

ATTACHMENT 1 – DRAFT STAGE A BASELINE SCOPE OF WORK

1. GENERAL DESCRIPTION OF PHASE 2 OF THE EXPOSITION LIGHT RAIL TRANSIT PROJECT

Phase 2 of the Exposition Light Rail Transit Project (Project), from Culver City to Santa Monica, is currently in the environmental planning stage. The alternatives analysis/draft environmental review process for Phase 2 of the Expo LRT Line has been completed. The Draft Environmental Impact Report (DEIR) for Phase 2 was completed and circulated for public comment on January 28, 2009. The public comment period closed March 27, 2009. The DEIR is available on the Authority's website at www.buildexpo.org.

At the April 2009 Expo Authority Board of Directors (Board) meeting, the Board directed the staff to pursue the Exposition Right-of-Way and Colorado Avenue alternative as the preferred alignment for the Phase 2 Final Environmental Impact Report (FEIR). This alternative is a 6.6 mile rail line with 7 stations that will run from the terminus of Phase 1 in Culver City to downtown Santa Monica at 4th Street and Colorado Avenue. This Scope of Work has been prepared accordingly. When completed, the Project will connect Santa Monica with Culver City, Exposition Park, University of Southern California and downtown Los Angeles.

The FEIR is scheduled for completion in the fourth quarter of 2009 and the Expo Authority Board is expected to certify the document in early 2010.

Phase 2 Exposition Light Rail Transit Project Alignment



The Project begins just west of the existing Expo Phase 1 Culver City Station in Culver City and runs along an abandoned railroad line, Exposition Boulevard, and Colorado Avenue to a new terminus in Santa Monica. It is anticipated that the Project will begin operations in 2015.

The design-build scope of work for the Project includes:

- Stations and associated parking facilities;
- Street undercrossing structures with retained fill approaches;
- Modification or replacement of existing street undercrossings;
- At-grade crossings with gate protection; and
- Extension of the existing Expo Phase 1 traction power, signaling and communications systems.

Under a separate contract, a storage yard and maintenance facility will be added adjacent to the Project alignment. A more detailed description of the elements of the Project is provided in the Final Environmental Impact Report (FEIR).

2 AUTHORITY PROVIDED SERVICES AND DOCUMENTATION

2.1 AUTHORITY PROVIDED SERVICES

The Authority will provide the following to the Contractor:

- Overall program direction including on-going technical review
- Overall project design concept
- Financial planning and commitment(s)
- Management of certain preliminary design activities performed by others
- System operating plan
- Systems assurance plan
- System safety plan
- System security plan
- Fire, life, and safety certification program plan
- Lead community outreach and participation efforts
- Public relations
- Administering all agreements with third parties (e.g., public agencies, utilities, property owners, railroads, etc.)
- Establishment and coordination of peer reviews and Authority initiated design reviews
- Final acceptance of all Project design
- CPUC application process

2.2 AUTHORITY PROVIDED DOCUMENTATION

The Contractor is expected to utilize, as much as practical, the designs prepared for the existing Expo Phase 1 project. In order to eliminate unnecessary duplication of existing designs, the Contractor is expected to refer to and utilize the information in Appendix A,

Reference Drawings, and Appendix B, Reference Documents, throughout all tasks described in the following Sections, unless otherwise noted, and modify as appropriate for the Project. The Authority intends to provide the following documentation to the Contractor at Notice to Proceed to be used at their discretion:

- Reference drawings from the Expo Phase 1 project for use and reference listed in Appendix A
 - Metro/Expo design criteria and standards listed in Appendix B
 - Reference documents listed in Appendix B
 - Draft Expo Phase 2 Stage B General Requirements
 - Draft Expo Phase 2 Stage B Performance Specifications
 - Exposition Corridor Transit Project Phase 2 FEIR including the associated technical background reports.*
 - Plan and profile (40-Scale) drawings*
 - Aerial mapping including DTM in Microstation format
 - Right-of-way survey and mapping
 - Geotechnical study report including supporting data*
 - HazMat - ESA Phase I and II reports including supporting data*
 - Composite utility plans and ownership documentation*
 - Draft CPUC Hazards Analysis*
 - TPSS load flow analysis*
- * Descriptions of the contents of the associated technical studies are provided in Appendix.

3 CONTRACTOR SCOPE OF SERVICES

3.1 GENERAL OVERVIEW OF DELIVERABLES

The Authority anticipates that the Contractor's final deliverables will be used in preparing their Design-Build (D-B) bid package. Therefore, the final deliverables shall encompass enough detail to define the project adequately to prepare a comprehensive Lump Sum Fixed Price (LSFP) for the Design-Build work (the Stage B Work),

Each of the following Sections, starting with Section 3.2, identify specific submittals to be delivered to the Authority for review and comment, each in accordance with the following package requirements:

- Draft Package: Four months after NTP, provide five hardcopies and five CDs with electronic copies in PDF format of the deliverables specified in each of the following Sections to a substantial level of completion. The Authority in conjunction with appropriate Third Parties will review these packages and deliver written comments to the Contractor within three weeks of the package delivery. No later than one week after comment delivery, the appropriate reviewers and the Contractor will hold a meeting to discuss and respond to the written comments. The Contractor shall then revise the deliverables accordingly. Note that the Authority will meet with each Contractor separately.

- **Final Package:** Six months after NTP, provide five hardcopies, five CDs with electronic copies in PDF format, and one CD of the electronic CADD files of the deliverables specified in each of the following Sections to a level sufficient for establishing a Lump Sum Fixed Price (LSFP) for the Design-Build work (the Stage B Work).

In addition to the above deliverables, the Authority will conduct over-the-shoulder reviews with the Contractor starting no later than one month after NTP and continuing until the end of the Project. These reviews will be an informal opportunity to discuss and verify the status of the design.

3.2 DRAFT STAGE B GENERAL REQUIREMENTS AND PERFORMANCE SPECIFICATIONS

The Draft Stage B General Requirements and Performance Specifications developed for the Project are similar to those used in the Expo Phase 1 project. The changes include those necessary to accommodate the unique characteristics of the Project to meet any local, state, and federal requirements and to incorporate lessons-learned from the Expo Phase 1 project. The Contractor is encouraged to propose any specific change recommendations to the Draft Stage B General Requirements and Performance Specifications that it believes would benefit the Project to the Authority for approval before incorporating into the design.

Deliverables:

Suggested changes to the General Requirements and Performance Specifications prior to incorporating into the design.

3.3 STATIONS

The Contractor shall utilize appropriate Reference Documents and requirements from the Expo Phase 1 project together with the following specific requirements to develop the station designs:

- Stations shall be wholly consistent with the architectural and urban design features of the Expo Phase 1 stations.

