Union/Patsaouras Plaza Busway Station

Design Build Contract No. C0970
Advanced Conceptual Engineering

VOLUME I
OF PROJECT DEFINITION DOCUMENTS – TECHNICAL DOCUMENTS

General Requirements

Issued for Bid May 7, 2012

Metro

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Volume I of Project Definition Documents – Technical Documents

GENERAL REQUIREMENTS

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SECTION 00700-DB

DESIGN MANAGEMENT

PART 1 - GENERAL

1.1 SCOPE

A. This Section specifies the Design Builder's minimum design management requirements relating to the development of design products during the course of the project.

B. The Designer may perform production design Work in the Los Angeles area or elsewhere. However, the design personnel designated as Key Personnel shall be in the Los Angeles area for the duration of the design for which they are responsible.

C. The Project Definition Documents – Technical show only a preliminary design for the Project. These drawings and the supporting electronic files are included to illustrate the general scope of improvements. Verify all information prior to use.

D. The Design Builder shall have the flexibility to recommend Project changes without impairing the essential functions, uses, and characteristics of the Project, such as safety, capacity, traffic operations, durability, desired appearance, maintainability, environmental protection, drainage, and other permitted constraints.

1.2 ACRONYMS AND DEFINITIONS

1.2.1 Definitions

"Design Unit" - A distinct portion of the Project whose design is performed as a contiguous, integrated unit.

"Major Temporary Works" - Components of the Project that are designed and constructed for temporary use during construction that have a significant effect on the Permanent Works, such as temporary support of excavation, falsework and formwork, etc.

"Permanent Works" - Physical components of the Project that comprise the final Project.

"Project Specification" - Construction or procurement specification developed by the Design Builder specifically for this Project in accordance with the requirements of the Contract Documents.

"Responsible Unit Engineer or Architect" - California-licensed Professional Engineer or Architect who will sign and seal the Final Project Design Documents and As-Built Drawings for which the Engineer or Architect is in 'responsible charge' of the design.

“Third Party” – See General Conditions Section 1.2 of the Design Build Contract, Article 01, DEFINITIONS.

“Preliminary Design” – 30% Design Level (Bid Option 1 only)

“Interim Design” – 60% Design Level

“Pre-Final Design” – 90% Design Level

“Final Design” – 100% Design Level

“Approved for Construction” – Construction Approved. "Released for Construction" or "Issued for Construction" have the same meaning.

Note: Definitions of other terms used in the General Requirements are found in the General Conditions of the Design Build Contract.

PART 2 - RESPONSIBILITIES

2.1 CONTRACTOR'S GENERAL RESPONSIBILITY

A. Manage the design of the Work. Produce complete final design of the Union/Patsaouras Plaza Busway Station Project as defined in the Project Definition Documents. The documents shall be signed and sealed by a registered architect or engineer registered in the appropriate discipline and shall be ready for construction. The Contractor is responsible for design of Third Party work as specified in the Contract. The Contractor shall manage and resolve all interfaces. The Contractor shall develop an Interface Management Plan that shall identify all interfaces associated with the Project and document how each interface will be accommodated during the Contract.

B. Coordinate and comply with all design requirements pertaining to governmental entities having jurisdictions over the Work and obtain necessary approvals from jurisdictions or Third Parties for all design and construction including but not limited to: temporary road detours, shutdowns, temporary diversions, utility locating and relocations, additional utility connections, temporary sidewalk closures, pedestrian detours, temporary lighting and fencing, and as-builts. Submit a copy of all correspondence to and from the Design Builder or its representatives and any jurisdiction or Third Party to Metro and note any problems in the Progress Narrative submitted with the Monthly Progress Report.

C. Include engineering and design progress and changes in Design Builder's engineering and design schedule (including Work on any design change) in the monthly Forecast Schedules.

2.2 CONTRACTOR'S DESIGN OBLIGATIONS

2.2.1 Design Organization

A. Appoint a suitably qualified and experienced design organization, which may be a consultant or an in-house design team, to undertake all design work for the Project. Require the design organization to maintain sufficient staff throughout the duration of the Contract to ensure that the Organization meets the Contract requirements.

B. The Organization shall prepare design documents including but not limited to: Design and Construction Drawings, Project Specifications and other design reports, calculations and documents to complete the design in conformance with the Contract requirements.

C. The Design Builder shall conduct meetings and reach an agreement with all approving governmental agencies and utility owners for their submittal requirements and design review process for obtaining all approvals and permits. The Design Builder shall invite the Metro project manager and third party coordinator to all meetings with the third parties. Items of agreement shall include submittal content, format, timing, and timing for review and approval (including permitting). The Design Builder shall submit a report consisting of submittal schedule, minutes of meetings and the agreements between the Design Builder and third parties within 45 days of NTP. The submittal schedule shall include required third party approval dates which tie in with the Contractor's schedule prepared under Section 01310-DB, Cost-Schedule Integration System.

2.2.2 Design Builder’s Design Manager

A. Designate and assign a Contractor’s Design Manager reporting to the Contractor’s Project Manager to manage all Work performed by the Contractor's design organization. The Design Manager shall have sufficient experience and background necessary to lead the design effort for this Project. The Metro Construction Manager or Resident Engineer shall approve the final selection of the Design Manager. The Design Builder’s Design Manager shall be located in the Los Angeles area for the duration of the design Work. The Design Builder’s Design Manager shall plan the design activities using a CPM method of scheduling together with Work Breakdown Structures detailing the actual Design Documents to be produced. The Work shall be divided into manageable Design Units that provide the best coordination and interface of design elements between the design disciplines involved.

B. The Design Builder’s Design Manager shall include written certification for all Work being subjected to a Design Review as required by Paragraph 3.3.

C. When the design units are finalized for submittal to the Design Builder for construction, the Design Builder’s Design Manager shall conduct an assessment and evaluation of design and shall certify to the Design Builder and Metro that the design satisfies the Contract requirements, including those for:

- Accuracy;
- Adequacy;
- Conformance to standards of practice;
- Compliance with codes and standards;
- Cost effectiveness;
- Quality; and
- Fitness for purpose and/or function as specified in the Contract.

D. The Design Builder’s Design Manager's assessment and evaluation activities shall include but are not limited to:

- Design reports;
- Design calculations
- Analytical approach;
- Drawing details for conformity to Contract requirements;
- Project Specifications for conformity to Contract requirements;
- Design and Construction Drawings;
- Major Temporary Works' effect on Permanent Works;
- Field design changes;
- Design approvals for materials and procedures; and
- As-Built records for conformity with Final Design and Contract requirements.

2.2.3 Responsible Unit Engineer or Architect

A Designate and assign an Engineer or Architect from the design organization for each Design Builder-designated Design Unit. The Engineer(s) or Architect(s) shall report to the Design Builder’s Design Manager.

B The Engineer(s) or Architect(s) shall be available for and attend all Design Reviews include Review Comment Resolution and Approved for Construction Meetings for his/her Design Unit(s).

2.2.4 Quality Assurance

Quality assurance requirements are defined in Section 01460-DB, Project Quality Program Requirements. These requirements shall be implemented by the Design

Builder and imposed on all sub-tier design organizations. If the Design Builder out-sources the design to an outside design firm, then that organization shall have its own parallel Quality Assurance Manager and staff interfacing with the Design Builder's quality organization. It is the intention of Metro that Quality Assurance Requirements and coverage be maintained and exercised over all aspects of the contract including sub-tier organizations. When outside design organizations are used, appropriate interface procedures shall be established by the Design Manager to assure that the required design criteria are available to the appropriate outside design organizations when required to perform design, and that checking and review procedures are implemented to assure that design deliverables provided by outside design organizations are properly checked and reviewed prior to incorporation into project design documents.

PART 3 – PERFORMANCE REQUIREMENTS

3.1 GENERAL

A. Within 30 days after Notice to Proceed (NTP), arrange a design workshop to familiarize the Designer's personnel, and Metro's and Third Parties' review personnel, with the design concepts, design quality requirements, issues, status, and review procedures. Develop the agenda of the workshop and how it will be organized (i.e., by Design Unit, engineering discipline, internal and Metro design reviews) jointly with Metro. The intent of the workshop is to make the subsequent Design Reviews more effective and efficient for all parties.

B. Quality assurance requirements are defined in Section 01460-DB, Project Quality Program Requirements. These requirements shall be implemented by the Contractor and imposed on all sub-tier design organizations. If the Contractor outsources the design to an outside design firm, then that organization shall have its own parallel Quality Assurance Manager and staff interfacing with the Contractor's quality organization. It is the intention of Metro that quality assurance requirements and coverage be maintained and exercised over all aspects of the contract including sub-tier organizations.

C. During the design process, the Design Builder shall develop project-specific Project Specifications and Drawings based on the specific materials, products, equipment, procedures and methods that the Design Builder intends to use, and shall comply with all relevant local agency standards. The Contractor may utilize Metro specifications and edit them to suit this project where appropriate. Design documents shall meet the requirements of the agency having jurisdiction.

D. During Design Review, the Design Drawings and Project Specifications will be evaluated by Metro to determine if they meet the Contract requirements.

3.2 DESIGN UNITS

3.2.1 Description

A. Within 30 days from Notice to Proceed, the Design Builder shall develop and submit for approval, a plan and schedule for packaging the design documents for the Work into a series of groupings or Design Units. The Design Units shall consist of Units of Work that provide a logical and efficient method for completing the Project within the approved project schedule and in conformance with Contract Documents. The project shall be divided into two broad categories, Facilities and Systems, and then divided into Design Units.

B. The Facilities portion of the Work shall include but is not limited to: those structures that comprise the static physical portions of the project such as the freeway improvements, bridges, architectural structures, utilities, streets, drainage facilities, access roads, retaining walls, landscaping, irrigation equipment, signage, and other items.

C. The Systems portion of the Contract are those items and components that comprise the station communications, traffic signals, bus arrival time system, power system, and electrical and electronic portions of the permanent project. Systems Work shall be in separate Design Units from Facilities Work.

D. The Design Builder shall separately submit 60%, 90%, 100% and Approved for Construction design stage submittals and obtain approvals from the appropriate departments of the City of Los Angeles for the design of all Work affecting the City/County of Los Angeles facilities including, but not limited to, City of Los Angeles streets, County of Los Angeles streets, local agency utilities, traffic signals, traffic control plans, haul routes, drainage facilities, etc. Design Builder is advised that approval of haul routes and other local agency approvals may be very time-consuming and must start early.

E. It is intended that the design and approval process for Caltrans will be integrated with the design and approval process for Metro as much as possible. However, if necessary, the Design Builder shall separately submit design stage submittals and obtain approvals from the appropriate departments of Caltrans for all Work affecting Caltrans facilities. Contractor shall assume that these submittals will be required at 60 percent, 90 percent, 100 percent, and Approved for Construction design stages at a minimum; however, final determination of number and timing of submittals shall be as agreed upon with Caltrans.

F. The design and construction shall be performed in a traditional design method where approval is required prior to the start of construction.

G. The Design Unit Plan and Submittal Schedule for each category shall consist of description and scope of design work for each Design Unit, including limits and interface points, schedule of design review stages and dates, Responsible Unit Engineer or Architect, and location(s) where design work will be performed. The Design Unit Plan and Submittal Schedule shall be incorporated into the Baseline Schedule and be reviewed monthly in accordance with Section 01310-DB, Cost/Schedule Integration System, until design Work is complete. No more than six (6) Design Unit Packages shall be scheduled for review and approval by Metro and Third Parties at one time without the Resident Engineer's prior written concurrence.

3.3 DESIGN REVIEW SUBMITTALS

Unless otherwise specified in the Technical Provisions, the design review process includes the following:

3.3.1 General

A. The Design Builder shall initiate a Design Review for each Design Unit Submittal at 60%, 90%, 100% and Approved for Construction stage of design development. (If Caltrans design approvals require different design stages, conduct reviews and meet other requirements of this section at each design stage.) If the 100% design review indicates that the design is incomplete or inadequate, authorization to start construction will be withheld by Metro and all resultant delays and costs shall be the responsibility of the Design Builder.

B. Submit detailed schematic plans, as requested by Metro, that include colored renderings at a scale required to adequately present to the community and that agreed with Metro showing the Project.

C. Separately submit and obtain approvals from the government agencies and utility owners for the design of all Work affecting their facilities.

D. The Design Review Submittals shall be consistent with the Baseline Schedule and updates. The design reviews shall not commence until all required Design Builder internal design reviews have been accomplished in accordance with Section 01460-DB, Project Quality Program Requirements.

E. Each Design Review Submittal package shall include Design Drawings, Project Specifications and supporting data, reports and such information as needed to advance to the next stage of design or the start of construction, whichever is applicable. The Design Builder shall use Metro's Primavera Contract Management Web Interface (CMI) (see Section 01300-DB, Submittals). This system shall be used to submit electronic files of drawings/design documents for review. Review comments (internal and external) shall be tracked to resolution prior to final design approval as required by the Project Quality

Assurance Requirements, See Section 01460-DB, Project Quality Program Requirements. Third Party review and comments shall be performed in a traditional method of matrix resolution on paper.

F. See Section 01300-DB, Submittals, for submittal requirements including drawing format and size. In addition to transmitting drawings and design documents through Primavera CMI, a sufficient number of hard copies shall be transmitted (to be coordinated with Metro) to Third Party participants in Design Review.

G. Allow 30 calendar days for Metro input to any Design Review. For Caltrans review, allow time as established by Caltrans, not less than 30 days. Allow 20 calendar days for City of Los Angeles input when required. Incorporate this schedule into Design Builder's Baseline Schedule; provide submittal dates, and report progress and updates, in the Monthly Forecast Schedule. The Design Builder shall respond to all Metro and Third Party comments within 15 days of receipt. The Design Builder shall show the exact timing of reviews and resolution of comments through the Weekly Progress Meetings and in the Three Week Look-Ahead Schedule.

3.3.2 Design Stages

Submit each Design Unit to Metro for design review in the following Design Stages:

All Design Units

- Interim 60% Design Stage
- Pre-Final 90% Design Stage
- Final 100% Design Stage

3.3.3 Design Review Documentation

A. The Design Builder or its design subcontractor shall maintain a written record of all internal Design Reviews. The written record shall:

a) List the participants of each review;
b) Cover the items discussed;
c) Identify discrepancies noted and report on corrective action taken or planned;
d) Identify follow-up items and due dates and party responsible for future action; and
e) Identify items needing resolution and time constraints for resolution.
f) Documented reports of Design Reviews, including oversight visits, shall be submitted to Metro within seven (7) days of completion of the review or visit.

g) Items found during reviews, surveillances, or audits by the Design Builder or his design organization requiring correction shall be documented and tracked for resolution by the design organization.

B. For Design Reviews conducted by Metro's staff, Metro's comments requiring the design to be changed or corrected will be transmitted to the Contractor via e-mail. Comments will be discussed with the Design Builder's Design Manager and Responsible Unit Engineer or Architect. Meeting minutes by the Design Builder will attest to Metro's written approval, if given, and will identify any actions arising from the review. The meeting minutes will identify the following:

a) List the participants of each review;
b) Cover the items discussed;
c) Identify discrepancies noted and report on corrective action taken or planned;
d) Identify follow-up items and due dates and party responsible for future action.

C. Prior to issuance of Design Review Meeting Minutes by the Design Builder, Metro may require consultations with the Design Builder's Design Manager, Responsible Unit Engineer(s) and Architect(s), and Designer's Lead Engineers and Architects for the various disciplines involved in the Work under review. Ensure that the relevant staff is available to participate in such consultations and that the results of consultations are reflected in the Design Review Meeting Minutes.

D. Supplemental and/or supporting information to the Design Units under review may be requested by Metro. Make every endeavor to supply such information quickly and efficiently. Metro may require the Design Builder to re-submit additional background Design Unit documents for review where the information submitted is considered insufficient to conduct a proper review or actions arising from the Design Review require significant revisions.

E. Design Builder shall bear the time and cost impacts to the Design Builder for re-submissions or revisions arising from the Design Reviews and caused by Design Builder's non-compliance with the Contract requirements or inadequacy or incompleteness of the submittal, including the time taken for Metro to review the revisions.

F. The Design Builder, in coordination with Metro, shall be responsible for obtaining all design reviews required by applicable Third Parties and to assure all agencies and departments have been provided design documents to review. The Design Builder shall provide Metro a copy of each submittal made to a Third Party for review.

G. The Design Builder shall submit Design Unit review document packages to all reviewers in accordance with the approved schedule through Metro's Primavera CMI system. For those Third Parties that do not have the capability to utilize the Primavera CMI system, submit hard copies in the quantities required by the third parties.

