plans.

- **SCAG Regional Comprehensive Plan and Guide**. The project would be consistent with the policies of the SCAG Regional Comprehensive Plan and Guide, such as its policies to link transit with higher-intensity land uses. No significant policy inconsistencies were identified. A summary of the manner in which the project is consistent with the relevant RCPG policies is provided in Table 1-2 below:

Table 1-2: Consistency of the Project with Regional Comprehensive Plan and Guide

POLICY		CONSISTENCY
3.12	Support existing or proposed local jurisdictions program aimed at designing land uses which encourage the use of transit and thus reduce the need for roadway expansion, reduce the number of auto trips and vehicle miles traveled (VMT), and create opportunities for residents to walk and bike.	Consistent: The Project would improve transit service and support land use and transportation integration policies in existing and local plans. Transit use would increase with the Project, which would result in a reduction of auto trips and vehicle miles traveled, and create opportunities for residents to have alternative means of transportation.
3.13	Encourage local jurisdiction plans that maximize the use of existing urbanized areas accessible to transit through infill and redevelopment.	Consistent: The Project would provide increased transit service within the City of San Bernardino with potential infill development and redevelopment. The improved transit services could provide opportunities for potential transit-supportive uses in the area.
3.14	Support local plans to increase density of future development located at strategic points along regional commuter rail, transit systems and activity centers.	Consistent: The platforms would be located in areas that could accommodate increased density. The Project would improve accessibility to commercial and activity centers.
3.15	Support local jurisdiction strategies to establish mixed-use clusters and other transit-oriented developments around transit stations and along transit corridors.	Consistent: The Project would provide enhanced transit service which would support transit-oriented development and mixed land use policies and strategies.

POLICY		CONSISTENCY
3.16	Encourage developments in and around activity centers, transportation corridors, underutilized infrastructure systems and areas needing recycling and redevelopment.	Consistent: The Project would provide support for this policy by locating platforms in activity centers or in areas which have the potential to be redeveloped or "recycled".
3.17	Support and encourage settlement patterns that contain a range of urban densities.	Consistent: The Project would increase accessibility to commercial and activity centers within the City of San Bernardino.
3.18	Encourage planned development in locations least likely to cause adverse environmental impact.	Consistent: The Project would be located in urbanized portions of the City of San Bernardino, which reduces the potential for environmental impacts.
3.19	National Forests shall remain permanently preserved and used as open space. SCAG shall support policies and actions that preserve open space areas identified in local, state, and federal plans.	Not applicable: The Project is not located within a National Forest.
3.20	Support the protection of vital resources such as wetlands, groundwater recharge areas, woodlands, production lands, and land containing unique and endangered plants and animals.	Consistent: The Project is located in an existing urban center and would generally avoid adverse impacts to any wetlands, groundwater recharge areas, woodlands, production lands, and lands containing unique and endangered plants and animals.
3.21	Encourage the implementation of measures aimed at the preservation and protection of recorded and unrecorded cultural resources and archaeological sites.	Consistent: If archaeological and cultural resources are encountered during excavation and grading activities, the project would be conditioned to treat any discovery of such resources in accordance with state and federal guidelines for disclosure, recovery, and preservation, as appropriate.
3.22	Discourage development, or encourage the use of special design requirements, in areas with steep slopes, high fire, flood, and seismic hazards.	Consistent: The Project would be conditioned to incorporate geotechnical design recommendations for structural facilities to minimize the risks associated with seismic hazards.
3.23	Encourage mitigation measures that reduce noise in certain locations, measures aimed at preservation of biological and ecological resources, measures that would reduce exposure to seismic hazards, minimize earthquake damage, and to develop emergency response and recovery plans.	Consistent: The Project design would be conditioned to incorporate mitigation requirements of applicable agencies.
Source: Gruen Associates, 2010		

- **SCAG Regional Transportation Plan.** The RTP focuses on making connections between transportation and land use. The Project would help expand transit ridership in and around the proposed alignment. The Project would help improve the mobility and accessibility for people in the area and would be consistent with the SCAG Regional Transportation Plan. Consistency of the Project with the RTP is evaluated in Table 1-3.

Table 1-3: Consistency of the Project with SCAG Regional Transportation Plan Goals and Policies

GOAL		CONSISTENCY
RTP G1	Maximize mobility and accessibility for all people and goods in the region.	Consistent: The Project would help improve mobility of residents by providing access to key activity centers in San Bernardino including government offices, and regional shopping centers. The Project would also provide opportunities for intermodal transfers to the planned sbX E Street BRT Corridor at the E Street rail platforms to connect to various cities within the region.
RTP G2	Ensure travel safety and reliability for all people and goods in the region.	Consistent: The Project would ensure safety and reliability (on-time performance). Greater transit and less auto travel would result in reduced air emissions, safer driving conditions, and energy savings.
RTP G3	Preserve and ensure a sustainable regional transportation system.	Consistent: The Project would serve as a sustainable transportation system in the City of San Bernardino by reducing travel time, easing congestion, and attracting people out of their cars.
RTP G4	Maximize the productivity of our transportation system.	Consistent: Improving average train speeds and limiting the number of stops would create a stronger sense of reliability and lead to more efficient operations.
RTP G5	Protect the environment, improve air quality and promote energy efficiency.	Consistent: Transit use would increase with the Project, which would result in a reduction of auto trips, vehicle miles traveled and air emissions, thereby improving air quality and promoting energy efficiency.
RTP G6	Encourage land use and growth patterns that complement our transportation investments.	Consistent: The Project would provide enhanced transit service which would support transit-oriented development and mixed land use development around platform areas.
POLICY		**CONSISTENCY**
RTP P1	Transportation investments shall be based on SCAG's adopted Regional Performance Indicators.	Consistent: The Project would be responsive to SCAG's Regional Performance Indicators. The project would improve mobility and accessibility within the County of San Bernardino, improve air quality by reducing auto trips and vehicle miles traveled, and create opportunities for residents to have an alternative and reliable means of transportation.
RTP P2	Ensuring safety, adequate maintenance, and efficiency of operations on the existing multi-modal transportation system will be RTP priorities and will be balanced against the need for system expansion investments.	Consistent: The project would ensure safety, adequate maintenance, and efficiency of operations on the existing multi-modal transportation system.
RTP P3	RTP land use and growth strategies that differ from currently expected trends will require a collaborative implementation program that identifies required actions and policies by all affected agencies and subregions.	Consistent: The Project is representative of a collaborative implementation program with SANBAG, City of San Bernardino and FTA working jointly to implement the Project.
RTP P4	HOV gap closures that significantly increase transit and rideshare usage will be	Consistent: The Project would provide enhanced transit service to serve a greater number of passengers within

GOAL		CONSISTENCY
	supported and encouraged, subject to Policy #1.	the City of San Bernardino.
RTP P5	Progress monitoring on all aspects of the Plan, including timely implementation of projects, programs, and strategies, will be an important and integral component of the Plan.	Consistent: SANBAG would monitor progress and timely implementation of the project.
Source: Gruen Associates, 2010		

- **SCAG Compass Blueprint 2% Strategy.** The entire project area has been identified by SCAG as Compass 2% Strategy Opportunity Areas (see Figure 1-4). The project would be consistent with SCAG's 2% Strategy as a planned new transportation facility improving mobility within the City of San Bernardino.

- **San Bernardino County Non-Motorized Transportation Plan – 2011 Update.** The Project would not affect the San Bernardino County Non-Motorized Transportation Plan. The planned bicycle facilities would remain unchanged with the operation of the Project. Currently bicycle racks are located at the San Bernardino Metrolink Station park-and-ride lot and bike racks would be provided at the E street Rail Platforms to encourage non-motorized modes of transportation. ADA compatible pedestrian access to these platforms would be provided through the Project.

- **City of San Bernardino's General Plan.** The San Bernardino General Plan contains transit supportive concepts. The Land Use Element promotes inter-connectivity of residential uses with commercial centers, open spaces, educational facilities and recreational uses. The Project would help to accomplish this policy by providing a linkage between the various uses along the alignment and key activity centers within the City of San Bernardino including Santa Fe Depot, commercial and civic uses in downtown San Bernardino and Arrowhead Credit Union Baseball Park. The Project would improve opportunities for Alternative modes of transportation and support land use and transportation integration policies in the Land Use Element of the General Plan. Rail use would increase with the Project and strengthen efforts to improve the quality of life for area residents and businesses.

  Policies in the Circulation Element encourage measures to reduce vehicle trips, traffic congestion and air pollution. The Project would improve air quality by reducing auto trips and vehicle miles traveled, and create oportunities for residents to have an alternative means of transportation. The vehicles as well as platforms would be designed to be accessible to seniors and persons with disabilities. The Project would improve the speed and efficiency of the proposed transit system and would be compatible with the General Plan.

- **City of San Bernardino Development Code.** As mentioned previously, partial acquisition(s) along the alignment would be required at some locations; however, these partial acquisitions

would maintain the minimum setback required by the applicable zoning district or an appropriate buffer would be provided. The proposed parking lot south of E Street Rail Platforms is under the CCS-1 District which allows for parking lots or structure subject to a Development Permit. The parking lot on this site would be subject to Landscape Standards listed in the Development Code. No adverse impacts are anticipated.

Summary LU Impact 2

SCAG Regional Comprehensive Plan and Guide and SCAG Compass Blueprint 2% Strategy plans land use policies and goals would not be met under the No Project Alternative. The goals, described in Tables 1-2 and 1-3, would not be achieved. Thus, potential inconsistencies with applicable policies would result for the No Project Alternative. However, given that these inconsistencies characterize existing conditions, this impact is considered less than significant.

The Project Alternative would be consistent with policies and would support regional and local plans. The Land Use Element of the General Plan promotes inter-connectivity of residential uses with commercial centers, open spaces, educational facilities and recreational uses and this Project would help to accomplish this policy by providing a linkage between the various uses along the alignment and key activity centers within the City of San Bernardino including Santa Fe Depot, commercial and civic uses in downtown San Bernardino and Arrowhead Credit Union Baseball Park.

1.5.2.3 LU Impact 3: Transit-supportive development potential at platform areas

Potential land use impact 3 along the alignment for the No Project and Project Alternatives are described below:

No Project Alternative

With the No Project Alternative lower density development trends would likely continue, resulting in longer commute times, greater use of single occupant vehicles and more traffic congestion.

Project Alternative

The Project would have the potential to serve as a catalyst for revitalization and stimulate joint development and transit-oriented development, particularly near platforms. In turn, new development could foster increased transit usage. The Project would potentially support the intensification of land uses.

As discussed under 1.4 Regulatory Framework, existing local and regional land use and transportation planning policies actively promote transit-supportive policies. The City of San Bernardino and SCAG in its Compass Blueprint 2% Strategy have policies to encourage transit-oriented development within walking distance of a transit stop. The San Bernardino General Plan provides for supportive policies near

transit stations. In general, the platform areas along the Corridor have a moderate to high potential for development of transit-supportive uses. The Project entails desirable benefits by providing a new transportation mode and by enabling residents to live and work in or adjacent to the alignment and platform areas.

The City of San Bernardino plans to continue to envision and implement land use and intensity changes to reflect transit-oriented development concepts. The City of San Bernardino is preparing a vision/action plan for the downtown area which would likely include land use changes. Cities make land use changes to their plans through lengthy processes considering factors such as market conditions, existing land use conditions, community input, and separate environmental reviews for each plan or developer proposal and it is not part of this Project's scope.

The following analysis identifies the potential for transit-oriented development and additional growth in the quarter-mile areas around the proposed platforms.

- **San Bernardino Metrolink Station –** Existing land uses in the ¼-mile radius of the station include industrial, commercial and residential uses. A few vacant parcels are interspersed among the commercial, industrial and residential uses. Initial development opportunities would likely be concentrated at currently existing vacant parcels and parking lots. In addition to existing vacant parcels, SANBAG would acquire several parcels during construction of the project for the storage of equipment and materials and other construction-related activities. Because the acquired parcels would be SANBAG-owned and adjacent to the alignment and platform area, they would create additional opportunities for Transit-Oriented Development (TOD). The current City policies regarding transit-supportive uses provide an opportunity to redevelop the existing land uses to more intensive uses. Land use intensification and redevelopment could occur on industrial and commercial properties along 3rd Street and on commercially designated properties near San Bernardino Metrolink Station. A review of the aerial photographs indicates these properties appear to be underutilized relative to the zoning and could be developed with more intensive transit supportive uses, but would be subject to project specific environmental analysis. Based on these findings, no impacts would occur.

- **E Street at Rialto Avenue.** The quarter-mile platform area primarily consists of commercial and light industrial uses with a few pockets of vacant and underutilized properties. The platform is located within a half-mile of the many civic and institutional uses located Downtown that would be compatible with a transportation system. Initial development opportunities would likely be concentrated at existing vacant parcels and parking lots and underutilized industrial uses. In addition, to the vacant parcels, SANBAG acquired parcels for storage of equipment and materials and other construction related would offer additional opportunities for TODs. The proposed parking on the vacant lot at the southwest corner of the intersection of E Street and railroad tracks also provides opportunity for transit-oriented dense/intense development. The

platform area is located within the San Bernardino Redevelopment Project Merger Area A. A few goals of this Merger Area are to eliminate and prevent the spread of blight, encourage the cooperation and participation of residents, businesses, public agencies and community organizations in the economic development. A portion of the platform area is also located within the General Plan's Downtown Strategic Area which envisions mixed-use projects, pedestrian amenities and pedestrian-active retail uses for this area. These plans and policies envision this area to redevelop in the future with more transit-supportive and economically viable uses which would be subject to separate project-specific environmental analyses. The project would result in any adverse impacts.

Summary LU-3

Under the No Project Alternative without transit many of the transit-supportive policies in the current plans will not be achieved. Thus, potential adverse effects would result for the No Project Alternative. However, given that these adverse would not deviate from existing conditions, the impact is considered less than significant.

The Project Alternative has the potential to induce transit-supportive development by providing a new transportation mode and by enabling residents to live and work in or adjacent to the alignment and platform areas. This would require separate project-specific environmental analysis which is not part of this project's scope; therefore, no adverse land use impacts are anticipated.

1.5.3 Mitigation Measures

No Project

The No Project Alternative would conflict with applicable land use plans and policies and transit-supportive development potential at platform areas. However, given that this alternative would not result in changes to existing environmental conditions, the corresponding impact is considered less than significant. For this reason, no mitigation measures are required.

Project Alternative

The Project Alternative would not result in adverse effects related to land use compatibility or inconsistencies with applicable plans, policies, and regulations. For these reasons, no mitigation measures are required.

APPENDIX I NOISE TECHNICAL MEMORANDUM

DOWNTOWN SAN BERNARDINO PASSENGER RAIL PROJECT
Noise Technical Memorandum

San Bernardino, San Bernardino County, California

August 2012

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Acronyms

APE	area of potential effects
BNSF	Burlington Northern Santa Fe
CCR	California Code of Regulations
CEQA	California Environmental Quality Act
CFR	Code of Federal Regulations
CNEL	community noise equivalent level
CPUC	California Public Utilities Commission
dB	decibel
dBA	A-weighted decibel
Depot	San Bernardino Metrolink Station/Santa Fe Depot
DSBPRP	Downtown San Bernardino Passenger Rail Project
EIS	environmental impact statement
EPA	U.S. Environmental Protection Agency
FAA	Federal Aviation Administration
FHWA	Federal Highway Administration
FRA	Federal Railroad Administration
FTA	Federal Transit Administration
HVAC	heating, ventilation, and air-conditioning
IEMF	Inland Empire Maintenance Facility
L_{eq}	equivalent sound level
$L_{eq}[h]$	hourly equivalent sound level
LT	long term
NEPA	National Environmental Policy Act
OSHA	Occupational Safety and Health Administration
PPV	peak particle velocity
PTC	positive train control
RMS	root-mean-square
RTC	rail traffic controller
SANBAG	San Bernardino Associated Governments
SBD	San Bernardino International Airport
SCAG	Southern California Association of Governments
SCRRA	Southern California Regional Rail Authority

SEL	sound exposure level
ST	short term
STC	Sound Transmission Class
TNM	Traffic Noise Model
USC	United States Code
VdB	velocity in decibels

EXECUTIVE SUMMARY

The Downtown San Bernardino Passenger Rail Project (DSBPRP or Project) would reconstruct rail infrastructure along the existing freight-only Redlands Subdivision to provide a double track for the route, grade-crossing improvements at four locations that meet Federal Railroad Administration (FRA) and California Public Utilities Commission (CPUC) requirements, railroad signaling improvements, and new station facilities. In addition, the Project would extend the existing Metrolink service to new rail platforms at E Street and Rialto Avenue. North of the proposed rail platforms is the planned Omnitrans Bus Facility, which will be served by commuter rail, rail transit, possible high-speed rail (future), existing fixed-route bus services, and a bus rapid transit line.

This report presents the results of the noise and vibration analysis conducted for the Project, along with background information and a discussion of methodology.

NOISE AND VIBRATION STUDY METHODOLOGY

The study methodology followed the guidelines contained in the Federal Transit Administration's (FTA's) *Transit Noise and Vibration Impact Assessment* manual (May 2006). As part of the process, the following steps were carried out: Noise- and vibration-sensitive receivers in the vicinity were inventoried, noise measurements were conducted at representative sites, a noise/vibration impact assessment was conducted using FTA impact criteria, and mitigation measures were developed for evaluation by project sponsors and FTA.

Construction of the Project would result in noise and vibration impacts during the operational and construction phases, as detailed below.

OPERATIONAL NOISE

A detailed noise assessment was conducted using the guidance in Chapter 6 of the FTA manual. Noise from proposed rail operations was analyzed, as were changes in traffic noise levels on roadways in the vicinity (as a result of trips to and from the San Bernardino Metrolink Station/Santa Fe Depot [Depot] and the proposed E Street rail platform).

RAIL NOISE

Rail noise sources include locomotives (including horn noise near crossings) and railcars as well as crossing signals. Potential noise effects from the E-Street platform parking area were also evaluated using the guidance in Chapter 5 of the FTA manual. Three levels of noise impact are defined in the FTA manual: severe impact, moderate impact, and no impact. Specific details regarding the determination of impact as well as noise terminology and noise metrics are provided in the body of this report and Appendix A.

Severe impacts from rail operations were predicted to occur at 11 receivers in the vicinity of the project improvements and are identified below.

- Receiver Site 11, representing two residences 50 to 100 feet southwest of the alignment (south of Rialto Avenue and west of I Street): Project noise level of 6 decibels above the existing noise environment.
- Receiver Site 15, representing two residences 50 feet east of the alignment (north of Rialto Avenue and west of I Street): Project noise level of 18 decibels above the existing noise environment.

- Receiver Site 17, representing three residences 50 to 100 feet east of the alignment (north of Rialto Avenue and west of I Street): Project noise level of 9 decibels above the existing noise environment.
- Receiver Site 18, representing two residences 100 to 200 feet west of the alignment (west of I Street): Project noise level of 8 decibels above the existing noise environment.
- Receiver Site 19, representing two residences 100 to 200 feet west of the alignment (west of I Street and south of 2nd Street): Project noise level of 8 decibels above the existing noise environment.
- Receiver Site 22, representing two residences 100 to 200 feet west of the alignment (east of J Street): Project noise level of 6 decibels above the existing noise environment.
- Receiver Site 25, representing two residences 100 to 200 feet west of the alignment (east of J Street and south of 2nd Street): Project noise level of 1 decibel above the existing noise environment.
- Receiver Site 28, representing two residences 100 to 200 feet west of the alignment (east of J Street and north of 2nd Street): Project noise level of 8 decibels above the existing noise environment.
- Receiver Site 29, representing one residence 100 to 200 feet east of the alignment (north of 2nd Street): Project noise level of 9 decibels above the existing noise environment.
- Receiver Site 35, representing nine residences 50 to 100 feet east of the alignment (west of Mt. Vernon Avenue and north of Rialto Avenue): Project noise level of 4 decibels above the existing noise environment.
- Receiver Site 36, representing three residences 100 to 200 feet west of the alignment (west of Pico Avenue and north of Rialto Avenue): Project noise level of 2 decibels above the existing noise environment.

Moderate impacts from rail operations were predicted to occur at 10 areas in the vicinity:

- Receiver Site 6, representing four residences 200 to 400 feet southwest of the alignment (west of I Street and north of Belleview Street): Project noise level of 1 decibel below the existing noise environment.
- Receiver Site 7, representing three residences 200 to 400 feet southwest of the alignment (north of Belleview Street): Project noise level of 1 decibel below the existing noise environment.
- Receiver Site 14, representing five residences 200 to 400 feet west of the alignment (east of J Street): Project noise level of 1 decibel below the existing noise environment.
- Receiver Site 16, representing three residences 200 to 400 feet east of the alignment (east of I Street): Project noise level of 2 decibels below the existing noise environment.
- Receiver Site 24, representing two residences 200 to 400 feet west of the alignment (west of J Street and south of 2nd Street): Project noise level of 4 decibels below the existing noise environment.
- Receiver Site 26, representing two residences 100 to 200 feet west of the alignment (east of J Street and north of 2nd Street): Project noise level equal to the existing noise environment.
- Receiver Site 27, representing one residence 100 to 200 feet east of the alignment (west of I Street and north of 2nd Street): Project noise level equal to the existing noise environment.

- Receiver Site 31, representing four residences 200 to 400 feet west of the alignment (east of J Street): Project noise level of 1 decibel below the existing noise environment.
- Receiver Site 32, representing one residence 100 to 200 feet west of the alignment (east of J Street and north of 2nd Street): Project noise level of 1 decibel above the existing noise environment.
- Receiver Site 37, representing three residences 200 to 400 feet west of the alignment (west of Pico Avenue and north of Rialto Avenue): Project noise level of 3 decibels below the existing noise environment.

MITIGATION MEASURES FOR RAIL NOISE IMPACTS

Pursuant to FTA requirements, mitigation of moderate and severe noise impacts was considered using the recommendations contained in Section 6.8 of the FTA manual and pertinent site information.

The measures below could be implemented to reduce rail noise and vibration impacts.

Mitigation Measure NV-1. Establish Quiet Zones

Quiet zones will be established for the at-grade crossings at the following grade crossings within the project alignment area: 2nd Street, Rialto Avenue/I Street, and G Street. Following implementation of the Quiet Zones, residual impacts (moderate and severe) would remain.

Mitigation Measure NV-2: Provide Building Noise Insulation ~~to Severe- and Moderate-Impact Residences Where Sound Barriers Are Infeasible~~

For three residential structures represented by Receivers 11 and 15, the project sponsor will provide sound insulation in the form of caulking and sealing gaps in the building façade and installing new doors and windows that are specially designed to meet acoustical transmission-loss requirements. Additional building sound insulation, if needed, will be provided by sealing vents and ventilation openings and relocating them to a side of the building and away from the noise source. To ensure that the windows and doors can be kept closed while still maintaining habitable conditions, a central heating, ventilation, and air-conditioning (HVAC) system will also be provided.

Mitigation Measure NV-3: Wayside Rail Lubrication

Wayside applicators will be installed for all tight-radius curves on the project alignment. If the wayside applicators are not sufficient to reduce squeal to an acceptable level, additional reduction may be possible through customized profiling of the rail to reduce the forces required for trains to negotiate the curve.

Mitigation Measure NV-4: Use Ballast Mats, Resiliently Supported Ties, or Measures of Comparable Effectiveness on Portions of the Rail near Sensitive Receivers

The project design team will ensure the track design specifications include the use of ballast mats or resiliently supported ties on portions of the track near sensitive receivers to minimize project-related ground-borne vibration generated when the trains pass sensitive receivers.

Mitigation Measure NV-5: Employ Noise-Reducing Measures during Construction

The project sponsor will require its construction contractors to employ measures to minimize and reduce construction noise. Measures that will be implemented to reduce construction noise to acceptable levels include the following:

- Comply with local noise regulations and limit construction hours to the extent practicable (i.e., between the hours of 7:00 a.m. and 8:00 p.m.).

- Use available noise suppression devices and techniques, including:
  - Equipping all internal combustion engine-driven equipment with mufflers, air-inlet silencers, and any other shrouds, shields, or other noise-reducing features that are in good operating condition and appropriate for the equipment (5 to 10 dB reduction possible).
  - Using "quiet" models of air compressors and other stationary noise sources where such technology exists.
  - Using electrically powered equipment instead of pneumatic or internal combustion-powered equipment, where feasible.
  - Using noise-producing signals, including horns, whistles, alarms, and bells, for safety-warning purposes only.
  - Locating stationary noise-generating equipment, construction parking, and maintenance areas as far as reasonable from sensitive receivers when sensitive receivers adjoin or are near the construction project APE.
  - Prohibiting unnecessary idling of internal combustion engines (i.e., in excess of 5 minutes).
  - Placing temporary soundwalls or enclosures around stationary noise-generating equipment when located near noise-sensitive areas (5 to 15 decibel reduction possible).
  - Ensuring that project-related public address or music systems are not audible at any adjacent receiver.
  - Notifying adjacent residents in advance of construction work.

Mitigation Measure NV-6: Prepare a Community Awareness Program for Project Construction

In consultation with the representatives of the neighboring cities, the construction contractor will prepare and maintain a program to enhance community awareness of project construction issues, including noise, vibration, nighttime noise, nighttime lighting, and roadway closures. Initial information packets will be prepared and mailed to all residences within a 500-foot radius of project construction, with updates prepared as necessary to indicate new scheduling or processes. A project liaison will be identified who will be available to respond to community concerns regarding noise, vibration, and light.

Mitigation Measure NV-7. Construct Sound Barriers

Sound barriers will be constructed along portions of the rail alignment to reduce noise levels at receivers with severe or moderate noise impacts.

TRAFFIC NOISE

Traffic noise associated with the proposed Project was assessed using the Federal Highway Administration's Traffic Noise Model (TNM), version 2.5. Traffic volumes, identified in the project traffic analysis (Iteris 2012), were used to estimate traffic noise levels at noise-sensitive receivers in the area for the following scenarios:

- Existing.
- Future Year 2014 project-only traffic.
- Future Year 2035 project-only traffic.

Project-related noise levels were then assessed for potential impacts using the same impact criteria as that used for rail noise. None of the representative modeled receivers were predicted to experience an increase in traffic noise equating to either a moderate or severe impact. No mitigation is required.

OMNITRANS BUS FACILITY AND RAIL PLATFORM PARKING LOT NOISE

Noise from the Omnitrans bus facility and rail platform parking lot near Rialto Avenue and E Street, adjacent to the rail platform, was evaluated using the screening methodology recommended in the FTA manual. It was determined that the nearest noise-sensitive receivers are beyond the screening distances for potential noise impact from the bus facility and parking lot. No mitigation is required.

OPERATIONAL VIBRATION

Operation of the Project would result in ground-borne vibration along the alignment. Impacts were predicted to occur at Category 2 land uses near the project alignment located east of the Depot and west of Interstate 215 (represented by Receivers 11 and 15) and west of the Depot and north of 2nd Street (Receiver Site 35). No Category 3 land uses are predicted to have vibration impacts. The ground-borne vibration impact at these Category 2 land uses would be severe. With the implementation of mitigation measures (resiliently supported ties or ballast mats), operational vibration levels would be minimized to no-impact levels. No residual ground-borne noise impacts are predicted to result from the Project.

CONSTRUCTION NOISE

After noise levels from construction activities were estimated, impacts were predicted to occur at all sensitive land uses along the project alignment at distances of up to approximately 240 feet under daytime impact criteria and approximately 410 feet under nighttime impact criteria. The construction noise impact is considered severe. However, implementation of mitigation measures (including limiting construction hours to the extent practicable, using available noise suppression devices and techniques such as "quiet" models of air compressors and other stationary noise sources, temporary soundwalls or enclosures, etc.) would minimize this impact to a moderate impact or lower.

CONSTRUCTION VIBRATION

The vibration levels from construction activities were estimated, and FTA construction vibration damage thresholds were not exceeded at any of the representative receiver locations. However, FTA construction annoyance criteria were exceeded at representative receivers as far as 120 feet from the alignment. Implementation of a community awareness program as a mitigation measure would reduce this impact such that no residential impact would occur.

1.0 OVERVIEW

This technical noise and vibration report describes the analysis approach, existing noise and vibration conditions, and the impact assessment and mitigation measures for the Downtown San Bernardino Passenger Rail Project (DSBPRP or Project). Noise-sensitive receivers include residential land uses and a transient residential/commercial land use (motel).

1.1 PROJECT DESCRIPTION

SANBAG is proposing to extend Metrolink regional passenger rail service approximately 1 mile east from its current terminus at the existing Depot located at 1170 West 3rd Street to new Metrolink commuter rail platforms proposed near the intersection of Rialto Avenue and E Street in the City of San Bernardino, San Bernardino County, California (see Figures 1-1 and 1-2). The primary features of the proposed Project include construction of a second track, rail platforms, parking lots, a pedestrian overpass at the Depot, an Omnitrans Bus Facility, and grade crossing improvements; railroad signalization; and roadway closures. The proposed Project's secondary features include: construction of drainage improvements, utility accommodation, new parking facilities, and implementation of safety controls. Figure 1-3 depicts the area of potential effects (APE)/Project Study Area and the primary project components contained within the APE.

The project components include the following:

Track Improvements: Track improvements include realignment of the existing railroad track and construction of a second track parallel to the existing track, extending from the Depot to the proposed rail platforms near Rialto Avenue and E Street. The Project also includes realignment and reconstruction of the two mainline tracks at the Depot and improvements to the Burlington Northern Santa Fe (BNSF) Railway Short Way.

San Bernardino Metrolink Station/Santa Fe Depot: The Project involves track and platform, pedestrian access, and parking lot improvements at the Depot. An Americans with Disabilities Act–compliant pedestrian overpass bridge would be constructed at the Depot, possibly in the Mission Revival architectural style. Two new platforms would be constructed north of the Depot, with new benches, canopies, platform amenities, ticket vending machines, lighting, and closed-circuit television security cameras that would serve both Metrolink and Amtrak passengers. In addition, minor interior and exterior improvements are proposed for the Depot that include the following: (1) installation of new window awnings, (2) new exterior and interior wayfinding signage for bathrooms and the San Bernardino Associated Governments (SANBAG)/Southern California Association of Governments (SCAG)/Whistle Stop Cafe/Museum, (3) new clock in the lobby, (4) new sign in the lobby that details the railroad's role in creating time zones, and (5) new monument sign and flagpole to be placed at the Depot entrance.

The parking lot located directly east of the Depot would be reconfigured to accommodate additional vehicles and landscaping, necessitating the realignment of 3rd Street.

Proposed Rail Platforms: The Project includes the installation of three new station platforms, canopies, platform amenities, ticket vending machines, lighting, and closed-circuit television security cameras near the intersection of Rialto Avenue and E Street. A new 265-space parking lot would be constructed directly south of the platforms to accommodate both train crews and Metrolink passengers. The vacant site to the north of the proposed rail platforms may be used as a staging area for the Project. A temporary Southern California Regional Rail Authority (SCRRA) crew building is also proposed for use during construction.

Omnitrans Bus Facility: The Omnitrans bus facility would include up to 22 bus bays and a bus circulation roadway with bus turnouts, as well as frontage street access improvements, pedestrian access improvements (e.g., crosswalks), and associated support facilities (e.g., security and lighting).

Pedestrian Connection to the San Manuel Stadium~~Arrowhead Credit Union Park~~: A lighted pedestrian pathway that would connect the proposed rail platforms to ~~Arrowhead Credit Union Park~~ San Manuel Stadium may be included as part of the Project. The following amenities would be provided: park benches, trash disposals, and bicycle racks.

Street Improvements:[1] The intersection of K Street and 3rd Street would be reconfigured as the west leg of a new T intersection. I Street at Rialto Avenue would be converted to a cul-de-sac on the south side, with the north leg of the intersection converted to a right-in/right-out configuration. The changes to the roadway system would require approval of a General Plan Amendment to the City's Circulation Map of the 2005 General Plan Update. Other improvements may be proposed.

Rail Alignment at I-215 Freeway: The I-215 freeway overpass was designed and constructed to accommodate the existing single track alignment within the Redlands Subdivision and would necessitate the use of compound horizontal curves in order to maintain a side clearance. The new corridor pier walls on the east side of the freeway constrict the overpass's opening width, which would necessitate the use of compound horizontal curves in order to maintain a side clearance.

Grade Crossings: Four existing at-grade crossings would be reconstructed to accommodate the second track, raised medians, and widened sidewalks (3rd Street, 2nd Street, Rialto Avenue/I Street, and G Street).

Parcel Acquisitions and Relocations: Acquisition of additional rights-of-way along the alignment would be required. This may require up to ~~70~~ 69 partial and full parcel acquisitions, as well as easements (i.e., roadway, temporary construction, sidewalk, utility, and alley vacations). Some of the parcels that would be acquired support active businesses and inhabited residences, which would require relocation.

Drainage Facility Improvements: A system of perforated underdrains and ditches would be constructed adjacent to the tracks to convey stormwater to the existing storm drain system. Catch basins at four crossings would also need to be relocated to accommodate proposed roadway improvements. Detention basins adjacent to the ~~Arrowhead Credit Union Park~~ San Manuel Stadium are also proposed.

Utility Replacement and Relocation: Existing subsurface water, sewer, storm drain, power, gas, fiber optic, and telephone lines that cross the tracks would be evaluated for conformance with Metrolink engineering standards. Overhead utilities, such as power and communication lines, would be raised if they fail to meet Metrolink's overhead clearance requirements. Railroad signal houses and streetlights would be relocated to accommodate the second track.

Relocation of Monitoring Wells: Fourteen groundwater monitoring wells located within the project APE would remain in place. However, four existing groundwater monitoring wells located within the project APE may need to be closed and four may need to be relocated due to their location within the railway.

Operational Controls (Rail Signals): Safety controls, including new traffic signals, railroad signal equipment (compatible with Metrolink's and BNSF's new positive train control [PTC] systems), and railroad/pedestrian crossing equipment, would be provided at each at-grade railroad crossing.

[1] The Interstate 215 widening project, under construction in 2010–2011, will convert I Street south of 3rd Street to a cul-de-sac. That project is separate from the proposed Project.

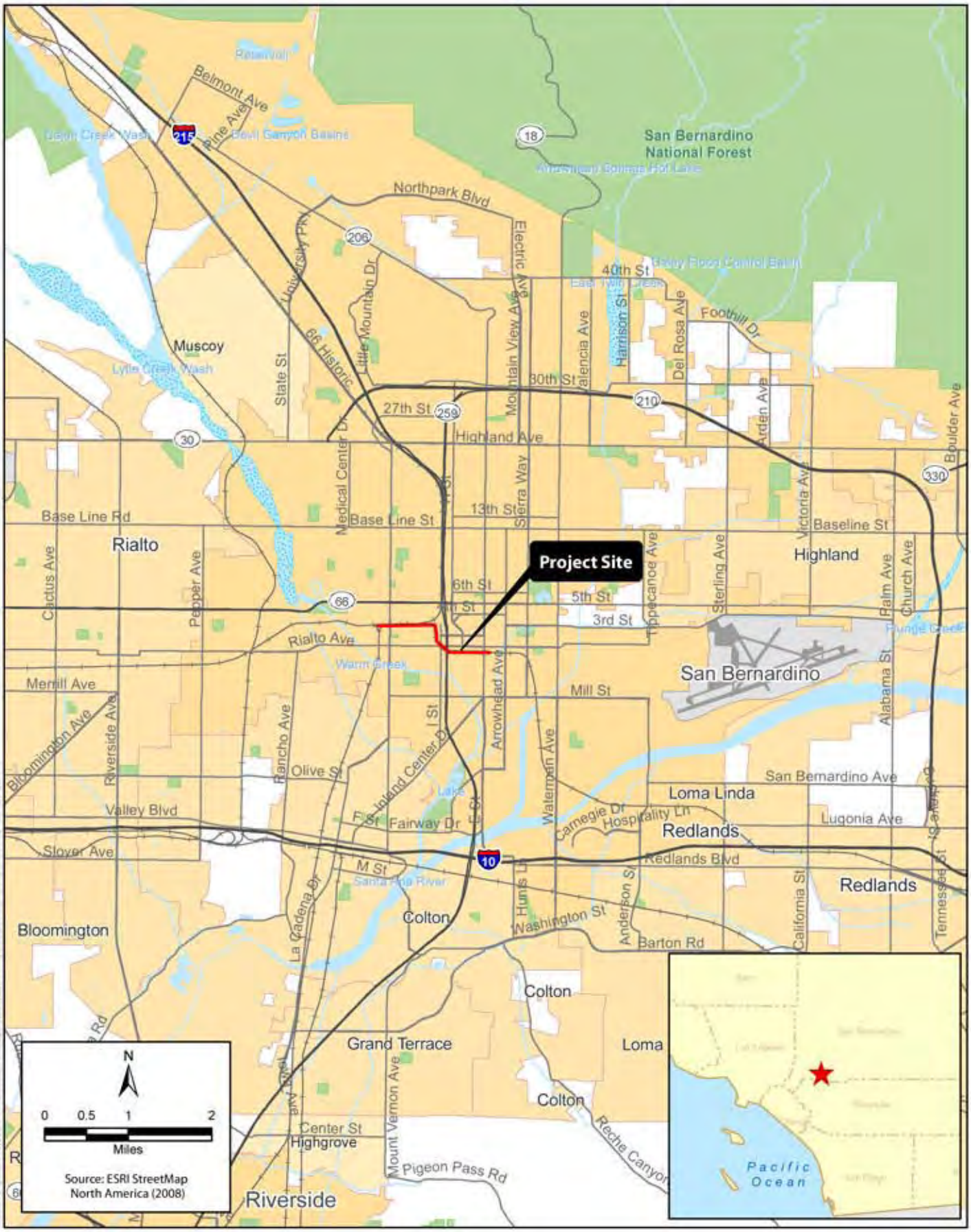
Rail Operations: An operating plan has been developed using Rail Traffic Controller (RTC) modeling and an operational analysis based on input from SANBAG, Metrolink, Amtrak, and BNSF personnel. Metrolink operations between the Depot and the new rail platforms are projected to start in early 2014.