The stations will be configured to accommodate 3-car consists and have provisions for ticket vending/validation machines (TVMs) and associated equipment. Metro will be responsible for procuring and installing the TVMs and associated equipment. The stations will be located, configured, and have the proper number of parking spaces in accordance with the FEIR as summarized in Table 1 below:

Table 1: Summary of Station Parking Requirements

Station		Approximate Location	Platform/ Configuration	Approximate Number of Parking Spaces
1	National/Palms	Exposition ROW between I-10 and Exposition Blvd, West of National/Palms Blvd	Center/At-Grade	0
2	Expo/Westwood	Exposition ROW between Westwood Blvd and Overland Ave	Center or Side* /At-Grade	170
3	Expo/Sepulveda	Exposition ROW North of Exposition Blvd and West of Sepulveda Blvd	Side/At-Grade	260 (structured)
4	Expo/Bundy	Exposition ROW at S. Bundy Dr.	Center/Aerial	250
5	Olympic/26 th St.	Exposition ROW South of Olympic, East of 26 th St.	Center or Side* /At-Grade	0
6	Colorado/17 th St.	Center of Colorado Blvd Between 16 th and 17 th Sts.	Center/At-Grade	70
7	Colorado/4 th St.	On Property Bounded by Colorado Blvd., 4 th St., 5 th St., and I-10	Center** /At-Grade	0

* Contractor to evaluate side vs. center platform arrangement

** One or two platforms pending Metro's operations analysis

Deliverables:

The following drawings and appropriate supporting material, such as calculations, for each of the Project stations.

1. Architectural

- Site plan (including location of parking, electrical and plumbing equipment)
- Platform plan
- Elevations
- Finish schedule
- Canopy plan, elevation, and details
- Platform finish details

2. Structural

- Foundation plan
- Platform and canopy plan
- Longitudinal sections

- Sections and elevations
- Miscellaneous details

3.4 SUPPORT TO COMMUNITY INTERACTION PROGRAM

The Contractor shall prepare display boards of station design development, finish material options, urban design concepts, sound wall locations, and other designs as necessary to support the Authority staff in meetings with the community, City Councils, and Board or Technical Committees.

3.5 SYSTEMS

3.5.1 TRACTION POWER

The Contractor shall utilize appropriate Reference Documents and requirements from the Expo Phase 1 project together with the following specific requirements to develop the traction power design:

- Confirm TPSS size, location and equipment required.
- Verify that the right-of-way for the TPSS at the Expo/Sepulveda station is sufficient.
- Develop catenary system requirements in conformance with California Public Utilities Commission (CPUC) regulations and requirements.

Deliverables:

1. Substation Site Selection Report.

2. Traction power design drawings as follows:

- Typical main line substation metering and relay one-line diagram for each classification of utility supply and/or voltage
- Typical substation site plan for each substation

3. Overhead Contact System (OCS) design drawings as follows:

- OCS typical sections for center pole, side pole, and headspan arrangements for exclusive and shared alignments

3.5.2 TRAIN CONTROL

The Contractor shall utilize appropriate Reference Documents and requirements from the Expo Phase 1 project together with the following specific requirements to develop the train control design:

- Coordinate train control design with track design to ensure the highest possible existing cab signal speed in the design of each track curve.
- Highway grade crossings – design nearside crossing approaches to maximize train speeds, while providing CPUC-required speed and safety enforcement.

Deliverables:

Train control design drawings as follows.

- Typical interlocking route and aspect chart

- Typical interlocking local control panel layout
- Typical wayside signal layout

3.5.3 COMMUNICATIONS

The Contractor shall utilize appropriate Reference Documents and requirements from the Expo Phase 1 project together with the following specific requirements to develop the communications design.

- Define design interfaces to Metro's rail operations control (ROC).
- Define interfaces to, and infrastructure to support, Metro's universal fare system (UFS).
- Conduct a review of the capacity of Expo Phase 1 communications systems and infrastructure to support the communications requirements for the Project. If any shortfalls are identified, indicate options available to the Authority to remedy the problem, together with the Contractor's recommendation.

Deliverables:

Communications System Capacity Report that incorporates the above requirements.

3.6 CIVIL WORK

3.6.1 RIGHT-OF-WAY (ROW)

Conduct a review of the right-of-way plans provided by the Authority and identify any additional right-of-way or easements required for the Project. Note that legal descriptions are not required in this stage of the Project.

Deliverables:

Exhibits describing additional right-of-way or easements that the Contractor recommends that the Authority acquire.

3.6.2 PLAN AND PROFILE

The Contractor shall utilize appropriate Reference Documents and requirements from the Expo Phase 1 project to verify and refine the Authority provided plan and profile conceptual drawings.

- The plan and profile shall include the bikeway facility that generally is adjacent to the alignment and within the Exposition ROW. **Design and** construction of the bikeway facility is not included in the Stage B Design-Build Contract, but will be constructed under a separate Authority issued contract during the period of performance of the Stage B Design-Build Contract.
- Contractor shall determine if a siding can be constructed within the Exposition ROW west of Venice Boulevard. If not, include a pocket track west of National/Palms station.

- Note that a portion of the Project is within the limits of a FEMA designated flood zone.
- The maintenance and storage facility in the Expo Phase 2 project is not part of this Contract. The Contractor is responsible for providing the turnouts and yard leads up to the boundary of the facility site.

Deliverables:

1. Plan and profile drawings as follows:

- Plan and profile drawings for the alignment
- Typical cross sections

3.6.3 GEOTECHNICAL INVESTIGATIONS

The Authority will provide the Contractor with the Phase I and Phase II ESA Report and Geotechnical Report. Should the Contractor determine that supplemental soils sampling, logging, testing, and analyses are necessary to establish a firm design-build price, the Contractor shall submit a request to the Authority describing the locations that additional investigation are needed. The Authority will review the request and if approved arrange to obtain the additional information. New bore hole investigation shall be limited to obtaining subsurface soils and hydrologic data required to substantiate the structural design assumptions and risk mitigations.

Deliverable:

Request for Supplemental Geotechnical Investigations.

3.6.4 TRACKWORK AND APPURTENANCES

Trackwork is defined as that portion of the Project that will be installed to support and provide the operating surface for the LRT vehicles, track and maintenance-of-way equipment.

The Contractor shall utilize appropriate Reference Documents and requirements from the Expo Phase 1 project, and the following specific requirements to develop the trackwork design:

- Design for ballasted track, wherever practical.
- Track shall be continuous welded, bonded and insulated joints at special trackwork and interlocking.
- Design to minimize the use of DF fasteners except where noise and vibration impacts prevail.
- Avoid the use of diamond crossovers, except where approved by the Authority.
- Integrate the trackwork design with the subballast and bridge structures such as duct banks, conduits, utilities, OCS foundations, and other structures.
- Develop track charts for the integrated rail system along the alignment, indicating rail type and anchorage, head hardness, special trackwork, etc.

Deliverables:

Trackwork drawings and appropriate supporting material, such as calculations, as follows:

- Using plan and profile drawings, generate trackwork typical sections
- Mainline track charts
- Special trackwork types and locations
- CPUC clearances, separations, and safety walk locations

3.6.5 UTILITIES

3.6.5.1 Existing Utilities

The Authority will provide composite utility plans and a matrix of potential conflicts with supporting ownership documentation. The Contractor shall review these documents and conduct field inspections to verify that existing underground and overhead utilities within the limits of the Project are accurately identified. Existing utilities which may impact the design of the Project include storm drainage and sanitary sewers; gas lines and valve boxes; petroleum product pipelines; water mains and services; power lines, poles, ductbanks and vaults; steam pipelines and communications systems both underground and overhead (telephone, telegraph, alarm systems, cable transmission systems, fiber optic). Should the Contractor determine that supplemental utility data are necessary to establish a firm design-build price, the Contractor shall submit a request to the Authority describing where the additional data are needed. The Authority will review the request and if approved arrange to obtain the additional information.