H. Metro comments will be provided to Design Builder via e-mail. Third Party comments will be provided to the Design Builder in written form by each third party in its format. The Design Builder may receive separate comment packages from each organization and group within an organization that reviews a design Submittal. The Design Builder shall provide written responses and resolutions prior to resubmittal to Metro and third parties for all design submittal review comments received by Design Builder.

I. The Design Builder shall be responsible for addressing and/or incorporating all comments that an agency or department has made. The Design Builder shall provide Metro a copy of all comments that are made and a copy of how each comment has been addressed.

3.3.4 Design Review and Comment Resolution Meetings

A joint comment resolution meeting will be scheduled by the Design Builder to discuss responses to Metro, Caltrans, and other Third Party review comments and to determine the review comments to be incorporated into the design documents. More than one (1) joint comment resolution meeting per design submittal may be necessary in order to discuss all design review submittal review comments. The Design Builder shall prepare meeting notes of the joint comment resolution meetings and submit the meeting notes to Metro within five (5) days for review and concurrence with the next submittal.

3.3.5 Design Builder’s Internal Design Checks and Certifications

The designer’s organization shall perform an internal design review process for all design documents (drawings, plans, specifications, calculations, and reports) produced by the design organization including its subcontractors. The Design Builder’s Design Quality Assurance Manager shall certify that the documents have been reviewed and checked per Design Builder’s Quality Program Requirements and that previous review comments have been incorporated or resolved. See also Section 01460-DB, Project Quality Program Requirements. In addition to the internal reviews required by the Design Builder's Design Quality Program, the Design Organization shall perform internal Constructability Reviews at 60% completion of each Design Unit Package to ensure that construction considerations have been taken into account during the design process. Reports of the Constructability Review shall be submitted to Metro within 7 days of completion of the review indicating the parameters and interfaces verified during the review.

3.4 DESIGN STAGES

This Section applies to all design activities. Do not construct any Permanent Works or Major Temporary Works until the design checks, Design Reviews, and certifications have been completed for the relevant Design Unit and Metro has issued a written approval.

3.4.1 Interim Design (60%)

A. Design Review of Interim Design is mandatory and shall be the first Design Review after Award.

B. The Interim Design shall include but not be limited to: general configuration, horizontal and vertical alignments, cross-sections, preliminary typical sections and plan and elevation views, preliminary equipment layouts, preliminary structure layouts, preliminary design reports, and similar level of design for the features included in the Design Unit

C. All initial documentation required to request deviations from Metro or Third Party design criteria or standards shall be submitted.

D. As a minimum, the following documents and design content shall be included in the Interim (60%) Design submittal:

1. Site plan
2. Preliminary geotechnical, hydrology, and other applicable reports
3. Utility and electrical plans showing major utilities and points of utility connections
4. Architectural plans including floor plans, elevations, sections, and major details
5. Structural plans for major structural frames of architectural and civil structures
6. Civil plans including all major civil structures and site improvements
7. Utility and electrical layouts including sized utility connections, major plumbing and mechanical equipment, and main power panels and disconnects
8. Signage and wayfinding layouts
9. Preliminary design calculations for architectural and civil structures and for electrical and mechanical (water, fire, HVAC) systems
10. Product data and samples as applicable to progress of the design

11. Outline of specifications (list of sections, brief description of each section, identification of codes and standards, summary statements for each subheading)

12. Preliminary calculations for LEED certification

11. Preliminary construction schedule including procurement activities for long lead items

E. Design Builder shall submit the Interim Design submittal to Metro for review and comment in accordance with Section 01300-DB, Submittals.

F. If the Interim Design is amended subsequent to the Design Review, re-check and re-certify as an additional Interim Design Review. The Design Builder shall not be entitled to an increase in Contract Price or a time extension for the recheck and re-certification except when the amended design results from a change in the work ordered by Metro.

3.4.2 Pre-Final Design

A. Pre-Final Design shall include but not be limited to: general configuration, horizontal and vertical alignments, cross-sections, sections and plan and elevation views, equipment layouts, structure layouts, design reports, and similar level of design for the features included in the Design Unit.

B. All documentation required to request deviations from Metro or Third Party design criteria or standards shall be submitted.

C. As a minimum, the following documents and design content shall be included in the Pre-Final design submittal:

1. Essentially complete drawings for all disciplines

2. Detailed design of civil, structural, architectural, and mechanical work

3. Detailed design of signage and wayfinding program

4. Final calculations and documentation for design calculations and Title 24 compliance

5. Geotechnical, hydrology, and other applicable reports

6. Definition of safety and reliability requirements

7. Testing and inspection requirements

8. Product data and samples as applicable to progress of the design

9. Completed Design Criteria Conformance Checklists

10. Completed Design Checklists

11. Essentially complete specifications

12. Design markups reflecting incorporation of review comments from the Interim Design (60%) design review

13. Check prints, interdisciplinary coordination markups, and checked originals for all drawings, calculations, and specifications

14. Full calculations, narrative, and complete documentation for LEED certification

15. Updated construction schedule including procurement activities for long lead items

D. Contractor shall submit the Pre-Final Design submittal to Metro for review and comment in accordance with Section 01300-DB, Submittals.

E. If the Pre-Final Design is amended subsequent to the Design Review, recheck and recertify as an additional Pre-Final Design Review. The Contractor shall not be entitled to an increase in Contract Price or a time extension for the recheck and recertification except when the amended design results from a change in the work ordered by Metro.

3.4.3 Final Design (100%)

A. During the final design phase, the Design Builder shall use the Design Review to verify that the concepts and information presented and contained in Contract Documents have been followed and Contract requirements have been met throughout the development of Project design.

B. The Final Design Unit Submittal shall include but not be limited to: detailed, 100% complete and checked Design Drawings, Project Specifications, reports, supporting calculations and design documentation necessary for final Metro and Third Party approval and for construction of the Design Unit Work. All documentation, including but not limited to: written approval of design deviations from Third Party design standards and/or criteria shall be provided to Metro prior to the Final Design Submittal.

C. The Final Design submittal shall include:

1. Final drawings

2. Final design calculations

3. Final specifications

4. Final reports

5. Complete product data and samples

6. Original permits from Fire Department

7. Design markups reflecting incorporation of review comments from the Pre-Final Design (90%) design review

8. Check prints, interdisciplinary coordination markups, and checked originals for all drawings, calculations, and specifications

9. Final calculations, narrative, and complete documentation for LEED certification

10. Updated construction schedule including procurement activities for long lead items

D. The architect or the engineer in general responsible charge, and other professionals delegated for preparation of portions of the project must be licensed or registered by the state of California, and shall provide his/her signature, stamp and registration number on plans, specification, calculations and other documents in accordance with Business and Professions Code and Title 24, Part 1.

E. The Design Builder shall make a formal submittal of design documents for this stage of Design Review to Metro and required Third Parties for review and written approval. Caltrans approvals required before Caltrans issuance of encroachment permits include utility relocations and right of way certification. Address and/or resolve Metro and Third Party comments in consultation with Metro. Design Builder's response to comments shall include:

1. Arrange meetings with Metro, including all design professionals, to review, discuss, and implement the 100% review comments.

2. Prepare meeting minutes clearly documenting the resolution of each comments.

3. Ensure that 100% review comments are fully incorporated.

3.4.3.1 Approval of Final Design Documents

When all comments to the Final Design Submittal for each Design Unit have been satisfactorily addressed and all Third Party approvals obtained, Metro will sign and indicate on the Final Design documents "Released for Construction," "Approved for Construction," or similar.

3.4.3.2 Final Design Certification

When the final 100% design for a Design Unit has been completed, the Design Builder's Design Manager shall submit certification that:

a) The design has been checked in accordance with the Design Builder's accepted Quality Assurance Procedures Manual;
b) The Design Builder has obtained all required Third Party approvals and permits;
c) The design documents meet the Contract requirements; and
d) The Work shown on the Design Documents is ready for construction to completion.

After Design Review, approval, and certification of Final Design, Contractor may complete construction of the Work covered by the applicable design documents without further formal Design Review except for the requirements given below under "Design Review of Major Temporary Works" and any design changes.

3.4.4 Design Review of Major Temporary Works

The Design Builder's Design Manager shall conduct a Design Review of Major Temporary Works that represent complex structures and that potentially may affect the safety, quality and durability of the Permanent Works. The review shall include the effect of the Major Temporary Works on the Permanent Works. Invite Metro and affected Third Parties to participate in the review. If the design of Major Temporary Works is being produced by the Design Builder's design organization, these should be included in the Final Design Unit review package and undergo formal review as part of the design unit documents.

If the Design Builder or a construction sub-contractor produces the Major Temporary Works design documents after the Design Unit Documents have been approved and distributed, then the Major Temporary Works design documents of the design unit must undergo a separate formal review by Metro and affected Third Parties. The formal review must be completed before any construction of the Permanent Works begins. The Design Builder shall check, review and certify Major Temporary Works Documents in accordance with Section 3.3, prior to their being issued for construction.

All necessary permits, clearances, and closures from government agencies shall be secured prior to construction.

3.4.5 Additional Reviews

Metro (with Third Party participation) may conduct additional "over-the shoulder" reviews as considered necessary to ensure a continuous and uniform consistency in the quality, and effective incorporation of Contract requirements and revisions to designs.

The time and cost impacts of revisions arising from additional reviews, which identify the Design Builder's non-compliance with Contract requirements, shall be borne by the Design Builder.

3.5 DESIGN CHANGES

The Design Builder's Design Organization shall address any changes to design initiated by the Design Builder, Metro, and Third Parties for portions of the design already checked by the design organization and certified by the Design Builder's Design Manager. Design Builder shall not be entitled to any increase in the contract price or extension of time for changes initiated by the Design Organization or Design Builder after the original design had been certified by the Design Builder's Design Manager and accepted as ready for construction by Metro.

Design changes may occur prior to construction or may occur after Final Design, and may be initiated by the Design Builder or Metro.

All design changes shall undergo the same design review process as the original design.

If the architect or engineer in general responsible charge makes any change to the construction documents prepared by other professionals, Metro would accept the changes under either of the following conditions:

1. The signature and stamp of the original professional appears on the change and the architect or engineer in general responsible charge provides a Statement of General Conformance, or

2. The architect or engineer in general responsible charge assumes responsibility for the changed portion in accordance with Title 24, Part 1, Section 4-316(c) and subject to the approval of Metro. If the changes significantly affect the safety of the entire structure, the architect or engineer in general responsible charge of the changes shall assume responsibility for the entire design.

All changes shall be submitted to Metro and affected Third parties prior to such changes being implemented for construction. The Final Design Documents may be changed only with prior written approval of Metro and affected Third Parties. Design changes to Final Design documents shall be approved in writing by the Engineer or Architect of Record for the original design. All changes to designs, drawings, specifications, calculations, and reports shall be signed and dated by a California-licensed Professional Engineer or Architect (signed and sealed for design changes to Final Design documents). The Design Builder's Design Manager shall certify in writing that the design change has 1) been designed in accordance with Contract requirements, 2) been checked in accordance with the Design Builder's Project Quality Program Manual, and 3) is consistent with all other design elements.

3.6 DESIGN SUPPORT DURING CONSTRUCTION

The Design Builder's design organization and Design Builder's Design Manager shall verify during construction that the conditions actually encountered are consistent with the accepted Design Drawings, Construction Drawings and Project Specifications. The Design Builder's design organization shall prepare As-Builts of the Design Drawings, Construction Drawings and Project Specifications as the work progresses in accordance with Section 01720-DB, As-Built Drawings and Current Status Documents. The Design Builder shall conduct the necessary inspections and reviews to assure the accuracy and correctness of as-built documents.

Once a document has been Released for Construction and items need to be clarified, such information shall be issued to the field construction staff only after a copy has been provided to Metro. In order to ensure that Metro has received such information, no construction documentation shall be allowed to be used for construction unless it has a Metro stamp. Such instances where the Design Builder is constructing from documents that do not have Metro stamps or from information not received by Metro shall be considered nonconforming and may be subject to the Assessment for Special Circumstances in the Design Build Contract Section 12.2.

PART 4 – MEASUREMENT AND PAYMENT

4.1 PHYSICAL PROGRESS MEASUREMENT

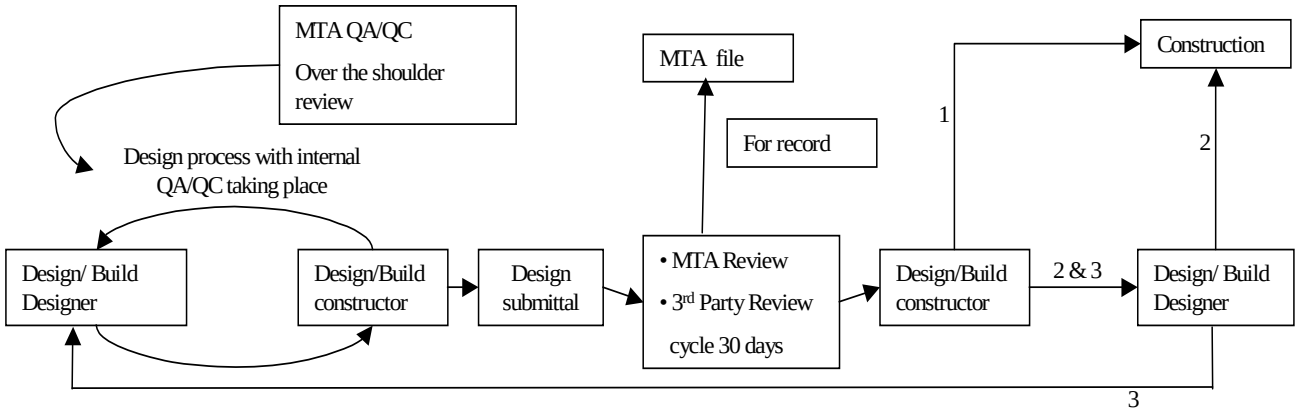
A. Physical progress will be measured as sum of earned dollar values of relevant design activities identified divided by "Physical Progress Budget." Activities and physical progress budget will be developed by Metro. Physical progress budget is defined as summed dollar values of cost loaded activities identified as representing design related activities in accepted cost and resource loaded Baseline Contract Schedule. Determine percent complete for cost-loaded activities as follows: For activities loaded with Contract unit quantities, calculate percent complete by dividing units of Work in place by total units of Work forecast. For activities loaded with lump sum costs, calculate percent complete by estimating percent of Work in place. Only activities representing physical progress (Work in place) will be included in physical progress calculation. Release for Construction of design drawings by Metro will qualify as physical progress for activities connected with design. Physical costs will be used as a basis for physical progress measurement and payment.

B. PAYMENT for the Work of this Section will be made under the applicable Schedule of Values items for Design and Design Support During Construction.

END OF SECTION

FLOWCHART 1

MTA Design Review Process



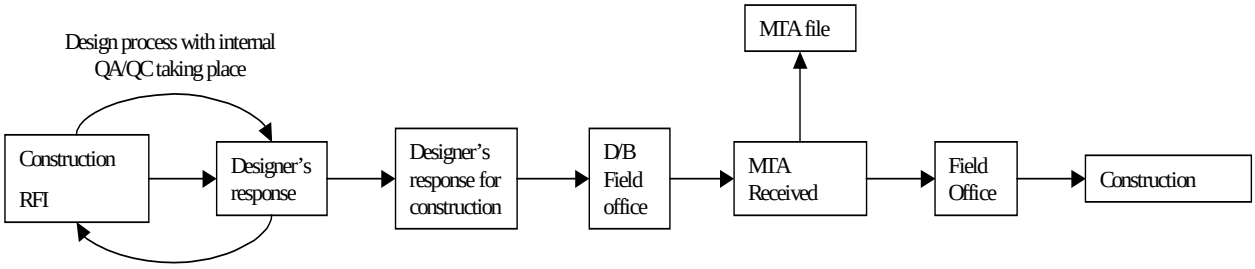
1 – Information has no revision or comments that do not require revision

2 – Information that requires revision but no resubmittal

3 – Information that requires revision and resubmittal

FLOWCHART 2

After information is stamped for Construction (changes from that point on)



MTA receipt of information is for verification that information is on file as construction proceeds

MTA's receipt of information is not a review of any sort, just a stamp of receipt.

Note: In the event a change is of such magnitude that it impacts the Design Criteria or Statement of Work it shall be required to conform to Flowchart 1.