Maintenance: Typical railroad maintenance and inspections would be conducted throughout the operational phase of the Project in accordance with SCRRA/Metrolink, BNSF, and Amtrak standard practices.

1.2 PROJECT DESIGN OPTIONS

This analysis includes the proposed Project in addition to three design options: Pedestrian Overpass Design Options 1A and 1B, Pedestrian Underpass Design Option 2, and 3rd Street Open Design Option 3. The Pedestrian Overpass Design Options 1A and 1B and the Pedestrian Underpass Design Option 2 would be designed to minimize visual effects on the Santa Fe Depot's historic façade. All other railway and station improvements proposed as part of the Project would remain the same. The 3rd Street Open Design Option 3 would not require 3rd Street to be closed and would instead upgrade the at-grade crossing between J Street and I Street. All other railway and station improvements proposed as part of the Project would remain the same.

The proposed Project and Project Design Options would all meet the project's objectives, purpose, and need, which is to extend Metrolink regional passenger rail service approximately 1 mile east to downtown San Bernardino. This would involve construction of a second track, rail platforms, parking lots, a pedestrian overpass at the Depot, a bus facility, and grade crossing improvements; railroad signalization; and roadway closures. However, after review of all adverse and beneficial environmental effects and upon review of the comments received during the public circulation period, SANBAG has chosen the proposed Project as the preferred alternative.

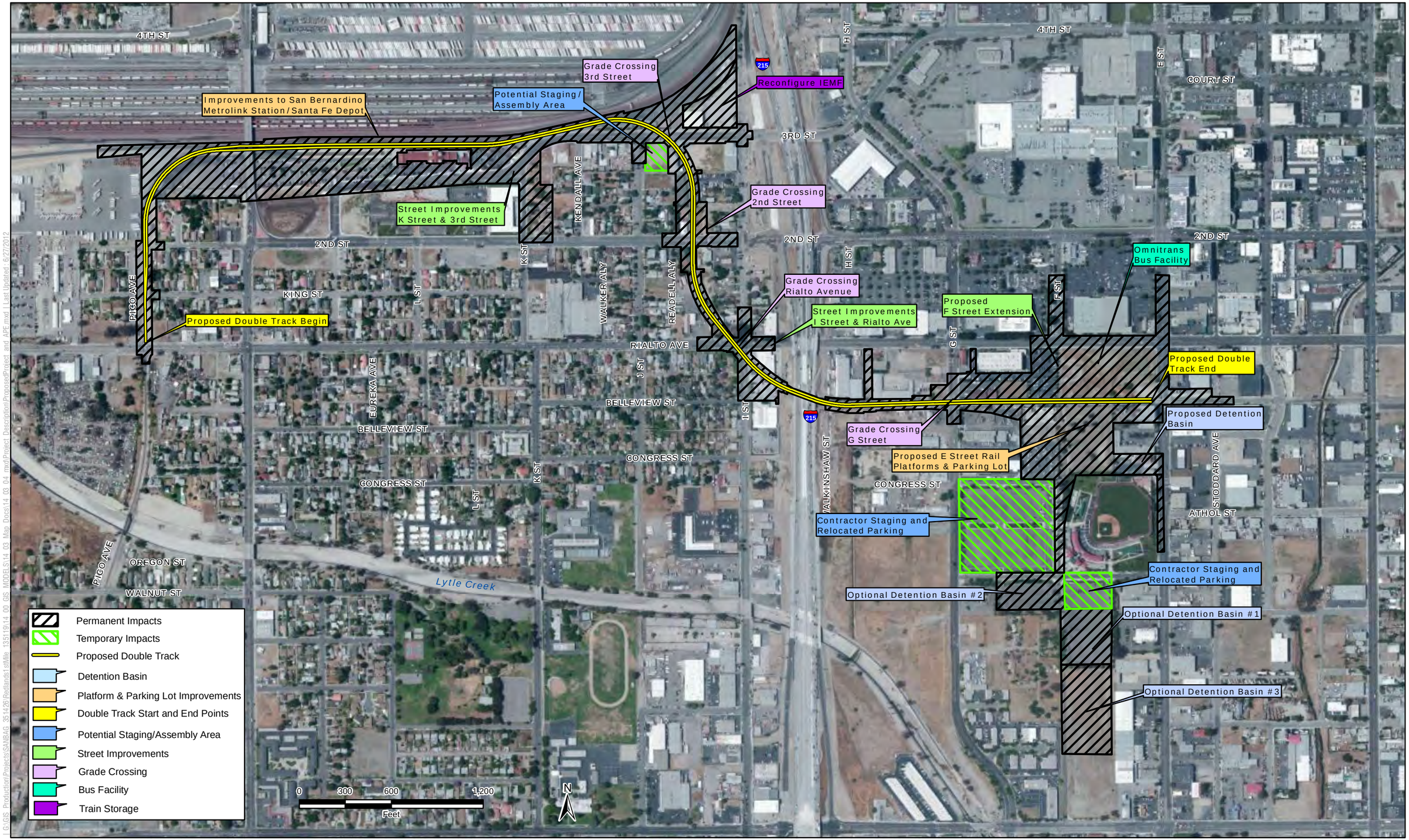


ICF INTERNATIONAL

Figure 1-1
Regional Location

Downtown San Bernardino Passenger Rail Project

Figure 1-2
Project Location
Downtown San Bernardino Passenger Rail Project



Source: HDR (2012), Bing (2012)

Figure 1-3
Project Study Area and Primary Project Components
Downtown San Bernardino Passenger Rail Project

2.0 NOISE/VIBRATION CRITERIA

2.1 NOISE IMPACT CRITERIA

2.1.1 Federal Regulations

Several federal laws and guidelines are relevant to the assessment of ground transportation noise and vibration impacts:

The National Environmental Policy Act of 1969 (42 United States Code [USC] 4321, et seq.) (PL-91-190) (40 Code of Federal Regulations [CFR] 1506.5) (NEPA) requires the preparation of an environmental impact statement (EIS) for federal or federally supported projects that will affect environmental quality, including projects that cause noise impacts.

The Noise Control Act of 1972 (42 USC 4910) was the first comprehensive statement of national noise policy. It declared that "it is the policy of the U.S. to promote an environment for all Americans free from noise that jeopardizes their health or welfare."

The Occupational Safety and Health Administration (OSHA) Occupational Noise Exposure Hearing Conversation Amendment (Federal Register [FR] 48 (46), 9738–9785) establishes noise exposure limits for the workplace, specifically relevant during construction.

U.S. Environmental Protection Agency (EPA) Railroad Noise Emission Standards (40 CFR 201) pertain to noise emissions from railroads.

The U.S. Department of Transportation has implemented these mandates and published impact assessment procedures and criteria pertaining to noise. Noise impact criteria have been adopted by the Federal Transit Administration (FTA) to assess the contribution of noise from conventional rail sources to the existing environment.[1] These guidelines establish methods for analyzing and assessing noise and vibration impacts. The impact criteria are based on the goal of maintaining a noise environment considered acceptable for land uses where noise may have an effect. The noise exposure is measured in terms of the L_{dn} for residential land uses or in terms of the hourly equivalent sound level (L_{eq}[h]) for other land uses.

In FTA's *Transit Noise and Vibration Impact Assessment*, noise impact criteria for construction and operation of rail facilities are based on the change in outdoor noise exposure using a sliding scale with three land use categories and three degrees of impact. These criteria apply to various surface transportation modes, including heavy rail. They respond to heightened community annoyance caused by late-night or early-morning service as well as communities' varying sensitivity to noise from projects during different ambient noise conditions.

For operational rail noise, FTA's three land use categories are as follows:

- Noise Category 1: Tracts of land where quiet is an essential element in their intended purpose, such as outdoor amphitheaters, concert pavilions, and National Historic Landmarks with significant outdoor use.
- Noise Category 2: Residences and buildings where people normally sleep, including homes, hospitals, and hotels.

[1] U.S. Department of Transportation, Federal Transit Administration. 2006. *Transit Noise and Vibration Impact Assessment*. Report FTA-VA-90-1003-06. May.

- Noise Category 3: Institutional land uses (schools, places of worship, libraries) with use typically during the daytime and evening. Other uses in this category can include medical offices, conference rooms, recording studios, concert halls, cemeteries, monuments, museums, historical sites, parks, and recreational facilities.

The categories are determined from general land use information about each receiver. No Category 1 receivers are located within 1 mile of the Project's proposed alignment. Outdoor hourly L_{eq} applies to Categories 1 and 3, whereas outdoor L_{dn} applies to Category 2.

Noise impacts on these three categories as a result of a proposed Project are assessed by comparing the existing and future project-related outdoor noise levels as illustrated in Figure 2-1. As shown in Figure 2-1, the criterion for each degree of impact is based on a sliding scale that is dependent on the existing noise exposure and the increase in noise exposure due to the Project. These potential noise impacts fall into three types: "No Impact," "Moderate Impact," and "Severe Impact" and are described further below:

- No Impact - A project, on average, will result in an insignificant increase in the number of instances where people are "highly annoyed" by new noise.
- Moderate Impact - The change in cumulative noise is noticeable to most people but may not be sufficient to cause strong, adverse community reactions.
- Severe Impact - A significant percentage of people would be highly annoyed by the noise, perhaps resulting in vigorous community reaction.

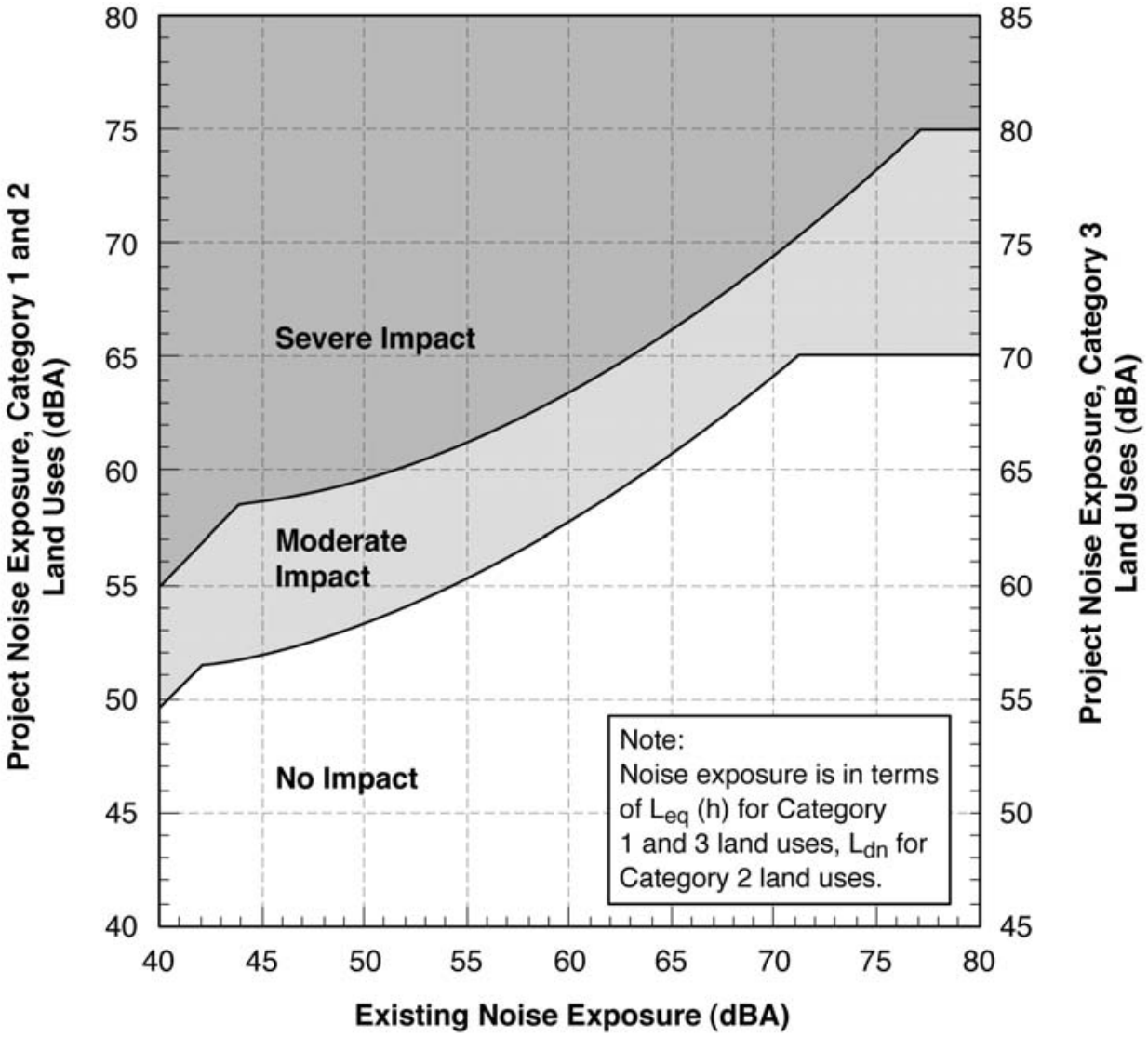
As an example of impact evaluation, consider the FTA's sliding impact criterion for Category 2 receivers. An existing environment of 50 dBA L_{dn} would experience a moderate impact if the rail project creates a noise exposure of approximately 53 dBA to 59 dBA L_{dn}. An existing environment of 65 dBA L_{dn} would be classified as a moderate impact if the rail project creates a noise exposure of 61 dBA to 66 dBA L_{dn}. Those same "existing" environments (50 or 65 dBA L_{dn}) would be classified as having a severe impact if the rail project creates noise exposure levels greater than 59 dBA and 66 dBA L_{dn}, respectively.

2.1.2 State Regulations

At the state level, the California Noise Control Act was enacted in 1973 (Health and Safety Code Section 46010 et seq.). It provides for the Office of Noise Control in the Department of Health Services to provide assistance to local communities developing local noise control programs, and work with the Office of Planning and Research to provide guidance for the preparation of the required noise elements in city and county general plans, pursuant to Government Code Section 65302(f). In preparing the noise element, a city or county must identify local noise sources and analyze and quantify to the extent practicable current and projected noise levels for various sources, including highways and freeways, passenger and freight railroad operations, ground rapid transit systems, commercial, general, and military aviation and airport operations, and other ground stationary noise sources. Noise level contours must be mapped for these sources, using either the community noise equivalent level (CNEL) or L_{dn}, and used as a guide in land use decisions to minimize the exposure of community residents to excessive noise. Airports are subject to the noise requirements set by the Federal Aviation Administration (FAA) and noise standards under the California Code of Regulations (CCR), Title 21, Section 5000.

The California Environmental Quality Act (CEQA) (Section 21000 et seq.) is a state statute passed in 1970. CEQA requires state and local agencies to identify the significant environmental impacts of their actions, including potential significant impacts from noise and vibration, and avoid or mitigate those impacts, when feasible.

Figure 2-1: FTA Noise Impact Criteria



The State of California has established land use compatibility criteria that provide guidance on the compatibility of different types of land uses based upon the existing community noise level. These guidelines are often adopted by city and county agencies for land use planning purposes. However, the State of California has not adopted specific noise criteria that are applicable to rail projects. Therefore, the noise impact assessment has been based on the guidelines provides by FTA.

2.1.3 Local Regulations

The Project is located in the City of San Bernardino. Local noise standards are addressed in the Noise Element of the City's General Plan (Chapter 14). The Noise Element sets forth goals, policies, and implementation guidelines to ensure land use compatibility with respect to noise. Among the City's General Plan objectives is the desire to ensure that excessive noise levels do not significantly affect citizens of the City. The General Plan policies address the siting of new noise-sensitive projects, suggesting that they are to be located where noise from mobile noise sources (i.e. motor vehicle, rail or aircraft) will not exceed an existing or projected future exterior noise level of 65 dBA L_{dn} or an interior noise level of 45 dBA L_{dn} (Goal 14.1). The Noise Element also promotes the reduction of noise from transportation-related sources, including rail (Goal 14.2).

Although the City's Noise Element acknowledges that the regulation of noise from the operation of railroad trains is preempted by state and federal law from local noise regulation while operating within dedicated rights-of-way, the following policies address rail operations within the City:

> Policy 14.2.15: "Work with all railroad operators in the City to properly maintain lines and establish operational restrictions during the early morning and late evening hours to reduce impacts in residential areas and other noise sensitive areas."
>
> Policy 14.2.16: "Work with all railroad operators to install noise mitigation features where operations impact existing adjacent residential or other noise-sensitive uses."

The City regulates noise sources (such as construction noise) that are not pre-empted from local noise control. The following policies pertain to construction noise:

> Policy 14.3.1: "Require that construction activities adjacent to residential units be limited as necessary to prevent adverse noise impacts."
>
> Policy 14.3.2: "Require that construction activities employ feasible and practical techniques that minimize the noise impacts on adjacent uses."

Additionally, the City's Municipal Code Noise Ordinance (Chapter 8.54, Noise Control) prohibits disturbance from construction noise except between the hours of 7 a.m. and 8 p.m. (Section 8.54.070) with certain exceptions. Exceptions (contained in Section 8.54.060, Exemptions) include the following:

> "H. Construction, operation, maintenance, and repairs of equipment, apparatus, or facilities of park and recreation departments, public work projects, or essential public services and facilities…"
>
> "I. Construction, repair, or excavation work performed pursuant to a valid written agreement with the City, or any of its political subdivisions, which provides for noise mitigation measures."
>
> "J. Any activity to the extent that regulation thereof has been pre-empted by state or federal law."

2.2 OPERATIONAL VIBRATION

2.2.1 Federal Regulations

Vibration impact levels, stated as the maximum root-mean-square (RMS) vibration level, are affected by the land use category and the number of vibration events per day. The impact level also depends on the type of analysis being conducted (i.e., ground-borne vibration or ground-borne noise).

FTA provides guidelines to assess human response to different levels of ground-borne noise and vibration. These are shown in Table 2–1. The project APE does not have any Category 1 land uses within approximately 2,000 feet of the alignment. The majority of vibration-sensitive land uses in the project APE are Category 2 land uses. The term "frequent events" is defined as more than 70 vibration events per day, while the term "infrequent events" is defined as less than 70 vibration events per day.

Ground-borne noise is normally not a consideration when trains are at grade. In these situations, the airborne noise is the major consideration. Ground-borne noise generally becomes an important consideration for subways or other projects in which part of the alignment includes a tunnel.

Table 2-1. Ground-borne Vibration and Noise Impact Criteria

Land Use Category	Ground-borne Vibration Impact Levels (VdB re 1 micro inch/sec)		Ground-borne Noise Impact Levels (dB re 20 micro Pascals)	
	Frequent Events[1]	Infrequent Events[2]	Frequent Events[1]	Infrequent Events[2]
Category 1: Buildings where vibration would interfere with interior operations.	65 VdB[3]	65 VdB[3]	N/A[4]	N/A[4]
Category 2: Residences and buildings where people normally sleep.	72 VdB	80 VdB	35 dBA	43 dBA
Category 3: Institutional land uses with primarily daytime use.	75 VdB	83 VdB	40 dBA	48 dBA

Notes:

1. The term frequent events is defined as more than 70 vibration events per day.
2. The term infrequent events is defined as fewer than 70 vibration events per day.
3. This criterion limit is based on levels that are acceptable for most moderately sensitive equipment, such as optical microscopes. Vibration-sensitive manufacturing or research will require detailed evaluation to define the acceptable vibration levels. Ensuring lower vibration levels in a building often requires special design of the heating, ventilation, and air-conditioning systems and stiffened floors.
4. Vibration-sensitive equipment is not sensitive to ground-borne noise.

Source: FTA 2006.

FTA analysis guidelines call for investigation of the potential for vibration-induced damage to "fragile" or "extremely fragile" buildings. Damage to a building is possible (but not necessarily probable) if ground vibration levels exceed the following criteria:

- 0.20-inch-per-second peak particle velocity (PPV) (approximately 100 VdB) for fragile buildings.
- 0.12-inch-per-second PPV (approximately 95 VdB) for extremely fragile buildings.

No fragile or extremely fragile buildings are in proximity to the Project. State Regulations

At the state level, vibrations limits have not been set.

2.2.2 Local Regulations

The City of San Bernardino does not have vibration standards or thresholds in its municipal code or other ordinances. Vibration from transportation systems is exempt from local regulations.

3.0 PROJECT APE AND NOISE-/VIBRATION-SENSITIVE SITES

Figure 1-2 shows an overview of the project APE. Residential and commercial land uses exist in the western portion of the project alignment, between the Depot and the undercrossing at Interstate 215 (I-215) as well as between the Depot and the BNSF Short Way. A motel exists on the southeast corner of West Rialto Avenue and South E Street.

Land uses from the I-215 undercrossing to South E Street are commercial/industrial. Residences located in the area north of Rialto Avenue to 3rd Street and between I-215 on the east and K Street on the west are within a general plan land use designation of "IL" (Industrial Light). Zoning for this area is a mix of Industrial and Residential designations.

The current rail line has occasional/intermittent freight traffic. Approximately 150 freight cars per year travel along the rail line, at a typical rate of zero to two trains per week. The typical configuration of these trains is one or two locomotives and two to five cars.[2]

San Bernardino International Airport (SBD) is approximately ~~3.5~~2.1 miles east of the project APE. SBD is the site of the former Norton Air Force Base, which was placed on the Department of Defense's base closure list in 1989. The last of the military facilities were closed in 1995. Currently, aircraft operations take place on an irregular basis: The U.S. Customs Service uses the airport on an on-call basis, the U.S. Forest Service uses the airport as a base for planes when fighting forest fires; and several hangars are used by civilian-owned aircraft maintenance companies. In addition, a fixed-base operator operates a private charter terminal at the airport. Although SBD has a renovated passenger terminal and is capable of handling scheduled commercial service, no passenger or cargo operations use the terminal. Given the information above, as well as critical listening/observations during site visits by project staff, the project APE is not affected on a regular basis by aircraft noise from SBD.

3.1 NOISE-/VIBRATION-SENSITIVE LAND USES AND SITE GEOMETRY

As the first step in the noise and vibration analysis process, a screening analysis is conducted to identify locations where a project may cause noise impacts. The procedure itself is explained in greater detail in Section 5.1.1. For the proposed Project, FRA's horn noise model (also known as the FRA Grade Crossing Noise Model) was used to determine the maximum distances from the project alignment at which noise impacts could occur. Receivers within the indicated screening distance of the Project are identified. If no receivers are within the screening distance, the Project is unlikely to have an impact, and no further noise analysis would be required. If receivers exist within the screening distance, that distance defines the study area for the general and/or detailed noise assessment. Using these screening distances, residential receivers located near the central and western portions of the project alignment and the motel located east of the eastern terminus of the Project were identified as being within the screening distances. Aside from these Category 2 land uses, no other noise or vibration-sensitive land uses exist within the screening distances.

The general topography of the area is flat. The rail line is at-grade with the surrounding area, with the exception of I-215, which is elevated and above both the local terrain and the rail line.

[2] Information provided by Richard Medina, BNSF engineer in charge, to Gerard Reminiskey, HDR, on July 23, 2010.

4.0 MEASUREMENTS OF EXISTING NOISE/VIBRATION CONDITIONS

For information describing the characteristics, associated terms, and noise metrics used for transportation-related noise and vibration, please see Appendix A.

4.1 NOISE MEASUREMENTS

The existing noise conditions in the project APE were documented through measurements at representative noise-sensitive locations during several rounds of measurement surveys. The goal of the measurements was to document the existing noise conditions in the project APE and to estimate existing noise levels as the baseline for the noise impact analysis. Measurements were conducted over a 2-day period, from Tuesday, June 29, 2010, to Wednesday, June 30, 2010, within the residential neighborhood at locations near the rail alignment between the Depot and I-215 and at the motel at the eastern end of the project alignment. Weather throughout the measurement period was acceptable for field noise measurements. Temperatures during the measurement period were warm, with light wind and moderate humidity. An additional round of noise measurements was conducted from Monday, September 19, 2011, to Wednesday, September 21, 2011. Temperatures during the measurement period were warm, with light wind and moderate humidity. The noise measurements are summarized below.

Appendix B contains a list of the instruments used for noise measurements. Field noise measurement data sheets are contained in Appendix C. The noise measurement locations are shown in Figure 4-1.

Two types of noise measurements were conducted: short term (ST) and long term (LT). Each of the ST measurements, conducted at seven locations, was approximately 15 minutes in duration. The noise measurements are considered representative of the hourly noise level occurring at the measurement sites. Four of the ST noise measurements (ST-1 through ST-4) were conducted in or adjacent to exterior residential private spaces (rear yards or side yards) adjacent to the project alignment, and ST-5 was conducted in a motel room at the eastern terminus of the project alignment. LT noise data were used as the basis for the impact analysis of the residential land uses. The remaining ST noise data (i.e., ST-1 through ST-5) serve to characterize further the existing noise environment in the project APE.

A “precision” grade (Type 1) sound level meter was used to conduct the ST noise measurements. All of the ST measurements were attended (i.e., performed by persons with training and experience in measuring environmental sound). In addition to operating the sound level meter, the noise specialist actively observed and noted the acoustical, weather, and community activity conditions. The LT noise measurements were unattended. A Type 2 community noise analyzer was deployed at representative noise-sensitive locations along the project alignment to collect continuous hour-by-hour sound level data for a minimum period of 24 hours.

The laboratory calibration of the sound measurement instruments was verified in the field before and after each measurement period using a reference acoustical calibrator. The accuracy of each acoustical calibrator is maintained through a program established by the manufacturer and is traceable to the National Institute of Standards and Technology. The sound measurement instruments meet the requirements of American National Standard S1.4-1983 and International Electrotechnical Commission Publications 804 and 651.

For the ST sound level measurements, a sound level meter was mounted on a tripod at a microphone height of 5 feet above the ground. The microphone was fitted with a windscreen. For the LT sound level measurements, the community noise analyzer was locked in a case with the microphone and windscreen connected via an extended microphone cable. The microphone was attached to a fence or tree branch such that the microphone was approximately 5 feet above the ground. The community noise analyzer was

located more than 15 feet from the nearest wall or other acoustically reflective surface during the measurements. For each measurement, field personnel completed a field measurement data sheet with information such as the site location and description, weather conditions, calibration parameters, noise level data, and sound sources.

The ST and LT noise measurement data, including locations, are summarized in Table 4-1 and Table 4-2. For the measurements conducted within the residential and commercial land uses (ST-1 through ST-5), noise associated with typical urban/residential land use activities dominates the noise environment in the project APE (e.g., local and distant traffic, children playing, distant construction activities). The exterior ambient 15-minute noise levels ranged from 57 A-weighted decibels (dBA) equivalent sound level (L_{eq}) at locations ST-1 and ST-3 to 63 dBA L_{eq} at ST-2. The interior noise level at ST-5 was 40 dBA L_{eq}.

LT-1 was conducted at 126 North I Street in San Bernardino. The community noise analyzer was located on the fence adjacent to the project right-of-way, in the residents' rear yard. The measured data at this location are considered to be representative of noise levels at locations not directly adjacent to the arterial roadways in the project APE. The day-night average sound level (L_{dn}) at location LT-1 was 61 dBA. The LT data plot presented in Appendix C shows the diurnal noise levels from hour to hour for LT-1. The quietest hours of the 24-hour period occurred between 2 a.m. and 4 a.m. The lowest 1-hour L_{eq} measured was 51 dBA, occurring between 2 a.m. and 3 a.m. and again between 3 a.m. and 4 a.m. The loudest hourly noise level (62 dBA L_{eq}) occurred between 11 a.m. and 12 p.m.

LT-2 was conducted at 907 West Rialto Avenue in San Bernardino. The community noise analyzer was located on a tree adjacent to the front porch of the residence, facing Rialto Avenue. The measured data at this location are considered to be representative of noise levels at locations adjacent to the arterial roadways in the project APE. The L_{dn} at location LT-2 was 69 dBA. The LT data plot presented in Appendix C shows the diurnal noise levels from hour to hour for LT-2. The quietest hours of the 24-hour period occurred between 1 a.m. and 2 a.m. The lowest 1-hour L_{eq} measured was 55 dBA L_{eq}. The loudest hourly noise level (67 dBA L_{eq}) occurred between 3 p.m. and 4 p.m. and between 7 a.m. and 8 a.m.

LT-3 was conducted at 211 North Grape Court in San Bernardino. The community noise analyzer was located on a fence in the side yard of the residence, adjacent to the portion of the rail alignment between the Depot and the Inland Empire Maintenance Facility (IEMF). The measured data at this location are considered to be representative of noise levels at locations adjacent to the rail line in the western portion of the project APE. The L_{dn} at location LT-3 was 66 dBA. The LT data plot presented in Appendix C shows the diurnal noise levels from hour to hour for LT-3. The quietest hours of the 24-hour period occurred between 2 a.m. and 3 a.m. The lowest 1-hour L_{eq} measured was 46 dBA L_{eq}. The loudest hourly noise level (75 dBA L_{eq}) occurred between 7 a.m. and 8 a.m.

For the measurements conducted within residential and commercial land uses (ST-1 through ST-5), no freight or other train passbys occurred along the project alignment during the ST measurements, and based on an examination of the LT noise data, none (with the exception of LT-3) occurred during the LT measurements. At LT-3, large fluctuations in interval noise data suggest that several train passbys occurred during the measurement period.

4.2 VIBRATION MEASUREMENTS

Vibration measurements were not conducted at this stage of the Project. Existing vibration sources in the project APE include motor vehicle traffic along local roads and I-215 as well as trains on the existing tracks.

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Figure 4-1
Noise Measurement Locations
Downtown San Bernardino Passenger Rail Project

Table 4-1. Short-Term Noise Measurement Data Summary

Site ID	Measurement Location	Measurement Period			Noise Sources	Measurement Results, dBA					
		Start Date	Start Time	Duration (minutes: seconds)		L_{eq}	L_{max}	L_{min}	L_{90}	L_{50}	L^{10}
ST-1	Residential land use at 118 N. I St.	6/29/2010	11:33	15:00	Distant rail, distant traffic, children playing, construction	57	68	52	54	56	59
ST-2	Residential land use at 907 W. Rialto Ave.	6/29/2010	14:25	15:00	Traffic, distant construction, birds	63	76	54	57	60	65
ST-3	Residential land use at 961 2nd St.	6/29/2010	12:28	15:00	Traffic, distant construction	59	79	56	53	56	67
ST-3A			14:51	15:00	Traffic, distant construction	57	73	48	50	54	60
ST-4	Residential land use at 907 W 2nd St.	6/29/2010	13:08	15:00	Traffic, distant construction, dog, distant rail	59	80	49	50	53	57
ST-5	Transient Residential land use (motel) at 111 S. E St.– Room 117 (interior noise measurement)	6/29/2010	13:40	15:00	Traffic	40	63	35	36	39	44

Table 4-2. Long-Term Noise Measurement Data Summary

Site ID	Location	Measurement Period			Measurement Results (dBA)				
		Start Date	Start Time	Duration (hours)	24-hour L_{eq}	L_{dn}	L_{90}	L_{50}	L_{10}
LT-1	126 N. I St.	6/29/2010	12:00	24	57	61	58	61	65
LT-2	907 W. Rialto Ave.	9/20/2011	12:00	24	64	69	56	60	67
LT-3	210 N. Grape Ct.	9/21/2011	13	24	65	66	46	53	69

5.0 PREDICTIONS OF NOISE/VIBRATION FROM THE PROJECT

5.1 METHODS FOR ASSESSING OPERATIONAL NOISE SOURCES

5.1.1 Rail Noise

The steps described in the FTA manual were used to evaluate the environmental effects of the Project. The FTA methodology identifies a screening procedure, a general noise assessment, and a detailed noise assessment.

Under the noise screening procedure, the project type is identified, (e.g., commuter rail mainline, commuter rail station, light rail transit station, busway). Project-to-receiver screening distances are given in the manual for each type of project, and adjustments to the generic screening distances are made to suit the project using the methodology in Chapter 5, the FTA spreadsheet model or, where horns and warning bells are used (as is the case with the proposed Project), the FRA's horn noise model (also known as the FRA Grade Crossing Noise Model). Receivers within the indicated screening distance of the Project are identified. If no receivers are within the screening distance, the Project is unlikely to have an impact, and no further noise analysis is called for. If receivers exist within the screening distance, then that distance defines the study area for the general and/or detailed noise assessment. Pursuant to the screening method steps, the FRA's horn noise model was used. The input assumptions and output are shown in Appendix D. As shown in Appendix D, the results are presented in terms of perpendicular distances from and lateral distances along the rail alignment, which define the zone of potential impact. The perpendicular distance is referred to as the impact distance and the lateral distance (from the grade crossing) is referred to as the zone length. The resultant horn noise model results indicated that the impact distance at the grade crossing would be 616 feet, and that the impact distance away from the grade crossing (referred to as the ½ zone length) would be 525 feet, while the zone length would be 500 feet. As a conservative measure, the screening distances for the noise analysis were rounded to 700 feet at the grade crossings and 600 feet at locations not in the immediate vicinity of the crossings. Using these screening distances, residential receivers located near the central and western portions of the project alignment and the motel located east of the eastern terminus of the Project were identified as being within the screening distances. Figure 5-1 shows the screening distances and the receivers located within the screening area.

In the general noise assessment method, the existing noise level and the project noise level are estimated and compared with the impact criteria contained in the manual. The estimations include parameters such as project type and location of alternatives, representative noise-source levels, design speed, and time and frequency of operation. Because severe noise impacts were identified as the general noise assessment for rail noise proceeded, the analysis proceeded to the more involved detailed noise assessment.

The FTA detailed noise assessment method quantifies impacts through an in-depth analysis, which is usually performed only for a single alternative. The methodologies outlined in Chapter 6 of the FTA manual were used to calculate the Ldn noise levels due to train operations on the rail alignment under the existing, future-no-project, and future-with-project scenarios. Receivers of interest were selected using the guidance provided in Chapter 6 and Appendix C of the FTA manual (see Figure 5-1).

The modeling accounted for the number of trains anticipated to pass along the alignment during daytime and nighttime hours (33 and 13, respectively), the typical train speed along the alignment (25 miles per hour), the typical future train consist (two engines and eight cars), and the use of locomotive horns at crossings near noise-sensitive land uses. Additionally, wayside signal bells at crossings were accounted for as part of the detailed noise analysis.

A summary of the fundamental equations used for this analysis and the input and output of the rail noise analysis is contained in Appendix D of this report.