Deliverables:

Request for supplemental utility data:

3.6.5.2 Utility Relocations or Modifications

The Contractor shall determine the methods by which conflicts between the Project and such existing utility lines and structure may be resolved considering such alternatives as permanent and temporary relocation, strengthening for support and protection in place, and abandonment and salvage. The Contractor shall evaluate the viable options and conclude a course of action and develop sketches to demonstrate the proposed designs..

Deliverables:

Utility relocation or modification drawings as follows:

- Sketch level plans, profiles and details for utility rearrangements to define space requirements for these facilities that are in conflict with the Project
- List of utilities that require early relocation

3.6.6 TRAFFIC ENGINEERING

The Contractor shall identify, study and resolve traffic engineering issues resulting from the development of the Project facilities, and shall review traffic data, analyses and

forecasting, as listed in the FEIR along with studies performed by the FEIR Consultant. In addition the following issues are to be evaluated:

- Street and pedestrian traffic conflicts with transit operations, requiring street closings, frontage road development, cul-de-sac development, grade-level crossings, street widening, parking lane removal, median break closures, mixed traffic operations and other methods of conflict resolution.
- Determine if it is possible to avoid or reduce the removal of on-street parking along Colorado Avenue in Santa Monica.
- Coordinated train control and traffic control systems including transit preemption of "green time" and addition of light rail segments to the traffic control cycles where appropriate facilitate traffic circulation at the stations.
- Consideration of other traffic control devices, including loop detectors and signals and signing to facilitate safe vehicular, pedestrian and cyclist traffic movement.
- Patron access to stations and station sites by all modes including the need for any traffic control at station site entrances.
- Trackway surface treatments to discourage vehicular encroachment.

The Contractor shall evaluate these issues for station areas, street intersections and at various points along the alignment, and shall develop preliminary designs for modifications to existing facilities and traffic control devices. The results shall be incorporated into the plan and profile drawings and other applicable design drawings.

Deliverables:

- 1. A Traffic Engineering Report that describes resolutions of traffic conflicts, the before and after traffic conditions, and allocation of responsibilities affecting modifications (design and construction) and maintaining and operating new devices**

3.6.7 CITY FACILITIES AND ROADWAYS

3.6.7.1 City Facilities

The Contractor shall utilize appropriate Reference Documents and Reference Drawings to establish the design of restorations of City facilities other than roadways affected by the Project. The Contractor shall determine the methods for resolution of conflicts between the Project and existing city facilities and structures. The Contractor shall evaluate viable options for the renovation or new construction of existing city facilities. Designs and plans shall be prepared in accordance with the criteria and standards of the Agency Having Jurisdiction.

Deliverables:

City facility drawings as follows:

- Identify each facility by owner, type and location using a separate matrix array keyed to the map set

- Develop plans and details for city facilities that require relocation, renovation, new construction, or other work
- Identify city facilities that require early relocation, renovation, new construction, or other work

3.6.7.2 Roadways

The Contractor shall utilize appropriate Reference Documents and Reference Drawings to establish the design of the public and other paved areas and appurtenances affected by the Project (e.g., streets, bus and private vehicle drop-off areas, surface parking lots, pedestrian facilities, driveways, etc.) including signage, marking and striping. The design of the roadway facilities shall be in accordance with the requirements of the local Agency Having Jurisdiction over the roadway, and applicable requirements of Metro.

Deliverables:

Roadway facilities drawings as follows:

- Plan and profile drawings of affected roadway facilities with limits of construction shown
- Typical sections of affected roadway facilities

3.6.8 GRADE CROSSINGS

The Contractor shall review the Draft CPUC Hazards Analysis and other Reference Documents and design each grade crossing accordingly. The designs shall take into account and incorporate as appropriate the following factors:

- The ownership of the crossing or separation.
- The volume of road traffic using the crossing.
- The posted and estimated speed of road and rail traffic at the crossing.
- The visibility of the crossing and its highway approaches to an oncoming LRV consist at line speed in time of day or weather condition.
- Roadway and intersection geometry and alignment, including vertical and horizontal curves, stopping sight distance, and passing sight distance.
- Location, angle, and length of crossing.
- Approach grade and speeds.
- Pedestrian traffic volumes and characteristics.
- Vehicle traffic volumes, classification, and turning movements.
- LRV traffic volumes, size, frequency, preemption circuit type, and operating characteristics.
- Vehicle and vehicular queue lengths and dissipation rates.
- Clearance distance measured from the signalized intersection to tracks.
- Operational characteristics of stop-controlled intersections, signalized intersections, and associated control equipment.
- Each grade crossing design will eventually have to reviewed and approved by the local/city agency, then by the CPUC.

Deliverables:

Grade Crossing drawings as follows:

- Plan and profile drawings from the Draft CPUC Hazards Analysis for each at-grade crossing revised as appropriate showing signing, striping and signal locations
- For each grade-separated crossing, show the clearance distance from top of rail or roadway to the bottom of soffit on the plan and profile drawings

3.6.9 STRUCTURES

The Contractor shall develop the design of each structure, whether as a new element or a renovation of an existing as necessary for a fixed design-build price proposal. The Contractor shall produce the most advantageous configuration of the Project or system structural components having considered alternative structural concepts and materials, capital and life cycle costs, aesthetics, alignment, environmental impact and constructability.

Where an existing railroad bridge or existing box structure is being considered for conversion for transit usage, the Contractor shall analyze the structure for condition and structural adequacy and identify what strengthening, rehabilitation, seismic retrofitting, or other renewal is required. The Contractor will verify the horizontal and vertical clearances through the existing I-10 box structure and under the I-405. Any alterations to Caltrans structures will be designed in accordance with applicable Caltrans criteria.

Deliverables:

1. Structures drawings as follows:

- Functional requirements of the bridge and its type, size and location
- Alternative studies of bridge types and standardization
- General plan showing, at a minimum, the layout, profile and foundation locations for each new bridge
- If needed, general plan and sections to illustrate any modifications to existing Caltrans structures.

2. Type Selection Reports for each new structure.

3.6.10 CORROSION CONTROL

The Contractor shall utilize appropriate Reference Documents and requirements from the Expo Phase 1 project to develop the corrosion control design.

Deliverables:

1. A Corrosion Control Study that includes new and existing structures and utilities on, under, over, or adjacent to the alignment. The study shall incorporate Caltrans requirements for Caltrans structures or structures on or over Caltrans property.

2. Corrosion Control drawings as follows:

- Typical corrosion control standards

- Drawings depicting corrosion control retrofits (if any) to existing structures/utilities

3.6.11 LANDSCAPING

The Contractor shall utilize appropriate Reference Documents and requirements from the Expo Phase 1 project together with the following specific requirements in developing the landscaping design:

- Provide landscaping at each of the stations, parking facilities, along the rail alignment and at TPSS sites.
- Provide landscaping as a screen to Authority structures and operations from their surroundings, and integrate it with the mitigation measures defined in the FEIR.
- Aesthetically integrate the Project into the surrounding community.