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SECTION 01010-DB

SUMMARY OF WORK

PART 1 - GENERAL

1.1 OBJECTIVE

A. The Los Angeles County Metropolitan Transportation Authority (Metro) is seeking a qualified Architectural / Engineering / Construction team (Contractor) to produce final design documents, permit, and construct Metro's Union / Patsaouras Plaza Busway Station project in downtown Los Angeles. The design documents shall be developed from an approximately 30 percent level of design, already completed by Metro.

1.2 BACKGROUND

A. For some time, the entrance to the existing high occupancy vehicle (HOV) and El Monte Busway lanes at Union Station has been in need of reconfiguration to allow for more efficient ingress and egress of pedestrians, buses, and automobiles. Further, the passenger boarding / alighting areas for the HOV and El Monte Busway lanes are not located contiguous with Union Station, but rather are situated at the corner of Alameda Street and the busway entrance, which requires a long walk to the Plaza. There is currently no direct pedestrian connection to Union Station, and there are no passenger amenities such as lighting, closed circuit television (CCTV), or information displays.

This issue will only become more acute upon revenue operation of the Congestion Reduction Demonstration Initiative project, since all new passengers would also need to make the long walk for other transit connections such as the Red Line, Gold Line, and Metrolink.

To resolve these issues and to provide a more user-friendly passenger experience, a number of potential configurations have been evaluated. The final preferred configuration is to provide a new passenger boarding / alighting area on the south side of Patsaouras Plaza on the El Monte Busway. The Preliminary Engineering Drawings and Specifications of the Project Definition Documents for this solicitation define the final configuration.

1.3 GENERAL DESCRIPTION

A. The Union / Patsaouras Busway Station project consists of the following main design and construction elements:

1. Relocation of the Busway patron boarding island (now situated at the corner of Alameda Street) to a new station platform located at the south end of Patsaouras Plaza.

2. Widening of the existing Caltrans Los Angeles River Busway Bridge and Overhead.

3. New vertical and horizontal pedestrian circulation elements (Pedestrian Ramp / Walkway, Pedestrian Overcrossing, elevators, and stairs) along the El Monte Busway and connecting to the south end of Patsaouras Plaza.

1.4 WORK WITHIN OTHER JURISDICTIONAL AREAS

A. All design and construction work performed within the jurisdictional areas of various agencies (e.g., Metro, Caltrans, City of Los Angeles, etc.) shall be subject to the requirements, approval, and inspection of those jurisdictional agencies.

1.5 WORK BY OTHERS

A. The Contractor shall anticipate that work by others will be performed during the course of his Work. Such work could include but not be limited to: community activities, portions of utility work, police activities, property owner work, work by Metro or its contractors including the HOT Lanes project, and other general public work. The Contractor shall cooperate when such work occurs.

1.6 STANDARDS

A. Due to the nature of ownership and location of the project site, the design and construction of this project is controlled by various codes and standards. Work is governed by Metro, Caltrans, the City of Los Angeles, and other requirements as defined in Volume II - Specifications and in Volume III – Preliminary Engineering Drawings of the Project Definition Documents. For a more complete discussion of this subject, refer to Section 00.04, Standards, of Volume II – Specifications.

1.7 SCOPE OF WORK

A. The work specified in this Contract includes all design and construction for the Union / Patsaouras Plaza Busway Station, as shown in Volume III – Preliminary Engineering Drawings and as described in Volume II - Specifications of the Project Definition Documents for this Contract. Following is a brief description of major work items and requirements for completing the project.

B. Roadways and Sitework

1. Roadway Modifications at El Monte Busway – The El Monte Busway is to be widened on the south side along a length of approximately 200 feet to accommodate the revised El Monte Busway lane configurations south of Patsaouras Plaza. The widening varies from 0.0 feet at the western limit to approximately 9.5 feet at the El Monte Busway bridge's western abutment. Removal work includes removal of pavement sections, raised islands, lighting standards, and barrier rails. New construction includes building new pavement and barrier rails, reconstruction of lighting standards, and modifications to existing embankment slopes. New signage, striping, and pavement markings along this length will also be required. In addition, new overhead signing is to be provided at the entrance to the busway near Alameda Street.

2. Roadway Modifications at Patsaouras Plaza – The revised lane configurations along the El Monte Busway require modifications to the busway lanes entering and exiting Patsaouras Plaza. The existing busway lane entering Patsaouras Plaza from the busway will be permanently closed, and exiting Plaza traffic entering the eastbound busway will be modified. Existing raised medians will be removed, and existing traffic signal poles and signal heads will be removed and salvaged. Signing and pavement markings will be provided at the Plaza for the new lane configurations.

3. Other Modifications at Patsaouras Plaza – Construction of the pedestrian overcrossing, stairs, and elevators will require removal of existing improvements in the plaza, including existing brick paving, granite curbs, sidewalk, accessible ramps, and palm trees. Brick paving and granite curbs are to be salvaged and reinstalled if not damaged. Any damage to existing pavement, landscape/hardscape, and granite curbs indicated to remain must be removed and replaced with new materials to very specific and exacting standards.

4. Roadway Modifications at the US 101 On/Off Ramps at Vignes Street – Construction of the columns and footings for the busway bridge and platform canopy in the area of these ramps will require removal and reconstruction of concrete barriers along roadway edges as well as removal / replacement of AC/AB. In addition, portions of an existing retaining wall and curb are to be removed at locations interfering with the new construction (see Drawing C-07 in Volume III of the Project Definition Documents for details). Allowable ramp closures are discussed in Volume II of the Project Definition Documents – Specifications.

5. Utilities and Drainage - Project construction will require relocation and reconstruction of various existing utilities and drainage facilities. In addition, new drainage facilities are to be provided for the freeway widening and other roadway improvements.

C. Structures

1. El Monte Busway Bridge Widening

a. The project includes widening both the north and south sides of the existing Caltrans Los Angeles River Busway Bridge and Overhead (Br. No. 53-2673). This bridge provides a travel way for the existing El Monte Busway through the project area. The widening on the north side of the bridge extends approximately 872 feet with an average width of 28 feet. The widening on the south side of the bridge extends approximately 823 feet with an average width of 14 feet.

b. The widening of the structure is required to provide for construction of the new station platform, bus lanes servicing the platform, and buffer lanes separating platform traffic from through traffic. In addition, the widening is required to provide for construction of the Pedestrian Ramp / Walkway which is to be built along the centerline of the existing bridge, allowing access to the platform from Patsaouras Plaza.

c. The widening work includes design and construction of new bridge superstructure, substructure, and barrier rails. Work also includes removal of portions of the existing bridge superstructure and barrier rails. In addition, removal (and replacement at some locations) of portions of existing retaining walls and removal of portions of the existing CIDH retaining wall (Bent 6 & 7) for new column / footing construction will be required. New columns / foundations are to be designed to avoid conflicts with existing roadways, the future and existing Metro Rail Subway Tunnel, and the future Ramirez Flyover.

2. Pedestrian Ramp / Walkway Structure

a. A new Pedestrian Ramp / Walkway is to be constructed to enable pedestrians to access the new Station Platform from the existing Plaza (via the new Pedestrian Overcrossing). This structure extends approximately 277 feet along the centerline of the existing El Monte Busway, connecting to the new Pedestrian Overcrossing on the west side and to the new Station Platform on the east side. The Pedestrian Ramp / Walkway rises approximately 9 feet vertically from the level of the station platform to the level of the new Pedestrian Overcrossing, thus allowing a minimum vertical clearance of 19.5 feet over the existing busway lanes for the Pedestrian Overcrossing.

b. The Pedestrian Ramp / Walkway structure width is to have a 10 feet minimum horizontal inside clear dimension. It is to be supported on new columns which extend through the deck surface of the existing

busway bridge to new foundations at existing grade below the existing bridge. The structure is enclosed with a structural steel frame with a 2-inch maximum stainless steel mesh on the roof surface and has side walls consisting of stainless steel ornamental panels and 2-inch maximum width stainless steel mesh. Art elements will cover portions of the outside surfaces of the enclosure.

3. Pedestrian Overcrossing

   a. A new Pedestrian Overcrossing (OC) is to be constructed to enable pedestrians to access the new Pedestrian Ramp / Walkway and Station Platform from the existing Plaza. The Pedestrian OC extends approximately 114 feet south from the south end of the existing Plaza and connects with the new Pedestrian Ramp / Walkway. The OC is basically a level structure that maintains a minimum vertical clearance of 19.5 feet over the existing busway lanes below. The north end of the OC at the Plaza junction connects to new elevators and a stairway that allows pedestrian access to / from the Plaza itself.

   b. The Pedestrian OC width has a 10 feet minimum horizontal inside clear dimension except at the north end, where it widens in the area of the new elevators and stairs. It is to be supported on new columns which extend through the deck surface of the existing busway bridge to new foundations at existing grade below the existing bridge, except for the north support column. The north column is to be supported on a new pedestal on the top of the existing parking garage structure.

   c. The OC structure is enclosed with a structural steel frame with 1-inch maximum stainless steel mesh on the roof surface and has side walls consisting of stainless steel ornamental panels and 1-inch maximum width stainless steel mesh. Art elements will cover portions of the outside surfaces of the enclosure.

D. Bus Platform and Amenities

1. The bus station platform consists of an 8-inch-high concrete slab placed on the existing El Monte Busway bridge deck. The platform is 200 feet long by 18 feet wide, covered by a continuous canopy with lighting. The canopy structure is supported on individual columns, separated from the platform slab, that extend through the existing bridge deck to foundations beneath the existing bridge structure. The station amenities include seating benches, map cases, brick paving, signage and graphics, public address speakers, CCTV cameras, a passenger assistance telephone, an emergency telephone, and trash receptacles.

E. Canopy Structure

1. A 16-feet-wide continuous canopy is to cover the entire platform length. The roof of the canopy consists of a corrugated stainless steel deck over a painted ornamental structural steel frame. The canopy rests on painted steel T-shaped supports that are separated from the deck platform and extend through the existing bridge deck to new foundations below the existing bridge.

F. Pedestrian Circulation

1. Stairs and Elevators

a. Pedestrian access to the Pedestrian OC from the existing Plaza is to be provided via new stairs and two (2) new elevators at the north end of the OC. The elevators are to be enclosed in a glass and steel framework. Elevator doors are to open on three levels within the enclosure: (1) the OC deck level - opening to the east; (2) the Plaza level - opening to the east; and (3) the P-1 level of the parking garage - opening to the west. The P-1 level doors will provide access to / from the existing pedestrian walkway located outside and along the west side of Metro's existing parking garage.

b. Construction of the stairs and elevators will require demolition of the southern bay of the existing arcade structure located along the west side of the Plaza. A new section of the arcade structure is to be built to connect to the southern end of the remaining arcade structure.

2. Emergency Egress

a. New stairs are to be provided for emergency egress from the eastern end of the new station platform. The stairs will descend approximately 21 feet from the platform level to the street level below. The area at the bottom of the stairs is to be enclosed for security purposes.

G. Lighting

a. Lighting will be a key component in the experience of passengers to and from the bus platform and the existing plaza. In addition to achieving required light levels and meeting energy codes, the lighting should assist with creating a visually stimulating procession for pedestrians as well as creating visual interest for people viewing the architectural canopies / structures from adjacent areas and the plaza. Lighting is to be provided for all areas of the project. This includes the stairways, elevator areas, Pedestrian OC, Pedestrian Ramp / Walkway, station platform, and canopies.

H. Signage and Wayfinding

1. The Contractor shall design, procure, and install all signage and wayfinding for the project. These items include identification, directional, and regulatory signage, and map cases. The identification signage includes iconic signs placed on top of the platform canopy. Signage and wayfinding is to be provided for the area of the new stairs and elevators at the south end of the Plaza, along the Pedestrian OC and Ramp / Walkway, and at the station platform and emergency egress. Signs shall conform to Metro's Signage Standards Manual and to accessibility standards under Specifications Section 00.04, Standards.

2. Information regarding the iconic signage requirements can be found in Volume II – Specifications and in Volume IV – Technical Reports, Mandatory Requirements, and Non-Mandatory Reference Information.

I. Universal Fare Collection

1. The project includes design and construction of provisions for future Ticket Vending Machines (TVMs), Stand Alone Validators (SAVs), and gating. The provisions include placing conduit with pull cords to service these elements. As shown in Volume III – Preliminary Engineering Drawings, provisions for future gating are to be provided at two locations. Provisions for future TVMs and SAVs are to be located at the Plaza entrance, at the level P-1 elevator entrance, and on the station platform. Locations shown in Volume III are preliminary. Final locations are to be determined by the Contractor and approved by Metro.

J. Public Art

1. The Metro Art Program has commissioned an artist for the design and fabrication of art elements for the project as identified below. Metro Art will manage the project art program including the artist's contract. The Contractor is not responsible for the contract or the management of the artists. The Contractor is to coordinate with the Metro Art representative as required to implement the public art project.

2. As currently envisioned, the artwork consists of 10-inch-square, perforated aluminum panels placed in locations on the Pedestrian Ramp and Pedestrian Overcrossing structures. Each panel hangs from a stainless steel hinge, allowing it to move freely in the wind. An interior layer of continuous perforated metal will form a membrane that will prevent people from touching the moving panels while at the same time creating shade. Panels will be provided with pre-drilled holes for attaching them to the bridge structure. The final layout, configuration, and installation methods for art panels will be determined during final design.

3. Metro will deliver the artwork panels to the Contractor. The Contractor shall install the art panels and provide and install the membrane backing and all hardware necessary to complete the artwork installation. Exhibits showing preliminary details and layouts for the artwork are included in Volume IV of the Project Definition Documents.

1.8 BID OPTIONS

A. Bid Option 1 – Reduced Lanes

1. Metro is evaluating the potential elimination of the access lane to Eastbound El Monte Busway from Patsaouras Plaza. This lane elimination will result in reduced bridge widening on the north side of the existing bridge structure. The reduction in bridge widening may not result in elimination of any proposed bent columns as shown in the ACE design package, referred to as “Base Bid” but will result in less superstructure and reduced foundation requirements. This condition is depicted on Drawing OPT-01 in Volume III “Preliminary Engineering Drawings” of the Project Definition Documents and is referred to as “Bid Option 1 – Reduced Lanes”.

2. The elimination of the access lane may result in the need to revise existing reports or preparation of new / supplemental reports and documents related to the project. The revised or new reports/documents are to be prepared by licensed professionals registered in the State of California and in accordance with Metro and Caltrans’ requirements. The revised reports/documents will have to be reviewed and approved by Metro and Caltrans.

3. The Contractor shall assume that the documents requiring revisions or requiring to be supplemented if the Bid Option 1 is utilized by Metro include (but may not be limited to):

    - Environmental documents as directed by Metro and Caltrans
    - Project Study Report/Project Report (Caltrans)
    - Fact Sheet Exceptions to both Mandatory and Advisory Design Standards (Caltrans)
    - Modified Access Reports (Caltrans/FHWA)
    - Traffic Report (Caltrans)
    - Storm Water Data Report

4. The revised documents / reports are to be completed simultaneously with the final design. No extension in schedule will be permitted for the task to revise / supplement any of the documents noted above or any others required by Caltrans / Metro. Metro has provided an Allowance for the effort to revise / supplement these documents / reports.

5. The Contractor shall prepare revised Preliminary Engineering Drawings for the project elements affected by this lane reduction and submit them for Metro and Caltrans approval prior to start of final design.

6. The Contractor shall provide the increased / decreased costs for incorporating Bid Option 1 in the line items shown in the Schedule of Quantities and Prices. The costs provided by the Contractor shall include all design and construction as defined in the Project Definition Documents. The Contractor's price for Bid Option 1 shall include costs to prepare any revised Preliminary Engineering Drawings as noted above but should not include costs to revise the reports / documents noted above. Costs for the report revisions are addressed in the project Allowances.

7. All Work for Bid Option 1 shall be in accordance with the Project Definition Documents and be completed within the timeframe shown in the Work Completion Schedule of Appendix "A" to the Special Provisions.

B. Bid Option 2 – Revised Ceilings for the Pedestrian Ramp and Pedestrian Overcrossing Structures

1. Metro is requesting bids to provide for an alternate ceiling enclosure on the Pedestrian Ramp and Pedestrian Overcrossing structures.

2. The ceilings of these structures for the Base Bid consist of a stainless steel mesh supported on a structural frame as shown on the drawings of Volume 3 and in the specifications of Volume 2 of the Project Definition Documents – Technical Documents.

3. The ceilings on these structures for Bid Option 2 are to be provided to match the ceiling of the canopy structure located at the Bus Platform. The Bus Platform's canopy ceiling is shown on the drawings of Volume 3 and described in the specifications of Volume 2 of the Project Definition Documents – Technical Documents.