5.1.2 Traffic Noise

Traffic noise associated with the proposed Project was assessed using the Federal Highway Administration's (FHWA's) Traffic Noise Model (TNM), version 2.5. Inputs to the TNM include the locations of roadways, shielding features (e.g., topography and buildings), noise barriers, and receivers as well as ground type. For the purposes of this analysis (i.e., a comparison of potential effects from changes in project-related motor vehicle traffic volumes on the local roadways), a simple grid-type model was constructed. Shielding effects from structures or topography were not included in the model; however, because most of the exterior use areas have some acoustical shielding from either a fence or a building, a uniform 5-decibel (dB) reduction was assumed and deducted from all of the modeled results. Distances from receiver to roadway represent typical representative noise-sensitive receiver distances in the area. Posted traffic speed limits were used in the model for all project scenarios. Acoustically "hard" site conditions were assumed. Traffic volumes provided by the Project's traffic consultant (Iteris) were used to estimate traffic noise levels at noise-sensitive receivers in the project APE for the following scenarios (Iteris 2012):

- Existing.
- Future Year 2014 project-only traffic.
- Future Year 2035 project-only traffic.

The resulting project-related noise levels were then assessed for potential impacts using the same impact criteria used for rail noise (i.e., Figure 3-1, Noise Impact Criteria for Transit Projects, of the FTA manual, included in this report as Figure 2-1). The modeled traffic volumes, as well as TNM model inputs and outputs, are contained in Appendix E. The traffic input to the TNM model consisted of peak-hour traffic volumes and, therefore, the model calculated peak-hour L_{eq} noise levels. These peak-hour levels were converted to L_{dn} noise levels using the 24-hour noise measurement data of LT-2 (i.e., the difference between the measured peak-hour noise level L_{eq} and the L_{dn}).

5.1.3 Omnitrans Bus Facility and Rail Platform Parking Lot Noise

As described earlier, the Project proposes to construct a new rail station with a parking lot and an Omnitrans Bus Facility near the intersection of E Street and Rialto Avenue. The parking lot would be located on the south side of the rail alignment, approximately 750 feet [3]from the nearest noise-sensitive receiver. The bus facility would be located on the north side of the rail alignment, approximately 450 feet[4] from the nearest noise-sensitive receiver. Both of these facilities are outside the adjusted screening distances (350 and 62 feet, respectively) for these facilities as determined using the FTA spreadsheet model (the input and output are included in Appendix F). Therefore, the noise effects from these elements of the Project were not analyzed further.

[3] Measured from the center of the noise-generating activity.
[4] Measured from the center of the noise-generating activity.

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Figure 5-1
Modeled Receiver Locations
Downtown San Bernardino Passenger Rail Project

5.1.4 Wheel / Rail Noise

Wheel squeal is the noise produced by wheel-rail interaction, particularly on a curve where the radius of curvature is smaller than allowed by the separation of the axles in a wheel set. Wheel squeal has not been included in the noise projections, because wheel squeal is highly variable, which makes accurate projections difficult. Measures are included in Section 8.0, "Noise/Vibration Mitigation," to minimize wheel squeal in areas of the Project with short radius curves.

5.2 OPERATIONAL VIBRATION

The FTA procedure for a general operational vibration assessment (as outlined in Chapter 10 of the FTA manual) was used for this analysis. The FTA assessment procedure requires the following data:

- Number of daily vibration events.
- Receiver land use designation (categories specified above).
- Vibration source levels.
- Distance from source to receiver (building) footprints.
- Train speed, suspension, wheel condition (worn or flat-spots), track condition.
- Number of floors above grade to the receiver.
- Soil characteristics of ground between the vibration source and receiver.
- Receiver construction/foundation type and description, including whether it is fragile or extremely fragile.

For the operational vibration analysis, the number of daily events was classified as "frequent." Category 2 land use designations were used for all of the receivers analyzed. The source levels were derived from Figure 10-1 of the FTA manual using the curve for "locomotive powered passenger or freight." The distance between the source (i.e., rail centerline) and the receiver was measured using scaled aerial photographs showing the existing and proposed project alignment. Train speed was assumed to be the maximum of 25 miles per hour[5] based on information provided by the project proponent (vibration level increases as a function of train speed). Because the train type is a commuter train, the train's wheels were assumed to be in good condition (i.e., no flat spots). Soil propagation characteristics were assumed to be "normal" (rather than "efficient"), and the structures were assumed to be of wood-frame construction, based on field observations. Using the generalized ground surface vibration curve, the RMS velocity level data at the receiver distance of interest is adjusted based on the factors affecting the source, factors affecting the vibration path, and factors affecting the receiver, as specified in Table 10-1 of the FTA manual. The calculation spreadsheets are contained in Appendix G of this report.

5.3 CONSTRUCTION NOISE

Noise and vibration related to construction would result from operation of heavy equipment needed to implement the Project.

The FTA manual (Chapter 12) contains several sets of tables listing suggested construction noise impact criteria, depending upon the level of detail/understanding of the construction phase. For the more detailed approach (which is applicable to the Project), the following set of impact criteria are suggested (Table 5-1). Table 5-1 provides different impact criteria levels for daytime and nighttime construction. Daytime is defined as 7 a.m. to 10 p.m., and nighttime is defined as 10 p.m. to 7 a.m.

[5] The vibration calculations for the Depot assumed a typical speed of 15 miles per hour because the arriving and departing trains would be either slowing down to a full stop or accelerating from a full stop.

Table 5-1. Prescriptive FTA Construction Noise Impact Guidelines

Land Use	8-Hour L_{eq} (dBA)		30-Day Average L_{dn} (dBA)
	Day	Night	
Residential	80	70	75[(a)]
Commercial	85	85	80[(b)]
Industrial	90	90	85[(b)]

(a) In urban areas with very high ambient noise levels (L_{dn} > 65 dB), L_{dn} from construction operations should not exceed existing ambient + 10 dB

(b) 24-hour L_{eq}, not L_{dn}.

Source: FTA 2006.

Noise from construction activity is generated by the broad array of powered noise-producing mechanical equipment used in the construction process. This equipment ranges from hand-held pneumatic tools to excavators, loaders, a variety of trucks, and tie and rail handling equipment. The complement of noise-producing construction equipment and construction scheduling information was provided by the project sponsor and has been used to estimate worst-case construction noise levels.

To assess potential noise effects from construction, this noise analysis used the methodology in Chapter 12 of the FTA manual. For the proposed Project, the construction work schedule/phasing and equipment information provided by the project sponsor was used to estimate noise levels for the construction activities having the most daily equipment usage (i.e., daily engine-hours). The noise exposure at a receiver location was calculated from the decibel addition of all operating construction equipment using the equations and methodology detailed in Appendix H. Table 12-1 of the FTA Manual (page 12-6), presents the construction source noise emission levels at a reference distance of 50 feet.

Where applicable, shielding effects from intervening structures were accounted for using the same shielding calculations used in the rail noise analysis (i.e., Table 6-9 of the FTA manual).

5.4 Construction Vibration

Vibrations resulting from activities with the potential to result in an impact during project construction were analyzed, using the methodology contained in Section 12.2 of the FTA manual. Vibration source levels for a variety of typical construction equipment types are supplied in Table 12-2 of the manual (reproduced here as Table 5-2) in terms of PPV in inches per second at a reference distance of 25 feet from the source and RMS velocity in decibels[6] (VdB) at 25 feet.

5.5 Alternatives Analysis

The analysis herein is specific to the proposed Project, except as noted. The remaining design options include the same project APE (except for the 3rd Street Open Design Option 3, which includes a reduced APE) and essentially the same or similar project components, with the differentiation involving a pedestrian egress at the Depot or the configuration of 3rd Street. Therefore, the assessment of noise and vibration impacts would essentially be the same or similar for the proposed Project, the Pedestrian Overpass Design Options 1A and 1B, the Pedestrian Underpass Design Option 2, and 3rd Street Open Design Option 3, and no other alternatives analysis is included.

[6] 1 micro-inch per second.

Table 5-2. Typical Construction Equipment Vibration Levels

Equipment/Source		Peak Particle Velocity at 25 Feet (in/sec)	Approximate L_v[a] at 25 Feet
Pile Driver (Impact)	Upper range	1.518	112
	Typical	0.644	104
Pile Driver (Vibratory)	Upper range	0.734	105
	Typical	0.170	93
Clam Shovel Drop (Slurry Wall)	--	0.202	94
Hydromill (Slurry Wall)	In soil	0.008	66
	In rock	0.017	75
Large Bulldozer	--	0.089	87
Caisson Drilling	--	0.089	87
Loaded Trucks	--	0.076	86
Jackhammer	--	0.035	79
Small Bulldozer	--	0.003	58

[a] Root mean square (RMS) velocity in decibels (VdB) reference 1 micro-inch per second.

Source: FTA manual, Table 12-3, 2006.

6.0 NOISE/VIBRATION IMPACT ASSESSMENT

6.1 OPERATIONAL NOISE

6.1.1 Rail Noise

The results of the rail noise impact assessment are summarized in Table 6-1 and shown graphically in Figure 6-1. There would be increased rail noise resulting in moderate and severe impacts at Category 2 (i.e., residential) land uses along the project alignment.

Moderate impacts from project-related rail noise are predicted to occur at Category 2 land uses within the area near the project alignment located east of the Depot and west of I-215 (represented by Receivers[7] 6, 7, 14, 16, 24, 26, 27, 31, 32) and within the area near the project alignment located west of the Depot and north of the IEMF (Receiver 37).

Severe impacts from project-related rail noise are predicted to occur at Category 2 land uses within the area near the project alignment located east of the Depot and west of I-215 (represented by Receivers 11, 15, 17, 18, 19, 22, 25, 28, 29) and within the area near the project alignment located west of the Depot and north of the IEMF (Receivers 35 and 36). In summary, the impact would be considered moderate at a total of 10 receivers representing 28 Category 2 land uses. The impact would be considered severe at a total of 11 receivers representing 30 Category 2 land uses. Mitigation measures for reducing these moderate and severe rail noise impacts are presented in Section 8.0.

Table 6-1. Rail Noise Assessment Inventory Table

Receiver #	Receiver Location Description	Land Use Description	Number of Noise-Sensitive Sites Represented	Existing Noise Exposure (dBA L_{dn})	Closest Distance to Project (Feet)	Project Noise Exposure (dBA L_{dn})	FTA Level of Noise Impact8
1	400' to 800' sw of alignment, w of I St, s of Belleview St	Residential	6	61	430	53	No Impact
2	200' to 400' sw of alignment, w of I St, s of Belleview St	Residential	4	69	320	57	No Impact
3	400' to 800' sw of alignment, w of I St, n of Belleview St	Residential	16	61	420	54	No Impact
4	400' to 800' sw of alignment, n of Belleview St	Residential	8	61	410	55	No Impact
5	400' to 800' sw of alignment, s of Rialto Ave	Residential	10	69	410	55	No Impact
6	200' to 400' sw of alignment, w of I St, n of Belleview St	Residential	4	61	240	60	Moderate Impact

[7] Modeled receiver locations are shown in Figures 5-1 and 6-1.
[8] Represents FTA Impact criteria

Receiver #	Receiver Location Description	Land Use Description	Number of Noise-Sensitive Sites Represented	Existing Noise Exposure (dBA L_{dn})	Closest Distance to Project (Feet)	Project Noise Exposure (dBA L_{dn})	FTA Level of Noise Impact8
7	200' to 400' sw of alignment, n of Belleview St	Residential	3	61	250	60	Moderate Impact
8	200' to 400' sw of alignment, s of Rialto Ave	Residential	5	69	230	60	No Impact
9	100' to 200' sw of alignment, s of Rialto Ave	Residential	1	69	180	62	No Impact
10	100' to 200' sw of alignment, w of I St, n of Belleview St	Residential	1	69	170	63	No Impact
11	50' to 100' sw of alignment, w of I St, s of Rialto Ave	Residential	2	69	60	75	Severe Impact
12	400' to 800' w of alignment, w of J St, n of Rialto Ave	Residential	2	61	510	52	No Impact
13	200' to 400' w of alignment, e of J St, n of Rialto Ave	Residential	2	69	260	60	No Impact
14	200' to 400' w of alignment, e of J St	Residential	5	61	240	60	Moderate Impact
15	less than 50' e of alignment, n of Rialto Ave, w of I St	Residential	2	61	30	79	Severe Impact
16	200' to 400' e of alignment, e of I St	Residential	3	61	310	59	Moderate Impact
17	50' to 100' e of alignment, w of I St	Residential	3	61	120	70	Severe Impact
18	100' to 200' w of alignment, w of I St	Residential	2	61	140	69	Severe Impact
19	100' to 200' w of alignment, w of I St, s of 2nd St	Residential	2	61	140	69	Severe Impact
20	400' to 800' w of alignment, w of J St	Residential	4	61	470	56	No Impact
21	400' to 800' w of alignment, w of J St, s of 2nd St	Residential	2	61	460	56	No Impact
22	100' to 200' w of alignment, e of J St	Residential	2	61	180	67	Severe Impact
23	400' to 800' w of alignment, w of J St, s of 2nd St	Residential	6	69	410	57	No Impact
24	200' to 400' w of alignment, w of J St, s of 2nd St	Residential	2	69	230	65	Moderate Impact
25	100' to 200' w of alignment, e of J St, s of 2nd St	Residential	2	69	110	70	Severe Impact

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Figure 6-1
Rail Noise Impact Areas
Downtown San Bernardino Passenger Rail Project

Receiver #	Receiver Location Description	Land Use Description	Number of Noise-Sensitive Sites Represented	Existing Noise Exposure (dBA L_{dn})	Closest Distance to Project (Feet)	Project Noise Exposure (dBA L_{dn})	FTA Level of Noise Impact8
26	100' to 200' w of alignment, e of J St, n of 2nd St	Residential	2	69	140	69	Moderate Impact
27	100' to 200' e of alignment, w of I St, n of 2nd St	Residential	1	69	140	69	Moderate Impact
28	100' to 200' w of alignment, e of J St, n of 2nd St	Residential	2	61	140	69	Severe Impact
29	100' to 200' e of alignment, w of I St, n of 2nd St	Residential	1	61	140	70	Severe Impact
30	400' to 800' w of alignment, w of J St	Residential	4	61	140	55	No Impact
31	200' to 400' w of alignment, e of J St	Residential	4	61	120	60	Moderate Impact
32	100' to 200' w of alignment, e of J St, n of 2nd St	Residential	1	61	490	62	Moderate Impact
33	200' to 400' w of alignment, w of J St	Residential	3	61	260	57	No Impact
34	400' to 800' se of alignment (e of Depot), s of 2nd St	Residential	4	61	180	50	No Impact
35	50' to 100' e of alignment (e of Depot), w of Mt. Vernon Ave, n of Rialto Ave	Residential	9	66	370	70	Severe Impact
36	100' to 200' w of alignment (e of Depot), w of Pico Ave, n of Rialto Ave	Residential	3	66	820	68	Severe Impact
37	200' to 400' w of alignment (e of Depot), w of Pico Ave, n of Rialto Ave	Residential	3	66	830	63	Moderate Impact
38	ST-5: Commercial/ Transient Residential use e of N. E St. and n of alignment (includes horn noise)	Transient Residential / Commercial (Motel)	1	69	420	61	No Impact

6.1.2 Traffic Noise

The results of the traffic noise impact assessment are summarized in Table 6-2. As shown in Table 6-2, none of the representative modeled receivers would experience an increase in traffic noise equating to either a moderate or severe impact. Therefore, no impact would occur and no mitigation is required.

Table 6-2. Summary of Traffic Noise Modeling Results – dBA L_{dn}

Receiver	Land Use Category	Existing	Project Only 2014, w 3rd St Closure	FTA Impact?	Project Only 2035, w 3rd St Closure	FTA Impact?
2nd and I Street NE quadrant	Residential/2	60	56	No Impact	58	No Impact
I Street N of Rialto Ave	Residential/2	57	43	No Impact	44	No Impact
I Street S of Rialto Ave	Residential/2	57	41	No Impact	42	No Impact
J Street N of Rialto Ave	Residential/2	56	50	No Impact	51	No Impact
Rialto Ave btwn J and K Streets	Residential/2	58	46	No Impact	47	No Impact
J Street S of Rialto Ave	Residential/2	52	48	No Impact	49	No Impact
K Street S of Rialto Ave	Residential/2	56	50	No Impact	51	No Impact
K Street N of Rialto Ave	Residential/2	53	52	No Impact	52	No Impact
2nd Street btwn J and K Streets	Residential/2	56	55	No Impact	56	No Impact
2nd Street btwn K and I Streets	Residential/2	57	56	No Impact	57	No Impact
K Street N of 2nd Street	Residential/2	55	53	No Impact	53	No Impact
J Street N of 2nd Street	Residential/2	54	53	No Impact	54	No Impact
E Street N of Rialto Av	Residential/2	59	49	No Impact	49	No Impact

6.1.3 Omnitrans Bus Facility and Rail Platform Parking Lot Noise

Noise from the Project's proposed parking lot adjacent to the rail platform near Rialto Avenue and E Street was evaluated as described in Section 5.1.3. The FTA's screening procedure calculations resulted in the finding that the nearest noise-sensitive land use is outside the adjusted screening distance for the bus facility and parking lot. Therefore, there would be no impact from the proposed parking lot. No mitigation is required.

6.2 OPERATIONAL VIBRATION

Operation of the Project would result in ground-borne vibration along the alignment. Impacts are predicted to occur at Category 2 land uses within the area near the project alignment located east of the Depot and west of I-215 (represented by Receivers 11 and 15) and within the area near the project alignment located west of the Depot and north of the IEMF (Receiver Site 35). No Category 3 land uses are predicted to have vibration impacts. These impacts and their locations (the receivers at which they would occur) are summarized in Table 6-3.

The ground-borne vibration impact is considered severe. According the FTA manual, use of ballast mats or resiliently supported ties would reduce ground-borne vibration levels by 10 decibels. Implementation of Mitigation Measure NV-4 (Use Ballast Mats, Resiliently Supported Ties, or Measures of Comparable Effectiveness on Portions of the Rail near Sensitive Receivers) would minimize this impact to the "No Impact" category. The data showing the impacts and mitigation results is contained in Appendix G.

As shown in Table 6-3, no ground borne noise impacts are predicted from the Project.

Table 6-3. Ground-borne Noise and Vibration Analysis Summary Table

Potentially Affected[1] Receiver #	Receiver Location Description	Land Use Category	Number of Noise-Sensitive Sites Represented	Distance to BNSF Track Centerline (feet)	Resultant Ground-borne Vibration Levels	FTA Ground-borne Vibration Criteria[4]	Impact?	Resultant Ground-borne Noise	FTA Ground-borne Noise Criteria[4]	Impact?
9	100 ft to 200 ft sw of alignment, s of Rialto Ave	Residential/2	1	180	66	72	No Impact	16	35	No Impact
10	100 ft to 200 ft sw of alignment, w of I St, n of Belleview St	Residential/2	1	170	65	72	No Impact	15	35	No Impact
11	50 ft to 100 ft sw of alignment, w of I St, s of Rialto Ave	Residential/2	2	60	76	72	Impact	26	35	No Impact
15	less than 50 ft e of alignment, n of Rialto Ave, w of I St	Residential/2	2	30	81	72	Impact	31	35	No Impact
17	50 ft to 100 ft e of alignment, w of I St	Residential/2	3	120	69	72	No Impact	19	35	No Impact
18	100 ft to 200 ft w of alignment, w of I St	Residential/2	2	140	68	72	No Impact	18	35	No Impact
19	100 ft to 200 ft w of alignment, w of I St, s of 2nd St	Residential/2	2	140	68	72	No Impact	18	35	No Impact
22	100 ft to 200 ft w of alignment, e of J St, s of 2nd St	Residential/2	2	180	66	72	No Impact	16	35	No Impact

Potentially Affected[1] Receiver #	Receiver Location Description	Land Use Category	Number of Noise-Sensitive Sites Represented	Distance to BNSF Track Centerline (feet)	Resultant Ground-borne Vibration Levels	FTA Ground-borne Vibration Criteria[4]	Impact?	Resultant Ground-borne Noise	FTA Ground-borne Noise Criteria[4]	Impact?
25	100 ft to 200 ft w of alignment, e of J St, s of 2nd St	Residential/2	2	110	70	72	No Impact	20	35	No Impact
26	100 ft to 200 ft w of alignment, e of J St, n of 2nd St	Residential/2	2	140	68	72	No Impact	18	35	No Impact
27	100 ft to 200 ft e of alignment, w of I St, n of 2nd St	Residential/2	1	140	68	72	No Impact	18	35	No Impact
28	100 ft to 200 ft w of alignment, e of J St, n of 2nd St	Residential/2	2	140	68	72	No Impact	18	35	No Impact
29	100 ft to 200 ft e of alignment, w of I St, n of 2nd St	Residential/2	1	120	69	72	No Impact	19	35	No Impact
32	100 ft to 200 ft w of alignment, e of J St, n of 2nd St	Residential/2	1	180	66	72	No Impact	16	35	No Impact
35	50 ft to 100 ft e of alignment (e of Depot), n of Grape Ct.	Residential/2	9	80	74	72	Impact	24	35	No Impact
36	100 ft to 200 ft w of alignment (e of Depot), n of Grape Ct.	Residential/2	3	120	69	72	No Impact	19	35	No Impact
38	ST-5: commercial/ transient residential use e of N. E St. and n of alignment (includes horn noise)	Commercial Transient Residential (motel)/2	1	200	64	72	No Impact	14	35	No Impact

[1] Per Table 9-2 of the General Vibration Assessment, FTA *Transit Noise and Vibration Impact Assessment* manual, the screening distance for vibration assessment for conventional commuter rail is 600 feet for Category 1 land uses and 200 feet for Category 2 land uses. The nearest known Category 1 land use is located approximately 2000 feet away and is thus well beyond the applicable screening distance. Category 2 (residential) land uses existing within 200 feet of the alignment are addressed in this table.

[2] Based on Figure 10-1, page 10-3, Chapter 10, ibid.

[3] Based on Table 10-1, ibid.

[4] Based on Table 8-1 (Category 2, Frequent Events), ibid.

7.0 CONSTRUCTION NOISE/VIBRATION IMPACTS

7.1 CONSTRUCTION NOISE

Construction of the Project would result in temporary but relatively high levels of noise along the alignment. The noise levels from construction activities were estimated using the method described in Section 5.3, and the results are summarized in Table 7-1. Impacts are predicted to occur at Category 2 land uses along the project alignment at distances of up to approximately 240 feet under daytime impact criteria and approximately 410 feet under nighttime impact criteria. Although it is anticipated that most construction work would take place during daytime hours, some work may require nighttime work (such as work at major street crossings).

Table 7-1. Construction Noise Data Summary

Receiver Distance (Perpendicular Distance to Alignment [feet])	Estimated Construction Noise Levels 8-Hour L_{eq}	FTA Criteria for Residential Land Uses (8-Hour L_{eq})		FTA Criteria Exceeded?[1]	
		Day	Night	Day	Night
30	92	80	70	Yes	Yes
60	89	80	70	Yes	Yes
80	88	80	70	Yes	Yes
110	86	80	70	Yes	Yes
120	85	80	70	Yes	Yes
140	85	80	70	Yes	Yes
170	78	80	70	No	Yes
200	76	80	70	No	Yes
230	81	80	70	Yes	Yes
240	80	80	70	Yes	Yes
250	75	80	70	No	Yes
260	75	80	70	No	Yes
310	74	80	70	No	Yes
320	72	80	70	No	Yes
370	72	80	70	No	Yes
410	71	80	70	No	Yes
420	68	80	70	No	No
430	67	80	70	No	No
460	70	80	70	No	No
470	70	80	70	No	No
490	70	80	70	No	No
510	66	80	70	No	No
820	66	80	70	No	No
830	61	80	70	No	No
850	61	80	70	No	No

The construction noise impact is considered severe. Implementation of Mitigation Measures NV-5 (Employ Noise-Reducing Measures during Construction) and NV-6 (Prepare a Community Awareness Program for Project Construction) would minimize this impact.

7.2 CONSTRUCTION VIBRATION

Construction of the Project would result in temporary vibration along the alignment from use of heavy equipment and machinery. The vibration levels from construction activities were estimated using the method described in Section 5.4, and the results are summarized in Table 7-2. FTA construction vibration damage thresholds were not exceeded at any of the representative receiver locations, indicating that potential for damage to any of the structures along the alignment is low. FTA construction annoyance criteria were exceeded at representative receivers as far as 120 feet from the alignment and, therefore, the impact is considered severe. Implementation of Mitigation Measure NV-6 (Prepare a Community Awareness Program for Project Construction) would minimize this impact.

Table 7-2. Construction Vibration Data Summary

Potentially Affected[1] Receiver #	Receiver Location Description	Land Use Description	Number of Noise-Sensitive Sites Represented	Distance to BNSF Track Centerline (feet)	Damage Assessment – Peak Particle Velocity (in/sec)2	Annoyance Assessment – RMS Velocity Level (VdB re 1 micro in/sec)[2]	FTA Construction Vibration Damage Criteria (PPV in/sec)[3]	FTA Damage Criteria Exceeded?	FTA Construction Vibration Annoyance Criteria RMS Velocity Level (VdB re 1 micro in/sec)[3]	FTA Annoyance Criteria Exceeded?
9	100 ft to 200 ft sw of alignment, s of Rialto Ave	Residential	1	180	0.011	68	0.2	No	72	No
10	100 ft to 200 ft sw of alignment, w of I St, n of Belleview St	Residential	1	170	0.012	69	0.2	No	72	No
11	50 ft to 100 ft sw of alignment, w of I St, s of Rialto Ave	Residential	2	60	0.056	83	0.2	No	72	Yes
15	less than 50 ft e of alignment, n of Rialto Ave, w of I St	Residential	2	30	0.160	92	0.2	No	72	Yes
17	50 ft to 100 ft e of alignment, w of I St	Residential	3	120	0.020	74	0.2	No	72	Yes
18	100 ft to 200 ft w of alignment, w of I St	Residential	2	140	0.016	72	0.2	No	72	No
19	100 ft to 200 ft w of alignment, w of I St, s of 2nd St	Residential	2	140	0.016	72	0.2	No	72	No
22	100 ft to 200 ft w of alignment, e of J St, s of 2nd St	Residential	2	180	0.011	68	0.2	No	72	No
25	100 ft to 200 ft w of alignment, e of J St, s of 2nd St	Residential	2	110	0.023	75	0.2	No	72	Yes
26	100 ft to 200 ft w of alignment, e of J St, n of 2nd St	Residential	2	140	0.016	72	0.2	No	72	No
27	100 ft to 200 ft e of alignment, w of I St, n of 2nd St	Residential	1	140	0.016	72	0.2	No	72	No
28	100 ft to 200 ft w of alignment, e of	Residential	2	140	0.016	72	0.2	No	72	No

Potentially Affected[1] Receiver #	Receiver Location Description	Land Use Description	Number of Noise-Sensitive Sites Represented	Distance to BNSF Track Centerline (feet)	Damage Assessment – Peak Particle Velocity (in/sec)2	Annoyance Assessment – RMS Velocity Level (VdB re 1 micro in/sec)[2]	FTA Construction Vibration Damage Criteria (PPV in/sec)[3]	FTA Damage Criteria Exceeded?	FTA Construction Vibration Annoyance Criteria RMS Velocity Level (VdB re 1 micro in/sec)[3]	FTA Annoyance Criteria Exceeded?
	J St, n of 2nd St									
29	100 ft to 200 ft e of alignment, w of I St, n of 2nd St	Residential	1	120	0.020	74	0.2	No	72	Yes
32	100 ft to 200 ft w of alignment, e of J St, n of 2nd St	Residential	1	180	0.011	68	0.2	No	72	No
35	50 ft to 100 ft e of alignment (e of Depot), n of Grape Ct.	Residential	9	80	0.037	79	0.2	No	72	Yes
36	100 ft to 200 ft w of alignment (e of Depot), n of Grape Ct.	Residential	3	120	0.020	74	0.2	No	72	Yes
38	ST-5: commercial/ transient residential use e of N. E St. and n of alignment (includes horn noise)	Commercial/ Transient Residential (motel)	1	200	0.009	67	0.2	No	72	No

[1] Category 2 (residential) land uses existing within 200 feet of the alignment are addressed in this table.

[2] Assuming PPV level of 0.210 in/sec and 94 VdB as for a vibratory roller (i.e., worst-case for the Project).

[3] Based on Table 12-3 (nonengineered timber and masonry buildings) and Table 8-1 (Categories 2 and 3, Frequent Events) of the FTA Transit Noise and Vibration Impact Assessment manual.

8.0 NOISE/VIBRATION MITIGATION

8.1 DISCUSSION OF MITIGATION MEASURES FOR RAIL NOISE IMPACTS

The mitigation of rail noise impacts was considered using the recommendations contained in Section 6.8 of the FTA manual.

The primary noise mitigation approaches applicable to the proposed Project are:

1. **Quiet Zones**:[9] Implementation of the FRA guidelines for the establishment of Quiet Zones for the at-grade crossings at 2nd Street, Rialto Avenue/I Street and G Street, would eliminate or reduce many of the predicted noise impacts. The locations of the quiet zones and residual noise impacts are shown on Figure 8-1. Table 8-1 summarizes the results of the analysis with the elimination of locomotive horn noise at the crossings with Quiet Zones.

   Following implementation of the Quiet Zones, moderate impacts from project-related rail noise are predicted to occur at Category 2 land uses within the area near the project alignment located east of the Depot and west of I-215 (represented by Receivers 11, 17 18, 19, 22, 25, 28, 29) and within the area near the project alignment located west of the Depot and north of the IEMF (Receiver 37).

   Severe impacts from project-related rail noise are predicted to occur at Category 2 land uses within the area near the project alignment located east of the Depot and west of I-215 (represented by Receiver 15) and within the area near the project alignment located west of the Depot and north of the IEMF (Receivers 35 and 36). In summary, the impact would be considered moderate at a total of nine receivers representing 19 Category 2 land uses. The impact would be considered severe at a total of three receivers representing 14 Category 2 land uses.

Table 8-1. Rail Noise Impacts following Quiet Zone Implementation

Receiver #	Receiver Location Description	Land Use Description	Number of Noise-Sensitive Sites Represented	Existing Noise Exposure (dBA L_{dn})	Closest Distance to Project (Feet)	Project Noise Exposure (dBA L_{dn})	FTA Level of Noise Impact[10]
1	400' to 800' sw of alignment, w of I St, s of Belleview St	Residential	6	61	430	47	No Impact
2	200' to 400' sw of alignment, w of I St, s of Belleview St	Residential	4	69	320	50	No Impact
3	400' to 800' sw of alignment, w of I St, n of Belleview St	Residential	16	61	420	47	No Impact

[9] The establishment of a "quiet zone" requires implementation of a number of Supplemental Safety Measures (SSMs) such as four-quadrant gate systems, temporary closure of crossings, etc. which would then allow the rail operator to not sound the locomotive horn as otherwise proscribed by the safety rules of the FRA. The current
Metrolink guidelines for local agencies that wish to establish quiet zones include early coordination with Metrolink followed by diagnostic meetings with the principal stakeholders.
[10] Represents FTA Impact criteria

Receiver #	Receiver Location Description	Land Use Description	Number of Noise-Sensitive Sites Represented	Existing Noise Exposure (dBA L_{dn})	Closest Distance to Project (Feet)	Project Noise Exposure (dBA L_{dn})	FTA Level of Noise Impact[10]
4	400' to 800' sw of alignment, n of Belleview St	Residential	8	61	410	49	No Impact
5	400' to 800' sw of alignment, s of Rialto Ave	Residential	10	69	410	49	No Impact
6	200' to 400' sw of alignment, w of I St, n of Belleview St	Residential	4	61	240	54	No Impact
7	200' to 400' sw of alignment, n of Belleview St	Residential	3	61	250	54	No Impact
8	200' to 400' sw of alignment, s of Rialto Ave	Residential	5	69	230	54	No Impact
9	100' to 200' sw of alignment, s of Rialto Ave	Residential	1	69	180	56	No Impact
10	100' to 200' sw of alignment, w of I St, n of Belleview St	Residential	1	69	170	56	No Impact
11	50' to 100' sw of alignment, w of I St, s of Rialto Ave	Residential	2	69	60	69	Moderate Impact
12	400' to 800' w of alignment, w of J St, n of Rialto Ave	Residential	2	61	510	46	No Impact
13	200' to 400' w of alignment, e of J St, n of Rialto Ave	Residential	2	69	260	53	No Impact
14	200' to 400' w of alignment, e of J St	Residential	5	61	240	54	No Impact
15	less than 50' e of alignment, n of Rialto Ave, w of I St	Residential	2	61	30	72	Severe Impact
16	200' to 400' e of alignment, e of I St	Residential	3	61	310	52	No Impact
17	50' to 100' e of alignment, w of I St	Residential	3	61	120	63	Moderate Impact
18	100' to 200' w of alignment, w of I St	Residential	2	61	140	62	Moderate Impact
19	100' to 200' w of alignment, w of I St, s of 2nd St	Residential	2	61	140	62	Moderate Impact
20	400' to 800' w of alignment, w of J St	Residential	4	61	470	49	No Impact
21	400' to 800' w of alignment, w of J St, s of 2nd St	Residential	2	61	460	50	No Impact
22	100' to 200' w of alignment, e of J St	Residential	2	61	180	60	Moderate Impact

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ICF INTERNATIONAL

Figure 8-1
Rail Noise Impact Areas with Quiet Zones
Downtown San Bernardino Passenger Rail Project

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ICF INTERNATIONAL

Figure 8-2
Evaluated Soundwall and Building Noise Insulation Locations
Downtown San Bernardino Passenger Rail Project

Receiver #	Receiver Location Description	Land Use Description	Number of Noise-Sensitive Sites Represented	Existing Noise Exposure (dBA L_{dn})	Closest Distance to Project (Feet)	Project Noise Exposure (dBA L_{dn})	FTA Level of Noise Impact[10]
23	400' to 800' w of alignment, w of J St, s of 2nd St	Residential	6	69	410	50	No Impact
24	200' to 400' w of alignment, w of J St, s of 2nd St	Residential	2	69	230	59	No Impact
25	100' to 200' w of alignment, e of J St, s of 2nd St	Residential	2	69	110	64	Moderate Impact
26	100' to 200' w of alignment, e of J St, n of 2nd St	Residential	2	69	140	62	No Impact
27	100' to 200' e of alignment, w of I St, n of 2nd St	Residential	1	69	140	63	No Impact
28	100' to 200' w of alignment, e of J St, n of 2nd St	Residential	2	61	140	62	Moderate Impact
29	100' to 200' e of alignment, w of I St, n of 2nd St	Residential	1	61	140	63	Moderate Impact
30	400' to 800' w of alignment, w of J St	Residential	4	61	140	49	No Impact
31	200' to 400' w of alignment, e of J St	Residential	4	61	120	53	No Impact
32	100' to 200' w of alignment, e of J St, n of 2nd St	Residential	1	61	490	56	No Impact
33	200' to 400' w of alignment, w of J St	Residential	3	61	260	51	No Impact
34	400' to 800' se of alignment (e of Depot), s of 2nd St	Residential	4	61	180	50	No Impact
35	50' to 100' e of alignment (e of Depot), w of Mt. Vernon Ave, n of Rialto Ave	Residential	9	66	370	70	Severe Impact
36	100' to 200' w of alignment (e of Depot), w of Pico Ave, n of Rialto Ave	Residential	3	66	820	68	Severe Impact
37	200' to 400' w of alignment (e of Depot), w of Pico Ave, n of Rialto Ave	Residential	3	66	830	63	Moderate Impact
38	ST-5: Commercial/ Transient Residential use e of N. E St. and n of alignment (includes horn noise)	Transient Residential/ Commercial (Motel)	1	69	420	61	No Impact

2. **Sound Barriers**: Sound barriers in the form of solid walls were considered for areas in which moderate or severe impacts would remain following implementation of Quiet Zones. The sound walls shown in Figure 8-2 and summarized in Table 8-2 would be sufficient to reduce all but two of the noise impacts to "No Impact" levels. For those receivers where sound walls would be infeasible to construct, building noise insulation could be incorporated to minimize the noise impact to these receiver locations (see #3 for discussion).