Deliverables:

A Landscaping Master Plan that defines where landscaping and irrigation are needed, the type of landscaping and irrigation required, and anticipated needs to repair and restore existing planting after completion of construction. The Master Plan shall consist of the following drawings:

- Planting legend, notes, and miscellaneous details
- Planting tablet of recommended trees, shrubs, flowering plants, and ground covers for the various landscape locations.
- Conceptual layout plan showing the location of the various plant materials and type of irrigation.

3.7 PROJECT MANAGEMENT PLAN (PMP)

Prepare a Project Management Plan and submit to the Authority for approval within 30 days of NTP. The PMP shall cover only the Work being performed in Stage A and conform to the applicable requirements described in the Draft Stage B General Requirements.

3.8 QUALITY ASSURANCE/QUALITY CONTROL (QA/QC) PLAN

Prepare QA/QC Plan and submit to the Authority for approval within 30 days of NTP. The QA/QC Plans shall cover only the Work being performed in Stage A and conform to the requirements described in the Draft Stage B General Requirements that are applicable to Stage A.

3.9 RISK REGISTER

APPENDICES

APPENDIX A – REFERENCE DRAWINGS

The following appended drawings are provided as examples of various discipline drawings in format, presentation, and scales acceptable to the Authority. These attached drawings may require changes and additional information to meet the Project's specific requirements. Electronic copies, if available, of these drawings will be provided to the Contractor. Unless noted otherwise these drawings were prepared for Expo Phase 1.

A.1 STATIONS

A.1.1 Architectural Drawings:

- Symbols, abbreviations and general notes
- Site plan
- Platform plan
- Elevation
- Finish schedule
- Canopy roof plan
- Canopy elevation
- Canopy sections and details
- Platform finish

A.1.2 Structural Drawings:

- Symbols, abbreviations and general notes
- Platform plan
- Foundation plan
- Canopy plan
- Sections
- Elevations

A.2 SYSTEMS

A.2.1 Traction Power Drawings:

- Symbols, abbreviations, and general notes
- Typical main line substation metering and relay one-line diagram
- Typical substation site plan

A.2.2 OCS Drawings:

- Symbols abbreviations and general notes
- Typical OCS supports

A.2.3 Train Control Drawings:

- Symbols and abbreviations
- Typical interlocking route and aspect chart
- Typical interlocking local control panel layout
- Typical wayside signal layout

A.3 CIVIL

A.3.1 Right-of-Way Drawings:

- Right-of-way of alignment

A.3.2 Plan and Profile Drawings:

- Symbols, abbreviations and general notes
- Plan and profile of alignment (Phase 2)

A.3.3 Trackwork Drawings:

- Abbreviations, symbols, and general notes
- Mainline track charts
- Mainline special trackwork schematic and locations (Phase 2)

A.3.4 Utility Relocation Drawings:

- Symbols, abbreviations and general notes
- Plan and profile of major utility rearrangement

A.3.5 City Facility Drawings:

- Symbols, abbreviations and general notes
- Plan and detail of city facility relocation and new work

A.3.6 Roadway:

- Symbols, abbreviations and general notes
- Plan of roadway improvement (Phase 2)
- Typical sections of roadway

A.3.7 Grade Crossing Drawings:

- Plan of grade crossing (Phase 2)

- Signing and striping of grade crossing (Phase 2)

A.3.8 Structure Drawings:

- Plan and profile of aerial structure
- Details of aerial structure

A.3.9 Landscape Drawings:

- Landscape planting legend
- Landscape planting of station
- Landscape planting of alignment
- Landscape planting of TPSS

APPENDIX B - REFERENCE DOCUMENTS

The Contractor is solely responsible for identifying and shall design the Project in accordance with all applicable Governmental Rules, codes, standards, and regulations, including but not limited to the following general codes, standards, and regulations, Metro/Expo design criteria and standards, environmental documents, and miscellaneous documents. If there are conflicts, the more stringent shall apply unless otherwise specifically directed by the Authority. Non-U.S. codes and standards may be considered for approval by the Authority for equivalence to those listed below or specifically called for elsewhere in this document upon submission by the Contractor of documentation demonstrating such equivalence.

B.1 CODES, STANDARDS, AND REGULATIONS

- Aluminum Association, Aluminum Construction Manual, particularly Section 3, Table 1.
- American Association of State Highway and Transportation Officials (AASHTO), especially Standard Specifications for Highway Bridges, Manual of Foundation Investigations, Guide Specifications for Horizontally Curved Highway Bridges, and Guide Specifications for Seismic Design of Highway Bridges.
- American Concrete Institute (ACI), relevant design/construction code publications, including ACI 301: Specifications for Structural Concrete Buildings and ACI 318: Building Code Requirements for Structural Concrete.
- American Institute of Steel Construction (AISC), Manual of Steel Construction, Specification for Structural Steel Buildings, and relevant design/construction code publications.
- Americans with Disabilities Act (ADA), especially Architectural and Transportation Barriers Compliance Board Accessibility Guidelines for Transportation Vehicles and Accessibility Guidelines for Buildings and Facilities.
- American National Standards Institute (ANSI) Standards, including but not limited to: A17.1, A117.1, B30.16, C2, C37, C57, C80.3, S1.4, S1.11, S2.4, S2.10, Z35.1, and Z97.1.
- American Public Transit Association (APTA), Transit Security, Guidelines Manual and Guidelines for the Design of Rapid Transit Facilities.
- American Railway Engineering and Maintenance of Way Association (AREMA), Manual for Railway Engineering and Manual of Recommended Practices – Signals.
- American Society of Heating, Refrigeration, and Air Conditioning Engineers (ASHRAE), especially ASHRAE Handbook and 90-75.

- American Society of Quality Control Engineers; C1, Q9000, Q9001, Q9002, Q9003, and Q9004.
- American Society for Testing and Materials (ASTM), especially A36, A325, A588, A615, B33, B172, B174, C150, C542, D256, D635, D648, D1044, D3675, E119, E162, E648, and E662.
- American Welding Society, (AWS) current design and construction standards and specifications, and welder certification requirements.
- Air Conditioning and Refrigeration Institute (ARI), "Directory of Certified Applied Air Conditioning Products."
- California Public Utilities Commission (CPUC) General Orders (GO), including GO 26, 75, 88, 95, 143, and 164.
- Federal Communications Commission (FCC) Rules and Regulations, particularly Parts 15, and 90.
- Federal Emergency Management Agency (FEMA) National Flood Insurance Program, Code of Federal Regulations, Parts 59 through 79, Title 44, Emergency, Management and Assistance, Chapter 1.
- Federal Highway Administration (FHWA) requirements and standards, including:
 - Highway Capacity Manual.
 - Manual on Uniform Traffic Control Devices (MUTCD).
 - Provisions for Elderly and Handicapped Pedestrians, FHWA-RD-79-1.
 - Standard Alphabets.
 - Standard Highway Signs.
 - Traffic Control Devices Handbook.
- Federal Railroad Administration (FRA) Regulations
- Institute of Electrical and Electronic Engineers (IEEE) Standards, including but not limited to: No. 11, 32, 80, 141, 142, 241, 242, 446, 610.12 and 730.
- International Code Council (ICC), as amended by the State of California and the individual cities
- International Standards Organization (ISO), including but not limited to: ISO 2631, 3095, 3381, 4866, and 9000-9004.
- National Electrical Manufacturers Association (NEMA), including but not limited to: RI9, SG4, TR1, and WC3.
- National Fire Protection Association (NFPA), including but not limited to: NFPA 12A, 70 (National Electric Code-NEC), 72101, 130, 253, 258, and 780.