4. Some of the key elements of the Bid Option 2 ceiling include:
    - Painted ornamental steel frame with a corrugated stainless steel deck
    - Structural support system
    - Drainage provisions
    - Conduit raceways
    - Lighting

5. Several components of the Pedestrian Ramp and the Pedestrian Overcrossing Structures will need to be revised (vs. the Base Bid) to accommodate the

revised ceiling design. These revisions include re-design of the ceiling's structural support and may include revisions to the superstructure and substructure design in order to accommodate the increased ceiling loadings.

6. The Contractor shall prepare revised Preliminary Engineering Drawings for the project elements affected by this revised ceiling design and submit them for Metro and Caltrans approval prior to start of final design.

7. The Contractor shall provide the net increase / decrease costs for incorporating Bid Option 2 – Revised Ceilings on Pedestrian Ramp and Pedestrian Ramp Overcrossing. The cost shown by the Contractor shall include all design and construction as defined for these structures in the Project Definition Documents. The Contractor's price for Bid Option 2 shall include costs to prepare any revised Preliminary Engineering Drawings as noted above.

8. All Work for Bid Option 2 shall be in accordance with the Project Definition Documents and be completed within the timeframe shown in the Work Completion Schedule of Appendix "A" to the Special Provisions.

1.9 ADDITIONAL INVESTIGATIONS: UTILITIES, ENVIRONMENTAL, GEOTECHNICAL, AND GEOPHYSICAL

A. General:

1. Metro has completed additional investigations regarding certain elements of the project in order provide the Contractor with more advanced knowledge of those elements than would normally be provided with a Preliminary Engineering package. A short summary of these investigations are as follows:

- Utilities: Metro contracted with consultant TRC to perform additional utility investigations in order to better identify any relocation work that may be needed. The results of this work has been included on the information shown in Volume III – "Preliminary Engineering Drawings" of the Project Definition Documents.

- Environmental: Metro contracted with consultant TRC and Ninyo & Moore to do additional field borings and provide evaluations regarding possible environmental issues at the project site. The results of this investigation are included in TRC's report "Geotechnical and Environmental Investigation Report" which is part of Volume IV – "Technical Reports, Mandatory Requirements, and Non-Mandatory Reference Information" of the Project Definition Documents.

- Geotechnical: TRC and Ninyo & Moore's additional work for Metro included drilling eight (8) borings at the project site, performing soil analysis, and preparation of a preliminary geotechnical evaluation. Their report is included in TRC's report "Geotechnical and Environmental Investigation

Report" which is part of Volume IV – "Technical Reports, Mandatory Requirements, and Non-Mandatory Reference Information" of the Project Definition Documents.

Note: The Preliminary Foundation Report completed earlier by Diaz Yourman & Associates to support the Advanced Planning Studies is also included in the Volume IV as additional reference material for the Contractor.

- Geophysical: Metro contracted with TRC and Spectrum Geophysics to collect geophysical data in three separate areas of the project. This work was performed in order to provide additional information regarding the Red Line tunnels and other buried facilities in those specific areas. The results of this investigation are included in TRC's report "Geotechnical and Environmental Investigation Report" which is part of Volume IV – "Technical Reports, Mandatory Requirements, and Non-Mandatory Reference Information" of the Project Definition Documents.

PART 2 – PRODUCTS - Not Used

PART 3 – EXECUTION - Not Used

PART 4 – MEASUREMENT AND PAYMENT - Not Used

END OF SECTION

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SECTION 01013-DB

CONTRACTOR'S USE OF WORKSITE

PART 1 - GENERAL

1.1 SUMMARY

A. The Work specified in this section consists of requirements for and conditions on Contractor's use of the worksite.

1.2 WORKSITE REQUIREMENTS

A. An area or areas for some staging of construction activities and storage of construction materials will be provided within the project site. A portion of the Parcel APN 5409-022-905 (former Denny's parking area) and a portion of Parcel APN 5409-023-060 as shown on Drawing Sheet C-16 are anticipated to be made available to the Contractor. Specific location and size of Contractor's facilities and related access routes shall be coordinated with Metro.

B. Confine worksite operations to areas permitted by law, ordinances, permits, and Contract Documents.

C. Comply with all safety requirements and orders for protection of the Work and of people and property on, and adjacent to, the worksite when determining amount, location, movement, and use of materials and equipment on the worksite.

D. Do not load the worksite with, or use, equipment or products that would endanger the integrity of the Work or third party facilities, including utilities. Any damage to existing facilities, including parking lot pavement, must be restored to the satisfaction of Metro.

E. Properly protect products stored on the worksite.

F. Relocate stored products that interfere with the operations of Metro, governmental bodies, public and private utilities, and other contractors.

G. Secure additional storage and Work areas needed for operations.

H. Protect Metro employees and the general public and residents from construction-related activities; do not unduly inconvenience those persons by construction activities. Comply with traffic control requirements of the governing agency.

I. If Contractor wishes to have utilities temporary relocated for its convenience, arrange with utility owners and pay for the work.

J. Restrict construction operations to areas within right of way lines, temporary construction lines, permanent drainage easement lines, temporary slope easement lines, and construction staging areas. If no additional easements are indicated, restrict construction operations for permanent drainage facilities to the permanent drainage easement. Do not use temporary easement areas for purposes other than those for which originally acquired. Use of Worksite shall be exclusive and complete, except as indicated on the drawings.

1.3 TEMPORARY USE OF COMPLETED FACILITIES

A. Temporary Use of Elevator: Limit temporary use for construction purposes to one elevator. Comply with the following requirements for elevator used for construction purposes:

1. Provide car with temporary enclosure, either within finished car or in place of finished car, to protect finishes from damage.

2. Provide strippable protective film on entrance and car doors and frames.

3. Provide padded wood bumpers on entrance door frames covering jambs and frame faces.

4. Provide other protective coverings, barriers, devices, signs, and procedures as needed to protect elevator and elevator equipment.

5. Do not load elevator beyond its rated weight capacity.

6. Engage elevator installer to provide full maintenance service. Include preventive maintenance, repair or replacement of worn or defective components, lubrication, cleaning, and adjusting as necessary for proper elevator operation at rated speed and capacity. Provide parts and supplies same as those used in the manufacture and installation of original equipment.

7. Engage elevator installer to restore damaged work, if any, so that no evidence remains of correction. Return items that cannot be refinished in the field to the shop, make required repairs and refinish entire unit, or provide new unit as required.

PART 2 – PRODUCTS - Not Used

PART 3 – EXECUTION - Not Used

PART 4 – MEASUREMENT AND PAYMENT - Not Used

END OF SECTION

SECTION 01020 - DB
ALLOWANCES

PART 1 – GENERAL

1.1 SUMMARY

A. Section includes:

1. Designate in construction schedule delivery dates for products and assemblies specified by allowance.

1.2 ALLOWANCES FOR PRODUCTS

A. Purchase products under each allowance as directed by Project Manager/METRO.

B. Include following amounts in Contract Sum:

1. Allowance No. 1: Reports for Bid Option 1

a. Preparation of revised and supplemental reports as required for Bid Option 1 described in Section 1.8 of the Summary of Work of Volume 1 - General Requirements.

b. The allowance shall be used for all work required to complete the reports and obtain Caltrans and Metro approval.

2. Allowance No. 2: Artifacts

a. Completion of all ARTIFACTS work as described in Section 02090-DB "Artifacts" of Volume 1 - General Requirements.

3. Allowance No. 3: COZEEP

a. Completion of work by the Contractor to meet all requirements of the Caltrans' Construction Zone Enhancement Enforcement Program (COZEEP) as described in Section 00.07 of Volume II – Specifications.

PART 2 – PRODUCTS - NOT USED.

PART 3 – EXECUTION

3.1 INSTALLATION

A. Comply with all requirements of referenced Project Definitions section.

END OF SECTION

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SECTION 01046-DB

ELEVATOR INTERFACE

PART 1 - GENERAL

1.1 DESCRIPTION

A. The Work specified in this Section consists of providing Elevator Subcontractor with available site, including scheduling, sequencing, and coordinating elevator-related Work with Work of Elevator Subcontractor. Elevator-related Work consists of:

1. Elevator pit with sump and ladder, hoistway area, pipe chase for hydraulic fluid pipe, embedded piping, and rough-in for wall fixture, lights and signaling devices recessed in concrete.

2. Elevator cylinder well casing, pipe sleeves, and embedded junction boxes and electrical conduit. Provide equipment room with access and floor drain.

3. Hoistway enclosure as indicated; include guide rail supports, surface mounted junction boxes and electrical conduit for controller feeder and other feeders, light, fire emergency, station annunciator, telephone and convenience outlets, equipment room lighting and ventilation, disconnect switch and access door, hydraulic fluid pipe chase fill, paint and grout for elevator pit, concrete fill and sealant for hoistway entrance frames and hall fixtures.

4. Provide communications conduit for smoke detectors in elevator shaft top and bottom, and elevator equipment rooms.

5. Provide sprinkler and sprinkler piping in elevator shaft top and bottom, and elevator equipment room.

6. Provide electrical conduit for CCTV cameras in elevators.

7. Provide fiberoptic conduit for remote monitoring system for elevators.

B. Definitions

1. Pit - That portion of hoistway extending from threshold level of lowest landing door to floor at bottom of hoistway.

2. Elevator equipment room - The space which will contain elevator control equipment and machinery.

3. Equipment room and hoistway pit access - The means of entering equipment room and hoistway pit as required in Cal/OSHA Elevator Safety Orders.

4. Hydraulic fluid pipe - Embedded hydraulic fluid lines between equipment room pump and the cylinder well in the pit fitted with grooved fittings.

5. Pipe sleeves - Short tube or pipe preset in concrete floor or wall through which hydraulic fluid pipe will be run from machine room to cylinder head in pit, to allow pipe's free longitudinal movement.

6. Pipe chase - Channel or trench in floor for hydraulic fluid pipe to lay in.

7. Hoistway enclosure - The fixed structure consisting of vertical walls or partitions which isolate hoistway from platform, mezzanine, and plaza areas, in which hoistway door assemblies are installed.

8. Clearance, bottom of car - The clear vertical distance between pit floor and lowest structural or mechanical part, equipment or device installed beneath car platform, except guide shoes and platform aprons or guards, when car rests on fully compressed buffers.

9. Clearance, top of car - The shortest vertical distance between crosshead or highest structural or mechanical part, equipment or device installed on top of car and nearest part of overhead structure, or other obstruction, when car floor is level with top terminal landing.

10. Available site - The elevator hoistway area with following events completed or provided by Contractor in accordance with Contract:

    a. Access route available to elevator hoistway and equipment room, clear and free of construction materials and debris, to permit delivery of elevator materials and equipment to hoistway and equipment room.

    b. Area in and around elevator hoistway, pit and equipment room is clear and free from construction materials and debris, to permit unloading and installation of rigging required for elevator materials and equipment.

    c. Temporary or permanent electric power, 480 volts, three phase, 60 Hz available at main line disconnect switch not later than actual site availability date.

    d. Hydrocarbon-resistant elevator well casing in place with accessories as indicated; casing plumb, sealed and watertight; pipe sleeves for hydraulic fluid lines and conduit in-place; and embedded hydraulic lines and conduit in-place.

e. Elevator pit floor finished and pit watertight with sump or drain as indicated; ladder, embedded conduits, junction boxes, outlets and switches, installed.

f. Hoistway area dry and covered for protection from exposure to elements.

g. Elevator hoistway area constructed with rough openings for doors in concrete walls, hoistway door sill supports, embedded conduit and outlet boxes in place.

h. Elevator hoistway finished with plumb walls and rough openings for elevator doors, guide rail support, hoistway door sill supports, conduit and outlet box for car lights, conduit and pull box for communication, telephone and security circuits in place.

i. Elevator equipment foundation and overhead beam support in place.

j. Elevator equipment room area complete with embedded conduit and junction boxes.

k. Elevator equipment room complete with main line disconnect switch and feeder wires, conduit and junction box for supervision and control circuits, conduit and junction boxes for telephone circuits, equipment room light and convenience outlet, door with lock.

l. Elevator equipment room adequately ventilated with temperature maintained between 65°F and 100°F.

C. Contractor remains responsible for the Work of the Elevator Subcontractor as part of this Contract. The intent of this section is to ensure that required preparatory Work is performed properly and in a timely manner.

1.2 SUBMITTALS

A. Refer to Section 01300-DB, Submittals, for submittal procedures.

B. Elevator interface schedule showing requirements of interface Work with Elevator Subcontractor.

C. Include only Work not to be performed by Elevator Subcontractor. Incorporate interface schedule in submittal required by Section 01310-DB, Cost/Schedule Integration System.

D. Coordinated layout of standard elevator pit.

PART 2 – PRODUCTS - Not Used

PART 3 - EXECUTION

3.1 SITE

A. Provide Elevator Subcontractor with available site as defined above.

3.2 SCHEDULING

B. Cooperate with Elevator Subcontractor in preparation of Station/Elevator Interface Schedule which Elevator Subcontractor is required to submit to Metro for review and acceptance.

PART 4 - MEASUREMENT AND PAYMENT

4.1 MEASUREMENT

A. The Work of this Section will be measured as a unit, acceptably completed.

4.2 PAYMENT

A. Payment will be made under the applicable Schedule of Values item for Elevator Enclosure.

END OF SECTION

SECTION 01170 - DB

ARCHAEOLOGICAL AND PALEONTOLOGICAL COORDINATION

PART 1 - GENERAL

1.1 DESCRIPTION - The Work specified in this Section consists of coordinating excavation or grading operations with Project Archaeologist (PA), a consultant hired by Metro, temporary suspension of excavation operations at specific isolated locations for archaeological and paleontological excavations, and relocating excavation or grading operations temporarily to bypass archaeological discovery sites.

1.2 JOB CONDITIONS

A. Pre-excavation Meeting - Before commencement of excavation or grading at Worksites, hold a pre-excavation meeting to discuss excavation methods to be used in field, and establish lines of communication between the Contractor, Metro or its designee and the PA regarding archaeological or paleontological discoveries and their removal. Metro will familiarize the Contractor with specific types of archaeological or paleontological materials that may be encountered, extent of cooperation with the PA, and methods of dealing with discovery of resources. Metro will familiarize the PA with excavation procedures.

B. Coordination between PA and Contractor shall flow through Metro or its designee..

PART 2 - PRODUCTS

Products are not required for this Section.

PART 3 - EXECUTION

3.1 COORDINATION - Coordinate excavation operations with the PA. The PA will be responsible for monitoring removal of earth from excavation sites for archaeological or paleontological resources. If such resources are encountered, the PA will determine significance and, if required, will recover resources and associated data.

3.2 MONITORING

A. The PA will provide monitoring of excavation to ensure discrete deposits and individual archaeological or paleontological features are not inadvertently lost.

B. The PA will assign a trained monitor to observe earth-moving activities. It may be necessary to temporarily suspend earth-moving activities if archaeological or paleontological resources are found. The PA will determine type, period and significance of resource and appropriate excavation and removal procedure to be followed.

C. Monitoring activities will continue until excavation has passed zone where archaeological or paleontological finds are considered likely.

3.3 TREATMENT OF DISCOVERY - If an archaeological or paleontological deposit is encountered during excavation, temporarily halt Work without additional cost or delay in immediate area so that the PA can conduct an evaluation to determine whether discovery is significant. Work stoppage for evaluation and data recovery, if necessary, will be held to a minimum. The Contractor shall redirect Work activities to work around the discovery area until a determination is made as to the significance of the discovery.

3.4 RECOVERY - When the PA determines an archaeological or paleontological discovery is significant, provide labor, materials and equipment to excavate, load, transport and unload discovery within Project limits as requested by the PA and accepted by Metro or its designee.

PART 4 - MEASUREMENT AND PAYMENT

4.1 MEASUREMENT

A. The Work of this Section will not be measured separately for payment, except as described below in 4.1.B.

B. The Work required for archaeological or paleontological discovery excavation, removal, and relocation will be paid for separately.

4.2 PAYMENT will be made under:

A. Payment will be made under the applicable Schedule of Values item for General Requirements – Nonspecific except as described below in 4.2.B.

B. Compensation for archaeological or paleontological discovery excavation, removal, and relocation will be paid for separately in accordance with General Conditions Article, Changes.

END OF SECTION

SECTION 01200-DB

PROJECT MEETINGS

PART 1 - GENERAL

1.1 DESCRIPTION

A. The work specified in this Section requires Contractor, Project Manager or Superintendent, Safety Representative, and others as required to attend meetings scheduled by Metro for collection and dissemination of information related to this Contract.