Table 8-2. Sound Barrier Locations

Receiver #s	Sound Barrier Location / Description	Max. Threshold Exceeded, dB[11]	Barrier Length (fleet)	Barrier Height (feet)	Estimated Barrier Performance[12] (dB)
15, 17, 18, 19	Northeast side of rail alignment north of Rialto Avenue, east of I Street	5[13]	500	10	7 to 8
22, 24, 25	Southwest side of rail alignment south of 2cnd Street	2	450	10	6 to 8
26, 28	West side of rail alignment, north of 2nd St	4	450	10	7
27, 29	East side of rail alignment, north of 2nd St	5	450	10	7
35	West of Depot, north of EMF, east side of rail alignment, north of Rialto Avenue	9	1300	12	10
36, 37	West of Depot, north of EMF, west side of rail alignment, north of Rialto Avenue	7	800	12	9

3. **Building Noise Insulation**: There are three residential structures and four individual receivers ~~two residences~~ (represented by Receivers 11 and 15) in the project APE where sound barriers would not be effective as noise reduction. Receiver 11 is located at the southwest corner of Rialto Avenue and I Street. At this location, the fronts and front entrances of the two affected ~~residences~~ residential structures face the rail alignment. Construction of an effective sound barrier (which would most likely need to be constructed adjacent to the sidewalk at the residential property line) would not be feasible because of effects on access to the properties as well as other likely effects, such as aesthetics and reduction of vehicle sight lines.

   The mitigation measure determined to be most effective and feasible for Receiver 11 was building noise insulation. Existing windows, doors, and seals facing the alignment would be replaced with acoustically rated items, and any gaps would be sealed and caulked. Additionally, air conditioning would be provided to ensure that the windows could remain closed. The FTA manual estimates that the cost for retrofit of a typical single-family home is $25,000 to $50,000. Thus, the estimated cost for the retrofit of the two residences represented by Receiver 11 is $50,000 to $100,000.

[11] The maximum amount that the predicted noise levels exceed the "No Impact" threshold (assuming that Quiet Zones are implemented the rail crossings at 2nd Street, Rialto Avenue/I Street and G Street.)
[12] Assuming a solid barrier with absorptive surface facing the rail alignment.
[13] Excludes receiver 15, which would require 14 decibels of noise reduction because the structure is located very near the rail right-of-way. This receiver would be mitigated using building upgrades.

Noise insulation would also be required for Receiver 15 because of the proximity of the residential structure to the rail alignment. Receiver 15 would require acoustical upgrades similar to Receiver 11 and may also require that existing windows looking out onto the alignment be eliminated. The cost to retrofit the two-story structure with building noise insulation is estimated to be $25,000 to $50,000. With implementation of the noise insulation, impacts at Receivers 11 and 15 would be reduced to a level of No Impact. The locations of Receivers 11 and 15 are shown in Figure 8-2.

4. **Rail Lubrication**: Wheel squeal on tight radius curves can be a particularly annoying community noise. It is usually possible to substantially reduce wheel squeal with wayside applicators that apply a friction control material to the top of the rail and/or a lubricant to the gage face of the rail.

   Installation of wayside applicators is recommended for all major curves on the project alignment. If the wayside applicators are not sufficient to reduce squeal to an acceptable level, additional reduction may be possible through customized profiling of the rail to reduce the forces required for trains to negotiate the curves.

Other Mitigation Considered but Found to Not Be Feasible. Source treatments, such as specifications of quieter vehicles, undercar absorption, wheel skirts, etc., were considered and discussed with the project sponsor, but were rejected as not feasible because of the need to have interchangeability of rolling stock.

8.2 Mitigation Measures for Project-Related Noise Impacts

To minimize adverse noise impacts associated with the project, the following combination of mitigation measures should be incorporated into the project.

Mitigation Measure NV-1: Establish Quiet Zones

Quiet zones will be established for the at-grade crossings at the following grade crossings within the project alignment area: 2nd Street, Rialto Avenue/I Street, and G Street. Following implementation of the Quiet Zones, residual impacts (moderate and severe) would remain, as detailed in Section 8.1.

Mitigation Measure NV-2: Provide Building Noise Insulation ~~to Severe- and Moderate-Impact Residences Where Sound Barriers Are Infeasible~~

For the three residential structures represented by Receivers 11 and 15 the project sponsor will provide sound insulation. Effective treatments include caulking and sealing gaps in the building façade and installing new doors and windows that are specially designed to meet acoustical transmission-loss requirements. Exterior doors facing the noise source will be replaced with well-gasketed solid-core wood doors and well-gasketed storm doors. Acoustical windows are usually made of multiple layers of glass with air spaces between to provide noise reduction. Acoustical performance ratings are published in terms of Sound Transmission Class (STC) for these special windows. A minimum STC rating of 39 will be used on any window exposed to the noise source. Additional building sound insulation, if needed, will be provided by sealing vents and ventilation openings and relocating them to a side of the building and away from the noise source. Particularly in the case of Receiver Site 15, it may be necessary to increase the mass of the building façade of wood-frame houses by adding a layer of sheathing to the exterior walls.

To ensure that the windows and doors can be kept closed while still maintaining habitable conditions, a central heating, ventilation, and air-conditioning (HVAC) system will also be provided.

Mitigation Measure NV-3: Wayside Rail Lubrication

Wayside applicators will be installed for all tight-radius curves on the project alignment. If the wayside applicators are not sufficient to reduce squeal to an acceptable level, additional reduction may be possible through customized profiling of the rail to reduce the forces required for trains to negotiate the curve.

Mitigation Measure NV-4: Use Ballast Mats, Resiliently Supported Ties, or Measures of Comparable Effectiveness on Portions of the Rail near Sensitive Receivers

The project design team will ensure the track design specifications include the use of ballast mats or resiliently supported ties on portions of the track near sensitive receivers to minimize project-related ground-borne vibration generated when the trains pass sensitive receivers.

Mitigation Measure NV-5: Employ Noise-Reducing Measures during Construction

The project sponsor will require its construction contractors to employ measures to minimize and reduce construction noise. Measures that will be implemented to reduce construction noise to acceptable levels include the following:

- Comply with local noise regulations and limit construction hours to the extent practicable (i.e., between the hours of 7:00 a.m. and 8:00 p.m.).
- Use available noise suppression devices and techniques, including:
  - Equipping all internal combustion engine-driven equipment with mufflers, air-inlet silencers, and any other shrouds, shields, or other noise-reducing features that are in good operating condition and appropriate for the equipment (5 to 10 dB reduction possible).
  - Using “quiet” models of air compressors and other stationary noise sources where such technology exists.
  - Using electrically powered equipment instead of pneumatic or internal combustion-powered equipment, where feasible.
  - Using noise-producing signals, including horns, whistles, alarms, and bells, for safety-warning purposes only.
  - Locating stationary noise-generating equipment, construction parking, and maintenance areas as far as reasonable from sensitive receivers when sensitive receivers adjoin or are near the construction project APE.
  - Prohibiting unnecessary idling of internal combustion engines (i.e., in excess of 5 minutes).
  - Placing temporary soundwalls or enclosures around stationary noise-generating equipment when located near noise-sensitive areas (5 to 15 decibel reduction possible).
  - Ensuring that project-related public address or music systems are not audible at any adjacent receiver.
  - Notifying adjacent residents in advance of construction work.

Mitigation Measure NV-6: Prepare a Community Awareness Program for Project Construction

In consultation with the representatives of the neighboring cities, the construction contractor will prepare and maintain a program to enhance community awareness of project construction issues, including noise, vibration, nighttime noise, nighttime lighting, and roadway closures. Initial information packets will be prepared and mailed to all residences within a 500-foot radius of project construction, with updates prepared as necessary to indicate new scheduling or processes. A project liaison will be identified who will be available to respond to community concerns regarding noise, vibration, and light.

Mitigation Measure NV-7. Construct Sound Barriers

Sound barriers will be constructed along portions of the rail alignment to reduce noise levels at receivers with severe or moderate noise impacts. Barrier locations and details are contained in Table 8-2 and shown in Figure 8-2.

9.0 REFERENCES

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Appendix A

Introduction to Rail and Construction Noise/Vibration

This appendix provides general information regarding the fundamentals of rail noise and construction noise and vibration.

A-1 FUNDAMENTALS OF RAIL NOISE

Noise is the common term used to describe unwanted sound. The terms “noise” and “sound” are used interchangeably in this discussion.

A-1.1 A-Weighted Sound Level

The unit of sound pressure level measurement is the decibel (dB). It is a unit describing the amplitude of sound pressure compared to a reference pressure. Commonly encountered sound levels range from slightly above the threshold of hearing and very quiet (around 20 dB) to very loud sounds at 130 dB. The sound pressure level is mathematically equal to 20 times the logarithm to the base 10 of the ratio of the pressure of the sound measured to the reference pressure, which is 20 micropascals.

The most common descriptor of sound and noise associated with community noise measurements is the A-weighted sound pressure level, which is abbreviated as dBA. It is defined as the sound pressure level in decibels as measured on a sound meter using the A-weighting filter network. The A-weighting frequency filter de-emphasizes the very low- and very high-frequency components of sound in a manner similar to the frequency response of human hearing and correlates well with people’s group reactions to sound and environmental noise. All sound levels in this report are A-weighted. A-weighted sound pressure levels of typical sources of noise are shown in Figure A-1.

A-1.2 Equivalent Sound Level and Day-Night Average Sound Level

The A-weighted sound level of rail noise and other long-term noise-producing activities within and around a community vary with time. Certain noise descriptors are preferred for use in describing community noise environments. These descriptors are based on noise energy and called the equivalent sound level (L_{eq}), and the day-night average sound level (L_{dn} or DNL). L_{eq} is defined as the continuous steady-state noise level that would have the same total acoustical energy as the real fluctuating noise measured during the same period. Although L_{eq} can be measured or computed for any period, it is typically specified for 1 hour (L_{eq}[h]) or 24 hours (L_{eq}[24h]). L_{dn} is the same as a 24-hour L_{eq} except that noise occurring during the nighttime hours (10:00 p.m. to 6:59 a.m.) is weighted or penalized by 10 dBA. The nighttime penalty accounts for the increased annoyance of noise during typical sleeping hours. L_{dn} accounts for the tempo (operational frequency), acoustic magnitude, duration, and time of day of transit-related noise events.

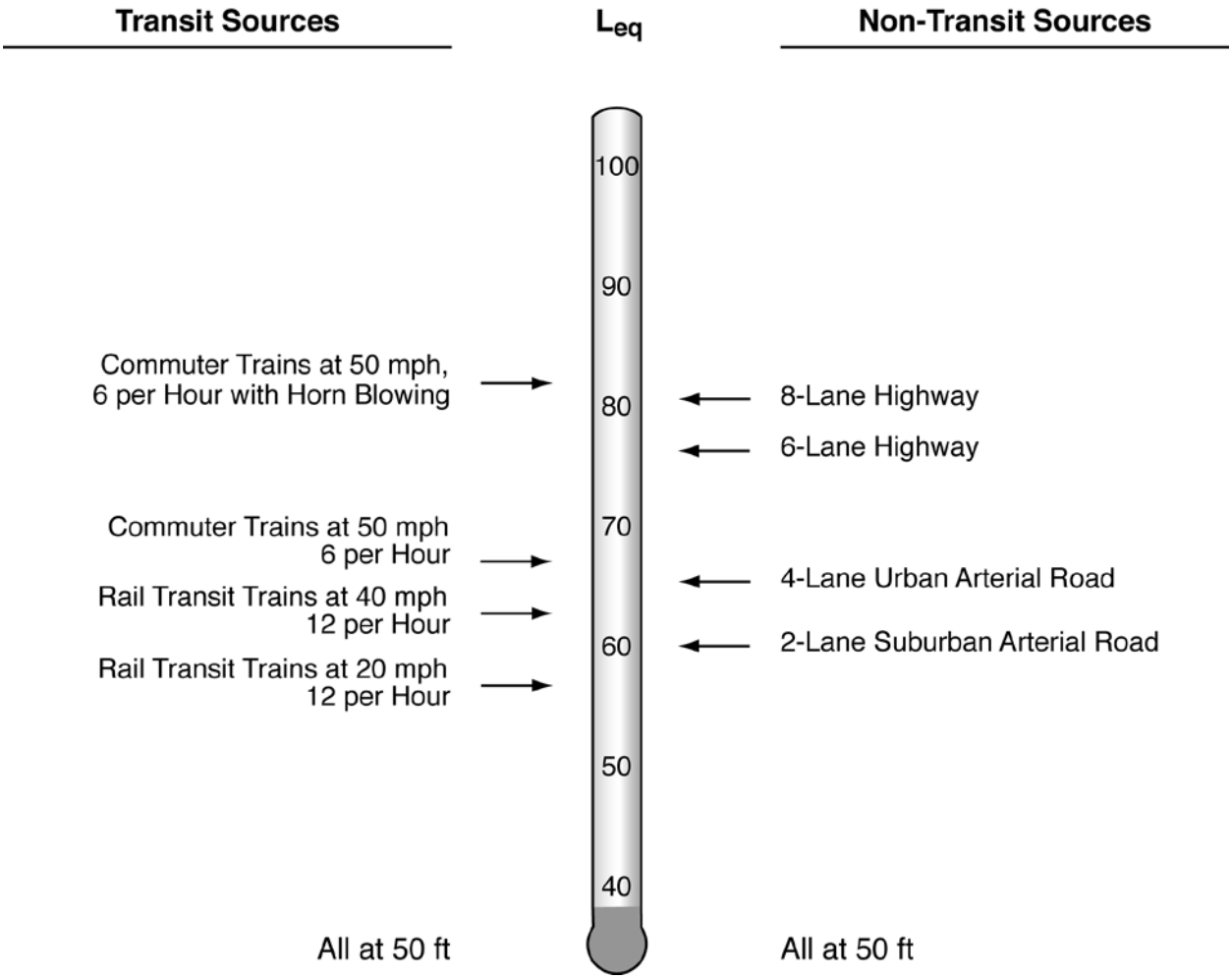
Both L_{eq} and L_{dn} descriptors are approved by various regulatory agencies for noise-related land use planning. The unit for each of these descriptors is dBA. The most recent methodology recommended for assessing rail noise effects (Federal Transit Administration [FTA] 2006) uses L_{dn} as the noise descriptor of choice. This is consistent with the guidelines previously adopted in 1995 by FTA. Figures A-2 and A-3 show typical L_{eq} and L_{dn}, respectively, for transit (rail) and nontransit (nonrail) sources. Comparing the automobile traffic noise levels, 1,000 autos per hour at 40 mph generate approximately 65 dBA L_{eq} at a reference distance of 50 feet (Figure A-1). Assuming this constant rate for the daytime period but only 100 autos per hour during the nighttime, the L_{dn} would be 65 dBA.

Figure A-1. Sound Levels of Typical Noise Sources and Noise Environments

Noise Level dBA	Extremes	Home Appliances	Speech at 3 Feet	Motor Vehicles at 50 Feet	General Type of Community Environment
120	Jet aircraft at 500 ft				
110					
100		Chain saw			
90		Power lawn mower		Diesel truck (not muffled)	
80		Shop tools	Shout	Diesel truck (muffled)	
70		Blender	Loud voice	Automobile at 70 mph	Major metropolis
60		Dishwasher	Normal voice	Automobile at 40 mph	Urban (daytime)
50		Air conditioner	Normal voice (back to listener)	Automobile at 20 mph	Suburban (daytime)
40		Refrigerator			Rural (daytime)
30					
20					
10					
0					
	Threshold of hearing				

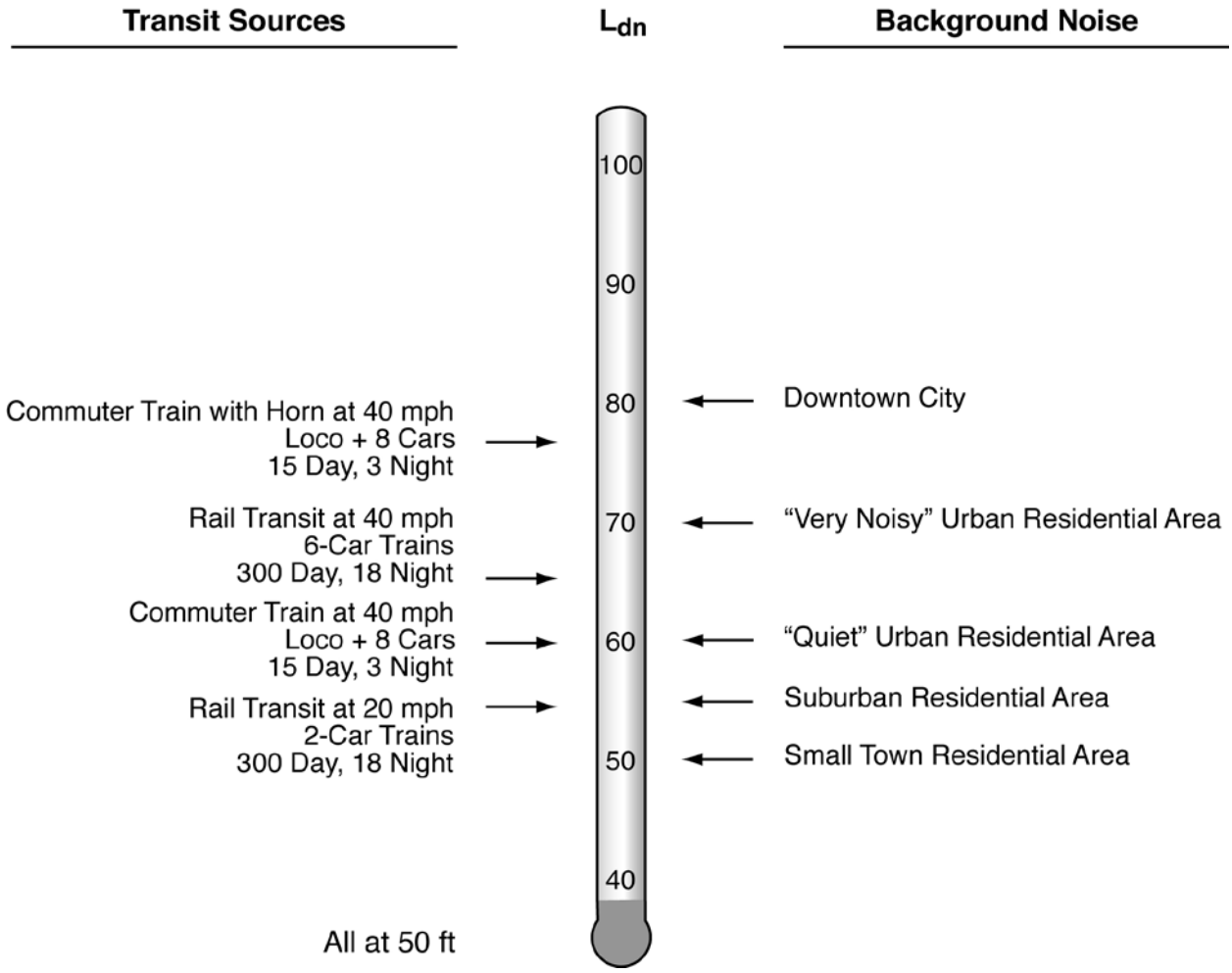
Source: Harris Miller Miller & Hanson, Inc. 2003. Noise and Vibration Impact Assessment for the San Francisco Bay Area Rapid Transit District (BART) Warm Springs Extension Project. Draft report. February. (HMMH Report No. 298760-01.) Burlington, MA. Prepared for Jones & Stokes.

Figure A-2. Typical Hourly L_{eq}



Source: FTA 2006.

Figure A-3. Typical L_{dn} Values



Source: FTA 2006.

The sound exposure level (SEL) is also an important descriptor or metric used in these noise analyses. The SEL describes a receiver's cumulative noise exposure from a single noise event. It is represented by the total A-weighted sound energy during the event, normalized to a 1-second interval. It is the primary descriptor of low- and high-speed rail vehicle noise emissions and is also a useful intermediate quantity for estimating the L_{dn} due to train passbys.

Other noise metrics used to describe the noise environment include the maximum sound level (L_{max}) and the minimum sound level (L_{min}). L_{max} is the highest noise level achieved during a noise event or measurement period. Standard sound level meters have two settings, fast and slow, which represent different time constants. L_{max} measured using the fast setting will typically be 1 to 3 dB greater than L_{max} using the slow setting. L_{max} values expressed in this report refer to the slow setting, which uses a time constant of 1 second. L_{min} denotes the lowest noise level achieved during a noise event or measurement period.

A-1.3 Insertion Loss

The insertion loss (abbreviated IL) is a measure of the effectiveness of a sound barrier. It is the noise level reduction at a specific receiver due to construction of a noise barrier between the noise source (such as traffic) and the receiver. Generally, it is the net effect of the noise barrier attenuation and the loss of ground effects.

A-1.4 Perception of Noise

A change in environmental noise and/or vibration conditions often results from providing new or expanded transportation services. Generally in the United States the main source of environmental noise affecting the population today is surface transportation noise, more specifically, noise from vehicles traveling local streets and roads and state and interstate highways. A more limited population is exposed to noise from railroad and aviation noise sources, with a very small number of persons affected by noise from marine transportation. Community noise may also be associated with transit stations, park-and-ride lots, and rail vehicle maintenance facilities.

Evaluating differences between an existing and total predicted future noise environment assesses the potential responses of persons to changes in their noise environment. The following relationships of perception and response to quantifiable increases in long-term sound levels are used as a basis for assessing potential effects of rail noise:

- Except in a carefully controlled laboratory condition, a change of 1 dBA is very difficult to perceive.
- In the outside environment, a 3 dBA change is considered perceptible.
- An increase of 5 dBA is considered readily perceptible and would generally result in a change in community response to its noise environment.
- A 10 dBA increase is perceived as a doubling in loudness and would likely result in a widespread community response.

A-1.5 Rail Noise Source Characteristics

Rail noise is dependent on many factors:

- Train length, consist, and speed.
- Track condition and gradient.
- Distance from the track to the receiver.
- Intervening ground surface characteristics, whether acoustically reflective or absorptive (i.e., pavement or vegetation).
- Meteorological factors such as wind and temperature gradients.
- Shielding due to structures, soundwalls, earthen berms, hills, and the edge of a roadway.

The noise from a train passby is a combination of contributions from locomotive engines and from cars, with the majority of the noise exposure from the engines. Engines produce higher noise levels than cars, but the duration of the car-related noise is usually longer. The noise emitted by the engine is nearly independent of speed, but is highly dependent on the grade of the track. The noise output of an engine increases when traveling uphill, and decreases rapidly when descending. Downgrade noise output tends to level off as the grade reaches approximately -2.5% because of increased noise from the cooling fans of the dynamic braking system.

Car noise is independent of grade but increases by approximately 6 dB for each doubling of speed. Track constriction and wheel condition have the greatest effect on car noise; jointed track (as opposed to welded track) and the presence of frogs and switches can produce noise levels up to 8 dBA higher than smooth track in good condition. In addition, wheel flats (caused by dragging of the car along the track when brakes are inappropriately applied) can add up to 15 dBA to the car noise emission.

Another difference between engines and cars is the location of their noise sources. The noisiest components on most locomotives are the cooling fans and radiators on the engine compartment, while the wheel-rail interaction typically generates the greatest noise from cars. The location of the noise source affects the noise reduction provided by a barrier because both the height and proximity of the source and receiver with respect to the barrier's location and height are important in determining the effectiveness of the barrier. The shape and surface of the barrier will also affect the attenuation provided. For example, an absorptive earthen berm or soundwall may provide up to 3 dBA greater attenuation compared to a reflective thin "screen" barrier of the same height and location.

A-2 VIBRATION

Ground-borne vibration is a small, rapidly fluctuating motion transmitted through the ground. The strength of ground-borne vibration diminishes (or attenuates) fairly rapidly over distance. Some soil types transmit vibration quite efficiently; other types (primarily sandy soils) do not. There are several basic measurement units commonly used to describe the intensity of ground vibration. The descriptors used by FTA are peak particle velocity, abbreviated PPV, in units of inches per second, and the velocity decibel, abbreviated VdB. The velocity parameter (instead of acceleration or displacement) best correlates with human perception of vibration. Thus, the response of humans, buildings, and sensitive equipment to vibration is described in this section in terms of the root-mean square (RMS) velocity level in VdB units relative to one micro-inch per second. As a point of reference, the average person can just barely perceive vibration velocity levels below 70 VdB (typically in the vertical direction).

A comparison of common ground-borne vibration levels is shown in Figure A-4. Typical background vibration levels are between 50 and 60 VdB, whereas the levels for minor cosmetic damage to fragile buildings or blasting are generally 100 VdB.

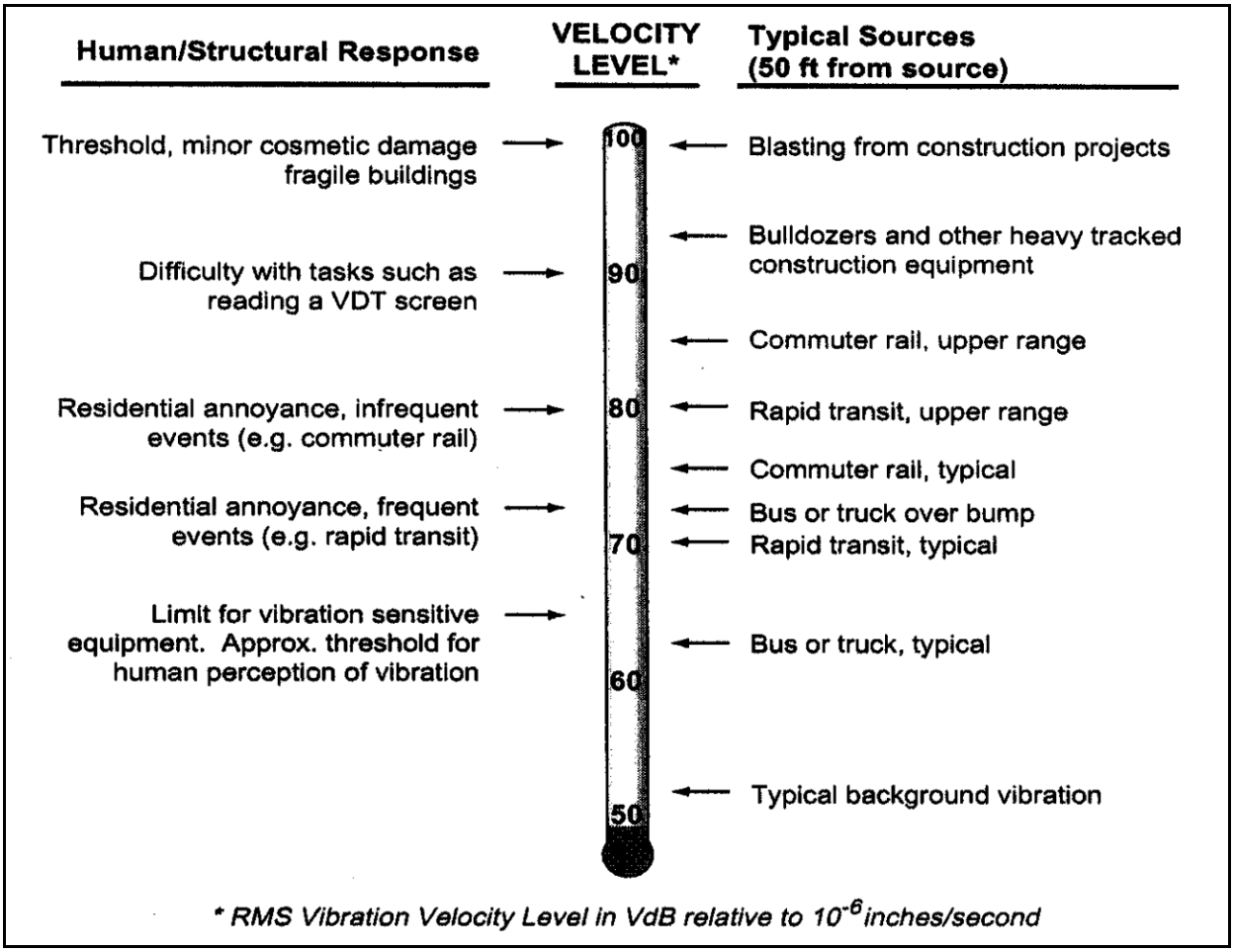
A-3 CONSTRUCTION NOISE AND VIBRATION

Conventional and specialized construction noise is addressed in Sections A-3.1 and A-3.2, respectively.

A-3.1 Conventional Construction Noise

The "conventional construction" activities for the Downtown San Bernardino Passenger Rail Project (DSBPRP or Project) would require the use of vehicles and heavy equipment whose noise characteristics are known. Table A-1 provides construction noise levels typical of various types of conventional construction equipment. The equipment ranges from concrete mixers producing noise levels of 80 to 86 dBA at a distance of 49.2 feet to jackhammers producing 90 to 95 dBA at a distance of 49.2 feet.

Figure A-4. Typical Levels of Ground-Borne Vibration



Source: FTA 2006.

Table A-1. Noise Level Ranges of Typical Construction Equipment

Equipment	Levels in dBA at 50 feet[a]
Front Loader	73–86
Trucks	82–95
Cranes (moveable)	75–88
Cranes (derrick)	86–89
Vibrator	68–82
Saws	72–82
Pneumatic Impact Equipment	83–88
Jackhammer	81–98
Pumps	68–72
Generators	71–83
Compressors	75–87
Concrete Mixers	75–88
Concrete Pumps	81–85
Back Hoe	73–95
Pile Driving (peaks)	95–107
Tractor	77–98
Scraper/Grader	80–93
Paver	85–88

[a] Machinery equipped with noise control devices or other noise-reducing design features may generate lower levels of emissions than those shown in this table

Source: U.S. Environmental Protection Agency 1971.

A-3.2 Construction Vibration

Construction activities can also produce varying degrees of ground vibration, depending on the equipment and methods employed. Operation of construction equipment causes ground vibrations that spread through the ground and decrease with distance. Ground vibrations from construction activities very rarely reach levels high enough to cause damage to structures, although special consideration must be made for fragile historical buildings. The construction activities that typically generate the highest levels of vibration are blasting and impact pile driving.

Ground vibration levels from construction activities vary considerably depending on soil conditions. Table A-2 presents average PPV and VdB levels at a distance of 25 feet from measured data of various types of construction equipment (FTA 2006).

Table A-2. Vibration Source Levels for Construction Equipment

Equipment		PPV at 25 ft (in/sec)	L_V at 25 ft (VdB)*
Pile driver (impact)	Upper range	1.518	112
	Typical	0.644	104
Pile driver (vibratory)	Upper range	0.734	105
	Typical	0.17	93
Clam shovel drop (slurry wall)		0.202	94
Hydromill (slurry wall)	In soil	0.008	66
	In rock	0.017	75
Large bulldozer		0.089	87
Caisson drilling		0.089	87
Loaded trucks		0.076	86
Jackhammer		0.035	79
Small bulldozer		0.003	58

* RMS velocity in decibels (VdB) re 1 micro-inch/second.

Source: FTA 2006.

Vibration from construction should be evaluated on an individual project basis where there is significant potential for impact. Such activities include demolition, pile driving, and drilling or excavation in proximity to structures. Vibration propagates according to the following expression, based on point sources with normal propagation conditions:

$$PPV_{equip} = PPV_{ref} \times (^{25}/_{D})^{1.5}$$

Where:

PPV_{equip} = the PPV in inches per second of the equipment adjusted for distance.

PPV_{ref} = the reference vibration level in inches per second at 25 feet.

D = the distance from the equipment to the receiver.

FTA and the Federal Railroad Administration (FRA) have published guidelines for assessing the impacts of ground-borne vibration associated with construction of transportation projects, which have been applied by other jurisdictions to other types of projects (FTA 2006; FRA 1998). The FTA measure of the threshold of architectural damage for conventional sensitive structures is 0.2 inch per second PPV. The threshold of perception of vibration is 0.01 inch per second PPV.

Mitigation measures, in cases where potential construction vibration impacts are identified, can include the following:

- Limit ground-borne vibration due to construction activities to not exceed 0.2 inch per second velocity in the vertical direction at sensitive receivers.
- Route heavily loaded trucks away from residential streets or streets with the fewest homes.

- Operate earthmoving equipment on the construction site as far away from vibration-sensitive receivers as possible.
- Phase construction activities that create high vibration levels so as not to occur at the same time.
- Avoid nighttime activities.
- Avoid impact pile driving where possible in vibration-sensitive areas. Consider the use of alternative methods that create less vibration such as drilled piles or a vibratory pile driver.
- Where necessary and feasible, select demolition methods not involving impact.