- Occupational Safety and Health Administration (OSHA), including but not limited to: 2206, Part 1910; 2207, Part 1926.
- Society of Automotive Engineers (SAE) Standards, including but not limited to: SAE J833.
- Steel Structures Painting Council (SSPC), relevant publications.
- Underwriters Laboratories (UL) Standards, including but not limited to: 1, 96, 797, 813 and 891.
- Uniform Federal Accessibility Standards (UFAS), FED-STD-795, 42 U.S.C. 4151-4157.
- Uniform Plumbing Code.
- U.S. Department of Commerce, Weather Bureau (National Weather Service).
- U.S. Department of Defense, Military Standards: MIL-STD-464 and MIL-STD-882.
- The most recent version of the applicable State of California, City (City of Santa Monica, Culver City, City of Los Angeles) and County of Los Angeles codes and standards shall be used in the design and construction of the Project, including CPUC and Caltrans requirements.

B.2 METRO/EXPO DESIGN CRITERIA AND STANDARDS

- Volume IV, Part 1 of 2, Design Criteria
- Volume IV, Part 2 of 2, Design Criteria
- Volume VI, Standard Drawings
- Volume VII, Part 1 of 5, Standard Specifications
- Volume VII, Part 2 of 5, Standard Specifications
- Volume VII, Part 3 of 5, Standard Specifications
- Volume VII, Part 4 of 5, Standard Specifications
- Volume VII, Part 5 of 5, Standard Specifications
- Volume VIII, CADD Drafting Standards
- Volume IX, Fire/Life Safety Criteria

B.3 ENVIRONMENTAL DOCUMENTS

- Final Environmental Impact Report, January 2010

B.4 MISCELLANEOUS DOCUMENTS

- Metro Grade Crossing Policy
- Art in Transit Program

B.4 DESCRIPTION OF CONTENTS OF TECHNICAL BACKGROUND REPORTS

- Scope of Work for Additional Conceptual Engineering and Final Environmental Impact Report

9.0 ADDITIONAL CONCEPTUAL ENGINEERING

9.1 SCALE CONVERSION (PLAN/PROFILE)

For the preferred alternative (presumed as LRT 2(Expo ROW-Colorado)), the existing 200 scale horizontal and 50 scale vertical shall be converted to 40 scale horizontal and 10 scale vertical. Alignment tables will be provided.

Deliverables:

- Geometry Data Tables (5 sheets)
- Track Key Map (1 sheet)
- Mainline Plan and Profile (34 sheets)
- Typical Sections

9.2 SURVEY

9.2.1 AERIAL MAPPING

Project Control

Project survey control suitable for 40-scale aerial mapping along LRT 2, utilizing GPS fast-static methods will be established. Survey Control will be based on the extension of the previous aerial mapping completed for the project's Phase 1 work, as well as the 200-scale aerial mapping completed in 2007.

The datum for all horizontal adjustments and positions is the North American Datum of 1983 (NAD 83). The datum for all vertical adjustments and elevations is the North American Vertical Datum of 1988 (NAVD 88) as published by the National Geodetic Surveys (NGS Adjustment). All horizontal values will be published in the California

Coordinate System 1983 (CCS83), Zone 5, (1991.35 adjustment) state plane values in U.S. Survey Feet.

Aerial Mapping

The alignment will be flown at a photo scale of 1:300 and controlled for a final product suitable for a final 40-scale topographic mapping, completed to meet National Map Accuracy Standards (NMAS). The aerial mapping shall include a 300-foot wide swath centered 150' along each side of the existing rail corridor and/or street centerlines. The mapping will also include the areas around the proposed train stations and parking including an approximate 50-foot buffer and will be expanded to accommodate project improvements as defined in the DEIR that fall beyond the basic 300 foot coverage area, such as Overland and Westwood.

A Digital Terrain Model (DTM) will be developed to generate a ground profile of the existing street surfaces. The DTM will be accurate for a 1' contour interval, suitable for conceptual 40-scale plan and profile engineering to depict as-built conditions.

Deliverables

- Traditional planimetric mapping for 40-scale mapping and 300 foot photo scale, 1 foot contours, and a DTM file. Final delivery will be in MicroStation V8.
- Black and white digital orthophotography at .025' pixel resolution

Exclusions

- DTM and Mapping beneath bridge structures
- Design surveys

9.2.2 LEGAL DESCRIPTIONS

Based upon the DEIR, 10 full property takings (not including curb cuts) will be required. Boundary surveys necessary for the legal descriptions will have been completed under the Right of Way Mapping Task (to be described below).

Deliverables

- Wet-stamped version of the signed description and plat, following standard guidelines and procedures for this work. Considering that these are full take descriptions and the descriptions already written, most of our work will be centered on calculating and plotting burdening easements, and drafting the plats for each exhibit. The burdening easement(s) will be shown, identified and labeled on each of the plats, and will be incorporated into the Right of Way digital file.
- Digital files and closure reports will also be submitted upon request.

Assumptions

Expo will provide Preliminary Title Reports, and copies of the documents and easements referenced within, for each of the properties identified for full takings.

9.2.3 OVERLAND AND WESTWOOD TOPOGRAPHIC SURVEY AND MAPPING

The 2008 existing topographic survey will be updated. The update will include the railroad right of way, between and including the two streets, and shall be sufficient enough to generate a contour interval of 0.5' that will also meet NMAS guidelines. The mapping will include both streets as well.

A metes and bounds description of the affected area (excluding the streets) will be provided. This legal description will be for FEMA's purposes only and will not be intended for the conveyance of land.

Deliverables

- Digital and hardcopy delivery of the area at 40-scale mapping with the legal description attached thereto. Digital files will include a CAD file in MicroStation V8, contours, boundary and right of way (record or final, depending on timing).

9.2.4 RIGHT-OF-WAY SURVEY AND MAPPING

This Task assumes that work completed to date under the Phase 1 project, and the limited amount of work already completed for Phase 2 can be used as a basis for further development. Any overlap of boundary and right of way mapping already completed for the extension of the Venice and Robertson Station and parking lot has been excluded. This area presents the same challenges as encountered for Phase 1, plus additional challenges that include access constraints, multiple ruling jurisdictions, the extension of the existing Phase 1 control further west, and being able to maintain the horizontal and vertical constraints.

Right-of-way survey and mapping includes those streets and areas that are currently determined to need full and/or partial acquisition for the design and construction of Phase 2.

The following detailed subtasks will be performed to complete this Task:

9.2.4.1 Research Cadastral Records

A final, updated research of Caltrans, Los Angeles County and City, City of Santa Monica, and local agency records will be conducted for existing horizontal and cadastral survey control. All found notes, maps, and data will be copied, correlated, and indexed in a survey database.

9.2.4.2 Calculate Cadastral Records/ Street Centerlines and Rights-of-Way Lines, and Metro Rights-of-Way Lines.

From the assembly of all research materials the remaining record locations of street centerlines and public and private right-of-ways will be calculated and entered into a survey-mapping database.