B. Contractor shall prepare minutes of each project meeting and distribute to all participants.

C. Notify Metro of proposed safety meetings. Metro or its designee will advise Contractor about contract-related safety information, safety meetings and safety-related issues.

PART 2 - PRODUCTS - Not Used

PART 3 - EXECUTION

3.1 PRE-DESIGN MEETING

A. Scheduled by Metro or its designee after Contract award, and before issuing a Notice to Proceed for Design. The purpose of this meeting is to introduce and discuss responsibilities of Metro‘s representative for quality assurance and Metro's Design Manager to their counterparts in the Contractor‘s organization, and to establish lines of communications for the Project.

3.2 DESIGN PROGRESS AND REVIEW MEETINGS

A. Scheduled by Metro or its designee after review of 60%, 90%, and 100% Design Submittals. The purpose is to review and discuss Metro‘s review comments. Additional design meetings for reviewing and discussing project design issues shall be pre-arranged by Contractor and approved by Metro.

3.3 PRE-CONSTRUCTION MEETING

A. Scheduled by Metro after receipt of approved final Design Documents, before issuing Notice to Proceed for Construction. The purpose of meeting is to introduce Metro's representatives for safety and quality assurance and Metro's Construction Manager to their counterparts in Contractor's organization and to establish lines of communication between these representatives.

3.4 SPECIAL MEETINGS BETWEEN CONTRACTOR AND METRO

A. Scheduled by Metro throughout course of construction, as Metro deems necessary.

3.5 INITIAL CONSTRUCTION MEETING

A. Scheduled by Contractor not more than 7 working days after the effective date of Notice to Proceed for Construction.

B. Metro will perform the following:

1. Distribute notice of meeting, along with agenda of subjects to be addressed.

2. Conduct the meeting with SAFETY CONTACT as the first order of business.

3. Explain and discuss responsibilities and authorities of Metro, its representatives, and the Contractor.

4. Discuss Equal Employment Opportunity (EEO) and affirmative action requirements.

5. Explain requirements of labor provisions stipulated by U.S. Department of Transportation.

6. Explain and discuss codes, traffic regulations, permit requirements of public agencies and their regulations.

7. Discuss quality assurance and inspections.

8. Discuss procedures for processing Change Notices, Change Orders, Configuration Management, Shop and Working Drawings, Product Data and Samples.

9. Discuss safety and security.

10. Discuss monthly estimate cut-off dates and progress payments.

11. Discuss schedule and cost control.

12. Discuss partial and final payments.

C. Contractor's Responsibility:

1. Perform the following:

a. Require Contractor's project manager / superintendent, safety representative, EEO officer, project quality manager, and subcontractor representatives to attend meeting.

b. Introduce Contractor's representatives, and briefly describe each person's responsibilities.

c. Distribute and discuss list of major subcontractors, sequence of critical work, and tentative schedule of construction.

d. Discuss submittals and required reports.

e. Discuss use of storage areas, construction areas, and temporary easements and facilities.

f. Define housekeeping procedures.

g. Discuss construction methods.

h. Describe construction sequencing, general Worksite layout, erosion and sedimentation controls, haul routes, noise, air and water pollution controls, and temporary street impacts and restoration.

i. Discuss coordination with public agencies for permits and inspection.

j. Discuss coordination and notification for utility work.

k. Discuss deliveries and priorities of major equipment.

l. Discuss breakdown of lump sum items.

m. Discuss construction progress schedule.

3.6 INITIAL SAFETY AND QUALITY ASSURANCE MEETING will be scheduled not later than seven working days after initial construction meeting.

A. Metro will perform the following:

1. Explain and discuss insurance requirements and introduce representatives of Metro Insurance Administrator.

2. Discuss submittal of Contractor's Safety and Security Plan, and introduce Metro's construction safety and security representatives.

3. Discuss quality control, inspection, and coordination of Work with Metro's system as a whole, and introduce Metro's Quality Assurance / Quality Control (QA/QC) representatives.

B. Contractor - Define arrangements for safety, first aid, emergency actions, security, and full-time safety representative.

3.7 CONSTRUCTION PROGRESS MEETINGS

A. Scheduled weekly and may be more often as necessary for competent and timely execution of work.

1. Perform following by Contractor:

a. Distribute notices of meetings before such meeting, to subcontractors engaged in construction, those expected to be engaged in work before next scheduled meeting, and to Metro or its designee.

b. Require designated personnel, as listed in Initial construction meeting, to attend.

c. Prepare meeting agenda.

2. Agenda:

a. Conduct the meeting with SAFETY CONTACT as the first order of business.

b. Introduce new attendees and areas of responsibility.

c. Review minutes of previous meetings, amend minutes if necessary, and accept minutes.

d. Safety.

e. Third party coordination.

f. Analyze work accomplished since previous meeting, coordination of Work with other contracts, offsite fabrication problems, product delivery problems, submitted schedule slippages, problems arising from proposed changes, and other circumstances which might affect progress of Work.

g. Discuss sequence of Work on critical path, and schedule of construction using Progress Schedule.

h. Discuss observations, problems, Work quality, and employee work standards.

i. Discuss coordination of utility Work.

j. Discuss traffic control plans and anticipated third party coordination.

k. Discuss changed conditions, associated costs, time extensions and other relevant subjects as required.

l. Discuss corrective measures to maintain construction schedule when necessary.

m. Discuss upcoming scheduled work.

n. Discuss three-week construction schedule.

3. Answer inquiries, requests for information or requests for solutions of problems presented during such meetings, when possible, during meeting; resolve those not answered during meeting, document and deliver in person or by mail to person requesting information within 3 calendar days of close of the meeting. Record answers provided orally at meetings in the minutes.

3.8 CONDUCT TOOL BOX MEETINGS as indicated in Construction Safety and Health Manual.

3.9 PARTICIPATE IN READINESS REVIEW MEETING – Participate in readiness review meetings prior to commencing with complex construction operations as requested by Metro.

PART 4 - MEASUREMENT AND PAYMENT

4.1 MEASUREMENT – The Work of this Section will be measured as a unit, acceptably completed.

4.2 PAYMENT will be made under the applicable Schedule of Values Item for General Requirements - Nonspecific.

END OF SECTION

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SECTION 01300-DB

SUBMITTALS

PART 1 - GENERAL

1.1 DESCRIPTION - The Work specified in this Section summarizes requirements and procedures for submitting documents defined herein. Appendix A provides a Submittal Summary Index, specifying which submittals require review and approval by Metro, and which submittals are transmitted for record only, as defined herein.

1.2 QUALITY CONTROL

A. Prepare Drawings, Shop Drawings, other materials, and record documents to a high standard of quality, such as the standards set forth below. Refer to Section 01720-DB, As-Built Drawings and Current Status Documents, for marking details on as-built drawings. Of the reference standards cited below, first comply with standards of the agency having jurisdiction (Metro, Caltrans, or the City of Los Angeles); follow NIBS or ASME standards for items not addressed by agency standards.

B. Reference Standards

1. Metro

   CADD Standards Manual

2. Caltrans

   Plans Preparation Manual
   Available at: www.dot.ca.gov/hq/oppd/cadd/usta/ppman/default.htm
   or through http://dot.ca.gov/hq/esc/techpubs/

   CADD Users Manual
   Available at: www.dot.ca.gov/hq/oppd/cadd/usta/caddman/default.htm
   or through www.dot.ca.gov/hq/oppd/cadd/rsc_files/webpage.htm

3. City of Los Angeles

   Standard Plans and SSPWC with Brown Book

4. National Institute of Building Sciences, Building Smart Alliance (NIBS)

   U.S. National CAD Standard
   Available at: www.buildingsmartalliance.org/index.php.ncs

5. American Society of Mechanical Engineers (ASME)

   ANSI/ASME Y14.100, Engineering Drawing Practice
   Available at: http://catalog.asme.org/

1.3 SUBMITTALS

A. Design Documents – Design drawings, reports, and specifications as defined in Section 00700-DB, Design Management.

B. Construction Drawings/Specifications – Issued for Construction Drawings and Specifications, and subsequent revisions. Refer to Section 01720-DB, As-Built Drawings and Current Status Documents.

C. Shop Drawings - Fabrication or layout drawings required to supplement Construction Drawings or individual Specification Sections for permanent incorporation in the Work. Refer to Section 01720-DB, As-Built Drawings and Current Status Documents.

D. Working Documents - The Contractor's plan for temporary equipment or structures such as decking, temporary bulkheads, support of excavation, support of utilities, ground water control, and forming and falsework; and for such other Work as may be required for construction but do not become an integral part of permanent Work. Submit working drawings and signed and stamped associated calculations as required by Contract Documents for temporary Work which will not become a part of permanent structures included in this Contract.

   1. Provide cross-reference to Construction Drawing numbers. Use a Working Drawing sheet with a maximum size of 22 inches by 34 inches. (Refer to Section 01720-DB, As-Built Drawings and Current Status Documents.)

   2. Have Working Drawings prepared, stamped and signed by an engineer of the involved discipline, currently registered as a professional engineer in the State of California.

   3. Verify field measurements and coordinate with pertinent Contract Drawings from other Contracts, where applicable.

   4. Distribute copies of Working Drawings and calculations after Metro or its designee's review and approval.

E. Engineering Calculations - Where required by Contract Documents, signed and stamped by an Engineer Registered in the State of California of the involved discipline. Have calculations, required by specifications Sections, prepared on 8-1/2 inches by 11 inches sheets. When calculations accompany drawings in a submittal, the body of the calculations must contain cross referencing to the individual drawing to which the page of the calculations pertain.

F. Permits, Third Party Inspection Reports, Third Party Sign-offs – Documentation that provides verification of third party permission to Work and approval of Work during Construction and at Project Completion.

G. Certifications and Documentation - As identified in Contract Documents, certificates or certified test results that demonstrate proof of compliance with Specifications for products, materials, equipment, systems, and qualifications of personnel, manufacturers, fabricators and installers. Documentation required by Contract Documents including miscellaneous items such as delivery tickets, batch tickets and bills of materials.

H. Inspection and Test Procedures/Reports - Test Procedures for review and acceptance by Metro or its designee before commencement of testing. Provide test reports in the accepted format for review by Metro or its designee. Refer to Contract Documents relating to specific mechanical and electrical equipment for further testing requirements.

I. Manufacturer/Product Data – Standard schematics and drawings, stamped calculations and data, and product data.

    1. Modify manufacturers' standard schematic drawings to delete information, which is not applicable to the Contract. Supplement standard information with additional information applicable to this Contract.

    2. Modify manufacturers' standard catalog cuts, brochures, diagrams, schedules, performance charts, illustrations, calculations, and other descriptive data to delete information that is not applicable to the Contract. Failure to comply with this requirement will result in rejection of the submittal. Indicate dimensions, clearances, performance characteristics, capacities, wiring and piping diagrams, controls, and other information as required.

    3. Modify manufacturer's printed installation, erection, application and placing instructions to delete information that is not applicable to the Contract.

    4. Include appropriate information as required herein and the Contract Documents.

5. Submit Certificates of Compliance for those products called out in the Contract Documents not later than 30 days before products are installed. Have copy of certificate accompany the product for which the certificate is prepared. Include on the certificate:

    a. Affirmation that the product complies with respective requirements indicated.

    b. Submittal date, Contractor's name and address, Contract Title and Number, product represented and its location in the Contract, producer's name, product trade name and catalog number, place of product origin, test date, testing organization's name and address, and quantity of the product furnished.

    c. Signature of an officer or other authorized representative of the manufacturer or producer.

J. Permanent Materials Data, Mock-ups, and Samples - As required by Contract Documents.

1. Submit samples of sizes and quantities to clearly illustrate full color range and functional characteristics of products and materials, including attachment devices. Indicate country of origin.

2. Erect field samples and mock-ups at the Worksite as specified in Contract Documents and as may be necessitated by the Contractor submitting value engineering proposals or substitutions, at locations acceptable to Metro or its designee.

3. Include appropriate information and have product data accompany samples.

Right is reserved to require submittal of samples or site mock-ups of any material whether or not such material has been previously approved for use elsewhere on the Project.

K. Operation and Maintenance Manuals - Operation and maintenance manuals for equipment and systems as specified in Section 01730-DB, Operation and Maintenance Data.

L. Construction Progress Photographs – Photographs documenting construction progress as specified in Specifications Section 10.01, Photography.

M. Construction Schedules – Refer to Section 01310-DB for submittal requirements.

N. The Contractor shall submit and obtain approvals from the appropriate departments of the City of Los Angeles, Caltrans, and all other Third Parties. The Contractor shall perform all submittals, and resolution of all comments. The Contractor shall provide Metro with a copy of all comments from City departments, Caltrans, and all other Third Parties. For LABOE, Plan Submittals shall include 1 full size copy, and 4 half size. Other documents, i.e., Engineering Calculations, Shop Drawings, Plans Clarifications, and Requests for information, etc. shall be 4 copies.

1.4 SUBSTITUTIONS – NOT USED

1.5 CHANGES proposed by the Contractor to items listed in paragraph 1.3 above will not be permitted unless those changes have been submitted and accepted in writing, by Metro or its designee.

1.6 CADD Drafting Standards - When submitting information, design drawings, submittals, as-builts or any other requested or required documentation as a CADD format, Contractor shall submit such CADD information in full compliance with the applicable CADD standards for Agency being submitted to, (e.g. (1) Metro, (2) LABOE, (3) LABSL, (4) LADOT, (5) Caltrans, etc.).

PART 2 - PRODUCTS

2.1 MASTER LIST OF SUBMITTALS

A. Identify submittal requirements and determine the date on which each submittal is required in conformance with schedules specified in Section 01310-DB, Cost/Schedule Integration System. Include submittals required under the Project Definition Documents (including General Requirements, Specifications, General Conditions, Special Provisions, and Preliminary Engineering Drawings) and applicable standards. Within 30 days after the effective date of Notice To Proceed, furnish a list of submittals required by the Contract Documents, with corresponding submittal dates which match milestones listed in the CPM Contract Schedule from Section 01310-DB and allow for not less than 30 day cycles for review by Metro or its designee. The list is to be furnished in both hard copy and in a compact disk (CD), in spreadsheet format.

B. Include submittal requirements for long lead procurement items and determine the date on which each submittal is required in conformance with schedules specified in Section 01310-DB, Cost/Schedule Integration System. Include required dates, corresponding to contract schedule milestone dates under Section 01310-DB, for long lead submittal approval, long lead bidding and contracting processes, and receipt of long lead products or materials.

C. Include submittal requirements for Third Party submittals and determine the date on which each submittal is required in conformance with schedules specified in Section 01310-DB, Cost/Schedule Integration System. Include required dates, corresponding to contract schedule milestone dates under Section 01310, for Third Party submittal approval. Allow submittal review time as required by Third Party reviewers, not less than 30 days for Caltrans.

2.2 PRIMAVERA CMI

The Contractor is required to utilize Metro's Primavera Contract Management Web Interface (CMI) for transmitting electronic files and data. Metro will provide training (up to 4 hours) and support for the system. The Contractor shall provide Internet access for Contractor's designated users. The Primavera CMI system is hosted on a Metro website.

Project data to be submitted electronically in the following formats:

- Drawing files in AutoCAD format (exported to AutoCAD format from other CAD systems acceptable) and PDF (in 11" x 17" and 22" x 34" page format). Provide a narrative description of the file organization and a drawing list including file name, drawing number, and sheet number.

- E-mail, letters, spreadsheets, charts, submittals, documents, manuals, pictures, graphs, etc. in native and PDF format (TIFF or JPEG as an alternative).

- Requests for Information (RFI) or Requests for Change (RFC) – input data in CMI.

2.3 SUBMITTAL FORMAT AND INSTRUCTIONS

A. Drawings - Show the following information:

1. Create in AutoCAD 2008 or higher and/or Microstation V8 or higher as appropriate under "CADD Drafting Standards" requirements above.

2. Drawing size 22" x 34", unless otherwise approved by Metro.

3. Title block including title of drawing and engineering contractor and sub-contractor logo and or identification.

4. Drawing title, date and revision dates, scale and consecutive drawing numbers.

5. Contract title and number.

6. Drawing number using codes in attached Appendix B.

7. Professional Engineer Seal, expiration date, and signature of an engineer, currently registered in the State of California for the involved discipline.

8. Construction Drawings cross-referenced to Shop Drawings and vice versa.

B. Submittals - Show the following information when applicable:

1. Names of Contractor, subcontractors, suppliers, manufacturers and, when applicable, the Professional Engineer Seal, expiration date, and signature of an engineer, currently registered in the State of California for the involved discipline.

2. Identification of product by either description, model number, style number, serial number or lot number, and finish numbers.