A-4 REFERENCES

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Appendix B

List of Noise Measurement Instruments

Appendix B

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
  - Rion NL-21Type 2 Integrating Sound Level Meter, Serial Number 00676771
  - Rion NL-21Type 2 Integrating Sound Level Meter, Serial Number 00776887

- **Acoustical Calibrators**
  - Larson Davis Model Cal 200 (114 dB SPL @ 1000 Hz), Serial Number 6644
- **Meteorology Instrumentation**
  - Kestrel Model K3000 Digital Hygrometer/Thermometer/Anemometer, Serial Number 475332

Appendix C

Noise Measurement Data Sheets

FIELD NOISE MEASUREMENT DATA

Jones & Stokes

PROJECT: **Redlands First Mile** PROJ. #

SITE IDENTIFICATION: LT-1 OBSERVER(S): Peter Hardie
ADDRESS: 126 I ST
START DATE / TIME: 11:15 6-29-10 END DATE / TIME:

METEROLOGICAL CONDITIONS:
TEMP: °F HUMIDITY: %R.H. WIND: **CALM LIGHT MODERATE VARIABLE**
WINDSPEED: 0 MPH DIR: **N NE E SE S SW W NW STEADY GUSTY**
SKY: **SUNNY CLEAR OVRCST PRTLY CLOUDY FOG RAIN OTHER:**

ACOUSTIC MEASUREMENTS:
INSTRUMENT: RION TYPE: 1 2 SERIAL #:
CALIBRATOR: CAL 200 SERIAL #: 6144
CALIBRATION CHECK: PRE-TEST 94.1 dBA SPL POST-TEST 94.0 dBA SPL WINDSCREEN ✓

SETTINGS: **A-WEIGHTED SLOW FAST FRONTAL RANDOM ANSI OTHER:**

AU2 DG49
1ST 2ND
LT FOULED

REC #	START	END	L_{eq}	L_{max}	L_{min}	L_{90}	L_{50}	L_{10}	OTHER:	(TYPE?)	
LT-1	11:15										

COMMENTS:

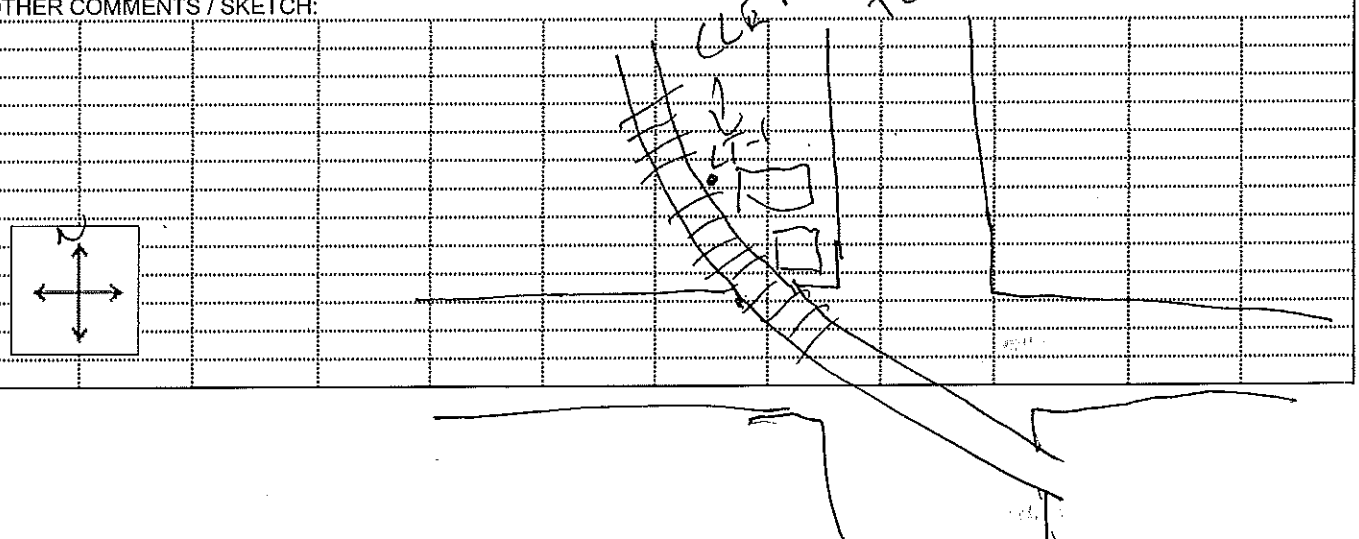
SOURCE INFO AND TRAFFIC COUNTS:
PRIMARY NOISE SOURCE: **TRAFFIC AIRCRAFT RAIL INDUSTRIAL AMBIENT OTHER:** DOGS ARE IN YARD + KIDS
ROADWAY TYPE:
TRAFFIC COUNT DURATION: ____-MIN

	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: **Redlands First Mile** PROJ. #

SITE IDENTIFICATION: LT-R2 AU2 - 9-19 OBSERVER(S): Mike Greene/Peter Hardie
ADDRESS: 907 W RIALTO AVE
START DATE / TIME: 9-19-11 11:45 END DATE / TIME:

METEROLOGICAL CONDITIONS:
TEMP: 94 °F HUMIDITY: 74 %R.H. WIND: **CALM LIGHT MODERATE VARIABLE**
WINDSPEED: 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: RION NL-21 TYPE: 1 (2) SERIAL #: 676771
CALIBRATOR: CAL 20 SERIAL #: 66414
CALIBRATION CHECK: PRE-TEST 114.0 dBA SPL POST-TEST 114.0 dBA SPL WINDSCREEN ✓

SETTINGS: **A-WEIGHTED SLOW FAST FRONTAL RANDOM ANSI OTHER:**

HARRY
HOUR

REC #	START	END	L_{eq}	L_{max}	L_{min}	L_{90}	L_{50}	L_{10}	OTHER:	(TYPE?)
LT-R2	11:45									

COMMENTS:

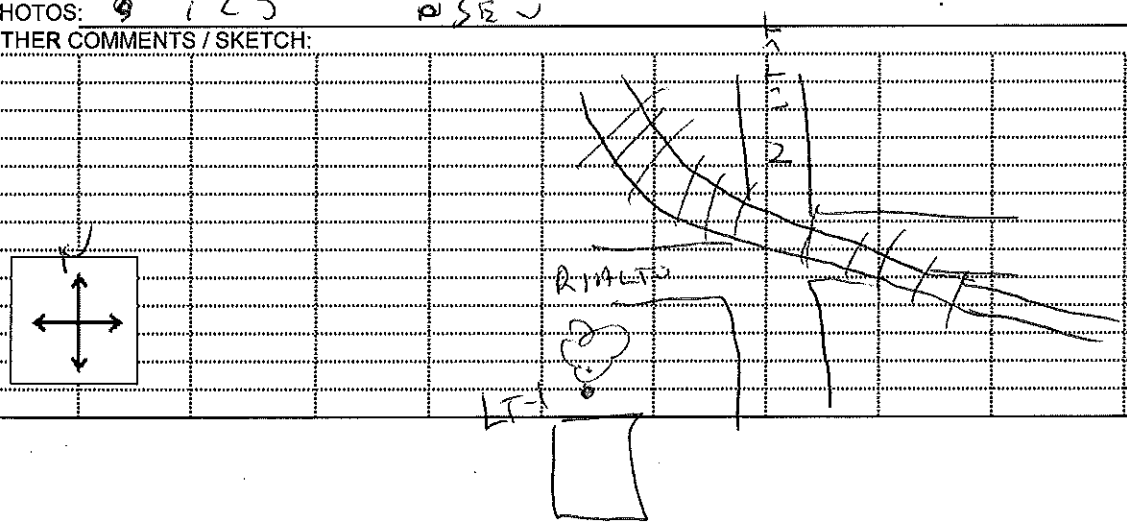
SOURCE INFO AND TRAFFIC COUNTS:
PRIMARY NOISE SOURCE: **TRAFFIC AIRCRAFT RAIL INDUSTRIAL AMBIENT OTHER:**
ROADWAY TYPE:
TRAFFIC COUNT DURATION: -MIN

	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: 9 1 2 3 4 5 6 7
OTHER COMMENTS / SKETCH:



FIELD NOISE MEASUREMENT DATA

Jones & Stokes

PROJECT: **Redlands First Mile** PROJ. #

SITE IDENTIFICATION: LT-3 AUG-9-20 OBSERVER(S): Mike Greene/Peter Hardie
ADDRESS: 110 N GRAPE CT
START DATE / TIME: END DATE / TIME:

METEROLOGICAL CONDITIONS:
TEMP: 61 °F HUMIDITY: 67 %R.H. WIND: CALM LIGHT MODERATE VARIABLE
WINDSPEED: 2-3 MPH DIR: N NE E SE S SW W NW STEADY GUSTY
SKY: SUNNY CLEAR OVRCST PRTLY CLOUDY FOG RAIN OTHER:

ACOUSTIC MEASUREMENTS:
INSTRUMENT: Nh-21 TYPE: 1 2 SERIAL #: 776887
CALIBRATOR: CAL 200 SERIAL #: 6649
CALIBRATION CHECK: PRE-TEST 114 dBA SPL POST-TEST 114 dBA SPL WINDSCREEN ✓

SETTINGS: A-WEIGHTED SLOW FAST FRONTAL RANDOM ANSI OTHER:

REC # LT-3	START	END	L_{eq}	L_{max}	L_{min}	L_{90}	L_{50}	L_{10}	OTHER:	(TYPE?)	

COMMENTS:

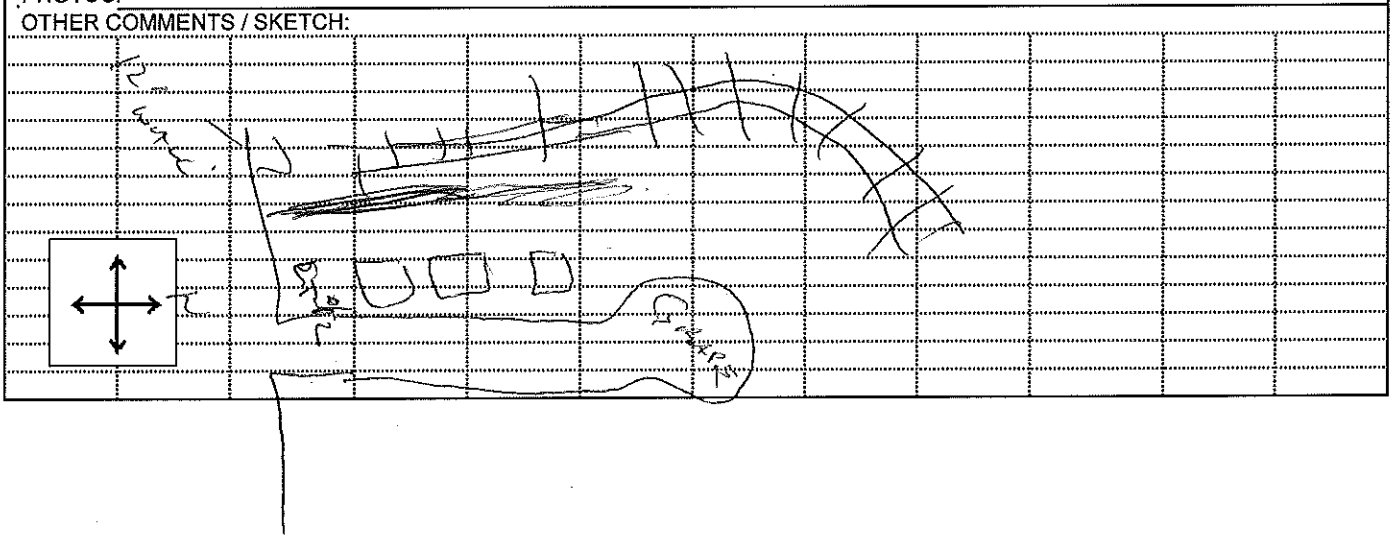
SOURCE INFO AND TRAFFIC COUNTS:
PRIMARY NOISE SOURCE: TRAFFIC AIRCRAFT RAIL INDUSTRIAL AMBIENT OTHER:
ROADWAY TYPE:
TRAFFIC COUNT DURATION: ____-MIN

	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: **Redlands First Mile** PROJ. #

SITE IDENTIFICATION: ST-1 OBSERVER(S): Peter Hardie
ADDRESS: 116 ESI
START DATE / TIME: 11:38 6/29/10 END DATE / TIME:

METEROLOGICAL CONDITIONS:
TEMP: 72-4 °F HUMIDITY: 61 %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: 2 SERIAL #: 0432
CALIBRATOR: CAL200 SERIAL #: 6644
CALIBRATION CHECK: PRE-TEST 94.5 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-1	11:33	11:48	57.4	68.2	51.6	53.8	55.9	59.4			

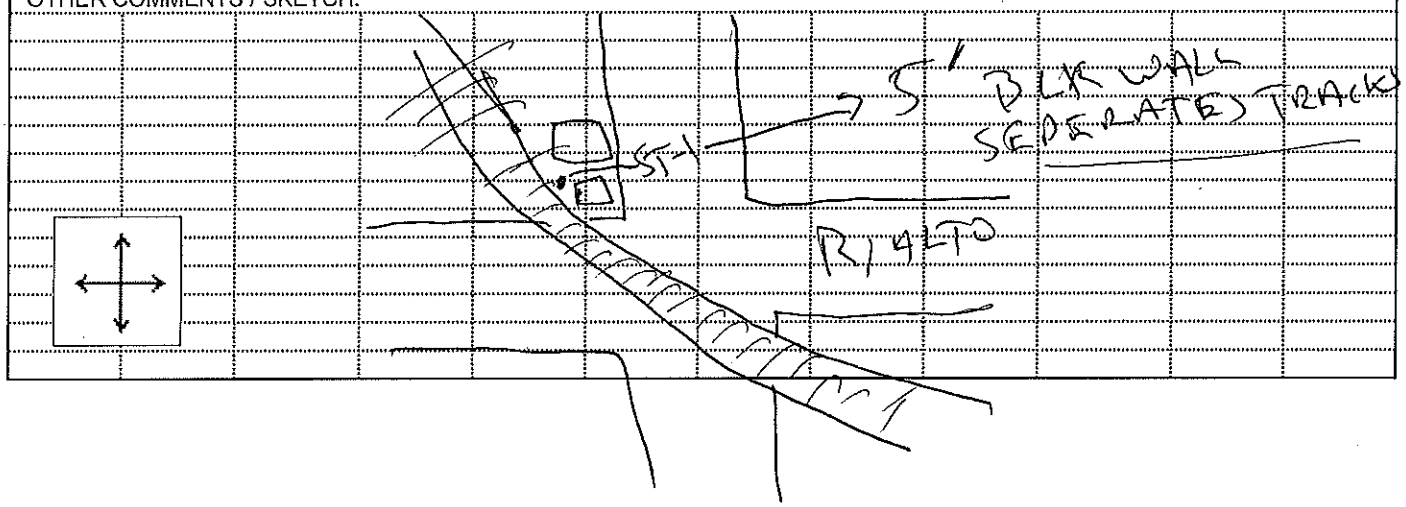
COMMENTS:
RIALTO & I-215

SOURCE INFO AND TRAFFIC COUNTS:
PRIMARY NOISE SOURCE: TRAFFIC AIRCRAFT RAIL INDUSTRIAL AMBIENT OTHER:
ROADWAY TYPE:
TRAFFIC COUNT DURATION: -MIN

	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: DIST RAIL
DIST CONSTRUCTION

DESCRIPTION / SKETCH:
TERRAIN: HARD SOFT MIXED FLAT OTHER:
PHOTOS: 2 3 4 5 N E S W
OTHER COMMENTS / SKETCH:



FIELD NOISE MEASUREMENT DATA

Jones & Stokes

PROJECT: **Redlands First Mile** PROJ. #

SITE IDENTIFICATION: ST-2 OBSERVER(S): Peter Hardie
ADDRESS: 907 RIALTO CORNER OF I & RIALTO
START DATE / TIME: 12:04 6-29-10 END DATE / TIME:

METEROLOGICAL CONDITIONS:
TEMP: 82 °F HUMIDITY: 57 %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 #: 6674
CALIBRATION CHECK: PRE-TEST 94.2 dBA SPL POST-TEST 94.1 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-2	12:04	12:14	72.4	82.0	55.5	61.1	71.9	75.2		
ST-2A	225	240	62.9	76.4	54.3	57.1	59.6	64.7		

COMMENTS: ST-2 IS ALONG SIDE WALK DUE TO NO ONE HOME AT RESIDENCE. CONSTRUCTION INCLUDED DILR DRIVING ABOUT 1000' FEET AWAY. AVERAGE NOISE LEVEL WAS AROUND 73 DBA

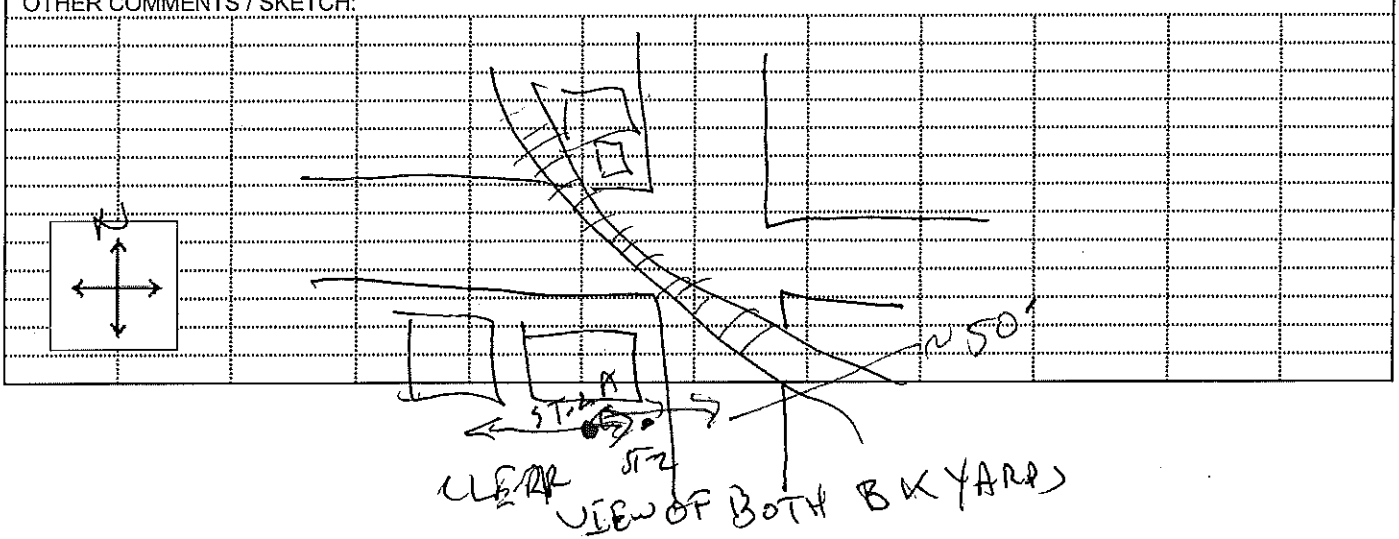
SOURCE INFO AND TRAFFIC COUNTS:
PRIMARY NOISE SOURCE: **TRAFFIC AIRCRAFT RAIL INDUSTRIAL AMBIENT OTHER:**
ROADWAY TYPE:
TRAFFIC COUNT DURATION: ____-MIN

	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:**
DIST CONSTRUCTION

DESCRIPTION / SKETCH:
TERRAIN: **HARD SOFT MIXED FLAT OTHER:**
PHOTOS: 7 8 9 N W S
OTHER COMMENTS / SKETCH:



FIELD NOISE MEASUREMENT DATA

Jones & Stokes

PROJECT: **Redlands First Mile** PROJ. #

SITE IDENTIFICATION: ST-3 OBSERVER(S): Peter Hardie
ADDRESS: 961 2ND ST
START DATE / TIME: 12 2Y 6-29-10 END DATE / TIME:

METEROLOGICAL CONDITIONS:
TEMP: 81 °F HUMIDITY: 46.5 %R.H. WIND: **CALM LIGHT MODERATE VARIABLE**
WINDSPEED: 6-7 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 #: 0423
CALIBRATOR: CAL 200 SERIAL #: 6644
CALIBRATION CHECK: PRE-TEST 94.1 dBA SPL POST-TEST 94.1 dBA SPL WINDSCREEN
SETTINGS: **A-WEIGHTED SLOW FAST FRONTAL RANDOM ANSI OTHER:**

REC #	START	END	L_{eq}	L_{max} (TRUCK)	L_{min}	L_{90}	L_{50}	L_{10}	OTHER:	(TYPE?)
ST-3	1:28	1:43	59.4	78.5	53.6	52.6	55.9	60.7		
ST-3A	2:51	3:06	57.2	72.8	48.2	50.4	53.8	59.6		

COMMENTS: TRUCKS PASSING HOUSE SET LMAX

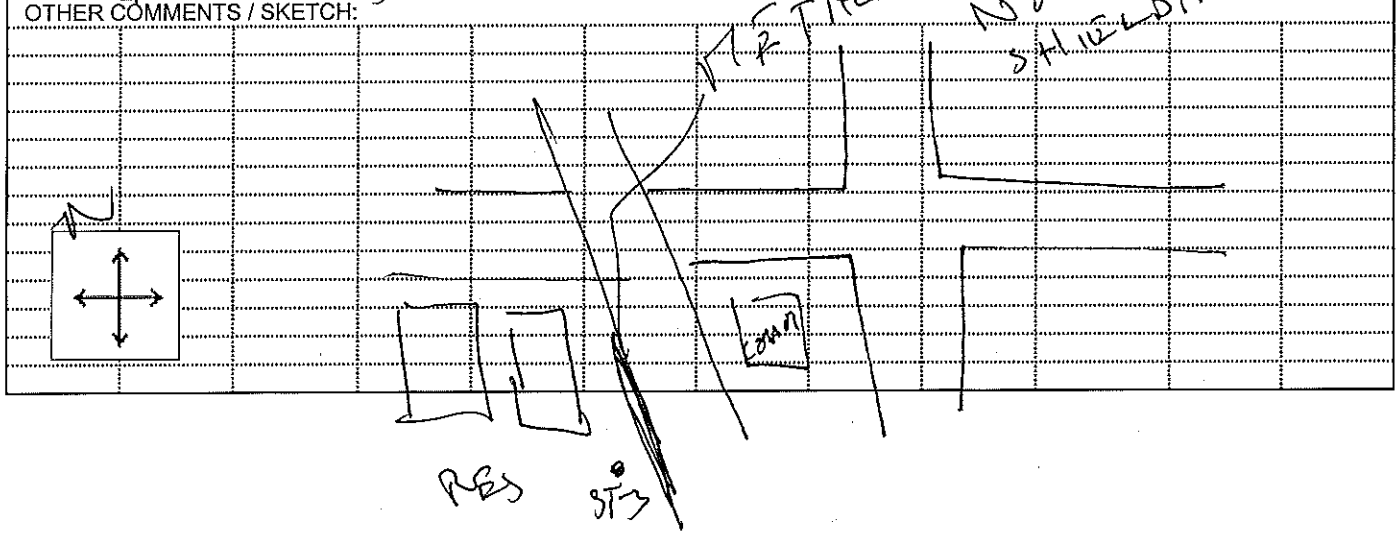
SOURCE INFO AND TRAFFIC COUNTS:
PRIMARY NOISE SOURCE: **TRAFFIC AIRCRAFT RAIL INDUSTRIAL AMBIENT OTHER:**
ROADWAY TYPE:
TRAFFIC COUNT DURATION: -MIN

			SPEED		#2 COUNT		SPEED	
	NB / EB	SB / WB	NB / EB	SB / WB	NB / EB	SB / WB	NB / EB	SB / WB
AUTOS:								
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:**
DIST CONSTRUCTION (PILE DRIVING)

DESCRIPTION / SKETCH:
TERRAIN: **HARD SOFT MIXED FLAT OTHER:**
PHOTOS: 13 14 15 16 N & SW
OTHER COMMENTS / SKETCH:



FIELD NOISE MEASUREMENT DATA

Jones & Stokes

PROJECT: **Redlands First Mile** PROJ. #

SITE IDENTIFICATION: ST-4 OBSERVER(S): Peter Hardie
ADDRESS: 972 8 ND ST
START DATE / TIME: 11L 6-29-10 END DATE / TIME:

METEROLOGICAL CONDITIONS:
TEMP: 82 °F HUMIDITY: 43 %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: CL200 SERIAL #: 6644
CALIBRATION CHECK: PRE-TEST 94.1 dBA SPL POST-TEST 94.1 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	108	123	58.6	80.4	48.5	50.3	52.9	56.8		

COMMENTS:

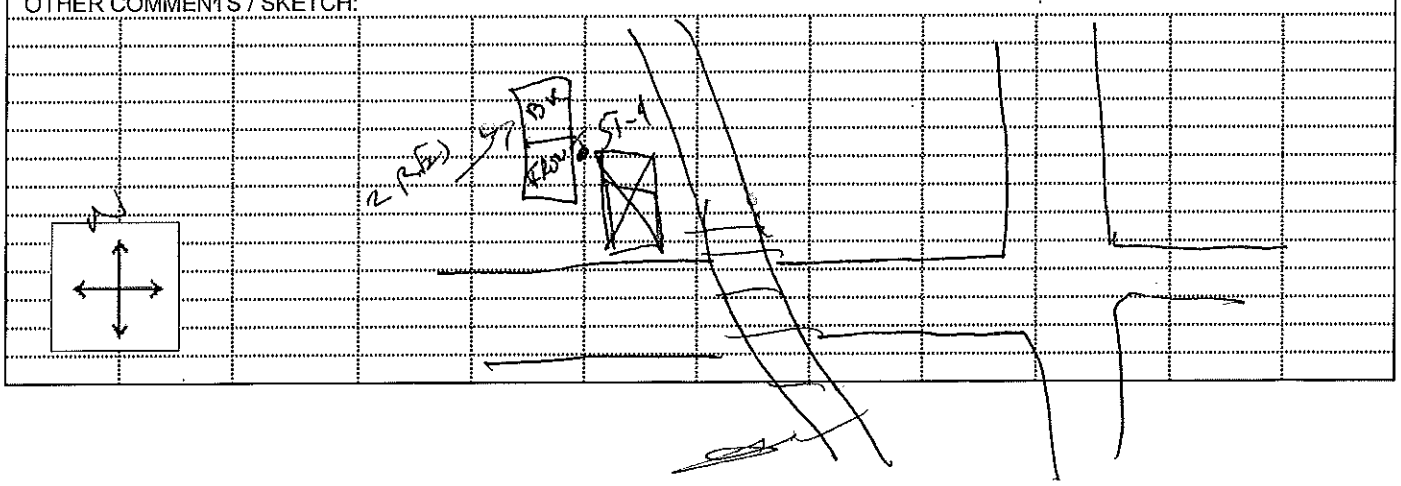
SOURCE INFO AND TRAFFIC COUNTS:
PRIMARY NOISE SOURCE: **TRAFFIC AIRCRAFT RAIL INDUSTRIAL AMBIENT OTHER:** DOG
ROADWAY TYPE:
TRAFFIC COUNT DURATION: ____-MIN

	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:**
DIST RAIL DIST CONSTRUCTION PILE DRIVING

DESCRIPTION / SKETCH:
TERRAIN: **HARD SOFT MIXED FLAT OTHER:**
PHOTOS: 9 10 11 12 N E S W
OTHER COMMENTS / SKETCH:



FIELD NOISE MEASUREMENT DATA

Jones & Stokes

PROJECT: **Redlands First Mile** PROJ. #

SITE IDENTIFICATION: ASTRO MOTEL IN STAR MOTEL ROOM #117 OBSERVER(S): Peter Hardie

ADDRESS: 151 S. EST

START DATE / TIME: 1:40 6-29-10 END DATE / TIME:

METEROLOGICAL CONDITIONS:

TEMP: °F HUMIDITY: %R.H. WIND: **CALM LIGHT MODERATE VARIABLE**

WINDSPEED: 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: LD ~~R705~~ CAL200 SERIAL #: 6644

CALIBRATION CHECK: PRE-TEST 94.1 dBA SPL POST-TEST 94.1 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	140	153	40.1	63.3	34.9	36.3	39.3	43.7			

COMMENTS:

SOURCE INFO AND TRAFFIC COUNTS:

PRIMARY NOISE SOURCE: **TRAFFIC AIRCRAFT RAIL INDUSTRIAL AMBIENT OTHER:**

ROADWAY TYPE:

TRAFFIC COUNT DURATION: -MIN

	SPEED NB / EB	SPEED 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**

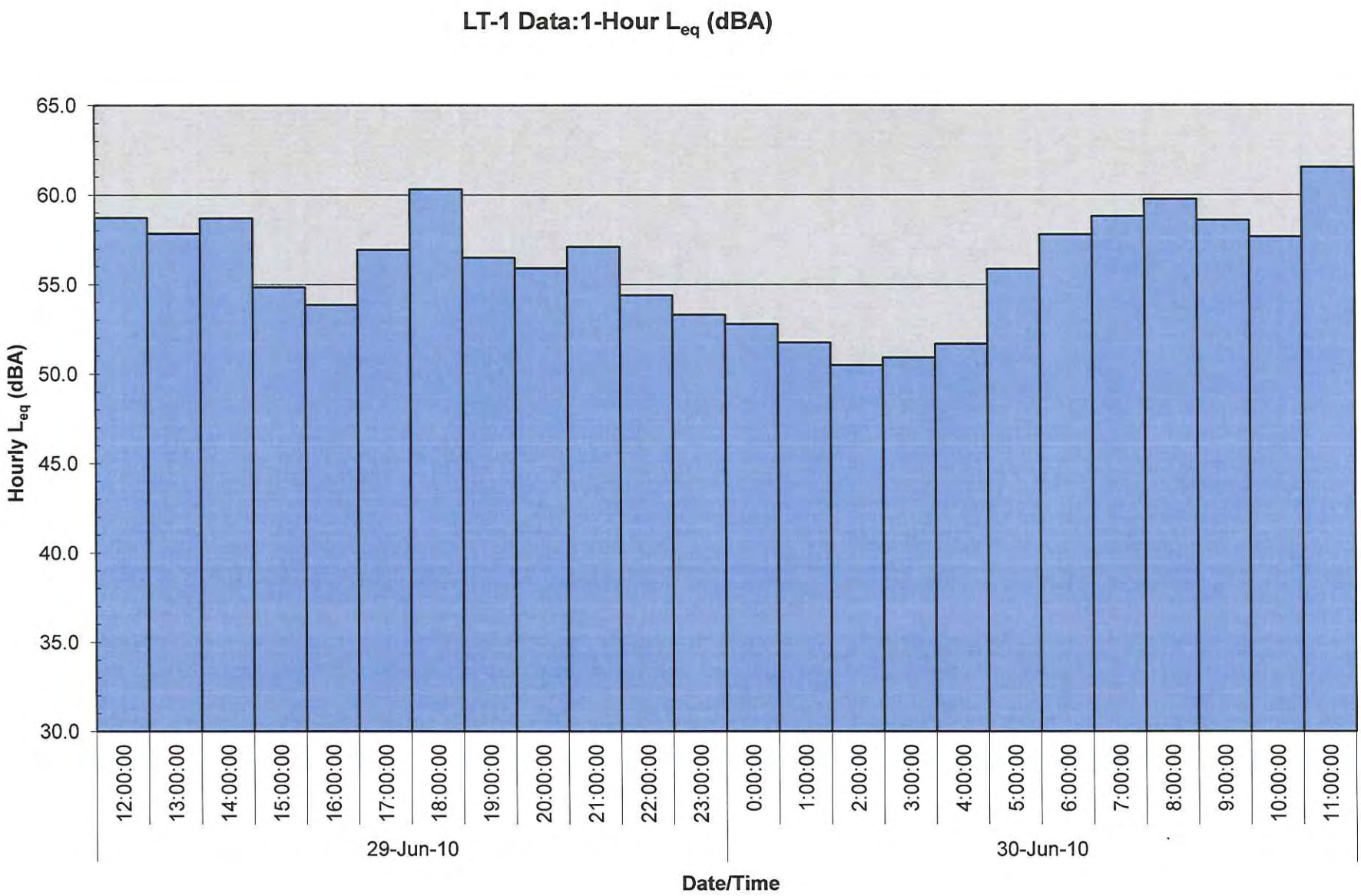
OTHER SOURCES: **DIST. AIRCRAFT / RUSTLING LEAVES / DIST. BARKING DOGS / BIRDS / DIST. INDUSTRIAL DIST. CHILDREN PLAYING / DIST. TRAFFIC / DIST. LANDSCAPING ACTIVITIES / OTHER:**

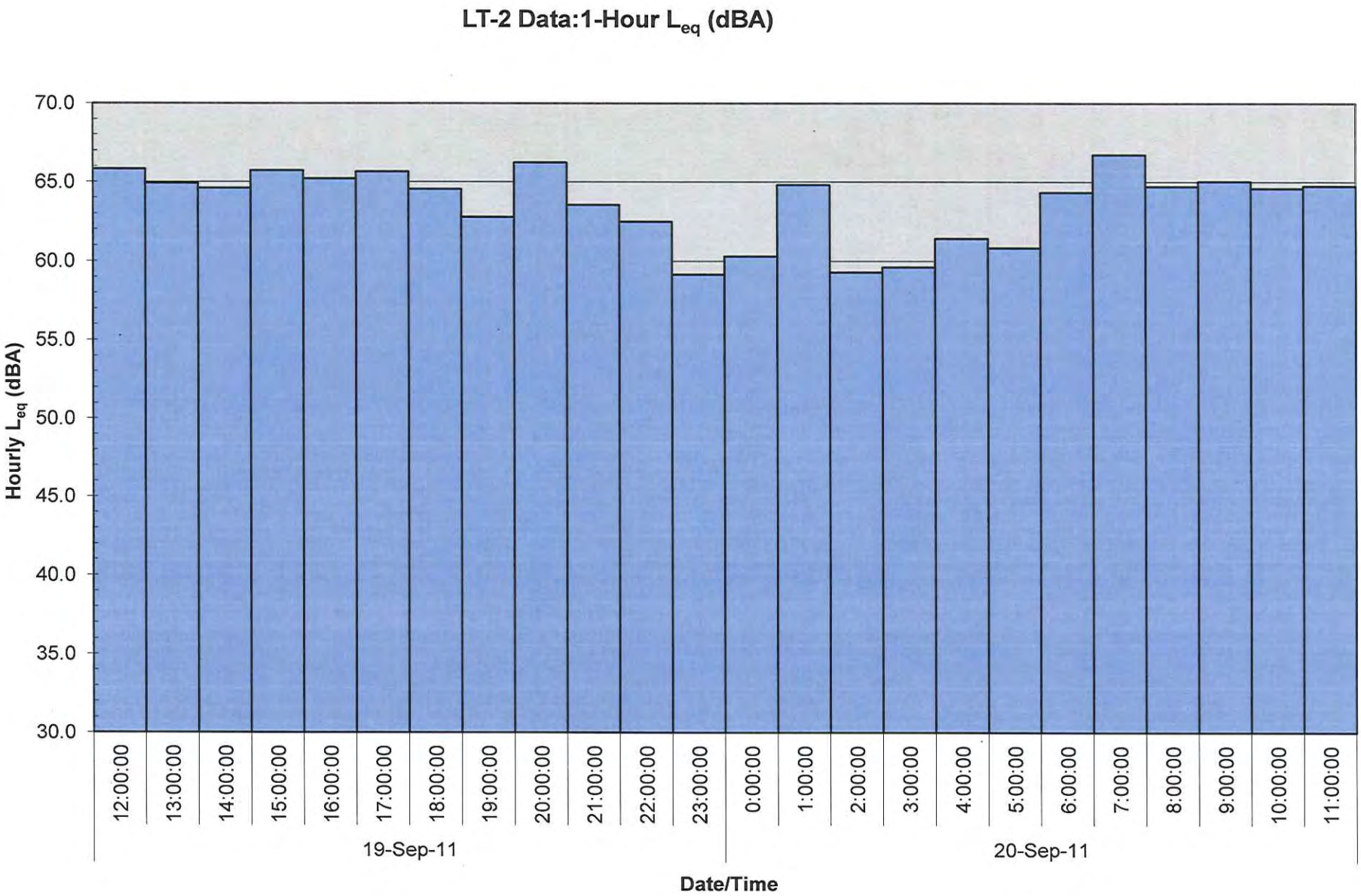
DESCRIPTION / SKETCH:

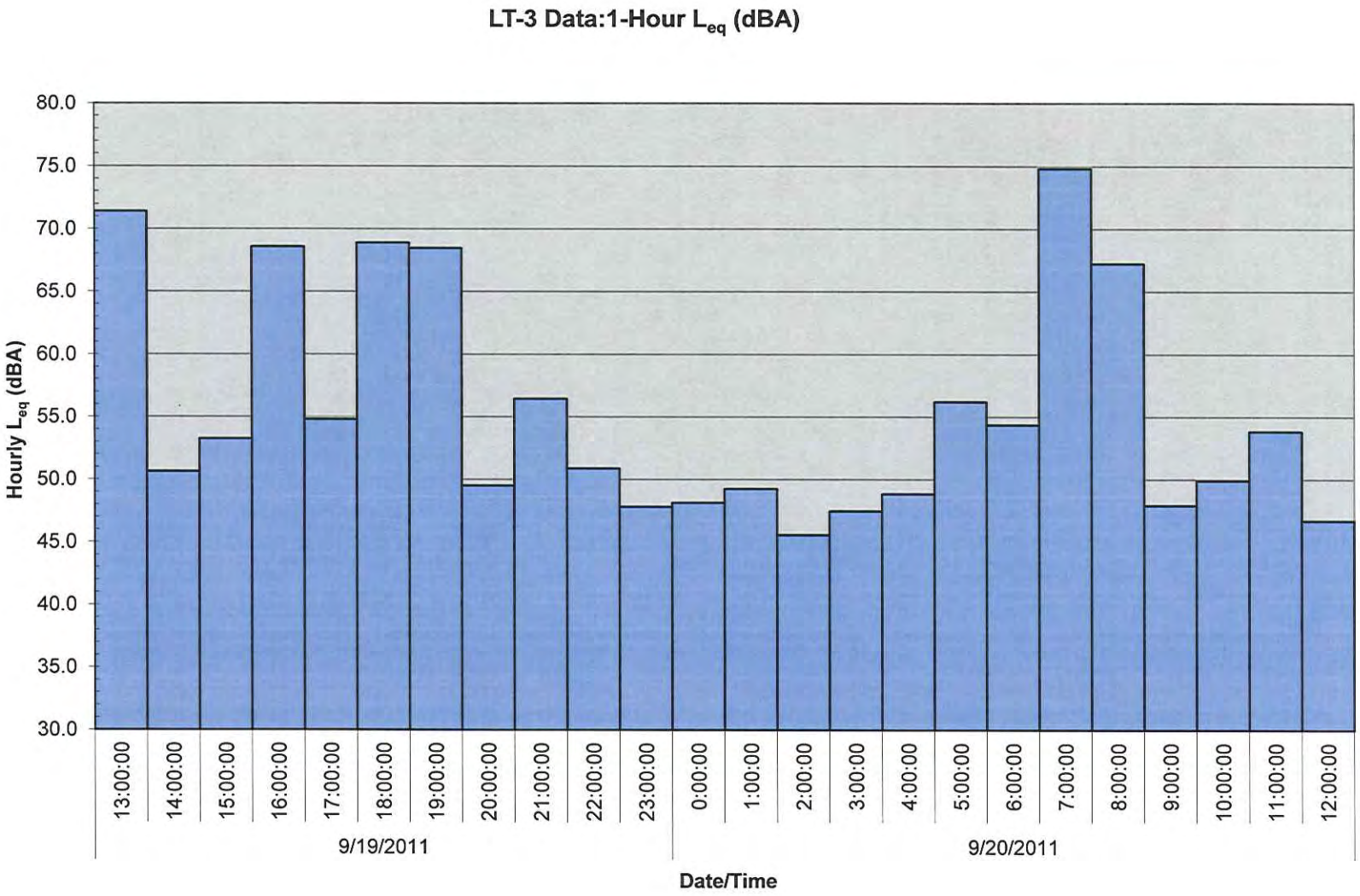
TERRAIN: **HARD SOFT MIXED FLAT OTHER:**

PHOTOS:

OTHER COMMENTS / SKETCH:


LT-1 Data:1-Hour L_{eq} (dBA)
Hourly L_{eq} (dBA)
65.0
60.0
55.0
50.0
45.0
40.0
35.0
30.0
12:00:00
13:00:00
14:00:00
15:00:00
16:00:00
17:00:00
18:00:00
19:00:00
20:00:00
21:00:00
22:00:00
23:00:00
0:00:00
1:00:00
2:00:00
3:00:00
4:00:00
5:00:00
6:00:00
7:00:00
8:00:00
9:00:00
10:00:00
11:00:00
29-Jun-10
30-Jun-10
Date/Time


LT-2 Data:1-Hour L_{eq} (dBA)
Hourly L_{eq} (dBA)
70.0
65.0
60.0
55.0
50.0
45.0
40.0
35.0
30.0
12:00:00
13:00:00
14:00:00
15:00:00
16:00:00
17:00:00
18:00:00
19:00:00
20:00:00
21:00:00
22:00:00
23:00:00
0:00:00
1:00:00
2:00:00
3:00:00
4:00:00
5:00:00
6:00:00
7:00:00
8:00:00
9:00:00
10:00:00
11:00:00
19-Sep-11
20-Sep-11
Date/Time


LT-3 Data:1-Hour L_{eq} (dBA)
Hourly L_{eq} (dBA)
80.0
75.0
70.0
65.0
60.0
55.0
50.0
45.0
40.0
35.0
30.0
13:00:00
14:00:00
15:00:00
16:00:00
17:00:00
18:00:00
19:00:00
20:00:00
21:00:00
22:00:00
23:00:00
0:00:00
1:00:00
2:00:00
3:00:00
4:00:00
5:00:00
6:00:00
7:00:00
8:00:00
9:00:00
10:00:00
11:00:00
12:00:00
9/19/2011
9/20/2011
Date/Time

Appendix D

Rail Noise

Input and Output

TABLE D-1

FRA Grade Crossing Noise Model — USED FOR RAIL NOISE SCREENING DIST.