9.2.4.3 Site Reconnaissance

This activity will be carried out by the field survey party chief and survey project manager for the purpose of identifying cadastral monuments, as required, for the establishment of street centerlines, and public and private rights-of-way. Required sub-control may be set with GPS.

9.2.4.4 Monument Recovery

Field survey crews will search and recover, where possible, all cadastral street centerline monuments as indicated during the site reconnaissance. All found monuments will be clearly identified in the field. Reference points will be set for horizontal and vertical control points, as needed for future survey control, as needed.

9.2.4.5 Right-of-Way and Parcel Boundary Establishment

The previously entered record cadastral information will be adjusted based upon measured data obtained during the monument recovery survey. This newly calculated information will be entered into the survey-mapping database. Where adjacent monumentation has been tied for street and rights-of-way crossings, street centerlines, and right-of-ways will be determined from a combination of record data and monumented location to provide the best overall fit. Record bearings and distances will be provided on all street and right-of-way crossings.

Assumptions and Exclusions

- Research and plotting of easements or other encumbrances – except for street crossings – within the Metro Right of Way, except for those easements noted within Task 9.2.2 above, are excluded from this proposal.
- If no title report is provided by EXPO for boundary-determination purposes, then the right of way and underlying vested interests of Metro (fee, easement, lease) shall be established by a comparative analysis of the 1991 Grant Deed, the Valuation Map, County Assessor Maps, Caltrans R/W Maps, and City of Los Angeles and Santa Monica Cadastral Maps.

9.3 GEO TECHNICAL / HAZMAT STUDIES

9.3.1 GEOTECHNICAL STUDIES

In summary, the following is boring program will be conducted

- 23 borings down to a depth of 50 feet
- 40 borings down to a depth of 25 feet

- 4 borings to a depth of 15 feet.

Borings will be drilled using hollow-stem auger rigs. Proposed boring locations will be submitted in a schedule for Authority concurrence before work begins.

9.3.1.1 Field Reconnaissance and Data Review

Pertinent documents and published literature for the project site and vicinity, and additional published and unpublished information for the LRT2, will be compiled and further reviewed prior to commencing field reconnaissance.

Field reconnaissance will be performed primarily to field verify data compiled during document review and to identify access constraints and other potential difficulties for exploration. Ideal exploration locations will be identified and geologic mapping will be performed wherever possible (the study corridor is within a developed area and surface mapping will be difficult).

9.3.1.2 Subsurface Exploration

Prior to commencing the explorations, an Exploration Field Manual will be prepared that will provide a detailed description of the exploration program, including proposed exploration locations and depths, standardized terminology for soil (ASTM), procedures for sampling and storage, drilling equipment, and logistical issues including access, types of equipment, supplies, and permitting.

The consultant team will procure the necessary permits.

Generally, vacuum excavation techniques or hand-augering to clear the upper 5 feet at our proposed exploration locations will be used to reduce the risk of damaging underground utility lines and cables, if present.

Underground Service Alert will be notified of the locations of planned explorations. Final boring locations will be recorded using a hand-held GPS instrument.

Exclusions

The consultant team will attempt to avoid utilities. However, even with reasonable efforts, there are inherent risks to utilities from drilling. The consultant team cannot assume responsibility for these inherent risks if the utility owners/their representatives and property owners/their representatives do not mark the utilities. This work plan does not include costs or other provisions for utility repairs. If a utility is damaged, the consultant team will attempt to contact the Authority immediately. However, if the damage potentially could result in further damage to property or life, the geo technical engineer will contact the appropriate authorities and contract for the temporary repair to help control potential hazards. The additional costs incurred are not included in the proposal and will be billed to the Authority

Shallow borings will be backfilled with soil cuttings unless evidence of contamination is encountered. If evidence contamination is encountered, all borings will be backfilled with cement/bentonite grout to the ground surface and soil cuttings stored in steel drums.

9.3.1.3 Laboratory Testing of Soil Samples

Laboratory testing of soil samples will be performed to develop geotechnical design criteria. We will perform soil tests according to applicable ASTM standards. The following laboratory tests will be conducted:

- Moisture/Density,
- Particle Size Analyses,
- Atterberg Limits,
- Direct Shear,
- Consolidation/Swell,
- Compaction,
- Stabilometer (R-value),
- Expansion Index, and
- Corrosion.

Ground Motion Study

Site-specific seismic response spectra corresponding to the Metro Serviceability Level Earthquake and the Maximum Capable Earthquake will be developed using Probabilistic Seismic Hazard Analysis (PSHA) based on actual subsurface conditions encountered during subsurface exploration. A PSHA considers all modeled earthquake sources and calculates the chance of an earthquake of a given size occurring anywhere on the source for any given time period based on the seismic recurrence characteristics of each source. The expected ground motions at the site for different earthquake events are then computed using ground motion attenuation curves. The PSHA then integrates the effects of all the earthquakes of various sizes occurring at the various sources at specified probabilities of occurrence to provide an estimate of probability of exceeding different levels of ground motions at a site during a specified time period.

Response spectra will be computed for the site for the SLE and MCE for structural damping ratios of 2, 5, and 10 percent of critical damping.

Geologic/Seismic Hazards Analyses

The preliminary analysis (based on document review) of geologic/seismic hazards performed during Stage 1 will be verified based on the actual subsurface conditions encountered during subsurface exploration. The following hazards will be considered:

- Earthquake Ground Motion,
- Surface Fault Rupture
- Liquefaction,

- Landslides,
- Expansive Soils,
- Collapsible Soils,
- Corrosive Soils,
- Flooding and Erosion,
- Tsunami,
- Hazardous Materials

9.3.1.4 Engineering Analyses

Engineering analyses will be performed using data obtained from the current investigation and prior studies to develop geotechnical design and construction recommendations for the proposed structures and improvements. A geologic map and several cross sections that integrate surface and subsurface data will be prepared to characterize the geologic and geotechnical conditions along the alignment.

For the proposed structures, the analysis will address **foundations and earthwork for stations, bridges/flyovers/overpasses, tunnels/trenches/underpasses – not currently anticipated, retaining walls, and sound walls, and traction power substations; subgrade preparation for support of trackwork, floor slabs and other concrete slabs-on-grade, and asphalt concrete (AC) and portland cement concrete (PCC) paving for parking lots and street restoration/improvement. In addition, seismic design parameters based on Caltrans and California Building Code methodology will be provided.**

Deliverables

- A draft geotechnical report will be prepared that will describe the field investigation, results of field and laboratory testing, engineering analyses, and geotechnical design criteria for the structures and improvements planned for LRT2. The draft report will include a detailed narrative description of the methods and procedures used during the investigation. This will include drilling techniques and logging, laboratory testing, geologic mapping, and engineering analyses.
- Boring logs will contain ASTM descriptions of soils. Data used in the analyses will be presented in tables and figures. Figures and graphical data will include field photographs, logs, maps, and cross sections. Laboratory test results, including index and strength tests will be provided in the draft report. Selected test result data will be included on the boring logs as appropriate.
- A geologic cross section will be prepared for the entire LRT2 at the appropriate scale to present interpretations of subsurface conditions as they relate to the proposed construction. The following maps will be included:
 - Site Location
 - Regional Geology
 - Regional Faults
 - Local Geology and Groundwater Conditions

- Historic Seismicity
- Geologic /Seismic Hazard Zones (Landsliding/Liquefaction)
- FEMA Flood Zone
- Hazardous Materials (Methane Gas, Hydrogen Sulfide Gas, Oil Fields, Oil Wells)

9.3.2 HAZARDOUS MATERIALS INVESTIGATION & ANALYSIS (PHASE 1 AND 2 SITE ASSESSMENTS)

9.3.2.1 Phase I Environmental Site Assessment

A Phase I Environmental Site Assessment (ESA) for the Locally Preferred Alignment (LPA) in general accordance with the current ASTM "Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessments Process E 1527-05" will be prepared.