3. Subject identification by CDRL reference.

4. Relation to adjacent structures or materials.

5. Field dimensions, clearly identified as such.

6. Applicable standards, such as ASTM or Federal Specification numbers.

7. Identification of deviations from Contract Documents.

8. Contractor's stamp, signed and dated, certifying:

a. Review of submittals for compliance with Contract requirements.

b. Verification of field measurements.

c. Verification of subcontractors' Work for accuracy.

d. Compatibility of the Work shown thereon with affected trades and other contracts.

C. Unless specified otherwise, transmit submittals at least 30 calendar days before commencement of related Work. If For Record Only Submittals are transmitted less than 30 calendar days before commencement of related Work, obtain Metro approval prior to commencement of Work. For Review and Approval Submittals, do not start Work until required submittals are accepted by Metro.

D. Allow 30 calendar days for review of each submittal cycle by Metro or its designee.

E. Ship submittals prepaid, by overnight express delivery or hand carry to Metro. Simultaneously submit electronic files through Metro's Primavera Contract Management Web Interface (CMI).

F. Accompany submittals with a Contractor Transmittal Form containing the following information:

1. Contractor's name, address, telephone number and for home office or field office.

2. Submittal number based on CDRL number and date.

3. Contract title and number.

4. Supplier's, manufacturer's or subcontractor's name, address and telephone number.

5. Subject identification.

6. Identification of deviations from Contract Documents, if any, for which the Contractor seeks approval.

7. Copy of subcontractor's or supplier's transmittal to Contractor.

8. List of all City agencies, Caltrans offices, and other Third Parties receiving copies.

G. Provide sufficient data with subsequent submittals initiated by the Contractor for consideration of corrective procedures for review. Make subsequent submittals in the same manner as initial submittals.

H. Incomplete or partial submittals will be returned to the Contractor without review.

I. Illegible facsimile copies of any portion of a submittal will not be accepted.

J. Substitution or Deviations - Stamp the submittal or drawings "SUBSTITUTION" or "DEVIATION" in 1/2-inch minimum size diagonal letters.

2.4 QUANTITIES

Refer to Appendix A, Submittal Summary Index, for submittal quantity and media requirements. Refer to paragraph 2.2 of this Section for electronic file

requirements. Refer to Section 01720-DB, As-Built Drawings and Current Status Documents, for as-built document requirements. Refer also to Section 01310-DB, Cost/Schedule Integration System, for schedule format and software requirements.

2.5 CITY OF LOS ANGELES REVIEW

A. The City shall have 20 working days to review and return comments for each set of plans to the Contractor.

B. The City shall have 7 working days to reject any submittal altogether.

C. The City shall have 20 working days after receiving a resubmittal to review and return comments to the Contractor.

D. Design Unit Submittal shall be reviewed at 60%, 90%, 100%, and AFC (Authorized for Construction) stages of design development.

PART 3 - EXECUTION

3.1 CONTRACTOR'S REVIEW - Review submittals, stamp and sign as reviewed and approved, before submission to Metro or its designee. Failure to comply with this requirement will result in immediate return of the submittal without review. See also Section 00700-DB, Design Management, for Contractor's Design Review and Approval requirements.

3.2 METRO'S REVIEW

A. Submittals will be reviewed for conformance to requirements of the Contract Documents. Review of a separate item will not constitute review of an assembly in which the item functions. Review will not relieve Contractor from his responsibility for accuracy of submittals, conformity of submittals to requirements indicated, compatibility of described product with contiguous products and the rest of the system, or for prosecution and completion of the Contract in accordance with the Contract Documents.

B. Metro will respond within 30 calendar days after submittals have been received. Submittals will be reviewed as follows:

1. DESIGN SUBMITTAL ACCEPTED AS NOTED means that the design documents have been reviewed and accepted as design submittal with comments as noted on attached Design Review forms. Refer to Section 00700-DB, Design Management, for design review and procedures requirements.

2. APPROVED is an approval, and means every illustration and description appears to conform to the respective requirements of the Contract

Documents; fabrication, assembly, manufacture, installation, application and erection of the illustrated and described product may proceed; the submittal is accepted for construction and need not be resubmitted.

3. REJECTED, REVISE AND RESUBMIT is a rejection, and means the submittal is deficient to the degree the reviewer cannot correct the submittal with a reasonable degree of effort, has not made a thorough review of the submittal, and the submittal needs revision and is to be corrected and resubmitted, within 30 calendar days for review.

4. RECORD ONLY means the submittal was not reviewed for approval and was received for information only. Metro may, however, use the submittal to verify or monitor Contractor's Work and/or progress. Refer to Appendix A Submittal Summary Index for the types of documents to be submitted For Record Only.

3.3 CONTRACTOR'S RESPONSIBILITIES

A. Coordinate each submittal with requirements of the Work; place particular emphasis upon ensuring that each submittal of one trade is compatible with other submittals of that trade and submittals of other trades.

B. Approval by Metro or its designee of submitted Drawings and associated calculations does not relieve the Contractor from responsibility for errors or omissions in the Drawings and associated calculations, or from deviations from the Contract Documents, unless such deviations were specifically called to the attention of Metro or its designee in the Letter of Transmittal submitted with the Drawings. The Contractor is responsible for correctness, accuracy and completeness of the drawings, for shop fits and field connections, dimensions and quantities and for results obtained by use of such drawings.

C. Distribution of Submittals After Review - Distribute prints of accepted submittals, bearing Metro or its designee's stamp and signature, to concerned subcontractors, suppliers and fabricators; and to concerned members of Contractor's Workforce.

D. Contractor's liability to Metro, in case of deviations in the submittals from requirements of the Contract Documents, is not relieved by Metro or its designee's review and approval of submittals containing deviations, unless Metro expressly approves deviations by issuing a Change as specified in General Conditions Article 33.

E. Do not start Work for which submittals are required until Contractor has received evidence of Metro's review and approval of all related submittals.

F. Before making submittals, ensure that products are available in quantities required by the Contract.

G. Verify field measurements, catalog numbers and similar data.

H. Resubmittals - Make any corrections required by Metro and resubmit for approval. Direct specific attention in writing, on resubmitted shop drawing to revisions other than the corrections by Metro on previous submittal.

3.4 SUBSTITUTIONS

A. Substitutions consists of preparing, submitting, amending and updating lists of products or methods of construction which the Contractor proposes to furnish and install instead of those indicated.

B. Propose substitutions in accordance with provisions indicated and include documentation on methods of construction, materials, products and supplies which are proposed for substitution instead of items shown or methods indicated or implied in the Contract Documents.

C. Equipment, material or products proposed as alternates or proposed due to commercial unavailability of a listed product, material or item of equipment, will not be considered as a substitution.

D. Substitutions indicated, or implied, on Shop Drawings or product data submittal will not be considered unless a request for substitution has been submitted in conformance with this Section.

E. The list of materials, products and supplies, and the list of methods of construction for substitution of those indicated will be considered only if those requests have been submitted. Approval of substitute items or methods will be only for characteristics and the use named in the approval. This approval will not be interpreted as a modification of Contract Documents, nor to establish approval of products and methods for other portions of Metro's System. Approval of a substitution does not relieve the Contractor of responsibility of fulfilling requirements of the Contract Documents. Metro or its designee will judge quality and suitability of substitute items or methods and its decision is final. If use of substitute products or methods involves redesign of other parts of the Work, perform redesign and submit for approval by Metro or its designee. Bear the cost and time of redesign and include the direct cost of evaluating substitutions by Metro or its designee.

F. Include the following information with documentation for materials, products and supplies:

1. Complete data substantiating compliance of proposed substitution with requirements of the Contract Documents.

2. Identification of materials, products or supplies, including manufacturer's name, address, catalog name and number.

3. Installation characteristics, installation drawings and manufacturer's literature, including product description, performance and test data, and reference standards if pertinent.

4. Name and address of projects on which the product was used under similar circumstances, and date of installation.

5. Itemized comparison of proposed substitution with the item specified. Include in a tabular form differences in materials, size, finish, estimated life, estimated maintenance, availability of spare parts and repair services, energy consumption, performance capacity, salvageability and manufacturer's warranties.

6. Effect of change on Construction Schedule.

7. Accurate cost data for the proposed substitution in comparison with the product specified.

8. Equitable adjustment and credit which the Contractor proposes to offer Metro.

9. When applicable or requested by Metro or its designee, provide off-the-shelf samples of the specified item and the proposed substitution.

G. Certify the following when making a request for substitution:

1. Personally investigate the proposed item and determined it to be equivalent, or superior, to that indicated; and update information as new or different data becomes known to him.

2. Furnish the same warranty for substitution as for the product specified.

3. Coordinate installation of the accepted substitution into the Work, and make those changes, subject to acceptance by Metro or its designee, required for the Work to be complete in all respects.

4. Waive claims for additional cost and time related to the substitution.

5. Provide complete cost data, including related costs and time, except the costs of Metro or its designee's for redesign or review of the Contractor's design.

6. Provide log detailing efforts to obtain specified products before efforts to obtain proposed substitution.

H. Include the following information in documentation for construction methods:

1. Detailed description of proposed methods.

2. Working Drawings illustrating the methods.

3. Itemized comparison of proposed substitute methods with methods shown, with product implied or specified. Include differences in estimated time for execution, labor, materials; revisions to construction process; and cost.

PART 4 - MEASUREMENT AND PAYMENT

4.1 MEASUREMENT - The Work of this Section will be measured as a unit, acceptably performed.

4.2 PAYMENT will be made under the applicable Schedule of Values item for General Requirements (Nonspecific).

END OF SECTION

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Section 01300-DB - Submittals
Appendix A - Submittal Summary Index

				Copies		
Description	Submit for Approval	Submit for Record	Original	Full size	Half size	Electronic
Design Units as specified in Document 00700 and other submittals stated as required for approval	x			6	1*	1
Construction Drawings		x	**	5	2	1
Shop Drawings: construction installation, erection, application and placing instructions, placement drawings		x	1	5		1
Working Documents		x	1	5	1*	1
Drawings (working and shop)		x		6	1	1
Engineering Calculations with California Professional Engineering stamp in discipline		x	2	4	1	1
Permits, third party inspection reports, third party sign-offs		x	1	5		1
Certifications		x	1	5		1
Reports (inspection and test)		x	1	5		1
Manufacturer Data: standard schematics and drawings, stamped calculations and data		x	1	5		1
Quality Assurance Records: QA Audit Reports Surveillance Reports Quality Action Requests Inspection Nonconformance Reports		x	1	5		1
Permanent Materials, Product Data and Samples: mock-ups, other physical pieces of materials and performance of workmanship	x		3			
Operation and Maintenance Manuals	x		6			1
Construction Photos (color)		x	3			1
Construction photos electronic files on CD		x	1			1
As-Builts including CADD files	x		2			1

*Drawings only
**Original drawing required at Approved for Construction Level only with California Professional Engineer's seal in discipline and wet signature, and for subsequent revisions if a different Engineer is signing.

Section 01300-DB – Submittals

Appendix B

DRAWING CODES

DISCIPLINE	CONTRACT DRAWING	STANDARD DRAWING	DIRECTIVE DRAWING
Architectural	A	AS	AD
Automatic Train Control	Q	QS	QD
Civil	C	CS	CD
Communications	N	NS	ND
Control Surveys	W	WS	WD
Electrical	E	ES	ED
Elevators and Escalators	H	HS	HD
Fare Collection Equipment	F	FS	FD
General Information	G		
Landscaping/Irrigation	L	LS	LD
Life Safety	B	BS	BD
Mechanical/HVAC	M	MS	MD
Electrical	E	ES	ED
Electrical - Lighting	EL		
Electrical - Grounding	EG		
Electrical - Communications	EC		
Electrical - Power	EP		
Plumbing/Fire Protection	PF	MS	MD
Right-of-Way	R	RS	RD
Soil/Geology	K	KS	KD
Special Studies	J	JS	JD
Structural	S	SS	SD
Tunnel	Y	YS	YD
TrackWork	T	TS	TD
Traction and Auxiliary Power	P	PS	PD
Utilities	U	US	UD

Section 01300-DB – Submittals

Appendix B

DRAWING CODES

DISCIPLINE	CONTRACT DRAWING	STANDARD DRAWING	DIRECTIVE DRAWING
Existing Utilities	UE		
Utilities Profile	UP		
Utilities Rearrangement	UR		
Utilities Overhead	UO		
Utilities Pothole	UH		
Signage & Graphics	ZA		
Illuminated Signs and Edge Lights	ZB		
Vehicle Directive			VD
Reference Drawing	RE		
Overhead Contact System	OC		
Seismic Detection	SC		
Staging Drawing	SG		
Cable Transmission	CT		
Supervisory Control & Data Acquisition	SA		
Building Underpinning	BP		

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SECTION 01310-DB

COST/SCHEDULE INTEGRATION SYSTEM

PART 1 - GENERAL

1.1 DESCRIPTION - The Work specified in this Section consists of developing and maintaining an accurate cost/schedule integration system in sufficient detail to show a logical sequence in which Contractor proposes to carry out all Work required under this Contract. It is the Contractor's responsibility to effectively plan, schedule, manage, and execute the Work in accordance with Contract Documents.

A. Contractor shall generate cost/schedule integration system products using the schedule software program in use by Metro. Metro uses Primavera Version 6.0 or greater. Metro will provide an electronic file that will contain a Primavera P6 schedule development template on or before Contract Notice to Proceed.

B. Contractor shall submit hard copy and include a Compact Disc (CDR or CD-ROM), electronic write-protected computer generated back-up copy of the Level One Schedule, Baseline CPM Contract Schedule, Current CPM Contract Schedule and any other schedule submittals. The compact disc shall be made directly from Primavera Version 6.0 or higher, and shall contain all files of the schedule that can be restored by Metro for its evaluation and analysis. It is the Contractor's responsibility to ensure that all schedule submittals will be calculated in the Metro P6 database without variance from hardcopies submitted for review. Any variance from printed reports from the Contractor's P6 environment to the calculated schedule dates within Metro's P6 production database will be cause for rejection of the submittal.

C. Contractor shall incorporate Contract milestones into the CPM Contract Schedule. These include, but are not limited to substantial completion, punchlist completion, furnished equipment availability dates, and right-of-way access matrix availability dates, as described in the Contract. These are unique zero duration activities containing corresponding dates and logic ties. Designate these activities as a "start no earlier than" or "finish no later than" milestone. Each milestone activity will constrain its dependent Work. Assume Notice to Proceed (NTP) is given at day zero for calculation of constraint dates for milestones. The use of float suppressing date constraints including "start on," "finish on," "mandatory start," and "mandatory finish" are not allowed within the schedule.

D. Float is not for exclusive use or benefit of either Metro or Contractor but is an expiring resource available to both parties on a nondiscriminatory basis. Float is used by either party, as needed to meet Contract milestone dates. Contract

time extensions for Contract performance will be granted only to extent that delays or disruptions to affected Work paths exceed total float along those paths of the Current CPM Contract Schedule (updated schedule) in effect at time of delay or disruption. These delays or disruptions must also cause end date of Work to exceed current Contract date or milestone date and be beyond control and without fault or negligence of Contractor or any subcontractor at any tier. If delays or disruptions impact an already negative float path, Contractor will not receive a time extension unless and until activity with highest negative float is driven even further negative. Pursuant to the float sharing requirements of the Contract Documents, it is acknowledged that third party caused time savings, such as critical path submittals returned in less time than allowed by the Contract Documents, that result in a savings of time to the Contract duration shall offset any potential third party caused delays.

E. Use of float suppression techniques such as preferential sequencing or logic, special lead/lag logic restraints, and extended activity times or durations shall be submitted with written justification to obtain Metro approval. Use of float time disclosed or implied by use of alternate float suppression techniques shall be shared to proportionate benefit of Metro and the Contractor. Use of any network technique solely for purpose of suppressing float will be cause for rejection of schedule submittal.

F. Planning units – Primavera Version 6.0 scheduling software supports schedule planning units of Hours, Days, Weeks or Months. The standard time unit applied to the cost/schedule integration system is defined as days. A day as defined within Primavera Version 6.0 will span eight hours from 8 AM to 5 PM for all scheduled activities. Contractor will verify that all schedule start and finish dates reflect these requirements. This requirement will apply to both calendar and working days. If for any reason the Contractor will be executing the work for activities beyond the standard specified workday (i.e. Multiple Shifts, planned Overtime, etc.), the Contractor will assign a project specific activity code as per the schedule electronic template to the affected activities. All schedule activities which meet these criteria will be readily identifiable in the Contractor schedule and the Contractor bears the burden to accurately identify all schedule activities which meet this criteria. Upon submission of any schedule update, Metro will have the ability to effectively identify (filter) for such activities for review and analysis. Failure to accurately identify such activities accurately may result in rejection of the current schedule submittal.