User Input	
Noise Situation (Pick from List)	1
Horn Lmax (dBA) @ 100 feet	100
Horn Location on Locomotive(Pick from List)	2
Non Train Noise Environment (pick from list)	4
Shielding (Pick from List)	3
Length of Impact Area (pick from list)	2
Existing Train Speed (mph)	15
Future Train Speed (mph)	25
Number of Existing Trains in one Direction	1
Number of Future Trains in one Direction	46
Existing Number of Day Trains (7 am to 10 p.m.)	0.625
Future Number of Day Trains (7 am to 10 p.m.)	28.75
Existing Number of Night Trains (10 p.m. to 7 am)	0.375
Future Number of Night Trains (10 p.m. to 7 am)	17.25
Existing Average Number of Cars	2
Future Average Number of Cars	10
Existing Average Number of Locomotives	1
Future Average Number of Locomotives	2

Noise Situation	
Horns Existing and Future	1
Horns in Future Only	2
No Horns Existing and Future	3

Horn Location on Locomotive		
National Average (50% front, 50% middle)		1
All Front Mounted		2
All Middle Mounted		3
User Defined	10 % front mounted horns	4

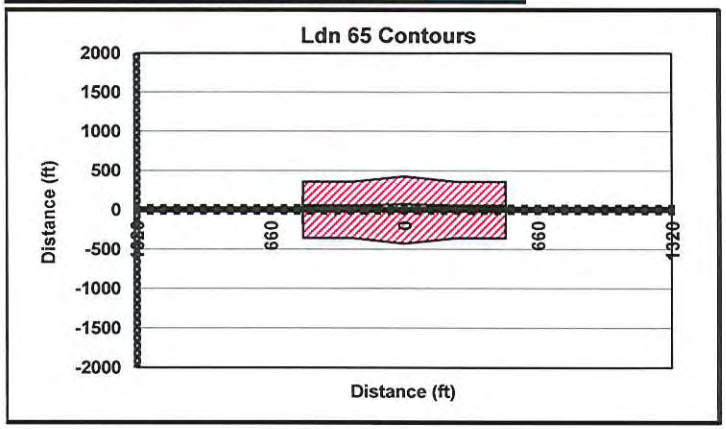
Non Train Noise Environment		
Urban		1
Suburban		2
Rural		3
User Defined Ldn =	61 dBA	4

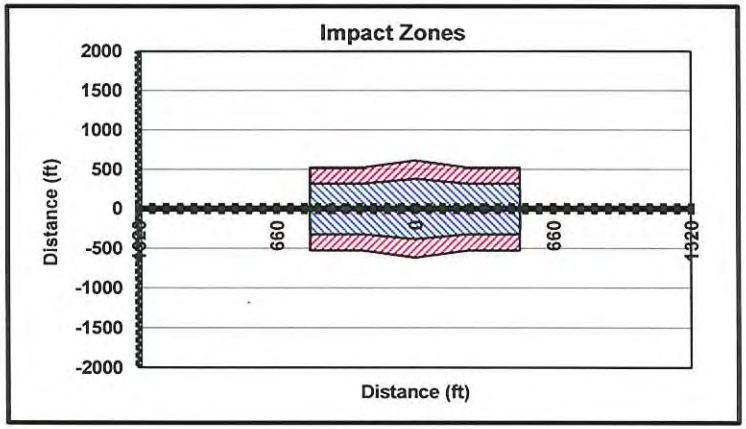
Shielding	
Dense Urban	1
Light Urban	2
Dense Suburban	3
Light Suburban	4
Rural	5
No Shielding	6

Length of Impact Area	
1/4 mile	1
20 seconds	2
15 seconds	3

Ldn 65 Contours Numeric Output (in feet)	
Existing 65 Ldn Contour at X-ing	73
Future 65 Ldn Contour at X-ing	427
Existing 65 Ldn Contour at 1/2 zone length	56
Future 65 Ldn Contour at 1/2 zone length	360
Zone Length	500
1/2 Zone Length	250

Impact Zones Numeric Output (in feet)	
Impact Distance at X-ing	616
Severe Impact Distance at X-ing	381
Impact Distance at 1/2 zone length	525
Severe Impact Distance at 1/2 zone length	320
Zone Length	500
1/2 Zone Length	250





Rail Noise Impact Assessment

The primary constituent of project noise would be locomotive noise. This can be calculated using the following equation,[1] which computes Leq(h) at a distance of 50 feet:

$L_{eq}(h)=SEL_{ref}+10*Log(N)+C_T+K*Log(S/50)+10*Log(V)-35.6$

Where SELref = source reference sound exposure level (SEL) for locomotive[2]

N = Number of locomotives

C_T = Throttle constant (0 for throttle settings less than 6)

K = constant (-10 for passenger diesel locomotives)

S = speed (miles per hour)

V = trains per hour

The daytime and nighttime Leq for Category 2 land uses were calculated using the equation above and then combined using the following equation[3] for Ldn:

$L_{dn} = 10*LOG[(15)*10^{(Leq(day)/10)}+(9)*10^{((Leq(night)+10)/10)}]-13.8$

Shielding (where applicable) at each receiver was calculated using the equations contained in Table 6-9 of the FTA manual. Additionally, the same method shown above was used to calculate the L_{eq} nose levels at the Depot (Category 3 land use) for analysis of potential project-related noise effects on office staff located at the Depot.

[1] Table 6-4 of the FTA manual.

[2] SELref for Metrolink commuter trains was derived from measurements of similar Metrolink trains. The measurements and averaging method are contained in this Appendix.

[3] Table 6-4 of the FTA manual.

TABLE D-2

Derivation of SEL ref for Metrolink Train (1 engine, 4 to 6 coaches[1])

Measurement #	Speed	SEL_{Msrd}	$SEL_{Adjtd\ to\ 50\ mph}$		Notes
1	76	87.4	85.6		LD-812
2	54	89.9	89.6		LD-812
3	54	88.9	88.6		NL-22
4	61	91.3	90.4		LD-812
5	61	85.7	84.8		NL-22
6	71	91.4	89.9		LD-812
7	71	90.7	89.2		NL-22
8	66	92	90.8		LD-812
9	66	90.1	88.9		NL-22
10	68	92.2	90.9		LD-812
11	68	91.3	90.0		NL-22
			Average	STDEV	
			89.0	2.00	
			Average	STDEV	
out the two outliers (1 and 5):			89.8	0.82	

Thus, conservatively, 90 dBA SEL at 50 feet and 50 mph

1 - Comparable to the existing configuration of the San Bernardino Line. Future configuration would have two engines and up to eight coaches; therefore, the calculations will assume N = 2 (ie., double the noise or a 3-dB increase)

Redlands First Mile - Computing Ldn from SEL for Project Alignment Area

Ref: Chapters 5 and 6, FTA Manual

Source Reference Levels:

Using 90 dBA SEL (locomotive and cars) at 50 feet and 50 mph, based on Measurements conducted on the Metrolink Oceanside - Los Angeles line, 08/09/10 and 08/10/10

Speed: 25 mph

Hourly Leq at 50':
Train without horns (ref : Table 5-2 FTA Manual)
Leqh=SELref +10*Log(N)+K*Log(S/50)+10*Log(V)-35.6
N=2 (ultimately)
K=-10 (passenger diesel)
S=25
V=33/15 = 2.2 daytime, 13/9 = 1.444 nighttime 2.200 1.444

Daytime Hourly Leq:
Leqh= 63.8

Nighttime Hourly Leq
Leqh= 62.0

Ldn @50': 68.7 dBA

Crossing Bell Noise (applicable to Rialto Avenue, 2cnd Street and E Street)
Reference SEL 109
Approximate Lmax 73

E, average duration: assume 45 seconds
Nd = 2.200
Nn= 1.444

Daytime Hourly Leq:
Leqh= 57.8

Nighttime Hourly Leq
Leqh= 56.0

Ldn @50': 62.7 dBA

Train Horns (ref: Table 5-2 and Table 6-3, FTA Manual)
Leqh=SELref+10*Log(V)-35.6
V=33/15 = 2.200 daytime, 13/9 = 1.444 nighttime
Based on information provided by ATS Consulting (e-mail of 6/14/2011), using 97 dBA SEL at 100 feet.
SELref= 101.5 dBA SEL
Daytime Hourly Leq:
Leqh= 69.3 at 50 feet

Nighttime Hourly Leq:
Leqh= 67.5 at 50 feet

Ldn @50': 74.2 dBA

Redlands First Mile - Rail Noise Calcs for Area N. of EMF and W. of Depot (Diff speeds and train numbers day/night)
(used for receivers 34 - 37)
Ref: Chapters 5 and 6, FTA Manual

Source Reference Levels:

Using 90 dBA SEL (locomotive and cars) at 50 feet and 50 mph, based on Measurements conducted on the Metrolink Oceanside - Los Angeles line, 08/09/10 and 08/10/10

Speed: 28 mph

Hourly Leq at 50':
Train without horns (ref : Table 5-2 FTA Manual)
Leqh=SELref +10*Log(N)+K*Log(S/50)+10*Log(V)-35.6
N=2 (ultimately)
K=-10 (passenger diesel)
S=28
V=0/15 = 0.000 daytime, 11/9 = 1.222 nighttime 0.000 1.222

Daytime Hourly Leq:
Leqh= 0.0

Nighttime Hourly Leq
Leqh= 60.8

Ldn @50': 66.5 dBA

Crossing Bell Noise (applicable to Rialto Avenue)
Reference SEL 109
Approximate Lmax 73

E, average duration: assume 45 seconds
Nd = 0.000
Nn= 1.222

Horn Noise added:
Leqh=SELref+10*Log(V)-35.6
V=0/15 = 0 daytime, 13/9 = 1.222 nighttime
~~SELref= 113dBA at grade crossing, 113-3(Dp/660) from crossing to 1/8 mile, 110 from 1/8 to 1/4 mile~~
Based on information provided by ATS Consulting (e-mail of 6/14/2011), using 97 dBA SEL at 100 feet.
SELref= 101.5 dBA SEL
Daytime Hourly Leq:
Leqh= 0.0 at 50 feet

Nighttime Hourly Leq:
Leqh= 66.8 at 50 feet

Ldn @50': 72.5 dBA

4-A

TABLE D-3

Redlands First Mile FTA Noise Modeling Results Input and Output - Project without Quiet Zones

Receiver #	Receiver Location Description	Land Use Description	Number of Noise-Sensitive Sites Represented	Existing (dBA Ldn)	Distance to BNSF Track Centerline (Feet)	Modeled Future with Project Rail Noise Level (dBA Ldn)	Existing Barrier or Building Row ?	Estimated Reduction from Existing Barriers / Building Rows	Resultant Rail Noise Level (dBA Ldn)	Distance to Crossing Signal (Feet)	Modeled Future Crossing Signal (Bell) Noise Level (dBA Ldn)	Existing Barrier or Building Row ?	Estimated Reduction from Existing Barriers / Building Rows	Resultant Crossing Bell Noise Level (dBA Ldn)	Combined Modeled Future with Project Rail Plus Crossing Signal Noise (dBA Ldn)	FTA Impact Level
1	400' to 800' sw of alignment, w of I St, s of Belleview St	Residential	6	61	430	61	3 Rows	8	53	485	43	4 Rows	9.5	33	53	No Impact
2	200' to 400' sw of alignment, w of I St, s of Belleview St	Residential	4	69	320	63	2 Rows	6.5	57	400	45	3 Rows	8	37	57	No Impact
3	400' to 800' sw of alignment, w of I St, n of Belleview St	Residential	16	61	420	61	3 Rows	8	53	390	45	4 Rows	9.5	35	54	No Impact
4	400' to 800' sw of alignment, n of Belleview St	Residential	8	61	410	62	2 Rows	6.5	55	411	44	5 Rows	10	34	55	No Impact
5	400' to 800' sw of alignment, s of Rialto Ave	Residential	10	69	410	62	2 Rows	6.5	55	460	43	8 Rows	10	33	55	No Impact
6	200' to 400' sw of alignment, w of I St, n of Belleview St	Residential	4	61	240	65	1 Row	5	60	350	46	2 Rows	6.5	39	60	Moderate Impact
7	200' to 400' sw of alignment, n of Belleview St	Residential	3	61	250	65	1 Row	5	60	240	49	2 Rows	6.5	43	60	Moderate Impact
8	200' to 400' sw of alignment, s of Rialto Ave	Residential	5	69	230	65	1 Row	5	60	170	52	3 Rows	8	44	60	No Impact
9	100' to 200' sw of alignment, s of Rialto Ave	Residential	1	69	180	67	1 Row	5	62	150	53	2 Rows	6.5	47	62	No Impact
10	100' to 200' sw of alignment, w of I St, n of Belleview St	Residential	1	69	170	67	1 Row	5	62	150	53	1 Row	5	48	63	No Impact
11	50' to 100' sw of alignment, w of I St, s of Rialto Ave	Residential	2	69	60	74	0 Rows	0	74	40	65	0 Rows	0	65	75	Severe Impact
12	400' to 800' w of alignment, w of J St, n of Rialto Ave	Residential	2	61	510	60	3 Rows	8	52	730	39	3 Rows	8	31	52	No Impact
13	200' to 400' w of alignment, e of J St, n of Rialto Ave	Residential	2	69	260	65	1 Rows	5	60	420	44	1 Rows	5	39	60	No Impact

TABLE D-3, CONT'D

14	200' to 400' w of alignment, e of J St	Residential	5	61	240	65	1 Rows	5	60	450	44	1 Rows	5	39	60	Moderate Impact
15	less than 50' e of alignment, n of Rialto Ave, w of I St	Residential	2	61	30	79	0 Rows	0	79	170	52	1 Row	5	47	79	Severe Impact
16	200' to 400' e of alignment, e of I St	Residential	3	61	310	63	1 Row	5	58	300	47	1 Row	5	42	59	Moderate Impact
17	50' to 100' e of alignment, w of I St	Residential	3	61	120	70	0 Rows	0	70	230	49	2 Rows	6.5	43	70	Severe Impact
18	100' to 200' w of alignment, w of I St	Residential	2	61	140	69	0 Rows	0	69	330	46	3 Rows	8	38	69	Severe Impact
19	100' to 200' w of alignment, w of I St, s of 2nd St	Residential	2	61	140	69	0 Rows	0	69	250	49	1 Row	5	44	69	Severe Impact
20	400' to 800' w of alignment, w of J St	Residential	4	61	470	61	1 Row	5	56	531	42	3 Rows	8	34	56	No Impact
21	400' to 800' w of alignment, w of J St, s of 2nd St	Residential	2	61	460	61	1 Row	5	56	460	43	1 Row	5	38	56	No Impact
22	100' to 200' w of alignment, e of J St	Residential	2	61	180	67	0 Rows	0	67	240	49	2 Rows	6.5	43	67	Severe Impact
23	400' to 800' w of alignment, w of J St, s of 2nd St	Residential	6	69	410	62	1 Row	5	57	470	43	1 Row	5	38	57	No Impact
24	200' to 400' w of alignment, w of J St, s of 2nd St	Residential	2	69	230	65	0 Rows	0	65	300	47	1 Row	5	42	65	Moderate Impact
25	100' to 200' w of alignment, e of J St, s of 2nd St	Residential	2	69	110	70	0 Rows	0	70	100	57	1 Row	5	52	70	Severe Impact
26	100' to 200' w of alignment, e of J St, n of 2nd St	Residential	2	69	140	69	0 Rows	0	69	150	53	1 Rows	5	48	69	Moderate Impact
27	100' to 200' e of alignment, w of I St, n of 2nd St	Residential	1	69	140	69	0 Rows	0	69	150	53	0 Rows	0	53	69	Moderate Impact
28	100' to 200' w of alignment, e of J St, n of 2nd St	Residential	2	61	140	69	0 Rows	0	69	220	50	1 Row	5	45	69	Severe Impact
29	100' to 200' e of alignment, w of I St, n of 2nd St	Residential	1	61	120	70	0 Rows	0	70	310	47	1 Row	5	42	70	Severe Impact
30	400' to 800' w of alignment, w of J St	Residential	4	61	490	60	1 Row	5	55	570	42	3 Rows	8	34	55	No Impact
31	200' to 400' w of alignment, e of J St	Residential	4	61	260	65	1 Row	5	60	360	46	3 Rows	8	38	60	Moderate Impact
32	100' to 200' w of alignment, e of J St, n of 2nd St	Residential	1	61	180	67	1 Rows	5	62	330	46	1 Rows	5	41	62	Moderate Impact
33	200' to 400' w of alignment, w of J St	Residential	3	61	370	62	1 Row	5	57	600	41	4 Rows	9.5	32	57	No Impact

TABLE D-3, CONT'D

34	400' to 800' se of alignment (e of Depot), s of 2nd St	Residential	4	61	420	60	6 Rows	10	50	660	40	4 Rows	9.5	31	50	No Impact
35	50' to 100' e of alignment (e of Depot), w of Mt. Vernon Ave, n of Rialto Ave	Residential	9	66	80	70	0 Rows	0	70	690	40	2 Rows	6.5	33	70	Severe Impact
36	100' to 200' w of alignment (e of Depot), w of Pico Ave, n of Rialto Ave	Residential	3	66	120	68	0 Rows	0	68	230	49	0 Rows	0	49	68	Severe Impact
37	200' to 400' w of alignment (e of Depot), w of Pico Ave, n of Rialto Ave	Residential	3	66	240	63	0 Rows	0	63	360	46	0 Rows	0	46	63	Moderate Impact
38	Commercial/ Transient Residential use e of N. E St. and n of alignment (includes horn noise)	Transient Residential / Commercial (Motel)	1	69	200	66	1 Row	5	61	1430	34	1 Rows	5	29	61	No Impact

TABLE D-4

Redlands First Mile FTA Noise Modeling Results Summary - with Quiet Zones

Receiver #	Receiver Location Description	Land Use Description	Number of Noise-Sensitive Sites Represented	Existing (dBA Ldn)	Distance to BNSF Track Centerline (Feet)	Modeled Future with Project Rail Noise Level (dBA Ldn)	Existing Barrier or Building Row ?	Estimated Reduction from Existing Barriers / Building Rows	Resultant Rail Noise Level (dBA Ldn)	Distance to Crossing Signal (Feet)	Modeled Future Crossing Signal (Bell) Noise Level (dBA Ldn)	Existing Barrier or Building Row ?	Estimated Reduction from Existing Barriers / Building Rows	Resultant Crossing Bell Noise Level (dBA Ldn)	Combined Modeled Future with Project Rail Plus Crossing Signal Noise (dBA Ldn)	Rail Noise minus Existing Noise Level (dB)	FTA Impact Level
1	400' to 800' sw of alignment, w of I St, s of Belleview St	Residential	6	61	430	55	3 Rows	8	47	485	43	4 Rows	9.5	33	47	-14	No Impact
2	200' to 400' sw of alignment, w of I St, s of Belleview St	Residential	4	69	320	57	2 Rows	6.5	50	400	45	3 Rows	8	37	50	-19	No Impact
3	400' to 800' sw of alignment, w of I St, n of Belleview St	Residential	16	61	420	55	3 Rows	8	47	390	45	4 Rows	9.5	35	47	-14	No Impact
4	400' to 800' sw of alignment, n of Belleview St	Residential	8	61	410	55	2 Rows	6.5	49	411	44	5 Rows	10	34	49	-12	No Impact
5	400' to 800' sw of alignment, s of Rialto Ave	Residential	10	69	410	55	2 Rows	6.5	49	460	43	8 Rows	10	33	49	-20	No Impact
6	200' to 400' sw of alignment, w of I St, n of Belleview St	Residential	4	61	240	59	1 Row	5	54	350	46	2 Rows	6.5	39	54	-7	No Impact
7	200' to 400' sw of alignment, n of Belleview St	Residential	3	61	250	58	1 Row	5	53	240	49	2 Rows	6.5	43	54	-7	No Impact
8	200' to 400' sw of alignment, s of Rialto Ave	Residential	5	69	230	59	1 Row	5	54	170	52	3 Rows	8	44	54	-15	No Impact
9	100' to 200' sw of alignment, s of Rialto Ave	Residential	1	69	180	60	1 Row	5	55	150	53	2 Rows	6.5	47	56	-13	No Impact
10	100' to 200' sw of alignment, w of I St, n of Belleview St	Residential	1	69	170	61	1 Row	5	56	150	53	1 Row	5	48	56	-13	No Impact
11	50' to 100' sw of alignment, w of I St, s of Rialto Ave	Residential	2	69	60	68	0 Rows	0	68	40	65	0 Rows	0	65	69	0	Moderate Impact
12	400' to 800' w of alignment, w of J St, n of Rialto Ave	Residential	2	61	510	54	3 Rows	8	46	730	39	3 Rows	8	31	46	-15	No Impact
13	200' to 400' w of alignment, e of J St, n of Rialto Ave	Residential	2	69	260	58	1 Rows	5	53	420	44	1 Rows	5	39	53	-16	No Impact
14	200' to 400' w of alignment, e of J St	Residential	5	61	240	59	1 Rows	5	54	450	44	1 Rows	5	39	54	-7	No Impact

TABLE D-8, CONT'D

15	less than 50' e of alignment, n of Rialto Ave, w of I St	Residential	2	61	30	72	0 Rows	0	72	170	52	1 Row	5	47	72	11	Severe Impact
16	200' to 400' e of alignment, e of I St	Residential	3	61	310	57	1 Row	5	52	300	47	1 Row	5	42	52	-9	No Impact
17	50' to 100' e of alignment, w of I St	Residential	3	61	120	63	0 Rows	0	63	230	49	2 Rows	6.5	43	63	2	Moderate Impact
18	100' to 200' w of alignment, w of I St	Residential	2	61	140	62	0 Rows	0	62	330	46	3 Rows	8	38	62	1	Moderate Impact
19	100' to 200' w of alignment, w of I St, s of 2nd St	Residential	2	61	140	62	0 Rows	0	62	250	49	1 Row	5	44	62	1	Moderate Impact
20	400' to 800' w of alignment, w of J St	Residential	4	61	470	54	1 Row	5	49	531	42	3 Rows	8	34	49	-12	No Impact
21	400' to 800' w of alignment, w of J St, s of 2nd St	Residential	2	61	460	54	1 Row	5	49	460	43	1 Row	5	38	50	-11	No Impact
22	100' to 200' w of alignment, e of J St	Residential	2	61	180	60	0 Rows	0	60	240	49	2 Rows	6.5	43	60	-1	Moderate Impact
23	400' to 800' w of alignment, w of J St, s of 2nd St	Residential	6	69	410	55	1 Row	5	50	470	43	1 Row	5	38	50	-19	No Impact
24	200' to 400' w of alignment, w of J St, s of 2nd St	Residential	2	69	230	59	0 Rows	0	59	300	47	1 Row	5	42	59	-10	No Impact
25	100' to 200' w of alignment, e of J St, s of 2nd St	Residential	2	69	110	64	0 Rows	0	64	100	57	1 Row	5	52	64	-5	Moderate Impact
26	100' to 200' w of alignment, e of J St, n of 2nd St	Residential	2	69	140	62	0 Rows	0	62	150	53	1 Rows	5	48	62	-7	No Impact
27	100' to 200' e of alignment, w of I St, n of 2nd St	Residential	1	69	140	62	0 Rows	0	62	150	53	0 Rows	0	53	63	-6	No Impact
28	100' to 200' w of alignment, e of J St, n of 2nd St	Residential	2	61	140	62	0 Rows	0	62	220	50	1 Row	5	45	62	1	Moderate Impact
29	100' to 200' e of alignment, w of I St, n of 2nd St	Residential	1	61	120	63	0 Rows	0	63	310	47	1 Row	5	42	63	2	Moderate Impact
30	400' to 800' w of alignment, w of J St	Residential	4	61	490	54	1 Row	5	49	570	42	3 Rows	8	34	49	-12	No Impact
31	200' to 400' w of alignment, e of J St	Residential	4	61	260	58	1 Row	5	53	360	46	3 Rows	8	38	53	-8	No Impact
32	100' to 200' w of alignment, e of J St, n of 2nd St	Residential	1	61	180	60	1 Rows	5	55	330	46	1 Rows	5	41	56	-5	No Impact
33	200' to 400' w of alignment, w of J St	Residential	3	61	370	56	1 Row	5	51	600	41	4 Rows	9.5	32	51	-10	No Impact
34	400' to 800' se of alignment (e of Depot), s of 2nd St	Residential	4	61	420	60	6 Rows	10	50	660	40	4 Rows	9.5	31	50	-11	No Impact

TABLE D-4, CONT'D

35	50' to 100' e of alignment (e of Depot), w of Mt. Vernon Ave, n of Rialto Ave	Residential	9	66	80	70	0 Rows	0	70	690	40	2 Rows	6.5	33	70	4	Severe Impact
36	100' to 200' w of alignment (e of Depot), w of Pico Ave, n of Rialto Ave	Residential	3	66	120	68	0 Rows	0	68	230	49	0 Rows	0	49	68	2	Severe Impact
37	200' to 400' w of alignment (e of Depot), w of Pico Ave, n of Rialto Ave	Residential	3	66	240	63	0 Rows	0	63	360	46	0 Rows	0	46	63	-3	Moderate Impact
38	Commercial/ Transient Residential use e of N. E St. and n of alignment (includes horn noise)	Transient Residential / Commercial (Motel)	1	69	200	66	1 Row	5	61	1430	34	1 Rows	5	29	61	-8	No Impact

Calculation of Barrier / Bldg Row Insertion Loss (Ref. FTA Noise and Vibration Maual)

TABLE D-5

Barrier Shielding from Building Rows - Ref Table 6-10, page 6-26

Gaps in rows of bldgs typically pretty tight so use 35percent or less

A buildings = min(10 or 1.5(R-1) + 5)

Number of Rows	Barrier Shielding (dB)
0 Rows	0
1 Row	5
2 Rows	6.5
3 Rows	8
4 Rows	9.5
5 Rows	10
6 Rows	10
7 Rows	10
8 Rows	10
9 Rows	10
10 Rows	10

TABLE D-6

Barrier Insertion Loss

Ref Table 6-9, Page 6-25 (FTA Manual)

Condition	Equation
For non-absorptive transit barriers within 5 feet of the track	Abarrier=min{12 or[5.3*log(P)+6.7]}
For absorptive transit barriers within 5 feet of the track	Abarrier=min{15 or[5.3*log(P)+9.7]}
For all other barriers, and for protrusion of terrain above the line of sight:	Abarrier=min{15 or[20*log((2.51*sqrt(P)/tanh*[4.46*sqrt(P)])+5]}
Barrier Insertion Loss	Ilbarrier=max{0 or[Abarrier-10*(Gnb-Gb)*log(D/50)]}
D= closest distance btwn rcvr and source, in feet	
P = path length difference, in feet (see figure 6-7) : P=A+B-C	
GNB = Ground factor G computed without barrier (see Figure 6-5)	
GB = Ground factor G computed with barrier (see Figure 6-5)	

Hs = 8 feet for trains with diesel-electric locomotives
Hr =5 feet

TABLE D-7

Barrier Insertion Loss, Cont'd

Source-Receiver Distance (ft. or m)	Source Base Elev. (ft. or m)	Source Height above Ground (ft. or m)	Receiver Base Elev. (ft. or m)	Receiver Height above Ground (ft. or m)	Horizontal Barrier Dist. (in ref. to source) (ft. or m)	Barrier Base Elev. (ft. or m)	Barrier Height (ft. or m)	Source-Rcvr Straight-Line Dist. (ft. or m) - C	Source-Top-of-Barrier Dist. (ft. or m) - A	Receiver-Top-of-Barrier Dist. (ft. or m) - B	P=A+B-C	Abarrier = IL because assume hard-ground (Red = negative i.e., no IL)		
												If Non-absorptive	If Absorptive:	If "Other":
Case: Rcvr 15														
30.0	1057.0	8.0	1058.0	5.0	10.0	1057.0	**6.0**	30.1	10.2	20.0	0.1	2.0	5.0	4.1
30.0	1057.0	8.0	1058.0	5.0	10.0	1057.0	**8.0**	30.1	10.0	20.1	0.0	-1.1	1.9	-5.1
30.0	1057.0	8.0	1058.0	5.0	10.0	1057.0	**10.0**	30.1	10.2	20.4	0.5	5.2	8.2	10.2
30.0	1057.0	8.0	1058.0	5.0	10.0	1057.0	**12.0**	30.1	10.8	20.9	1.6	7.8	10.8	12.0
30.0	1057.0	8.0	1058.0	5.0	10.0	1057.0	**14.0**	30.1	11.7	21.5	3.1	9.3	12.3	12.0
30.0	1057.0	8.0	1058.0	5.0	10.0	1057.0	**16.0**	30.1	12.8	22.4	5.1	10.5	13.5	12.0
30.0	1057.0	8.0	1058.0	5.0	10.0	1058.0	**18.0**	30.1	14.9	23.9	8.7	11.7	14.7	12.0
Case: Rcvr 17														
120.0	1058.0	8.0	1058.0	5.0	10.0	1058.0	**6.0**	120.0	10.2	110.0	0.2	2.6	5.6	5.2
120.0	1058.0	8.0	1058.0	5.0	10.0	1058.0	**8.0**	120.0	10.0	110.0	0.0	-6.4	-3.4	-60.5
120.0	1058.0	8.0	1058.0	5.0	10.0	1058.0	**10.0**	120.0	10.2	110.1	0.3	3.7	6.7	7.4
120.0	1058.0	8.0	1058.0	5.0	10.0	1058.0	**12.0**	120.0	10.8	110.2	1.0	6.6	9.6	12.0
120.0	1058.0	8.0	1058.0	5.0	10.0	1058.0	**14.0**	120.0	11.7	110.4	2.0	8.3	11.3	12.0
120.0	1058.0	8.0	1058.0	5.0	10.0	1058.0	**16.0**	120.0	12.8	110.5	3.3	9.5	12.5	12.0
120.0	1058.0	8.0	1058.0	5.0	10.0	1058.0	**18.0**	120.0	14.1	110.8	4.9	10.3	13.3	12.0
Case: Rcvr 18														
140.0	1059.0	8.0	1059.0	5.0	10.0	1059.0	**6.0**	140.0	10.2	130.0	0.2	2.6	5.6	5.3
140.0	1059.0	8.0	1059.0	5.0	10.0	1059.0	**8.0**	140.0	10.0	130.0	0.0	-7.1	-4.1	-77.9
140.0	1059.0	8.0	1059.0	5.0	10.0	1059.0	**10.0**	140.0	10.2	130.1	0.3	3.6	6.6	7.2
140.0	1059.0	8.0	1059.0	5.0	10.0	1059.0	**12.0**	140.0	10.8	130.2	0.9	6.5	9.5	12.0
140.0	1059.0	8.0	1059.0	5.0	10.0	1059.0	**14.0**	140.0	11.7	130.3	1.9	8.2	11.2	12.0
140.0	1059.0	8.0	1059.0	5.0	10.0	1059.0	**16.0**	140.0	12.8	130.5	3.2	9.4	12.4	12.0
140.0	1059.0	8.0	1059.0	5.0	10.0	1059.0	**18.0**	140.0	14.1	130.6	4.8	10.3	13.3	12.0
Case: Rcvr 19														
140.0	1060.0	8.0	1060.0	5.0	10.0	1060.0	**6.0**	140.0	10.2	130.0	0.2	2.6	5.6	5.3
140.0	1060.0	8.0	1060.0	5.0	10.0	1060.0	**8.0**	140.0	10.0	130.0	0.0	-7.1	-4.1	-77.9
140.0	1060.0	8.0	1060.0	5.0	10.0	1060.0	**10.0**	140.0	10.2	130.1	0.3	3.6	6.6	7.2
140.0	1060.0	8.0	1060.0	5.0	10.0	1060.0	**12.0**	140.0	10.8	130.2	0.9	6.5	9.5	12.0
140.0	1060.0	8.0	1060.0	5.0	10.0	1060.0	**14.0**	140.0	11.7	130.3	1.9	8.2	11.2	12.0
140.0	1060.0	8.0	1060.0	5.0	10.0	1060.0	**16.0**	140.0	12.8	130.5	3.2	9.4	12.4	12.0
140.0	1060.0	8.0	1060.0	5.0	10.0	1060.0	**18.0**	140.0	14.1	130.6	4.8	10.3	13.3	12.0
Case: Rcvr 22														