Records Review

The Environmental Database Review conducted during the DEIR preparation will be reviewed for any data gaps or updates. It is presumed that the DEIR work will be largely sufficient to meet the requirements of this task element. Any data gaps will be rectified.

Reasonably ascertainable historical sources of information that shows the subject site dating back to first developed use, or back to 1940, whichever is earlier, will be reviewed. The resources may include one or more of the following: aerial photographs, fire insurance maps, property tax files, recorded land title records, USGS 15 and/or 7.5 Minute Topographic Maps, local street directories, building department records, zoning/land use records, and other historical sources.

The Consultant team will:

- Review reasonably ascertainable available published local geologic literature to determine geologic setting and types of geologic formations beneath the site.
- Review reasonably ascertainable published information for depths to ground water, general quality of ground water, direction of ground water flow, and water-bearing lithologies.
- Review any existing geotechnical and environmental reports provided by the Authority for mention of environmental conditions at the site.
- Contact appropriate city, county, state, and federal agencies who may have information regarding the occurrence of hazardous materials/waste at along LRT2, including registered aboveground and underground storage tanks, landfills, contaminated sites, records of emergency release response reports,

contaminated public wells. A street address for the subject property is typically required by the city and county agencies in order to review their file.

- Review a 50-year Chain of Title document provided by the Authority (if applicable), for names of previous owners of the site, for mention of hazardous materials/waste at the site, and for any recorded environmental liens.

Site Reconnaissance

The Consultant team will:

- Perform an observational reconnaissance of the properties for visual indications of environmental conditions including the inside and outside of onsite structures. This includes observations of the current conditions of the onsite structures, roads, potable water supply, sewage disposal system, hazardous substances and petroleum products, aboveground and underground storage tanks or vent pipes, fill pipes or access ways indicating an underground storage tank, odors, pools of liquid, sumps, drums, polychlorinated biphenyls (PCBs) containing equipment, heating and/or cooling system, stains or corrosion, pits, ponds or lagoons, stained soil or pavement, stressed vegetation, solid waste, wastewater (including clarifiers), wells, and dumping. The site reconnaissance will be conducted by a qualified environmental professional as defined in the ASTM 1527-05 standard and AAI.
- Land use of immediately adjacent properties will be visually and/or physically observed and documented and any conditions indicative of contamination or potential contamination will be documented, to the extent possible.
- Current site conditions will be photographed.

Interviews

- A reasonable attempt to interview present and/or past owners, lessees, key site manager, occupant, and employees (if they have been identified by the client, and are available and cooperative) for additional information about past and present site usage.
- A reasonable attempt to interview local government officials for information regarding hazardous waste disposal or other environmental issues that may exist at the site.
- A Phase I Environmental Site Assessment Owner/Site Contact Interview Form should be completed by owners or other persons familiar with the properties along the alignment and returned to us. The information provided on this form is an important part of the Phase I ESA.
- Interview selected adjacent tenants (if they are available at the site reconnaissance and cooperative) for additional information about past and

present site usage.

Deliverables

- Draft and Final reports will be prepared that summarize findings, conclusions, and recommendations. The report will state any data gaps due to a lack of or inability to obtain information on the site despite LCI's good faith efforts.
- Should the results of the environmental investigation identify recognized environmental conditions requiring specific further investigation, the subsurface exploration program outlined below for the Phase II ESA will be modified accordingly. Modifications may include type, number, and depth of explorations.

Limitations

The proposed scope of the environmental services does not include the following:

- Subsurface investigation of the site(s).
- Soil, air, water, asbestos or lead-based paint sampling or analyses.
- Consideration of possible future contamination of the site from adjacent or surrounding facilities or properties.
- Investigation for radon or methane gas at the site.
- Investigation for mold, mildew or other biohazards at the site.
- Handling or disposal of hazardous materials.
- Responses to agency comments outside of the above specified deliverables.

9.3.2 .2 Phase II Environmental Site Assessment

Pre-field Activities

Site Safety Plan: A Health and Safety Plan (HSP) will be prepared specifically for the work to be performed for this ESA. The HSP will be in compliance with the Occupational Safety and Health and Administration (OSHA) regulation 29 CFR 1910.120.

Underground Service Alert: Underground Service Alert (USA) will be contacted prior to the commencement of fieldwork to mark all underground utility locations. Each proposed boring location will be clearly marked in white paint prior to contacting USA.

Field Activities

Soil Borings: Qualified personnel will observe and direct field activities during the advancement of approximately 73 exploratory soil borings positioned at various

locations along the railroad authority right-of-way to a maximum depth of 20 feet below ground surface (bgs). Thirty-six soil borings advanced to 5 feet bgs will be located approximately every 1,000 feet along the route from the Venice/Robertson Station to Colorado Boulevard and 4th Street. An additional 17 soil borings advanced to 5 feet bgs will be located near Interstate 10 and the Interstate 405 overpass between Sepulveda Boulevard and Sawtelle Avenue for an aerially deposited lead (ADL) survey. Up to 20 soil borings will be advanced to a maximum of 20 feet bgs in specific locations of concern identified during the Phase I ESA. All of the boring locations will be advanced using a limited-access and/or truck-mounted direct push rigs.

Direct-push technology will be used to collect soil samples at 0.5, 2.5, and 5 feet bgs for lithologic observation and laboratory analysis. At boring locations that are advanced to 20 feet bgs, samples will be collected at 0.5, 5, 15, and 20 feet bgs. Samples will be collected in acetate or brass sleeves and a six-inch length of the sleeve containing the soil sample will be retained for laboratory analysis. A Teflon™ square will be placed over each end of the sample and secured with a plastic cap. Soil samples will be placed in an ice-cooled chest for temporary storage, and transported to a State of California Certified laboratory for analysis. Table 1 summarizes the laboratory analysis, depths that samples are to be collected, and the location of each boring. After all samples have been collected, hydrated bentonite chips will be placed in the boreholes from the bottom up. The surface will be restored in-kind to the condition existing prior to boring advancement. All samples collected will be handled following proper chain of custody protocol.

Decontamination of Equipment: All drilling and sampling equipment that is to be re-used will be appropriately decontaminated between boreholes. The equipment will be washed with a solution of tri-sodium phosphate and water in the proportions specified by the manufacturer. The equipment will be rinsed with potable water and then rinsed with de-ionized water and allowed to air dry before being re-used. All decontamination liquids and soil cuttings, if generated, will be transported offsite for disposal at an appropriate disposal/treatment facility.