G. Schedule network - Use Retained Logic CPM Precedence Diagram Method of scheduling.

H. Analyze in detail activities included in CPM Contract Schedule to determine activity time durations in units of project Working days. Base durations on engineering and design resources, drawing production rates, submittal review periods, procurement lead time and duration, manufacturing times, labor

(crafts), equipment, and materials required to perform each activity on a normal Work day basis. No on-site activity shall have duration of over 20 Working days except non-construction activities such as submittals, submittal reviews, procurement and delivery of materials or equipment, and concrete curing. All design and on-site construction activities will be shown in their resource loaded state to reflect cost, except those activities specifically identified under this Section. Durations shall be the result of definitive manpower and resource planning by the Contractor to perform Work in consideration of Contract defined on-site Work conditions.

I. In preparing the CPM Contract Schedule, the Contractor shall consider the nature and complexity of each design submittal and shall allow ample time for review, revisions or corrections. Under no circumstances will an extension of time be allowed for any design submittal for which a resubmittal is required and resubmittal time was not originally scheduled. If a CPM Contract Schedule submittal places an extraordinary labor demand on the technical reviewing staff of Metro or any jurisdictional third party, the CPM Contract Schedule submittal will be rejected. The Contractor shall then prioritize the criticality of submittals, revise and resubmit the CPM Contract Schedule submittal.

J. Professional Scheduler/Project Control Engineer - Employ a Professional Scheduler/Project Control Engineer with critical path method scheduling knowledge using Primavera Version 6.0 or greater, and a minimum of five (5) years experience using automated scheduling systems involving one or more projects of similar scope, time, and cost. Within ten (10) calendar days of Contract award, submit to Metro the Professional Scheduler/Project Control Engineer's resume of experience as a construction scheduler including professional references that have had experience with individual as a construction scheduler. Metro has the right to refuse to accept the Professional Scheduler/Project Control Engineer based upon lack of experience of similar Work as required in this Specification. If Metro refuses to accept Professional Scheduler/Project Control Engineer proposed, the Contractor is to provide another Professional Scheduler/Project Control Engineer meeting experience requirements.

K. Assign a Project Controls individual responsible for project control and scheduling responsibilities. Project Controls individual shall have combined eight (8) years or more experience in scheduling of civil construction projects and at least one (1) design/build project of at least ten million US Dollars ($10,000,000). Submit a resume for approval.

PART 2 - PRODUCTS

2.1 SUBMITTALS - Submit one original and one copy of Schedule unless specified otherwise. Provide submittals specified in this Section to Metro for review and approval.

A. Level One Schedule

1. Contractor to submit the Level One Schedule containing the first 120 day submittals, permits, equipment procurement and summary design and construction activities with Contractor's intended sequencing of Work within 30 calendar days after Notice of Award.. Schedule shall contain Contractor's detailed activities for first 120 calendar days following Notice to Proceed (NTP). Update the approved Level One Schedule monthly and submit until specified Contractor's Baseline CPM Contract Schedule is approved. Include summary bars that reflect the balance of Work to be performed for remaining Interim and Contract completion milestones.

2. Contractor to submit hard copy and include a Compact Disc (CDR or CD-ROM), electronic write-protected computer generated back-up copy of the Level One Schedule. Submit a written narrative for the Level One Schedule. The Compact Disc shall be made directly from Primavera Version 6.0 and shall contain all files of the schedule that can be restored by Metro for its evaluation and analysis.

B. Schedule of Values

1. Contractor to submit “partial” Schedule of Values for design and construction within 30 calendar days after Notice of Award. Identify value of Work planned for first 120 calendar days following NTP. Allocate costs to related cost accounts provided in Level One Schedule. Allocate Schedule of Values to activities to be performed in first 120 calendar days after NTP.

2. Contractor to submit a “complete” Schedule of Values; a breakdown of Contract price into individual cost accounts and into individual activities detailed by Contractor in Baseline CPM Contract Schedule, within 45 calendar days after the Commencement Date stated in the NTP. Cost information will be allocated to discrete activities using the "Expenses" tab in P6 as an expense item named "Budget." Cost Loaded activities to satisfy this requirement will have only one (1) cost associated with the line item. Multiple costs allocated to a single activity will warrant rejection of the schedule. All cost loaded activities will utilize unique project level activity codes for "project task" and "bid item." These project specific activity codes will be identified in the Primavera P6 schedule development template provided by Metro.

C. Baseline CPM Contract Schedule

1. Submit breakdown of Contract price into individual accounts and into individual activities detailed by Contractor in Baseline CPM Contract

Schedule, within 45 calendar days after NTP. A cost loaded activity will have only one (1) line item on the expenses tab and each of these cost loaded activities will have an assigned unique project level activity code for "project task" and "bid item."

2. Contractor to submit cost loaded Baseline CPM Contract Schedule, containing detailed activities and intended sequencing of Work included in Contract, within 45 calendar days after NTP. Cumulative amount of cost loaded Work activities shall equal total Contract award price.

3. Contractor to include a time phased barchart, based on work days, as well as computer generated reports. Construct to show the order in which the Contractor proposes to carry out Work, to indicate restrictions of access, and availability and use of access and to show availability of Work areas, and availability and use of manpower, materials and equipment. Also include any schedule activities affected by any specified access milestones that interface with other contractors. Use the Baseline CPM Contract Schedule to plan, schedule, coordinate and execute the Work under the Contract (including activities of subcontractors, equipment vendors, and suppliers). Provide Metro with written confirmation of concurrence of major (five percent or more of Contract amount) trade Subcontractors and Suppliers with Baseline CPM Contract Schedule, revisions and updates.

4. Contractor to provide Metro with a means to monitor and follow progress of all phases of Work, comply with limits imposed by scope of Work, with contractually specified interim milestones and completion dates, and with constraints, restraints or sequences included in the Contract. Degree of schedule detail required shall include factors to the satisfaction of Metro, including, but not limited to, the following:

    a. Master list of submittals and all other requirements as referenced in Section 01300-DB, Submittals;

    b. Contract interim milestones and Contract completion date, substantial completion dates, constraints, restraints, sequences of Work indicated;

    c. Type of Work to be performed, and sequences;

    d. Purchases, manufacture, tests, delivery, and installation activities for major materials and equipment, and a separate list of major material items of equipment for which the Contractor intends to seek payment before installation;

    e. Deliveries of Metro furnished goods and/or materials, if any, in accordance with dates or schedule windows of such times set forth in the Contract;

f. Approvals and permits required by regulatory agencies or other third parties;

g. Schedules for Subcontractor's Work, including engineering and design services;

h. Assignment of responsibility for performing specific activities, including engineering, design, and procurement management services;

i. Access and availability to Work areas;

j. Identification of interfaces and dependencies with preceding, concurrent, and follow-on construction by other contractors and utilities;

k. Cost loading for cost utilizing expenses;

l. Actual tests, submission of test reports, and approval of test results;

m. Testing, training, and assistance required under the Contract;

n. Punchlist and final cleanup;

o. Identification of manpower, material, or equipment restrictions, as well as any activity requiring unusual shift Work, such as two shifts, six day weeks, specified overtime, or Work at times other than a Standard Work Day; and

p. Any cost, schedule summary organization, WBS or activity code designation requested by Metro.

D. Current CPM Contract Schedule Updates

1. Initially, upon approval of the Baseline CPM Contract Schedule, establish the Current CPM Contract Schedule from the Baseline CPM Contract Schedule. Thereafter, update the Current CPM Contract Schedule monthly with Data Date designated by Metro. Use updated Current CPM Contract Schedule for subsequent planning, scheduling, managing, monthly progress payments, statusing of the master list of submittals and execution of Work to be accomplished.

2. Participate with Metro in periodic meetings, at least monthly, on dates directed by Metro for purposes of reviewing changes to schedule logic and Project status. At meeting held prior to Data Date, provide preliminary updated Current CPM Contract Schedule that forecasts Project status through the Data Date and contains actual start and actual finish dates for

activities in progress or completed, remaining durations of activities in progress, percent complete, earned value of cost-loaded activities, logic changes, new or deleted activities, and new Change Orders/Modifications.

3. Submit a stand alone portion of the network (fragnet), if current progress reflects negative float of minus 14 calendar days or more for a Contract milestone activity, as indicated by most recent Current CPM Contract Schedule. Show activities affected, date delay or disruption occurred or how productivity rates were impacted, and unmitigated impacts to schedule caused by delay or disruption. Submit similar fragnet showing Contractor's plan to mitigate delay or disruption and subsequent impacts to schedule at Metro's request. Provide written narrative describing circumstances which caused delay or disruption and methodology used to determine extent of delay or disruption. Submission of such fragnet does not constitute permission to proceed with plan. Execute some or all of the following remedial actions, and submit a recovery schedule that may include:

    a. Increase construction manpower in such quantities and crafts as necessary to eliminate the backlog or Work.

    b. Increase the number of work hours per shift, shifts per work day, work days per week, the amount of construction equipment, or combination of the foregoing to eliminate the backlog or Work.

    c. Reschedule the Work in conformance with the Specification requirements.

4. Before implementing any of the above actions, notify and obtain acceptance from Metro. If such actions are accepted, incorporate revisions before next update.

5. Addition of equipment or construction forces, increasing work hours or other methods, manner, or procedure to return to contractually required completion date will not be considered justification for a Change Order, nor be treated as acceleration where the need for a recovery schedule has been caused by the Contractor and/or its Subcontractors or Suppliers, at any tier.

6. When the Contractor receives a Change Order/Modification, or delays are experienced by the Contractor and a time extension is requested, submit to Metro a written Time Impact Analysis illustrating the influence of each change or delay on the Contract milestone completion date, utilizing Current CPM Contract Schedule. Include in each Time Impact Analysis a fragnet demonstrating how the Contractor proposes to incorporate the Change Order/Modification or delay into the Current CPM Contract Schedule. The fragnet shall contain a sequence of new and/or activity

revisions that are proposed to be added to the Current Contract CPM Schedule in effect at the time change or delay is encountered, to demonstrate influence or delay and method for incorporating the delay, and its impact into the schedule as they are encountered.

a. Each Time Impact Analysis shall demonstrate estimated time impact based on events of delay, date of Change Order/Modification given to the Contractor, status of design or construction at that point in time, and event time computation of activities affected by change or delay. Event times used in analysis shall be those included in latest version of the Current CPM Contract Schedule, in effect at time change or delay was encountered.

b. Submit each Time Impact Analysis within ten calendar days after a delay occurs. If the Contractor does not submit a Time Impact Analysis for a specific Change Order/Modification or delay within specified period of time, the Contractor will be deemed to have irrevocably waived rights to additional time and cost.

c. Because float time within Current CPM Contract Schedule is jointly owned, it is acknowledged and agreed by the Contractor that Metro caused delays on the project may be offset by Metro caused time savings (including, but not limited to: critical path submittals returned in less time than allowed for in the Contract, approval of substitution requests which result in a savings of time along the critical path for the Contractor, etc.). In such an event, the Contractor will not be entitled to receive an extension of time or delay damages until Metro caused time saving is exceeded and Contract completion date is also exceeded.

d. Metro will accept or reject each Time Impact Analysis. Upon approval, a copy of a Time Impact Analysis signed by Metro will be returned to the Contractor for incorporation into the schedule.

e. Upon mutual agreement by both parties, incorporate fragnets illustrating the influence of Change Orders/Modifications and delays into the Current CPM Contract Schedule during first update after agreement is reached.

E. As-Built Schedule - As-Built Schedule is to be submitted within 30 calendar days for each stage of work that is completed in connection with Contract Milestones. The As-Built Schedule shall be certified by the Contractor’s Professional Scheduler/Project Control Engineer and Contractor's Project Manager as to how the Contract was executed. Submittal and approval of the Schedule will be a condition precedent to reduction/release of any Contract retention.

F. Schedule Reviews - Metro will review and respond to scheduling submittals within 14 calendar days after submittal. Submit a revised schedule within seven days after receipt of Metro's response if Metro requires changes or additional information.

G. Early Completion Schedule - Contractor agrees that in the event a proposed early completion schedule (or any subsequent update) which is found to be acceptable by Metro, indicating a duration which is less than time allowed by Contract for completion of Work or of interim milestone, Contract completion time shall only be shortened by a Change Order/Modification to equal Contractors proposed Baseline CPM Contract Schedule duration.

H. Three Week Rolling Bar Chart Schedule - Submit a weekly manpower/construction report and progress schedule listing activities completed and in progress for the previous week and the activities scheduled for the succeeding two weeks based on the Current CPM Contract Schedule. The Three Week Rolling Bar Chart Schedule shall be provided from the Current Contract CPM Schedule and include all activities scheduled including: activity ID, description, early start and early finish, total float, original duration, remaining duration, percent complete, and pertinent remarks as to activity status.

I. Pay Estimate Schedule - As back-up for the Application for Progress Payments, prepare schedule of activities for all design and construction Work to be done and show status of completion. Payment will be made off the cost loaded schedule as activities are completed. Progress for payment shall be derived from the progress for Current CPM Contract Schedule Update. Pay Estimate Schedule format and content shall be in compliance with layouts and report specifications as indicated within the Primavera P6 schedule development template provided by Metro.

2.2 CASH FLOW AND PROGRESS CURVES

A. Cash Flow

1. Submit with the initial Baseline CPM Contract Schedule a Cash Flow Curve of expected progress payments over the performance period. Plot curve using costs assigned to activities in the Baseline CPM Contract Schedule.

2. Update the curve with actuals from the approved monthly Application for Progress Payment and forecast progress payments and submit monthly to Metro. The total approved progress payments and forecast progress payments must equal Contract amount including Change Orders/Modifications. Derive updated curve from updated Current CPM Contract Schedule.

B. Progress Curves - Submit progress curves with Baseline CPM Contract Schedule. Show with the curves the cumulative scheduled percent complete of each phase, time-scaled in calendar days from NTP to Contract completion. The curves shall be derived from the Cash Flow Curve. Update progress curves with each monthly update of the Current CPM Contract Schedule. Include schedule, actual and forecast progress, plotted as a time-scaled curve from 0 to 100 percent. Derive schedule, actual, and forecast progress from Cash Flow Curve.

2.3 WRITTEN NARRATIVE REPORTS - Include a “stand-alone” narrative of sufficient detail to explain basis of Contractor’s submittal with each schedule submittal.

A. Level One Schedule and Baseline CPM Contract Schedule Submittals - Explain determination of activity durations and describe Contractor’s approach for meeting Contract milestone dates. Include as a minimum: basis and assumptions used in preparing submittal, including crew sizes, equipment requirements, and anticipated delivery dates; restraints; critical path activities; production rates; activities requiring overtime or additional shifts; activities that contain time contingencies for impacts to be expected from normal rainfall; holidays and other non-Work days; potential problem areas; permits; coordination required with Metro, railroads, utilities and other parties; and long lead delivery items requiring more than 30 calendar days from order to delivery. Identify Work items that may be expedited by use of overtime or additional shifts. Identify and explain sequencing and other constraints such as manpower, material, and equipment. Include listing of holidays and special non-Work days.

B. Current CPM Contract Schedule Submittals - State in narrative, identification of significant schedule progress during the reporting period including progress along the critical path, progress against Contract milestones this period in terms of days ahead of or behind allowable dates, and discuss the status of major Contract material and equipment procurement. Specific requirements of narrative are as follows:

1. If updated Current CPM Contract Schedule indicates an actual or potential delay to Contract completion date or interim milestone dates as specified under the Contract or modified by Change Order/Modification, identify causes of delays, disruptions and interruptions and provide explanation of Work affected and proposed corrective action to meet milestone dates involved or to mitigate potential delays or disruptions.

2. Explain any significant schedule variances from the Baseline CPM Contract Schedule (target). Explain any schedule changes, including changes to the logic sequence or activity durations and the impacts to the overall Contract. Discuss any Contract schedule concerns and issues and recovery plans (if required).

3. Identify by activity number and description, activities in progress and which activities are scheduled to be completed during the next update period.

4. Identify by activity number and description, activities to be started during the month following the report period. Show Contractor's forecast early and late start and finish dates.

5. Discuss added Change Order/Modification Work items. Also identify and proposed schedule change orders submitted during the last reporting period.

6. Submit an automated database schedule analysis comparison report that identifies the changes made between the previous month Current CPM Contract Schedule and the current month Current CPM Contract Schedule. List activities started or completed during the reporting period and list all changes made to the logic or planned durations.