TABLE D-7, CONT'D

180.0	1056.0	8.0	1059.0	5.0	10.0	1056.0	**6.0**	180.0	10.2	170.0	0.2	3.1	6.1	6.3
180.0	1056.0	8.0	1059.0	5.0	10.0	1056.0	**8.0**	180.0	10.0	170.0	0.0	#NUM!	#NUM!	#NUM!
180.0	1056.0	8.0	1059.0	5.0	10.0	1056.0	**10.0**	180.0	10.2	170.0	0.2	3.1	6.1	6.3
180.0	1056.0	8.0	1059.0	5.0	10.0	1056.0	**12.0**	180.0	10.8	170.0	0.8	6.2	9.2	12.0
180.0	1056.0	8.0	1059.0	5.0	10.0	1056.0	**14.0**	180.0	11.7	170.1	1.8	8.0	11.0	12.0
180.0	1056.0	8.0	1059.0	5.0	10.0	1056.0	**16.0**	180.0	12.8	170.2	3.0	9.2	12.2	12.0
180.0	1056.0	8.0	1059.0	5.0	10.0	1056.0	**18.0**	180.0	14.1	170.3	4.4	10.1	13.1	12.0
Case: Rcvr 25														
110.0	1057.0	8.0	1058.0	5.0	10.0	1058.0	**6.0**	110.0	10.0	100.0	0.0	-0.9	2.1	-4.2
110.0	1057.0	8.0	1058.0	5.0	10.0	1058.0	**8.0**	110.0	10.0	100.0	0.1	0.8	3.8	1.3
110.0	1057.0	8.0	1058.0	5.0	10.0	1058.0	**10.0**	110.0	10.4	100.1	0.5	5.3	8.3	10.4
110.0	1057.0	8.0	1058.0	5.0	10.0	1058.0	**12.0**	110.0	11.2	100.2	1.4	7.5	10.5	12.0
110.0	1057.0	8.0	1058.0	5.0	10.0	1058.0	**14.0**	110.0	12.2	100.4	2.6	8.9	11.9	12.0
110.0	1057.0	8.0	1058.0	5.0	10.0	1058.0	**16.0**	110.0	13.5	100.6	4.0	9.9	12.9	12.0
110.0	1057.0	8.0	1058.0	5.0	10.0	1058.0	**18.0**	110.0	14.9	100.8	5.7	10.7	13.7	12.0
Case: Rcvr 26														
140.0	1065.0	8.0	1065.0	5.0	10.0	1065.0	**6.0**	140.0	10.2	130.0	0.2	2.6	5.6	5.3
140.0	1065.0	8.0	1065.0	5.0	10.0	1065.0	**8.0**	140.0	10.0	130.0	0.0	-7.1	-4.1	-77.9
140.0	1065.0	8.0	1065.0	5.0	10.0	1065.0	**10.0**	140.0	10.2	130.1	0.3	3.6	6.6	7.2
140.0	1065.0	8.0	1065.0	5.0	10.0	1065.0	**12.0**	140.0	10.8	130.2	0.9	6.5	9.5	12.0
140.0	1065.0	8.0	1065.0	5.0	10.0	1065.0	**14.0**	140.0	11.7	130.3	1.9	8.2	11.2	12.0
140.0	1065.0	8.0	1065.0	5.0	10.0	1065.0	**16.0**	140.0	12.8	130.5	3.2	9.4	12.4	12.0
140.0	1065.0	8.0	1065.0	5.0	10.0	1065.0	**18.0**	140.0	14.1	130.6	4.8	10.3	13.3	12.0
Case: Rcvr 28														
140.0	1068.0	8.0	1068.0	5.0	10.0	1068.0	**6.0**	140.0	10.2	130.0	0.2	2.6	5.6	5.3
140.0	1068.0	8.0	1068.0	5.0	10.0	1068.0	**8.0**	140.0	10.0	130.0	0.0	-7.1	-4.1	-77.9
140.0	1068.0	8.0	1068.0	5.0	10.0	1068.0	**10.0**	140.0	10.2	130.1	0.3	3.6	6.6	7.2
140.0	1068.0	8.0	1068.0	5.0	10.0	1068.0	**12.0**	140.0	10.8	130.2	0.9	6.5	9.5	12.0
140.0	1068.0	8.0	1068.0	5.0	10.0	1068.0	**14.0**	140.0	11.7	130.3	1.9	8.2	11.2	12.0
140.0	1068.0	8.0	1068.0	5.0	10.0	1068.0	**16.0**	140.0	12.8	130.5	3.2	9.4	12.4	12.0
140.0	1068.0	8.0	1068.0	5.0	10.0	1068.0	**18.0**	140.0	14.1	130.6	4.8	10.3	13.3	12.0
Case: Rcvr 29														
120.0	1072.0	8.0	1071.0	5.0	10.0	1072.0	**6.0**	120.1	10.2	110.0	0.1	2.3	5.3	4.7
120.0	1072.0	8.0	1071.0	5.0	10.0	1072.0	**8.0**	120.1	10.0	110.1	0.0	-5.1	-2.1	-37.5
120.0	1072.0	8.0	1071.0	5.0	10.0	1072.0	**10.0**	120.1	10.2	110.2	0.3	3.9	6.9	7.7
120.0	1072.0	8.0	1071.0	5.0	10.0	1072.0	**12.0**	120.1	10.8	110.3	1.0	6.7	9.7	12.0
120.0	1072.0	8.0	1071.0	5.0	10.0	1072.0	**14.0**	120.1	11.7	110.5	2.0	8.4	11.4	12.0
120.0	1072.0	8.0	1071.0	5.0	10.0	1072.0	**16.0**	120.1	12.8	110.7	3.4	9.5	12.5	12.0
120.0	1072.0	8.0	1071.0	5.0	10.0	1072.0	**18.0**	120.1	14.1	110.9	5.0	10.4	13.4	12.0
Case: Rcvr 35														
80.0	1085.0	8.0	1081.0	5.0	10.0	1085.0	**6.0**	80.3	10.2	70.2	0.1	0.6	3.6	0.8

TABLE D-7, CONT'D

80.0	1085.0	8.0	1081.0	5.0	10.0	1085.0	**8.0**	80.3	10.0	70.3	0.0	-0.5	2.5	-2.7
80.0	1085.0	8.0	1081.0	5.0	10.0	1085.0	**10.0**	80.3	10.2	70.6	0.5	5.0	8.0	9.7
80.0	1085.0	8.0	1081.0	5.0	10.0	1085.0	**12.0**	80.3	10.8	70.9	1.3	7.3	10.3	12.0
80.0	1085.0	8.0	1081.0	5.0	10.0	1085.0	**14.0**	80.3	11.7	71.2	2.6	8.9	11.9	12.0
80.0	1085.0	8.0	1081.0	5.0	10.0	1085.0	**16.0**	80.3	12.8	71.6	4.1	9.9	12.9	12.0
80.0	1085.0	8.0	1081.0	5.0	10.0	1085.0	**18.0**	80.3	14.1	72.0	5.9	10.8	13.8	12.0
Case: Rcvr 36														
120.0	1067.0	8.0	1071.0	5.0	10.0	1067.0	**6.0**	120.0	10.2	110.0	0.2	3.4	6.4	6.7
120.0	1067.0	8.0	1071.0	5.0	10.0	1067.0	**8.0**	120.0	10.0	110.0	0.0	-11.4	-8.4	-297.9
120.0	1067.0	8.0	1071.0	5.0	10.0	1067.0	**10.0**	120.0	10.2	110.0	0.2	3.0	6.0	6.0
120.0	1067.0	8.0	1071.0	5.0	10.0	1067.0	**12.0**	120.0	10.8	110.0	0.8	6.2	9.2	12.0
120.0	1067.0	8.0	1071.0	5.0	10.0	1067.0	**14.0**	120.0	11.7	110.1	1.8	8.0	11.0	12.0
120.0	1067.0	8.0	1071.0	5.0	10.0	1067.0	**16.0**	120.0	12.8	110.2	3.0	9.2	12.2	12.0
120.0	1067.0	8.0	1071.0	5.0	10.0	1067.0	**18.0**	120.0	14.1	110.4	4.5	10.2	13.2	12.0
Case: Rcvr 37														
120.0	1067.0	8.0	1074.0	5.0	10.0	1067.0	**6.0**	120.1	10.2	110.2	0.3	3.9	6.9	7.7
120.0	1067.0	8.0	1074.0	5.0	10.0	1067.0	**8.0**	120.1	10.0	110.1	0.0	-5.1	-2.1	-37.5
120.0	1067.0	8.0	1074.0	5.0	10.0	1067.0	**10.0**	120.1	10.2	110.0	0.1	2.3	5.3	4.7
120.0	1067.0	8.0	1074.0	5.0	10.0	1067.0	**12.0**	120.1	10.8	110.0	0.7	5.9	8.9	11.5
120.0	1067.0	8.0	1074.0	5.0	10.0	1067.0	**14.0**	120.1	11.7	110.0	1.6	7.8	10.8	12.0
120.0	1067.0	8.0	1074.0	5.0	10.0	1067.0	**16.0**	120.1	12.8	110.1	2.8	9.1	12.1	12.0
120.0	1067.0	8.0	1074.0	5.0	10.0	1067.0	**18.0**	120.1	14.1	110.2	4.2	10.0	13.0	12.0

Appendix E

Traffic Noise Model (TNM)

Input and Output

ICF International 7 November 2011
M Greene TNM 2.5

INPUT: ROADWAYS
PROJECT/CONTRACT: RFM / HDR
RUN: Redlands First Mile - Existing Traffic

Average pavement type shall be used unless a State highway agency substantiates the use of a different type with the approval of FHWA

Roadway Name	Width	Points Name	No.	Coordinates (pavement) X	Y	Z	Flow Control Control Device	Speed Constraint	Percent Vehicles Affected	Segment Pvmt Type	On Struct?
	ft			ft	ft	ft		mph	%		
2nd Street - W of K Street	60.0	point1	1	100.0	1,650.0	100.00				Average	
		point11	11	700.0	1,650.0	100.00					
Rialto Avenue - W of K St	50.0	point3	3	100.0	1,000.0	100.00				Average	
		point14	14	700.0	1,000.0	100.00					
K Street-S of Rialto Avenue	60.0	point5	5	700.0	500.0	100.00				Average	
		point31	31	700.0	1,000.0	100.00					
J Street - S of Rialto Avenue	50.0	point7	7	1,300.0	500.0	100.00				Average	
		point37	37	1,300.0	1,000.0	100.00					
I Street-S of Rialto Avenue	50.0	point9	9	1,900.0	500.0	100.00				Average	
		point43	43	1,900.0	1,000.0	100.00					
2nd Street- E of K Street	60.0	point17	17	700.0	1,650.0	100.00				Average	
		point23	23	1,000.0	1,650.0	100.00					
2nd Street-E of J Street	60.0	point18	18	1,300.0	1,650.0	100.00				Average	
		point25	25	1,600.0	1,650.0	100.00					
2nd Street-E of I Street	60.0	point19	19	1,900.0	1,650.0	100.00				Average	
		point2	2	2,500.0	1,650.0	100.00					
Rialto Avenue- E of K St	50.0	point20	20	700.0	1,000.0	100.00				Average	
		point27	27	1,000.0	1,000.0	100.00					
Rialto Avenue - E of J St	50.0	point21	21	1,300.0	1,000.0	100.00				Average	
		point29	29	1,600.0	1,000.0	100.00					
Rialto Avenue - E of I St	50.0	point22	22	1,900.0	1,000.0	100.00				Average	
		point51	51	2,200.0	1,000.0	100.00					
2nd Street- W of J Street	60.0	point24	24	1,000.0	1,650.0	100.00				Average	
		point12	12	1,300.0	1,650.0	100.00					
2nd Street-W of I Street	60.0	point26	26	1,600.0	1,650.0	100.00				Average	

		point13	13	1,900.0	1,650.0	100.00					
Rialto Avenue - W of J St	50.0	point28	28	1,000.0	1,000.0	100.00				Average	
		point15	15	1,300.0	1,000.0	100.00					
Rialto Avenue - W of I St	50.0	point30	30	1,600.0	1,000.0	100.00				Average	
		point16	16	1,900.0	1,000.0	100.00					
K Street-N of 2nd Street	60.0	point33	33	700.0	1,653.4	100.00				Average	
		point6	6	700.0	2,200.0	100.00					
K Street-N of Rialto Avenue	60.0	point34	34	700.0	1,000.0	100.00				Average	
		point35	35	700.0	1,325.0	100.00					
K Street-S of 2nd Street	60.0	point36	36	700.0	1,325.0	100.00				Average	
		point32	32	700.0	1,650.0	100.00					
J Street-N of 2nd Street	50.0	point40	40	1,300.0	1,650.0	100.00				Average	
		point8	8	1,300.0	2,200.0	100.00					
J Street-S of 2nd Street	50.0	point41	41	1,300.0	1,325.0	100.00				Average	
		point39	39	1,300.0	1,650.0	100.00					
J Street-N of Rialto Avenue	50.0	point42	42	1,300.0	1,000.0	100.00				Average	
		point38	38	1,300.0	1,325.0	100.00					
I Street-N of Rialto Avenue	50.0	point46	46	1,900.0	1,000.0	100.00				Average	
		point44	44	1,900.0	1,325.0	100.00					
I Street-S of 2nd Street	50.0	point47	47	1,900.0	1,325.0	100.00				Average	
		point45	45	1,900.0	1,650.0	100.00					
I Street-N of 2nd Street	50.0	point48	48	1,900.0	1,650.0	100.00				Average	
		point10	10	1,900.0	2,200.0	100.00					
Rialto Avenue - E of E St	50.0	point49	49	2,500.0	1,000.0	100.00				Average	
		point50	50	3,100.0	1,000.0	100.00					
E Street - N of Rialto Ave	50.0	point52	52	2,500.0	1,600.0	100.00				Average	
		point53	53	2,500.0	1,000.0	100.00					
E Street - S of Rialto Ave	50.0	point54	54	2,500.0	1,000.0	100.00				Average	
		point55	55	2,500.0	500.0	100.00					
Rialto Avenue - W of E St	50.0	point56	56	2,200.0	1,000.0	100.00				Average	
		point4	4	2,500.0	1,000.0	100.00					

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M Greene **TNM 2.5**

INPUT: TRAFFIC FOR LAeq1h Percentages
PROJECT/CONTRACT: **RFM / HDR**
RUN: **Redlands First Mile - Existing Traffic**

Roadway	Points												
Name	Name	No.	Segment										
			Total	Autos		MTrucks		HTrucks		Buses		Motorcycles	
			Volume	P	S	P	S	P	S	P	S	P	S
			veh/hr	%	mph	%	mph	%	mph	%	mph	%	mph
2nd Street - W of K Street	point1	1	647	97	35	2	35	1	35	0	0	0	0
	point11	11											
Rialto Avenue - W of K St	point3	3	963	97	35	2	35	1	35	0	0	0	0
	point14	14											
K Street-S of Rialto Avenue	point5	5	380	97	35	2	35	1	35	0	0	0	0
	point31	31											
J Street - S of Rialto Avenue	point7	7	79	97	25	2	25	1	25	0	0	0	0
	point37	37											
I Street-S of Rialto Avenue	point9	9	369	97	25	2	25	1	25	0	0	0	0
	point43	43											
2nd Street- E of K Street	point17	17	631	97	35	2	35	1	35	0	0	0	0
	point23	23											
2nd Street-E of J Street	point18	18	810	97	35	2	35	1	35	0	0	0	0
	point25	25											
2nd Street-E of I Street	point19	19	923	97	35	2	35	1	35	0	0	0	0
	point2	2											
Rialto Avenue- E of K St	point20	20	1125	97	35	2	35	1	35	0	0	0	0
	point27	27											
Rialto Avenue - E of J St	point21	21	1039	97	35	2	35	1	35	0	0	0	0
	point29	29											
Rialto Avenue - E of I St	point22	22	1111	97	35	2	35	1	35	0	0	0	0
	point51	51											
2nd Street- W of J Street	point24	24	785	97	35	2	35	1	35	0	0	0	0

	point12	12											
2nd Street-W of I Street	point26	26	642	97	35	2	35	1	35	0	0	0	0
	point13	13											
Rialto Avenue - W of J St	point28	28	1019	97	35	2	35	1	35	0	0	0	0
	point15	15											
Rialto Avenue - W of I St	point30	30	1137	97	35	2	35	1	35	0	0	0	0
	point16	16											
K Street-N of 2nd Street	point33	33	89	97	35	2	35	1	35	0	0	0	0
	point6	6											
K Street-N of Rialto Avenue	point34	34	122	97	35	2	35	1	35	0	0	0	0
	point35	35											
K Street-S of 2nd Street	point36	36	131	97	35	2	35	1	35	0	0	0	0
	point32	32											
J Street-N of 2nd Street	point40	40	37	97	25	2	25	1	25	0	0	0	0
	point8	8											
J Street-S of 2nd Street	point41	41	70	97	25	2	25	1	25	0	0	0	0
	point39	39											
J Street-N of Rialto Avenue	point42	42	74	97	25	2	25	1	25	0	0	0	0
	point38	38											
I Street-N of Rialto Avenue	point46	46	496	97	25	2	25	1	25	0	0	0	0
	point44	44											
I Street-S of 2nd Street	point47	47	477	97	25	2	25	1	25	0	0	0	0
	point45	45											
I Street-N of 2nd Street	point48	48	352	97	25	2	25	1	25	0	0	0	0
	point10	10											
Rialto Avenue - E of E St	point49	49	1013	97	35	2	35	1	35	0	0	0	0
	point50	50											
E Street - N of Rialto Ave	point52	52	1028	97	35	2	35	1	35	0	0	0	0
	point53	53											
E Street - S of Rialto Ave	point54	54	1263	97	35	2	35	1	35	0	0	0	0
	point55	55											
Rialto Avenue - W of E St	point56	56	1072	97	35	2	35	1	35	0	0	0	0
	point4	4											

ICF International **7 November 2011**
M Greene **TNM 2.5**

INPUT: RECEIVERS
PROJECT/CONTRACT: **RFM / HDR**
RUN: **Redlands First Mile - Existing Traffic**

Receiver Name	No.	#DUs	Coordinates (ground) X	Y	Z	Height above Ground	Input Sound Levels and Criteria: Existing LAeq1h	Impact Criteria LAeq1h	Impact Criteria Sub'l	NR Goal	Active in Calc.
			ft	ft	ft	ft	dBA	dBA	dB	dB	
R1 2nd and I Street NE quadrant	1	1	2,025.0	1,715.0	100.00	5.00	0.00	66	10.0	8.0	Y
R2 I Street N of Rialto Ave	3	1	1,800.0	1,150.0	100.00	5.00	0.00	66	10.0	8.0	Y
R3 I Street S of Rialto Ave	5	1	1,800.0	850.0	100.00	5.00	0.00	66	10.0	8.0	Y
R4 J Street N of Rialto Ave	7	1	1,400.0	1,150.0	100.00	5.00	0.00	66	10.0	8.0	Y
R5 Rialto Ave btwn J and K Streets	9	1	1,015.0	900.0	100.00	5.00	0.00	66	10.0	8.0	Y
R6 J Street S of Rialto Ave	11	1	1,200.0	750.0	100.00	5.00	0.00	66	10.0	8.0	Y
R7 K Street S of Rialto Ave	13	1	600.0	800.0	100.00	5.00	0.00	66	10.0	8.0	Y
R8 K Street N of Rialto Ave	15	1	600.0	1,400.0	100.00	5.00	0.00	66	10.0	8.0	Y
R9 2nd Street btwn J and K Streets	16	1	950.0	1,550.0	100.00	5.00	0.00	66	10.0	8.0	Y
R10 2nd Street btwn K and I Streets	17	1	1,500.0	1,750.0	100.00	5.00	0.00	66	10.0	8.0	Y
R11 K Street N of 2nd Street	18	1	800.0	1,800.0	100.00	5.00	0.00	66	10.0	8.0	Y
R12 J Street N of 2nd Street	19	1	1,200.0	1,800.0	100.00	5.00	0.00	66	10.0	8.0	Y
R13 E Street N of Rialto Ave	21	1	2,600.0	1,200.0	100.00	5.00	0.00	66	10.0	8.0	Y

ICF International 7 November 2011
M Greene TNM 2.5
Calculated with TNM 2.5

RESULTS: SOUND LEVELS
PROJECT/CONTRACT: RFM / HDR
RUN: Redlands First Mile - Existing Traffic
BARRIER DESIGN: INPUT HEIGHTS
ATMOSPHERICS: 68 deg F, 50% RH

Average pavement type shall be used unless a State highway agency substantiates the use of a different type with approval of FHWA.

Receiver Name	No.	#DUs	Existing LAeq1h	No Barrier LAeq1h Calculated	Crit'n	Increase over existing Calculated	Crit'n Sub'l Inc	Type Impact	With Barrier Calculated LAeq1h	Noise Reduction Calculated	Noise Reduction Goal	Calculated minus Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
R1 2nd and I Street NE quadrant	1	1	0.0	63.0	66	63.0	10	----	63.0	0.0	8	-8.0
R2 I Street N of Rialto Ave	3	1	0.0	60.6	66	60.6	10	----	60.6	0.0	8	-8.0
R3 I Street S of Rialto Ave	5	1	0.0	60.2	66	60.2	10	----	60.2	0.0	8	-8.0
R4 J Street N of Rialto Ave	7	1	0.0	59.3	66	59.3	10	----	59.3	0.0	8	-8.0
R5 Rialto Ave btwn J and K Streets	9	1	0.0	61.3	66	61.3	10	----	61.3	0.0	8	-8.0
R6 J Street S of Rialto Ave	11	1	0.0	55.4	66	55.4	10	----	55.4	0.0	8	-8.0
R7 K Street S of Rialto Ave	13	1	0.0	59.5	66	59.5	10	----	59.5	0.0	8	-8.0
R8 K Street N of Rialto Ave	15	1	0.0	56.5	66	56.5	10	----	56.5	0.0	8	-8.0
R9 2nd Street btwn J and K Streets	16	1	0.0	59.5	66	59.5	10	----	59.5	0.0	8	-8.0
R10 2nd Street btwn K and I Streets	17	1	0.0	59.9	66	59.9	10	----	59.9	0.0	8	-8.0
R11 K Street N of 2nd Street	18	1	0.0	57.9	66	57.9	10	----	57.9	0.0	8	-8.0
R12 J Street N of 2nd Street	19	1	0.0	57.8	66	57.8	10	----	57.8	0.0	8	-8.0
R13 E Street N of Rialto Ave	21	1	0.0	62.4	66	62.4	10	----	62.4	0.0	8	-8.0

Dwelling Units	# DUs	Noise Reduction Min	Avg	Max
		dB	dB	dB
All Selected	13	0.0	0.0	0.0
All Impacted	0	0.0	0.0	0.0
All that meet NR Goal	0	0.0	0.0	0.0

ICF International 20 April 2012
M Greene TNM 2.5

INPUT: ROADWAYS
PROJECT/CONTRACT: RFM / HDR
RUN: RdldsFstMlProjOnly2014w3rdStClsr0412

Average pavement type shall be used unless a State highway agency substantiates the use of a different type with the approval of FHWA

Roadway Name	Width	Points Name	No.	Coordinates (pavement) X	Y	Z	Flow Control Control Device	Speed Constraint	Percent Vehicles Affected	Segment Pvmt Type	On Struct?
	ft			ft	ft	ft		mph	%		
2nd Street - W of K Street	60.0	point1	1	100.0	1,650.0	100.00				Average	
		point11	11	700.0	1,650.0	100.00					
Rialto Avenue - W of K St	50.0	point3	3	100.0	1,000.0	100.00				Average	
		point14	14	700.0	1,000.0	100.00					
K Street-S of Rialto Avenue	60.0	point5	5	700.0	500.0	100.00				Average	
		point31	31	700.0	1,000.0	100.00					
J Street - S of Rialto Avenue	50.0	point7	7	1,300.0	500.0	100.00				Average	
		point37	37	1,300.0	1,000.0	100.00					
I Street-S of Rialto Avenue	50.0	point9	9	1,900.0	500.0	100.00				Average	
		point43	43	1,900.0	1,000.0	100.00					
2nd Street- E of K Street	60.0	point17	17	700.0	1,650.0	100.00				Average	
		point23	23	1,000.0	1,650.0	100.00					
2nd Street-E of J Street	60.0	point18	18	1,300.0	1,650.0	100.00				Average	
		point25	25	1,600.0	1,650.0	100.00					
2nd Street-E of I Street	60.0	point19	19	1,900.0	1,650.0	100.00				Average	
		point2	2	2,500.0	1,650.0	100.00					
Rialto Avenue- E of K St	50.0	point20	20	700.0	1,000.0	100.00				Average	
		point27	27	1,000.0	1,000.0	100.00					
Rialto Avenue - E of J St	50.0	point21	21	1,300.0	1,000.0	100.00				Average	
		point29	29	1,600.0	1,000.0	100.00					
Rialto Avenue - E of I St	50.0	point22	22	1,900.0	1,000.0	100.00				Average	
		point51	51	2,200.0	1,000.0	100.00					
2nd Street- W of J Street	60.0	point24	24	1,000.0	1,650.0	100.00				Average	
		point12	12	1,300.0	1,650.0	100.00					
2nd Street-W of I Street	60.0	point26	26	1,600.0	1,650.0	100.00				Average	

		point13	13	1,900.0	1,650.0	100.00					
Rialto Avenue - W of J St	50.0	point28	28	1,000.0	1,000.0	100.00				Average	
		point15	15	1,300.0	1,000.0	100.00					
Rialto Avenue - W of I St	50.0	point30	30	1,600.0	1,000.0	100.00				Average	
		point16	16	1,900.0	1,000.0	100.00					
K Street-N of 2nd Street	60.0	point33	33	700.0	1,653.4	100.00				Average	
		point6	6	700.0	2,200.0	100.00					
K Street-N of Rialto Avenue	60.0	point34	34	700.0	1,000.0	100.00				Average	
		point35	35	700.0	1,325.0	100.00					
K Street-S of 2nd Street	60.0	point36	36	700.0	1,325.0	100.00				Average	
		point32	32	700.0	1,650.0	100.00					
J Street-N of 2nd Street	50.0	point40	40	1,300.0	1,650.0	100.00				Average	
		point8	8	1,300.0	2,200.0	100.00					
J Street-S of 2nd Street	50.0	point41	41	1,300.0	1,325.0	100.00				Average	
		point39	39	1,300.0	1,650.0	100.00					
J Street-N of Rialto Avenue	50.0	point42	42	1,300.0	1,000.0	100.00				Average	
		point38	38	1,300.0	1,325.0	100.00					
I Street-N of Rialto Avenue	50.0	point46	46	1,900.0	1,000.0	100.00				Average	
		point44	44	1,900.0	1,325.0	100.00					
I Street-S of 2nd Street	50.0	point47	47	1,900.0	1,325.0	100.00				Average	
		point45	45	1,900.0	1,650.0	100.00					
I Street-N of 2nd Street	50.0	point48	48	1,900.0	1,650.0	100.00				Average	
		point10	10	1,900.0	2,200.0	100.00					
Rialto Avenue - E of E St	50.0	point49	49	2,500.0	1,000.0	100.00				Average	
		point50	50	3,100.0	1,000.0	100.00					
E Street - N of Rialto Ave	50.0	point52	52	2,500.0	1,600.0	100.00				Average	
		point53	53	2,500.0	1,000.0	100.00					
E Street - S of Rialto Ave	50.0	point54	54	2,500.0	1,000.0	100.00				Average	
		point55	55	2,500.0	500.0	100.00					
Rialto Avenue - W of E St	50.0	point56	56	2,200.0	1,000.0	100.00				Average	
		point4	4	2,500.0	1,000.0	100.00					

ICF International **20 April 2012**
M Greene **TNM 2.5**

INPUT: TRAFFIC FOR LAeq1h Percentages
PROJECT/CONTRACT: **RFM / HDR**
RUN: **RdldsFstMlProjOnly2014w3rdStClsr0412**

Roadway	Points												
Name	Name	No.	Segment										
			Total	Autos		MTrucks		HTrucks		Buses		Motorcycles	
			Volume	P	S	P	S	P	S	P	S	P	S
			veh/hr	%	mph	%	mph	%	mph	%	mph	%	mph
2nd Street - W of K Street	point1	1	255	97	35	2	35	1	35	0	0	0	0
	point11	11											
Rialto Avenue - W of K St	point3	3	89	97	35	2	35	1	35	0	0	0	0
	point14	14											
K Street-S of Rialto Avenue	point5	5	165	97	35	2	35	1	35	0	0	0	0
	point31	31											
J Street - S of Rialto Avenue	point7	7	216	97	25	2	25	1	25	0	0	0	0
	point37	37											
I Street-S of Rialto Avenue	point9	9	0	97	25	2	25	1	25	0	0	0	0
	point43	43											
2nd Street- E of K Street	point17	17	676	97	35	2	35	1	35	0	0	0	0
	point23	23											
2nd Street-E of J Street	point18	18	762	97	35	2	35	1	35	0	0	0	0
	point25	25											
2nd Street-E of I Street	point19	19	422	97	35	2	35	1	35	0	0	0	0
	point2	2											
Rialto Avenue- E of K St	point20	20	0	97	35	2	35	1	35	0	0	0	0
	point27	27											
Rialto Avenue - E of J St	point21	21	93	97	35	2	35	1	35	0	0	0	0
	point29	29											
Rialto Avenue - E of I St	point22	22	0	97	35	2	35	1	35	0	0	0	0
	point51	51											
2nd Street- W of J Street	point24	24	499	97	35	2	35	1	35	0	0	0	0

	point12	12											
2nd Street-W of I Street	point26	26	740	97	35	2	35	1	35	0	0	0	0
	point13	13											
Rialto Avenue - W of J St	point28	28	28	97	35	2	35	1	35	0	0	0	0
	point15	15											
Rialto Avenue - W of I St	point30	30	0	97	35	2	35	1	35	0	0	0	0
	point16	16											
K Street-N of 2nd Street	point33	33	0	97	35	2	35	1	35	0	0	0	0
	point6	6											
K Street-N of Rialto Avenue	point34	34	207	97	35	2	35	1	35	0	0	0	0
	point35	35											
K Street-S of 2nd Street	point36	36	183	97	35	2	35	1	35	0	0	0	0
	point32	32											
J Street-N of 2nd Street	point40	40	29	97	25	2	25	1	25	0	0	0	0
	point8	8											
J Street-S of 2nd Street	point41	41	227	97	25	2	25	1	25	0	0	0	0
	point39	39											
J Street-N of Rialto Avenue	point42	42	228	97	25	2	25	1	25	0	0	0	0
	point38	38											
I Street-N of Rialto Avenue	point46	46	0	97	25	2	25	1	25	0	0	0	0
	point44	44											
I Street-S of 2nd Street	point47	47	0	97	25	2	25	1	25	0	0	0	0
	point45	45											
I Street-N of 2nd Street	point48	48	5	97	25	2	25	1	25	0	0	0	0
	point10	10											
Rialto Avenue - E of E St	point49	49	45	97	35	2	35	1	35	0	0	0	0
	point50	50											
E Street - N of Rialto Ave	point52	52	112	97	35	2	35	1	35	0	0	0	0
	point53	53											
E Street - S of Rialto Ave	point54	54	154	97	35	2	35	1	35	0	0	0	0
	point55	55											
Rialto Avenue - W of E St	point56	56	101	97	35	2	35	1	35	0	0	0	0
	point4	4											

ICF International **20 April 2012**
M Greene **TNM 2.5**

INPUT: RECEIVERS
PROJECT/CONTRACT: **RFM / HDR**
RUN: **RdIdsFstMlProjOnly2014w3rdStClsr0412**

Receiver Name	No.	#DUs	Coordinates (ground) X	Y	Z	Height above Ground	Input Sound Levels and Criteria: Existing LAeq1h	Impact Criteria LAeq1h	Impact Criteria Sub'l	NR Goal	Active in Calc.
			ft	ft	ft	ft	dBA	dBA	dB	dB	
R1 2nd and I Street NE quadrant	1	1	2,025.0	1,715.0	100.00	5.00	0.00	66	10.0	8.0	Y
R2 I Street N of Rialto Ave	3	1	1,800.0	1,150.0	100.00	5.00	0.00	66	10.0	8.0	Y
R3 I Street S of Rialto Ave	5	1	1,800.0	850.0	100.00	5.00	0.00	66	10.0	8.0	Y
R4 J Street N of Rialto Ave	7	1	1,400.0	1,150.0	100.00	5.00	0.00	66	10.0	8.0	Y
R5 Rialto Ave btwn J and K Streets	9	1	1,015.0	900.0	100.00	5.00	0.00	66	10.0	8.0	Y
R6 J Street S of Rialto Ave	11	1	1,200.0	750.0	100.00	5.00	0.00	66	10.0	8.0	Y
R7 K Street S of Rialto Ave	13	1	600.0	800.0	100.00	5.00	0.00	66	10.0	8.0	Y
R8 K Street N of Rialto Ave	15	1	600.0	1,400.0	100.00	5.00	0.00	66	10.0	8.0	Y
R9 2nd Street btwn J and K Streets	16	1	950.0	1,550.0	100.00	5.00	0.00	66	10.0	8.0	Y
R10 2nd Street btwn K and I Streets	17	1	1,500.0	1,750.0	100.00	5.00	0.00	66	10.0	8.0	Y
R11 K Street N of 2nd Street	18	1	800.0	1,800.0	100.00	5.00	0.00	66	10.0	8.0	Y
R12 J Street N of 2nd Street	19	1	1,200.0	1,800.0	100.00	5.00	0.00	66	10.0	8.0	Y
R13 E Street N of Rialto Ave	21	1	2,600.0	1,200.0	100.00	5.00	0.00	66	10.0	8.0	Y

ICF International **20 April 2012**
M Greene **TNM 2.5**
Calculated with TNM 2.5

RESULTS: SOUND LEVELS
PROJECT/CONTRACT: **RFM / HDR**
RUN: **RdldsFstMlProjOnly2014w3rdStClsr0412**
BARRIER DESIGN: **INPUT HEIGHTS**
ATMOSPHERICS: **68 deg F, 50% RH**

Average pavement type shall be used unless a State highway agency substantiates the use of a different type with approval of FHWA.