Laboratory Analysis

Select soil samples will be analyzed for these constituents as follows:

- Total petroleum hydrocarbons, carbon chain (TPH-cc) by EPA Method 8015M;
- Volatile organic compounds (VOCs) by EPA Method 8260B;
- Semi-volatile organic compounds (SVOCs) by EPA Method 8270C;
- Title 22 Metals by EPA Method 6010;
- Polychlorinated biphenyls (PCBs) by EPA Method 8082

- Organochlorine pesticides (OCPs) by EPA Method 8081A;
- Herbicides by EPA Method 8151A;
- Total lead by EPA Method 6010B;
- Soluble lead using the STLC WET Citric method;
- Soluble lead using the STLC WET DI method;
- Soluble lead using the TCLP method; and
- pH by EPA Method 9045C.

The table below indicates the approximate boring locations, the proposed sampling depth, and the proposed laboratory analysis. If field conditions indicate that contamination extends deeper than expected and additional sampling is recommended, the consultant team will consult with the Authority for verbal approval prior to any additional work.

Boring Locations	Proposed Samples, ft bgs	Proposed Analysis and # of Samples
Entire corridor, spaced approximately 1,000 feet apart, 36 total borings and 108 samples	0.5 2.5 5.0	TPH-cc, 3 per boring (108) VOCs, 1 per boring (36) SVOCs, 1 per boring (36) Title 22 metals, 1 per boring (36) PCBs, 1 per boring (36) OCPs, 1 per boring (36) Herbicides, 1 per boring (36)
Discrete locations based upon Phase I ESA recommendations 20 total borings and 80 samples	5 10 15 20	TPH-cc, 4 per boring (80) VOCs, up to 2 per boring (40) SVOCs, up to 2 per boring (40) Title 22 metals, up to 2 per boring (40) PCBs, up to 2 per boring (40)

ADL locations spaced ~350 feet apart along I-10 and I-405 overpass. Utilizes 10 borings advanced for general investigation purposes and includes 17 additional borings. 81 samples	0.5	Total lead, 3 per boring (81)
	2.5	STLC WET Citric method, 20% (16)
	5.0	STLC WET DI method, 10% (8)
		TCLP , 20% (16)
		pH, 10% (8)

Deliverables

All field and laboratory data compiled during the soil investigation will be reviewed and documented in a report summarizing this investigation. The report will include field/laboratory data, figures, boring logs, findings, and conclusions. The report will include a statistical analysis of the lead samples collected from the approximately 1.3 mile length of railroad located adjacent to Interstate-10 in accordance with SW-846, Chapter 9, as required by Caltrans. This evaluation will be conducted to determine if the soil would be considered a hazardous waste if excavated or if it can be reused at the site in accordance with the DTSC Variance issued to Caltrans, for management of soils containing aurally deposited lead (ADL).

9.4 COMPOSITE UTILITY PLANS AND OWNERSHIP DOCUMENTATION

AECOM will collect pertinent record drawings from local agencies and utility companies, and based on the collected information and field observations, will plot the underground and overhead utilities within the project limits on CADD. These utilities may include, but are not limited to, existing water, storm drain (pipes and channels), sewer, gas, electric, and communication facilities. AECOM will identify and recommend critical utilities whose locations should be precisely located.

Deliverables

- Public records research documentation with Utility Matrix
- 34 Existing Composite Utility Sheets

9.11 PRELIMINARY HAZARD ANALYSIS

The purpose of this task to address the California Public Utilities Commission (CPUC) specified grade crossing hazard identification and mitigation analysis required for proposed new light rail systems and extensions. This scope will fulfill the CPUC's requirements and provide the results of the analysis with the necessary CPUC application for Phase 2.

Pedestrian crossings associated with new station access will not be addressed during this analysis. When the preliminary plans for the project are produced showing the station details and required pedestrian crossings, the plans will be submitted to the CPUC as usual. Subsequently, application to the Commission will be submitted as required for each of the station pedestrian crossings. Previously completed work conducted during Stage 1 of the project will be the basis for the Analysis, modified as appropriate to reflect design development conducted in Stage

2.9.11.1 Field Investigation

A field investigation will be conducted to verify the existing conditions, observe the existing vehicular operating conditons to note any physical or operating hazards. The analysis will be conducted for the following crossings in Table 1:

TABLE 1

CROSSING	CROSSING
Venice	26 th
Bagley	Cloverfield
Palms / National	Olympic
Motor	20 th
Overland	19 th
Westwood	18 th
Military	17 th
Sepulveda	16 th
Sawtelle	14 th
Pico/Gateway	11 th
Barrington	Lincoln
Bundy	7 th
Centinela	6 th
Stewart	5 th

It is assumed that ten (10) crossings per day could be appropriately observed.

9.11.2 HAZARD ANALYSIS

The same defined hazards and their mitigation will be used for Expo Phase 2 as was used on Expo Phase 1.

9.11.3 GRADE CROSSING CONCEPT PLANS

There are basically three levels in developing concept plans for submission to CPUC. These three levels are:

1. Drawing sheets will be prepared for each grade crossing showing existing improvements. The existing base CADD file will be used to generate these sheets. These improvements will be field verified in Task 2 and the drawings will be updated based on the field investigation.
2. Concept plans will be prepared showing the proposed improvements recommended by the Hazard Analysis that identifies mitigation improvements for the safety of each grade crossing.
3. The concept plans will be updated based upon the recommendations of the Diagnostic Field Review.

9.11.4 DIAGNOSTIC TEAM REVIEW

Conceptual drawings will be generated for each of the proposed crossings reflecting the proposed improvements to mitigate the identified hazard. These drawings will be used for the Diagnostic Team Field Review.

The Diagnostic Team, consisting of Expo and Metro staff, CPUC, LADOT or Santa Monica staff, and AECOM staff shall field visit each of the proposed grade crossings with conceptual plans of the improvements to discuss their potential effectiveness and any other possible mitigation measures deemed necessary by the Diagnostic Team.

Identified measures and/or corrections will be applied to the final concept drawings and will be reflected in the final hazard analysis report. Meeting minutes of the field review will be developed by AECOM and distributed for review/comment to the meeting participants.

9.11.5 HAZARD ANALYSIS REPORT

The Hazard Analysis Report will be structured as follows:

- Introduction – Describes the Exposition Line Phase 2 project and the purpose of this report.
- Overview of Grade Crossings – Provides a list of the defined at-grade vehicle crossings, proposed grade separations and closure of certain streets that

currently cross the right of way. The impact of construction and operation of the light rail line on the proposed crossing will included.

- Grade Crossing Analysis – Utilizing the information in Tables 2 & 3 above, an analysis of potential hazards for each grade crossing will be defined and potential mitigations to address these hazards will be presented in an individual matrix for each crossing identifying the hazard being analyzed, the hazard probability, the current control status of the crossing and the proposed control measures for mitigation of the hazard.
- Summary and Conclusion – Summarizes the findings of the hazard analysis and presents recommendations for future action.

9.11.6 CPUC APPLICATION

CPUC Form G will be prepared, identifying all crossings analyzed and the proposed mitigations as approved and recommended by the Diagnostic Team for each crossing. The conceptual drawings will be updated base on the Diagnostic Teams recommendations and the drawings will be an appendix to the CPUC application and the Hazard Analysis Report. The technical memorandums for Milestones 1, 2 and 3 will also be an appendix to the Hazard Analysis Report.