Receiver Name	No.	#DUs	Existing LAeq1h	No Barrier LAeq1h Calculated	Crit'n	Increase over existing Calculated	Crit'n Sub'l Inc	Type Impact	With Barrier Calculated LAeq1h	Noise Reduction Calculated	Noise Reduction Goal	Calculated minus Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
R1 2nd and I Street NE quadrant	1	1	0.0	59.7	66	59.7	10	----	59.7	0.0	8	-8.0
R2 I Street N of Rialto Ave	3	1	0.0	46.6	66	46.6	10	----	46.6	0.0	8	-8.0
R3 I Street S of Rialto Ave	5	1	0.0	44.2	66	44.2	10	----	44.2	0.0	8	-8.0
R4 J Street N of Rialto Ave	7	1	0.0	53.1	66	53.1	10	----	53.1	0.0	8	-8.0
R5 Rialto Ave btwn J and K Streets	9	1	0.0	49.1	66	49.1	10	----	49.1	0.0	8	-8.0
R6 J Street S of Rialto Ave	11	1	0.0	51.4	66	51.4	10	----	51.4	0.0	8	-8.0
R7 K Street S of Rialto Ave	13	1	0.0	53.6	66	53.6	10	----	53.6	0.0	8	-8.0
R8 K Street N of Rialto Ave	15	1	0.0	55.4	66	55.4	10	----	55.4	0.0	8	-8.0
R9 2nd Street btwn J and K Streets	16	1	0.0	58.8	66	58.8	10	----	58.8	0.0	8	-8.0
R10 2nd Street btwn K and I Streets	17	1	0.0	59.5	66	59.5	10	----	59.5	0.0	8	-8.0
R11 K Street N of 2nd Street	18	1	0.0	56.4	66	56.4	10	----	56.4	0.0	8	-8.0
R12 J Street N of 2nd Street	19	1	0.0	56.6	66	56.6	10	----	56.6	0.0	8	-8.0
R13 E Street N of Rialto Ave	21	1	0.0	52.5	66	52.5	10	----	52.5	0.0	8	-8.0

Dwelling Units	# DUs	Noise Reduction Min	Avg	Max
		dB	dB	dB
All Selected	13	0.0	0.0	0.0
All Impacted	0	0.0	0.0	0.0
All that meet NR Goal	0	0.0	0.0	0.0

ICF International 20 April 2012
M Greene TNM 2.5

INPUT: ROADWAYS
PROJECT/CONTRACT: RFM / HDR
RUN: RdldsFrstMlPrjOnly2035w3rdStClsr 0412

Average pavement type shall be used unless a State highway agency substantiates the use of a different type with the approval of FHWA

Roadway Name	Width	Points Name	No.	Coordinates (pavement) X	Y	Z	Flow Control Control Device	Speed Constraint	Percent Vehicles Affected	Segment Pvmt Type	On Struct?
	ft			ft	ft	ft		mph	%		
2nd Street - W of K Street	60.0	point1	1	100.0	1,650.0	100.00				Average	
		point11	11	700.0	1,650.0	100.00					
Rialto Avenue - W of K St	50.0	point3	3	100.0	1,000.0	100.00				Average	
		point14	14	700.0	1,000.0	100.00					
K Street-S of Rialto Avenue	60.0	point5	5	700.0	500.0	100.00				Average	
		point31	31	700.0	1,000.0	100.00					
J Street - S of Rialto Avenue	50.0	point7	7	1,300.0	500.0	100.00				Average	
		point37	37	1,300.0	1,000.0	100.00					
I Street-S of Rialto Avenue	50.0	point9	9	1,900.0	500.0	100.00				Average	
		point43	43	1,900.0	1,000.0	100.00					
2nd Street- E of K Street	60.0	point17	17	700.0	1,650.0	100.00				Average	
		point23	23	1,000.0	1,650.0	100.00					
2nd Street-E of J Street	60.0	point18	18	1,300.0	1,650.0	100.00				Average	
		point25	25	1,600.0	1,650.0	100.00					
2nd Street-E of I Street	60.0	point19	19	1,900.0	1,650.0	100.00				Average	
		point2	2	2,500.0	1,650.0	100.00					
Rialto Avenue- E of K St	50.0	point20	20	700.0	1,000.0	100.00				Average	
		point27	27	1,000.0	1,000.0	100.00					
Rialto Avenue - E of J St	50.0	point21	21	1,300.0	1,000.0	100.00				Average	
		point29	29	1,600.0	1,000.0	100.00					
Rialto Avenue - E of I St	50.0	point22	22	1,900.0	1,000.0	100.00				Average	
		point51	51	2,200.0	1,000.0	100.00					
2nd Street- W of J Street	60.0	point24	24	1,000.0	1,650.0	100.00				Average	
		point12	12	1,300.0	1,650.0	100.00					
2nd Street-W of I Street	60.0	point26	26	1,600.0	1,650.0	100.00				Average	

		point13	13	1,900.0	1,650.0	100.00					
Rialto Avenue - W of J St	50.0	point28	28	1,000.0	1,000.0	100.00				Average	
		point15	15	1,300.0	1,000.0	100.00					
Rialto Avenue - W of I St	50.0	point30	30	1,600.0	1,000.0	100.00				Average	
		point16	16	1,900.0	1,000.0	100.00					
K Street-N of 2nd Street	60.0	point33	33	700.0	1,653.4	100.00				Average	
		point6	6	700.0	2,200.0	100.00					
K Street-N of Rialto Avenue	60.0	point34	34	700.0	1,000.0	100.00				Average	
		point35	35	700.0	1,325.0	100.00					
K Street-S of 2nd Street	60.0	point36	36	700.0	1,325.0	100.00				Average	
		point32	32	700.0	1,650.0	100.00					
J Street-N of 2nd Street	50.0	point40	40	1,300.0	1,650.0	100.00				Average	
		point8	8	1,300.0	2,200.0	100.00					
J Street-S of 2nd Street	50.0	point41	41	1,300.0	1,325.0	100.00				Average	
		point39	39	1,300.0	1,650.0	100.00					
J Street-N of Rialto Avenue	50.0	point42	42	1,300.0	1,000.0	100.00				Average	
		point38	38	1,300.0	1,325.0	100.00					
I Street-N of Rialto Avenue	50.0	point46	46	1,900.0	1,000.0	100.00				Average	
		point44	44	1,900.0	1,325.0	100.00					
I Street-S of 2nd Street	50.0	point47	47	1,900.0	1,325.0	100.00				Average	
		point45	45	1,900.0	1,650.0	100.00					
I Street-N of 2nd Street	50.0	point48	48	1,900.0	1,650.0	100.00				Average	
		point10	10	1,900.0	2,200.0	100.00					
Rialto Avenue - E of E St	50.0	point49	49	2,500.0	1,000.0	100.00				Average	
		point50	50	3,100.0	1,000.0	100.00					
E Street - N of Rialto Ave	50.0	point52	52	2,500.0	1,600.0	100.00				Average	
		point53	53	2,500.0	1,000.0	100.00					
E Street - S of Rialto Ave	50.0	point54	54	2,500.0	1,000.0	100.00				Average	
		point55	55	2,500.0	500.0	100.00					
Rialto Avenue - W of E St	50.0	point56	56	2,200.0	1,000.0	100.00				Average	
		point4	4	2,500.0	1,000.0	100.00					

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M Greene **TNM 2.5**

INPUT: TRAFFIC FOR LAeq1h Percentages
PROJECT/CONTRACT: **RFM / HDR**
RUN: **RdldsFrstMlPrjOnly2035w3rdStClsr 0412**

Roadway	Points												
Name	Name	No.	Segment										
			Total	Autos		MTrucks		HTrucks		Buses		Motorcycles	
			Volume	P	S	P	S	P	S	P	S	P	S
			veh/hr	%	mph	%	mph	%	mph	%	mph	%	mph
2nd Street - W of K Street	point1	1	367	97	35	2	35	1	35	0	0	0	0
	point11	11											
Rialto Avenue - W of K St	point3	3	95	97	35	2	35	1	35	0	0	0	0
	point14	14											
K Street-S of Rialto Avenue	point5	5	177	97	35	2	35	1	35	0	0	0	0
	point31	31											
J Street - S of Rialto Avenue	point7	7	236	97	25	2	25	1	25	0	0	0	0
	point37	37											
I Street-S of Rialto Avenue	point9	9	0	97	25	2	25	1	25	0	0	0	0
	point43	43											
2nd Street- E of K Street	point17	17	617	97	35	2	35	1	35	0	0	0	0
	point23	23											
2nd Street-E of J Street	point18	18	893	97	35	2	35	1	35	0	0	0	0
	point25	25											
2nd Street-E of I Street	point19	19	655	97	35	2	35	1	35	0	0	0	0
	point2	2											
Rialto Avenue- E of K St	point20	20	36	97	35	2	35	1	35	0	0	0	0
	point27	27											
Rialto Avenue - E of J St	point21	21	105	97	35	2	35	1	35	0	0	0	0
	point29	29											
Rialto Avenue - E of I St	point22	22	0	97	35	2	35	1	35	0	0	0	0
	point51	51											
2nd Street- W of J Street	point24	24	637	97	35	2	35	1	35	0	0	0	0

	point12	12											
2nd Street-W of I Street	point26	26	1023	97	35	2	35	1	35	0	0	0	0
	point13	13											
Rialto Avenue - W of J St	point28	28	48	97	35	2	35	1	35	0	0	0	0
	point15	15											
Rialto Avenue - W of I St	point30	30	0	97	35	2	35	1	35	0	0	0	0
	point16	16											
K Street-N of 2nd Street	point33	33	0	97	35	2	35	1	35	0	0	0	0
	point6	6											
K Street-N of Rialto Avenue	point34	34	217	97	35	2	35	1	35	0	0	0	0
	point35	35											
K Street-S of 2nd Street	point36	36	183	97	35	2	35	1	35	0	0	0	0
	point32	32											
J Street-N of 2nd Street	point40	40	70	97	25	2	25	1	25	0	0	0	0
	point8	8											
J Street-S of 2nd Street	point41	41	370	97	25	2	25	1	25	0	0	0	0
	point39	39											
J Street-N of Rialto Avenue	point42	42	370	97	25	2	25	1	25	0	0	0	0
	point38	38											
I Street-N of Rialto Avenue	point46	46	0	97	25	2	25	1	25	0	0	0	0
	point44	44											
I Street-S of 2nd Street	point47	47	0	97	25	2	25	1	25	0	0	0	0
	point45	45											
I Street-N of 2nd Street	point48	48	8	97	25	2	25	1	25	0	0	0	0
	point10	10											
Rialto Avenue - E of E St	point49	49	45	97	35	2	35	1	35	0	0	0	0
	point50	50											
E Street - N of Rialto Ave	point52	52	112	97	35	2	35	1	35	0	0	0	0
	point53	53											
E Street - S of Rialto Ave	point54	54	154	97	35	2	35	1	35	0	0	0	0
	point55	55											
Rialto Avenue - W of E St	point56	56	101	97	35	2	35	1	35	0	0	0	0
	point4	4											

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M Greene **TNM 2.5**

INPUT: RECEIVERS
PROJECT/CONTRACT: **RFM / HDR**
RUN: **RdIdsFrstMlPrjOnly2035w3rdStClsr 0412**

Receiver Name	No.	#DUs	Coordinates (ground) X	Y	Z	Height above Ground	Input Sound Levels and Criteria: Existing LAeq1h	Impact Criteria LAeq1h	Impact Criteria Sub'l	NR Goal	Active in Calc.
			ft	ft	ft	ft	dBA	dBA	dB	dB	
R1 2nd and I Street NE quadrant	1	1	2,025.0	1,715.0	100.00	5.00	0.00	66	10.0	8.0	Y
R2 I Street N of Rialto Ave	3	1	1,800.0	1,150.0	100.00	5.00	0.00	66	10.0	8.0	Y
R3 I Street S of Rialto Ave	5	1	1,800.0	850.0	100.00	5.00	0.00	66	10.0	8.0	Y
R4 J Street N of Rialto Ave	7	1	1,400.0	1,150.0	100.00	5.00	0.00	66	10.0	8.0	Y
R5 Rialto Ave btwn J and K Streets	9	1	1,015.0	900.0	100.00	5.00	0.00	66	10.0	8.0	Y
R6 J Street S of Rialto Ave	11	1	1,200.0	750.0	100.00	5.00	0.00	66	10.0	8.0	Y
R7 K Street S of Rialto Ave	13	1	600.0	800.0	100.00	5.00	0.00	66	10.0	8.0	Y
R8 K Street N of Rialto Ave	15	1	600.0	1,400.0	100.00	5.00	0.00	66	10.0	8.0	Y
R9 2nd Street btwn J and K Streets	16	1	950.0	1,550.0	100.00	5.00	0.00	66	10.0	8.0	Y
R10 2nd Street btwn K and I Streets	17	1	1,500.0	1,750.0	100.00	5.00	0.00	66	10.0	8.0	Y
R11 K Street N of 2nd Street	18	1	800.0	1,800.0	100.00	5.00	0.00	66	10.0	8.0	Y
R12 J Street N of 2nd Street	19	1	1,200.0	1,800.0	100.00	5.00	0.00	66	10.0	8.0	Y
R13 E Street N of Rialto Ave	21	1	2,600.0	1,200.0	100.00	5.00	0.00	66	10.0	8.0	Y

ICF International 20 April 2012
M Greene TNM 2.5
Calculated with TNM 2.5

RESULTS: SOUND LEVELS
PROJECT/CONTRACT: RFM / HDR
RUN: RdldsFrstMlPrjOnly2035w3rdStClsr 0412
BARRIER DESIGN: INPUT HEIGHTS
ATMOSPHERICS: 68 deg F, 50% RH

Average pavement type shall be used unless a State highway agency substantiates the use of a different type with approval of FHWA.

Receiver Name	No.	#DUs	Existing LAeq1h	No Barrier LAeq1h Calculated	Crit'n	Increase over existing Calculated	Crit'n Sub'l Inc	Type Impact	With Barrier Calculated LAeq1h	Noise Reduction Calculated	Noise Reduction Goal	Calculated minus Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
R1 2nd and I Street NE quadrant	1	1	0.0	61.4	66	61.4	10	----	61.4	0.0	8	-8.0
R2 I Street N of Rialto Ave	3	1	0.0	47.7	66	47.7	10	----	47.7	0.0	8	-8.0
R3 I Street S of Rialto Ave	5	1	0.0	45.0	66	45.0	10	----	45.0	0.0	8	-8.0
R4 J Street N of Rialto Ave	7	1	0.0	54.6	66	54.6	10	----	54.6	0.0	8	-8.0
R5 Rialto Ave btwn J and K Streets	9	1	0.0	50.8	66	50.8	10	----	50.8	0.0	8	-8.0
R6 J Street S of Rialto Ave	11	1	0.0	52.0	66	52.0	10	----	52.0	0.0	8	-8.0
R7 K Street S of Rialto Ave	13	1	0.0	54.0	66	54.0	10	----	54.0	0.0	8	-8.0
R8 K Street N of Rialto Ave	15	1	0.0	55.8	66	55.8	10	----	55.8	0.0	8	-8.0
R9 2nd Street btwn J and K Streets	16	1	0.0	59.0	66	59.0	10	----	59.0	0.0	8	-8.0
R10 2nd Street btwn K and I Streets	17	1	0.0	60.3	66	60.3	10	----	60.3	0.0	8	-8.0
R11 K Street N of 2nd Street	18	1	0.0	56.5	66	56.5	10	----	56.5	0.0	8	-8.0
R12 J Street N of 2nd Street	19	1	0.0	57.6	66	57.6	10	----	57.6	0.0	8	-8.0
R13 E Street N of Rialto Ave	21	1	0.0	52.7	66	52.7	10	----	52.7	0.0	8	-8.0

Dwelling Units	# DUs	Noise Reduction Min	Avg	Max
		dB	dB	dB
All Selected	13	0.0	0.0	0.0
All Impacted	0	0.0	0.0	0.0
All that meet NR Goal	0	0.0	0.0	0.0

Appendix F

Parking Lot Noise Analysis

Input and Output

Input for Screening Level Assessment, facility parking lot and Omnitrans bus facility

Ref: Page 4-2, FTA Transit Noise and Vibration Impact Assessment manual and FTA Spreadsheet model.

Per DSBPRP Traffic Study (rev. 01/16/2012), Figure 10, the proposed parking lot would generate approximately 1193 daily vehicle trips. Based upon bus schedules for routes that would stop at the transit center, approximately 90% of these would occur during the daytime hours, and the remaining 10% during nighttime hours.

Thus number of autos per hour daytime =	72 per hour
Thus number of autos per hour nighttime =	13 per hour

Per the bus schedules for routes that would stop at the transit center, there would be a total of approximately 934 bus visits per day; approximately 90 % occuring during daytime hours (7AM to 10 pm) and 10 % during nighttime hours (10 pm to 7 am).

Thus number of busses per hour daytime =	56 per hour
Thus number of busses per hour nighttime =	10 per hour

Per Page 4-2 of FTA Manual, the FTA spreadsheet model (see attached) was used to arrive at the adjusted screening distances, using the inputs for numbers of autos and buses above.

TABLE F-1

Noise Model Based on Federal Transit Adminstration General Transit Noise Assessment
Developed for Chicago Create Project
Copyright 2006, HMMH Inc.
Case: Screening Dist's for Bus Facility and Parking Lot

RESULTS			
Noise Source	**Ldn (dB)**	**Leq - daytime (dB)**	**Leq - nighttime (dB)**
All Sources	53	52	44
Source 1	50	49	41
Source 2	50	49	41
Source 3	0	0	0
Source 4	0	0	0
Source 5	0	0	0
Source 6	0	0	0
Source 7	0	0	0
Source 8	0	0	0

Enter noise receiver land use category below.

LAND USE CATEGORY	
Noise receiver land use category (1, 2 or 3)	2

Enter data for up to 8 noise sources below - see reference list for source numbers.

NOISE SOURCE PARAMETERS						
Parameter	**Source 1**		**Source 2**		**Source 3**	
Source Num.	Bus Transit Center	21	Park & Ride Lot	23		
Distance (source to receiver)	distance (ft)	350	distance (ft)	62		
Daytime Hours (7 AM - 10 PM)	buses/hour	56 0.0666672	autos/hour buses/hour	72 0		
Nighttime Hours (10 PM - 7 AM)	buses/hour	10 0.1111112	autos/hour buses/hour	13 0		
Wheel Flats?						
Jointed Track?						
Embedded Track?						
Aerial Structure?						
Barrier Present?	Y/N		Y/N			
Intervening Rows of of Buildings	number of rows		number of rows			

SOURCE REFERENCE LIST	
Source	**Number**
Commuter Electric Locomotive	1
Commuter Diesel Locomotive	2
Commuter Rail Cars	3
RRT/LRT	4
AGT, Steel Wheel	5
AGT, Rubber Tire	6
Monorail	7
Maglev	8
Freight Locomotive	9
Freight Cars	10
Hopper Cars (empty)	11
Hopper Cars (full)	12
Crossover	13
Automobiles	14
City Buses	15
Commuter Buses	16
Rail Yard or Shop	17
Layover Tracks	18
Bus Storage Yard	19
Bus Op. Facility	20
Bus Transit Center	21
Parking Garage	22
Park & Ride Lot	23

2

Appendix G

Vibration Analysis

Input and Output

TABLE G-1

Ground-borne Noise and Vibration Analysis Summary Table - Operational

Potentially Impacted[1] Receiver #	Receiver Location Description	Land Use Description	Number of Noise-Sensitive Sites Represented	Distance to BNSF Track Centerline (Feet)	Resultant Ground-borne Vibration Levels	FTA Ground-borne Vibration Criteria[4]	Impact ?	Recommended Abatement Measures	Estimated Level of Reduction	Ground-borne Vibration Levels after Abatement	Abated to below Impact Level ?	Resultant Ground-borne Noise	FTA Ground-borne Noise Criteria[4]	Impact ?
9	100' to 200' sw of alignment, s of Rialto Ave	Residential	1	180	**66**	72	No Impact	n/a	n/a	n/a	n/a	**16**	35	No Impact
10	100' to 200' sw of alignment, w of I St, n of Belleview St	Residential	1	170	**65**	72	No Impact	n/a	n/a	n/a	n/a	**15**	35	No Impact
11	50' to 100' sw of alignment, w of I St, s of Rialto Ave	Residential	2	60	**76**	72	**Impact**	Resiliently Supported Ties or Ballast Mats	-10	66	No Residual Impact	**26**	35	No Impact
15	less than 50' e of alignment, n of Rialto Ave, w of I St	Residential	2	30	**81**	72	**Impact**	Resiliently Supported Ties or Ballast Mats	-10	71	No Residual Impact	**31**	35	No Impact
17	50' to 100' e of alignment, w of I St	Residential	3	120	**69**	72	No Impact	n/a	n/a	n/a	n/a	**19**	35	No Impact
18	100' to 200' w of alignment, w of I St	Residential	2	140	**68**	72	No Impact	n/a	n/a	n/a	n/a	**18**	35	No Impact
19	100' to 200' w of alignment, w of I St, s of 2nd St	Residential	2	140	**68**	72	No Impact	n/a	n/a	n/a	n/a	**18**	35	No Impact
22	100' to 200' w of alignment, e of J St, s of 2nd St	Residential	2	180	**66**	72	No Impact	n/a	n/a	n/a	n/a	**16**	35	No Impact

TABLE G-1, CONT'D

25	100' to 200' w of alignment, e of J St, s of 2nd St	Residential	2	110	**70**	72	No Impact	n/a	n/a	n/a	n/a	**20**	35	No Impact
26	100' to 200' w of alignment, e of J St, n of 2nd St	Residential	2	140	**68**	72	No Impact	n/a	n/a	n/a	n/a	**18**	35	No Impact
27	100' to 200' e of alignment, w of I St, n of 2nd St	Residential	1	140	**68**	72	No Impact	n/a	n/a	n/a	n/a	**18**	35	No Impact
28	100' to 200' w of alignment, e of J St, n of 2nd St	Residential	2	140	**68**	72	No Impact	n/a	n/a	n/a	n/a	**18**	35	No Impact
29	100' to 200' e of alignment, w of I St, n of 2nd St	Residential	1	120	**69**	72	No Impact	n/a	n/a	n/a	n/a	**19**	35	No Impact
32	100' to 200' w of alignment, e of J St, n of 2nd St	Residential	1	180	**66**	72	No Impact	n/a	n/a	n/a	n/a	**16**	35	No Impact
35	50' to 100' e of alignment (e of Depot), n of Grape Ct.	Residential	9	80	**74**	72	**Impact**	Resiliently Supported Ties or Ballast Mats	-10	64	No Residual Impact	**24**	35	No Impact
36	100' to 200' w of alignment (e of Depot), n of Grape Ct.	Residential	3	120	**69**	72	No Impact	n/a	n/a	n/a	n/a	**19**	35	No Impact
37	Commercial/ Transient Residential use e of N. E St. and n of alignment (includes horn	Transient Residential / Commercial (Motel)	1	200	**64**	72	No Impact	n/a	n/a	n/a	n/a	**14**	35	No Impact

1 - Per Table 9-2 of the General Vibration Assessment, FTA Transit Noise and Vibration Impact Assessment manual, the screening distance for vibration assessment for conventional commuter rail is 600 feet for Category 1 land uses and 200 feet for Category 2 land uses. The nearest known Category 1 land use is located approximately 2000 feet away and is thus well beyond the applicable screening distance. Category 2 (residential) land uses existing within 200 feet of the alignment are addressed in this table.

2 - Based on Figure 10-1, page 10-3, Chapter 10, ibid.

3 - Based on Table 10-1, ibid.

4 - Based on Table 8-1 (Category 2, Frequent Events), ibid.

Appendix H

Construction Noise and Vibration Analysis

Input and Output

FTA Methodology Construction Calculations

Ref: Chapter 12, Noise and Vibration During Construction, Transit Noise and Vibration Impact Assessment manual

Leq(equip)= E.L. + 10*Log(U.F.) - 20*Log(D/50) - 10*G*Log(D/50)

E.L. = noise emission level - derived from Table 12-1 of the FTA manual
U.F. = utilization factor - derived from the defaults of the RCNM
D=distance

Case Description:	Downtown SanBrndno Passenger Rail - Area 4, CrewT3			
Equip Typ	units*hrs per unit	Coded as	E.L.	U.F
Truck 3/4T pickup	6	Truck	88	0.75
Truck - 2500 gal water	1	Truck	88	0.125
Excavator - Rubber Tir	4	Truck	88	0.5
Loader - Rubber Tire	2	Loader	85	0.25
Roller - Vibratory	2	Roller	74	0.25
Roller - Static	2	Roller	74	0.25
Air Compressor	4	Air Compressor	81	0.5
Generator - portable	6	Generator	81	0.75
Truck -Fltbd w/boom c	2	Crane, Mobile	83	0.25
Forklift	1	Loader	85	0.125
Grader	1	Grader	85	0.125
Speed Swing	1	Tie Handler	80	0.125
Rail Saw	1	Rail Saw	90	0.125
Rail Welder	2	Generator	81	0.25
Ballast Regulator	1	Ballast Equalizer	82	0.125
Ballast Tamper	1	Ballast Tamber	82	0.125
Impact Wrench	1	Impact Wrench	85	0.125
Pneumatic or Elec Tool	1	Pneumative Tool	85	0.125
Total Leq				

Case Description:	**Downtown SanBrndno Passenger Rail - Area 4, CrewD2**			
Equip Typ	units*hrs per unit	Coded as	E.L.	U.F
Truck 3/4T pickup	6	Truck	88	0.75
Truck 10-wheel Dump	8	Truck	88	1
Truck - 2500 gal water	3	Truck	88	0.375
Excavator - Track	8	Scraper	89	1
Loader - Rubber Tire	6	Loader	85	0.75
Air Compressor	18	Air Compressor	81	2.25
Jack Hammer	12	Jack Hammer	88	1.5
Concrete or Asphalt Sa	4	Saw	76	0.5

Excavator w/HoRam	4	Jack Hammer	88	0.5
Total Leq				

TABLE H1

Table 12-1. Construction Equipment Noise Emission Levels	
Equipment	**Typical Noise Level (dBA) 50 ft from Source**
Air Compressor	81
Backhoe	80
Ballast Equalizer	82
Ballast Tamper	83
Compactor	82
Concrete Mixer	85
Concrete Pump	82
Concrete Vibrator	76
Crane, Derrick	88
Crane, Mobile	83
Dozer	85
Generator	81
Grader	85
Impact Wrench	85
Jack Hammer	88
Loader	85
Paver	89
Pile-driver (Impact)	101
Pile-driver (Sonic)	96
Pneumatic Tool	85
Pump	76
Rail Saw	90
Rock Drill	98
Roller	74
Saw	76
Scarifier	83
Scraper	89
Shovel	82
Spike Driver	77
Tie Cutter	84
Tie Handler	80
Tie Inserter	85
Truck	88
Table based on an EPA Report, (4) measured data from railroad construction equipmenttaken during the Northeast Corridor Improvement Project, and other measured data .	

TABLE H-2

Acoustically-averaged distances for typical noise level	
30	78
60	112
80	131
110	158
120	167
140	185
170	211
200	269
230	295
240	304
250	312
260	321
310	366
320	375
370	420
410	515
420	524
430	533
460	559
470	568
490	586
510	604
820	887
830	897
850	916

TABLE H-3

Barrier Shielding (from FTA Operational Rail Analysis Spreadsheet, simplified to least amount of shielding if more than one distance applies)

30	0 Rows	0
60	0 Rows	0
80	0 Rows	0
110	0 Rows	0
120	0 Rows	0
120	0 Rows	0
140	0 Rows	0
170	1 Row	5
180	1 Rows	5
200	1 Row	5
230	0 Rows	0
240	0 Rows	0
250	1 Row	5
260	1 Row	5
310	1 Row	5
320	2 Rows	6.5
370	1 Row	5
410	1 Row	5
420	3 Rows	8
430	3 Rows	8
460	1 Row	5
470	1 Row	5
490	1 Row	5
510	3 Rows	8
820	1 Row	5
830	6 Rows	10
850	5 Rows	10

TABLE H-4

Case Description: Downtown SanBrndno Passenger Rail - Area 4, CrewT3

Receiver Distance (Perpendicular Distance to Alignment (feet))	30	60	80	110	120	140	170	200	230	240	250	260	310	320	370	410	420	430	460	470	490	510	820	830	850
Equipment Type																									
Truck 3/4T pickup	82.9	79.8	78.4	76.7	76.3	75.4	74.2	72.1	71.3	71.1	70.8	70.6	69.5	69.3	68.3	66.5	66.3	66.2	65.8	65.6	65.4	65.1	61.8	61.7	61.5
Truck - 2500 gal water	75.1	72.0	70.6	69.0	68.5	67.6	66.5	64.4	63.6	63.3	63.1	62.8	61.7	61.5	60.5	58.7	58.6	58.4	58.0	57.9	57.6	57.3	54.0	53.9	53.7
Excavator - Rubber Tire	81.1	78.0	76.6	75.0	74.5	73.6	72.5	70.4	69.6	69.3	69.1	68.8	67.7	67.5	66.5	64.7	64.6	64.4	64.0	63.9	63.6	63.4	60.0	59.9	59.7
Loader - Rubber Tire	75.1	72.0	70.6	69.0	68.5	67.6	66.5	64.4	63.6	63.3	63.1	62.8	61.7	61.5	60.5	58.7	58.6	58.4	58.0	57.9	57.6	57.3	54.0	53.9	53.7
Roller - Vibratory	64.1	61.0	59.6	58.0	57.5	56.6	55.5	53.4	52.6	52.3	52.1	51.8	50.7	50.5	49.5	47.7	47.6	47.4	47.0	46.9	46.6	46.3	43.0	42.9	42.7
Roller - Static	64.1	61.0	59.6	58.0	57.5	56.6	55.5	53.4	52.6	52.3	52.1	51.8	50.7	50.5	49.5	47.7	47.6	47.4	47.0	46.9	46.6	46.3	43.0	42.9	42.7
Air Compressor	74.1	71.0	69.6	68.0	67.5	66.6	65.5	63.4	62.6	62.3	62.1	61.8	60.7	60.5	59.5	57.7	57.6	57.4	57.0	56.9	56.6	56.4	53.0	52.9	52.7
Generator - portable	75.9	72.8	71.4	69.7	69.3	68.4	67.2	65.1	64.3	64.1	63.8	63.6	62.5	62.3	61.3	59.5	59.3	59.2	58.8	58.6	58.4	58.1	54.8	54.7	54.5
Truck -Fltbd w/boom crane	73.1	70.0	68.6	67.0	66.5	65.6	64.5	62.4	61.6	61.3	61.1	60.8	59.7	59.5	58.5	56.7	56.6	56.4	56.0	55.9	55.6	55.3	52.0	51.9	51.7
Forklift	72.1	69.0	67.6	66.0	65.5	64.6	63.5	61.4	60.6	60.3	60.1	59.8	58.7	58.5	57.5	55.7	55.6	55.4	55.0	54.9	54.6	54.3	51.0	50.9	50.7
Grader	72.1	69.0	67.6	66.0	65.5	64.6	63.5	61.4	60.6	60.3	60.1	59.8	58.7	58.5	57.5	55.7	55.6	55.4	55.0	54.9	54.6	54.3	51.0	50.9	50.7
Speed Swing	67.1	64.0	62.6	61.0	60.5	59.6	58.5	56.4	55.6	55.3	55.1	54.8	53.7	53.5	52.5	50.7	50.6	50.4	50.0	49.9	49.6	49.3	46.0	45.9	45.7
Rail Saw	77.1	74.0	72.6	71.0	70.5	69.6	68.5	66.4	65.6	65.3	65.1	64.8	63.7	63.5	62.5	60.7	60.6	60.4	60.0	59.9	59.6	59.3	56.0	55.9	55.7
Rail Welder	71.1	68.0	66.6	65.0	64.5	63.6	62.5	60.4	59.6	59.3	59.1	58.8	57.7	57.5	56.5	54.7	54.6	54.4	54.0	53.9	53.6	53.3	50.0	49.9	49.7
Ballast Regulator	69.1	66.0	64.6	63.0	62.5	61.6	60.5	58.4	57.6	57.3	57.1	56.8	55.7	55.5	54.5	52.7	52.6	52.4	52.0	51.9	51.6	51.3	48.0	47.9	47.7
Ballast Tamper	69.1	66.0	64.6	63.0	62.5	61.6	60.5	58.4	57.6	57.3	57.1	56.8	55.7	55.5	54.5	52.7	52.6	52.4	52.0	51.9	51.6	51.3	48.0	47.9	47.7
Impact Wrench	72.1	69.0	67.6	66.0	65.5	64.6	63.5	61.4	60.6	60.3	60.1	59.8	58.7	58.5	57.5	55.7	55.6	55.4	55.0	54.9	54.6	54.3	51.0	50.9	50.7
Pneumatic or Elec Tools	72.1	69.0	67.6	66.0	65.5	64.6	63.5	61.4	60.6	60.3	60.1	59.8	58.7	58.5	57.5	55.7	55.6	55.4	55.0	54.9	54.6	54.3	51.0	50.9	50.7
Total Leq	**88.0**	**84.9**	**83.5**	**81.8**	**81.4**	**80.5**	**79.3**	**77.3**	**76.4**	**76.2**	**75.9**	**75.7**	**74.6**	**74.4**	**73.4**	**71.6**	**71.5**	**71.3**	**70.9**	**70.7**	**70.5**	**70.2**	**66.9**	**66.8**	**66.6**

TABLE H-5

Case Description: Downtown SanBrndno Passenger Rail - Area 4, CrewD2

Receiver Distance (Perpendicular Distance to Alignment (feet))	30	60	80	110	120	140	170	200	230	240	250	260	310	320	370	410	420	430	460	470	490	510	820	830	850
Equipment Type																									
Truck 3/4T pickup	82.9	79.8	78.4	76.7	76.3	75.4	74.2	72.1	71.3	71.1	70.8	70.6	69.5	69.3	68.3	66.5	66.3	66.2	65.8	65.6	65.4	65.1	61.8	61.7	61.5
Truck 10-wheel Dump	84.1	81.0	79.6	78.0	77.5	76.6	75.5	73.4	72.6	72.3	72.1	71.8	70.7	70.5	69.5	67.7	67.6	67.5	67.0	66.9	66.6	66.4	63.0	62.9	62.7
Truck - 2500 gal water	79.9	76.7	75.4	73.7	73.2	72.4	71.2	69.1	68.3	68.1	67.8	67.6	66.5	66.2	65.3	63.5	63.3	63.2	62.8	62.6	62.4	62.1	58.8	58.7	58.5
Excavator - Track	85.1	82.0	80.6	79.0	78.5	77.6	76.5	74.4	73.6	73.3	73.1	72.8	71.7	71.5	70.5	68.7	68.6	68.5	68.0	67.9	67.6	67.4	64.0	63.9	63.7
Loader - Rubber Tire	79.9	76.8	75.4	73.7	73.3	72.4	71.2	69.1	68.3	68.1	67.8	67.6	66.5	66.3	65.3	63.5	63.3	63.2	62.8	62.6	62.4	62.1	58.8	58.7	58.5
Air Compressor	80.7	77.5	76.1	74.5	74.0	73.2	72.0	69.9	69.1	68.9	68.6	68.4	67.2	67.0	66.0	64.3	64.1	64.0	63.6	63.4	63.1	62.9	59.5	59.4	59.3
Jack Hammer	85.9	82.8	81.4	79.7	79.3	78.4	77.2	75.2	74.3	74.1	73.8	73.6	72.5	72.3	71.3	69.5	69.4	69.2	68.8	68.7	68.4	68.1	64.8	64.7	64.5
Concrete or Asphalt Saw	69.1	66.0	64.6	63.0	62.5	61.6	60.5	58.4	57.6	57.3	57.1	56.8	55.7	55.5	54.5	52.7	52.6	52.4	52.0	51.9	51.6	51.4	48.0	47.9	47.7
Excavator w/HoRam	81.1	78.0	76.6	75.0	74.5	73.6	72.5	70.4	69.6	69.3	69.1	68.8	67.7	67.5	66.5	64.7	64.6	64.4	64.0	63.9	63.6	63.4	60.0	59.9	59.7
Total Leq	**92.1**	**89.0**	**87.6**	**85.9**	**85.5**	**84.6**	**83.4**	**81.4**	**80.5**	**80.3**	**80.0**	**79.8**	**78.7**	**78.5**	**77.5**	**75.7**	**75.5**	**75.4**	**75.0**	**74.8**	**74.6**	**74.3**	**71.0**	**70.9**	**70.7**

TABLE H-6

Ground-borne Vibration Analysis - Construction

Potentially Impacted [1] Receiver #	Receiver Location Description	Land Use Description	Number of Noise-Sensitive Sites Represented	Distance to BNSF Track Centerline (Feet)	Damage Assessment -Peak Particle Velocity (in/sec)[2]	Annoyance Assessment - RMS Velocity Level (VdB re 1 micro in/sec) [2]	FTA Construction Vibration Damage Criteria (PPV in/sec)[3]	FTA Damage Criteria Exceeded ?	FTA Construction Vibration Annoyance Criteria RMS Velocity Level (VdB re 1 micro in/sec)[3]	FTA Annoyance Criteria Exceeded ?
9	100' to 200' sw of alignment, s of Rialto Ave	Residential	1	180	0.011	68	0.2	No	72	No
10	100' to 200' sw of alignment, w of I St, n of Belleview St	Residential	1	170	0.012	69	0.2	No	72	No
11	50' to 100' sw of alignment, w of I St, s of Rialto Ave	Residential	2	60	0.056	83	0.2	No	72	Yes
15	less than 50' e of alignment, n of Rialto Ave, w of I St	Residential	2	30	0.160	92	0.2	No	72	Yes
17	50' to 100' e of alignment, w of I St	Residential	3	120	0.020	74	0.2	No	72	Yes
18	100' to 200' w of alignment, w of I St	Residential	2	140	0.016	72	0.2	No	72	No
19	100' to 200' w of alignment, w of I St, s of 2nd St	Residential	2	140	0.016	72	0.2	No	72	No
22	100' to 200' w of alignment, e of J St, s of 2nd St	Residential	2	180	0.011	68	0.2	No	72	No
15	100' to 200' w of alignment, e of J St, s of 2nd St	Residential	2	110	0.023	75	0.2	No	72	Yes
16	100' to 200' w of alignment, e of J St, n of 2nd St	Residential	2	140	0.016	72	0.2	No	72	No
17	100' to 200' e of alignment, w of I St, n of 2nd St	Residential	1	140	0.016	72	0.2	No	72	No
28	100' to 200' w of alignment, e of J St, n of 2nd St	Residential	2	140	0.016	72	0.2	No	72	No

TABLE H-6 CONT'D

29	100' to 200' e of alignment, w of I St, n of 2nd St	Residential	1	120	0.020	74	0.2	No	72	Yes
32	100' to 200' w of alignment, e of J St, n of 2nd St	Residential	1	180	0.011	68	0.2	No	72	No
35	50' to 100' e of alignment (e of Depot), n of Grape Ct.	Residential	9	80	0.037	79	0.2	No	72	Yes
36	100' to 200' w of alignment (e of Depot), n of Grape Ct.	Residential	3	120	0.020	74	0.2	No	72	Yes

1 - Category 2 (residential) land uses existing within 200 feet of the alignment are addressed in this table.
2 - Assuming PPV level of 0.210 in/sec and 94 VdB as for a vibratory roller (i.e., worst-case for this project)
3 - Based on Table 12-3 (Non-engineered timber and masonry buildings) and Table 8-1 (Categories 2 and 3, Frequent Events) of Transit Noise and Vibration Impact Assessment manual.

For damage assessment, the following equation is used:

$$PPV_{equip} = PPV_{ref} \times (^{25}/_{D})^{1.5}$$

where:

PPV_{equip} = the peak particle velocity, in inches per second, of the equipment adjusted for distance.

PPV_{ref} = the reference vibration level, in inches per second, at 25 feet (from Table 3.4-4).

D = the distance from the equipment to the receiver in feet.

For annoyance assessment, the following equation is used:

$$LV(D) = LV(25\ ft) - 30 \times Log\ (D/25)$$

where:

LV (D) = RMS vibration level at distance D.

LV (25 ft) = RMS vibration level at 25 feet (from Table 3.4-4).

D = distance from the equipment to the receiver in feet.

FTA and FRA have published guidelines for assessing the impacts of ground-borne vibration associated with the construction of transportation projects, (FTA 2006; FRA 1998). The FTA measure of the threshold of architectural damage for conventional sensitive structures is 0.2 inch per second PPV. The "impact" threshold of annoyance of vibration[1] is 72 VdB for Category 2 land uses and 75 VdB for Category 3 land uses.