PART 3 - EXECUTION

3.1 LEVEL ONE SCHEDULE

A. Show activities that will or may affect Contract milestone dates including planning, mobilization, engineering, design, permits and approvals, submittals, procurement, fabrication, and construction during first 120 calendar days after Commencement Date shown in NTP. Include activities and milestones that will or may affect or be affected by activities of Metro, utilities, and other third parties.

B. Describe Contractor's approach to mobilization, procurement, design and construction during first 120 calendar days, including crew sizes, equipment and material delivery, site access, submittals and permits.

3.2 SCHEDULE OF VALUES

A. Allocate applicable Contract costs using expenses to Contractor's detailed activities, included in Level One Schedule, to be completed or partially completed during four month period following NTP. Comply with General Requirements 01371-DB, Schedule of Values.

B. Submit schedule layout reports sorted by project-specific activity codes for "project task" and "bid item." Schedule of values format and content shall be in compliance with layouts and report specifications as indicated within the Primavera P6 schedule development template provided by Metro.

3.3 BASELINE CPM CONTRACT SCHEDULE

A. Provide Contractor's detailed activities and sequencing for Work included in the Contract. Assign unique activity identification for each detailed activity.

B. Cost sums and unit quantity sums of cost loaded activities shall equal Contract award amounts plus approved Change Order/Modification amounts. Assign General Requirement costs not specifically assigned to Work activities to level of effort activities representing entire Contract duration. Budget will be loaded utilizing expenses and shall be coded using project-specific activity codes for "project task" and "bid item." Budget shall equal approved Contract award amounts plus approved Change Order/Modification amounts. Approved activity budget dollar value shall equal forecast dollar value. Submittal items may only be paid for out of General Requirements pay item.

C. Indicate Contractor's best estimate for original durations, early dates, late dates, logic ties, constraint dates, and total float. Schedule activities in the sequence which Contractor intends to perform Work.

D. Cost load activities for installation and testing of materials and equipment.

E. Include following activity sequence for major material and equipment procurement: Submittal Preparation; Review for Approval; and Fabricate/Deliver. Divide procurement items that may contain multiple submittals occurring at different time intervals into separate sequences that can be tracked on an individual basis. Include a minimum original duration of 30 calendar days in Review-for-Approval activities. Include a minimum duration of 30 calendar days for re-review. Re-submittal activities shall contain submittal preparation activities for other material and equipment procurement (non-major). Submit for Metro's review and approval, a listing of proposed activity codes, code values and titles.

F. Baseline CPM Contract Schedule activity requirements are as follows:

1. Activity descriptions - Briefly convey scope and location of Work indicated.

2. Activities - Discrete items of Work accomplished under Contract that provide measurable and recognizable parts of Work.

3. Include as Contract deliverables, submittal and approval of permit applications and variances, design milestone deliverables and approvals, samples of materials, Shop Drawings, Working Drawings, Inspection and Test Plans, Safety and Security Plans, and Site Traffic Control Plans. Include activities of Metro that may affect progress as well as those of affected utility companies and other similarly involved third parties. Include activities in the Baseline CPM Contract Schedule as stipulated in General Requirements.

4. Work activities - Show duration in workdays and include costs, where applicable.

5. Work activities - Durations of 20 Working days or less except for non-construction activities such as procurement of materials, or fabrication of equipment. Should a Work activity require more than 20 Working days, subdivide Work activity to define appropriate Work items.

6. Critical paths defined as the sequence(s) of activities with the least amount of float.

7. Failure to include any element of Work required for performance of the Contract in Baseline CPM Contract Schedule will not excuse Contractor from completing Work required to achieve milestone completion, notwithstanding approval of Baseline CPM Contract Schedule submittals.

8. The Contractor needs to disclose in detail how the weather delays caused by rain, as specified in the Special Provisions of the Contract, will be incorporated into the CPM Contract Schedule. The Contractor must keep a current "weather delay registry" that would be reviewed and agreed to by both parties during the Current CPM Contract Schedule submittal process.

3.4 CURRENT CPM CONTRACT SCHEDULE - When commencing new Work associated with a Change Order/Modification, incorporate Work into the Current CPM Contract Schedule submittal as new activities after discussion with Metro concerning how a change will be placed into proposed revised Contract CPM Schedule. After an official Change Order/Modification has been issued for Work, add it to the schedule. Change Orders/Modifications added to the schedule are cost loaded with corresponding cost account, activity description, and costs. The activity ID identifies the number of the change. Time extensions may not be incorporated into schedule for changes or delays without an approved Change Order/Modification. Zero duration activities may be added until time extensions are executed.

3.5 FRAGNETS

A. Submit revised Current CPM Contract Schedule within seven (7) calendar days of request, if current progress reflects negative float of minus 14 days or more for a Contract milestone activity, or submittal of Current CPM Contract Schedule no longer represents Contractor’s actual prosecution of Work.

B. Properly connect to, and constrain by, previously existing predecessor and successor activities, as applicable, activities of revised portion(s) of schedule. Band impacted activities in separate networks (fragnets), indicating specific

delay or impact issue and submit to Metro for review. Combine accepted fragnets into Current CPM Contract Schedule.

C. Subject to the requirements of Contract General Condition entitled Extension of Time, Time extensions will be granted only to the extent that equitable time adjustments for activity or activities affected exceed total or remaining float along critical path of activities at time of actual delay, or at time Change Order/Modification was issued.

3.6 VARIANCE REPORTS - Submit a monthly comparison of consecutive updated Current CPM Contract Schedules. Include:

A. Activity I.D. number code and description

B. Previous scheduled early start/finish dates.

C. Current scheduled early start/finish dates.

D. Working days remaining to complete the activity.

E. Percentage complete of the activity.

F. Remaining total float of each activity.

G. Reason for the delay and mitigation measures to be implemented, in the narrative.

3.7 AS-BUILT SCHEDULE – As-built schedules are to be submitted within 30 calendar days for each stage of work that is completed in connection with a Milestone.

PART 4 - MEASUREMENT AND PAYMENT

4.1 PHYSICAL PROGRESS MEASUREMENT

A. This Section is intended to inform Contractor how Metro will calculate "Physical progress." Physical progress will be measured as the sum of earned dollar values of activities identified as representing physical construction divided by "Physical Progress Budget." Activities and physical progress budget will be developed by Metro. Physical progress budget is defined as summed dollar values of cost loaded activities identified as representing physical construction in approved cost loaded Baseline CPM Contract Schedule. Determine percent complete for cost-loaded activities as follows: For design activities, the Contractor will prepare and Metro will approve a schedule of values for said work. For activities loaded with Contract unit quantities, calculate percent complete by dividing units of Work in place by total units of Work forecast. For activities loaded with lump sum costs, calculate percent complete by

estimating percent of Work in place. Only activities representing physical progress (work in place) will be included in physical progress calculation. Approval of design drawings by Metro will qualify as physical progress for activities connected with design. Physical costs will be used as a basis for physical progress measurement.

B. Monthly Application for Progress Payment schedule submission “pay estimate," showing updated activity, and cost data in accordance with requirements of this Section and the Contract, will be the basis upon which progress payments and requests are reviewed for approval by Metro. Metro will review the submittal within seven (7) calendar days. All work activities shall be distinguishable between the prime contractor and subcontractors, inclusive of baseline work, contract modifications and retention withheld in accordance with Contract Terms and Conditions. The start of the 30 calendar day progress payment cycle will begin once the Contractor has signed the Payment Application, the updated Current CPM Contract Schedule has been approved and the Payment Application has been approved by Metro.

4.2 PAYMENT for Work of this Section will be made under the applicable Schedule of Values item for General Requirements (Nonspecific).

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SECTION 01371-DB

SCHEDULE OF VALUES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Preparation, submittal, review, revision, and resubmittal of Schedule of Values.

1.2 DEFINITIONS

A. Schedule of Values: A statement furnished by Contractor allocating portions of the Contract Sum to various portions of the work and used as the basis for reviewing Contractor's Applications for Payment.

1.3 SUBMITTALS

A. Submit Schedule of Values in accordance with Compensation & Payment Provisions (Construction) and General Requirements Section 01300-DB, Submittals.

B. Upon request by Metro, submit supporting data to substantiate correctness of values.

C. Update and resubmit Schedule of Values before next Application for Payment when changes to the Contract occur.

1.4 PREPARATION

A. Coordinate preparation of the Schedule of Values with preparation of Contractor's construction schedule and submittals schedule.

1. Subschedules for Separate Elements of Work: Where the Contractor's construction schedule defines separate elements of the work, provide subschedules showing values correlated with each element.

B. Base the Schedule of Values on the Schedule of Quantities and Prices.

C. Format and Content:

1. Use the General Requirements and Specifications tables of contents as a guide to establish line items for the schedule of values. Break down the contract lump sum price to reflect major divisions of the work for

which Contractor seeks to receive progress payments. Include the following categories as a minimum.

a. Design:

1) Preliminary Design – 30% design completion (Bid Option 1 elements only)

2) Interim Design – 60 percent design completion

3) Pre-Final Design - 90 percent design completion.

4) Final Design - 100 percent design completion.

5) Approved for construction.

b. Design support during construction.

c. Construction and construction management:

1) General Requirements:

a) Project closeout requirements.

b) Sustainability requirements.

c) Project Quality Program.

d) General Requirements (nonspecific).

2) Survey and site preparation, including selective demolition.

3) Earthwork, including dewatering.

a) Handling of contaminated soils.

b) Handling of contaminated groundwater.

c) Other earthwork.

4) Site utilities:

a) Water, fire, sewer, and drainage.

b) Electrical, lighting, and communications.

5) Site improvements.

6) Civil structures:

   a) Busway bridge widening.

   b) Pedestrian ramp.

   c) Pedestrian overcrossing, which includes elevator platform.

   d) Below-deck columns and foundations for bus platform canopy.

7) Architectural structures:

   a) Station platform floor.

   b) Canopies, pedestrian enclosures, and railings.

   c) Pedestrian ramp / overcrossing and pedestrian walkway floor.

   d) Elevator enclosure.

   e) Elevator machine room.

   f) Stairs.

   g) Arcade structure.

8) Facility services:

   a) Elevators.

   b) Water, fire, and drainage.

   c) HVAC.

   d) Electrical, lighting, and communications.

   e) Fire alarm and security.

9) Equipment and furnishings:

   a) Signage and wayfinding.

b) Public art.

c) Other equipment and furnishings.

2. Include quantities, unit prices, and total cost per line item.

3. Metro will provide standard Pay Estimate form.

4. Provide a breakdown of the Contract Sum in enough detail to facilitate continued evaluation of Applications for Payment and progress reports. Coordinate with the contract documents tables of contents. Provide multiple line items for principal subcontract amounts in excess of five percent of Contract Sum.

5. Round amounts to nearest whole dollar; total shall equal the Contract Sum.

6. Each item in the Schedule of Values and Applications for Payment shall be complete. Include total cost and proportionate share of general overhead and profit for each item.

   a. Temporary facilities and other major cost items that are not direct cost of actual work-in-place may be shown either as separate line items in the schedule of values or distributed as general overhead expense, at Contractor's option.

PART 2 - PRODUCTS - Not Used

PART 3 - EXECUTION - Not Used

PART 4 - MEASUREMENT AND PAYMENT - Not Used

END OF SECTION

SECTION 01460-DB

PROJECT QUALITY PROGRAM REQUIREMENTS

PART 1 – GENERAL

1.1 PURPOSE

This section defines Project Quality Program requirements to ensure compliance to contract documents, applicable regulatory requirements and industry standards. The Project Quality Program, supported by specific and detailed procedures, defines the project organization; processes and responsibilities that will ensure that construction, procured equipment and materials, installation and testing will comply will all specified contract documents.

1.2 SPECIAL INSPECTION

Metro shall be responsible for obtaining and paying for the services of registered deputy inspectors to perform the "Special Inspections" required by the building permit and California Building Code (CBC). The Contractor shall be responsible for obtaining and paying for the services of an Independent Testing Laboratory as defined Sections 3.1.7 and 3.1.8. Contractor shall not use the results of Special Inspections or the results of any inspection conducted by Metro or any other agency in fulfillment of the requirements of this specification.

1.3 SUBMITTALS

A. All submittals shall meet the requirements of Specification Section 01300-DB - Submittals.

B. Project Quality Program Manual – shall meet the requirements of section 3.1 **PROJECT QUALITY PROGRAM.**

C. Design Quality Program and Procedures shall meet the requirements of section 3.1.2 Design Control.

D. Design Quality Manager resume

E. Not Used

F. Design Unit Plan that meets the requirements of section 3.1.2.2.

G. BIM Implementation Plan that meets the requirements of section 3.1.2.5 C.

H. Third Party Coordination Plan that meets the requirements of section 3.1.2.4.

I. Project Instructions, Procedures and Drawings; shall meet the requirements of paragraph 3.1.3

J. Source Inspection List which includes the identification of all suppliers and manufacturers of materials and components to be incorporated in the work.

K. Inspection and test Instructions that define the inspection requirements for source, receiving, in-process and final inspection and test.

L. Current qualifications and certifications of independent test laboratories that will be used for job control testing in accordance with section 3.1.A.

M. Current qualifications and certifications of test and inspection personnel employed by the laboratories identified in section 3.1.8.A.

N. Construction Work Plans; shall meet the requirements of paragraph 3.1.21

O. Personnel Qualifications shall meet the requirements of paragraph 3.1.1.2

PART 2 – PRODUCTS – NOT USED

PART 3 – EXECUTION

3.1 PROJECT QUALITY PROGRAM

3.1.1 Project Quality Program Manual

A Project Quality Program Manual (PQPM) shall be prepared describing the project organization's processes and responsibilities that will ensure that design, construction, procured equipment and materials, installation and testing will comply with all specified contract documents. Metro Quality Management shall approve the Project Quality Program Manual before work is authorized to start. After approval by Metro Quality Management, the Project Quality Program Manual shall not be revised without prior written approval by Metro Quality Management. The PQPM shall address, as a minimum, the following articles:

3.1.1.1 Project Quality Organization

A. The Project Quality Organization ("Project Quality") and individuals responsible for executing quality responsibilities shall report to an executive level of management independent from line organizations responsible for performing the Work. Organization charts shall illustrate the Project Quality organization's internal and external reporting relationships as well as the relationship to sub-tier contractors or consultants and the Independent Test Laboratory. These charts shall be included in the PQPM which shall be approved by Metro Quality Management before the start of Work.

B. A Project Quality Manager (PQM) shall be assigned to the project and shall be responsible for all Project Quality Program functions. This individual shall be available at the job location or offsite locations, at all times required, to perform or support all Quality related activities. The PQM shall report directly to contractor executive management personnel with responsible charge of project execution and contract compliance. The PQM shall not have responsibility for project construction, cost, schedule or design.

C. The PQM shall not be an employee of the Contractor's Independent Test Laboratory or any sub-tier contractor.

D. The PQM shall have the authority to stop affected Work, control further processing, or prevent shipment of items that do not meet contract quality requirements. A Stop Work Order written by the PQM can only be removed by the PQM. Metro shall be notified when a Stop Work Order is issued and when it is removed.

E. The D/B Management shall ensure that the Project Quality Organization has adequate resources to fulfill the requirements of this section and other Contract requirements.

3.1.1. 2 Quality Management Personnel Qualifications

A. The PQM shall have a Bachelors degree from an accredited four-year educational institution in quality, an engineering discipline, engineering technology, management, business administration or a related field and a minimum of ten years Quality experience, at least five years of which is in a Quality management position. Educational requirements may be waived by Metro Quality Management based on additional courses, certificates or specified training In welding, non-destructive testing, construction engineering, electrical systems design or testing, knowledge of heavy civil construction related to rail and rail systems design, tunnel construction, train control systems, Including construction and/or manufacture and/or testing of trackwork components, systems and structures.

B. The Design Quality Manager (DQM) shall have a Bachelors degree from an accredited four-year educational institution in quality, architecture or engineering, or related field and a minimum of ten years experience, at least three years in a Quality management position. Specific design quality experience as identified in 3.1.1.2 above may be substituted for education, subject to approval by Metro Quality Management.

C. The Design Manager (DM) shall have a degree from an accredited four-year educational institution in architecture or engineering, or related field and a minimum of fifteen years experience. The experience shall include participation in another project of similar size and complexity in a leadership position.

D. When utilized by the Contractor, Quality Engineers shall have a Bachelors degree from an accredited four-year institution in engineering, engineering technology, management, business administration or related field and a minimum of three years project quality experience. Specific quality experience may be substituted for education, subject to approval by Metro Quality Management.

E. When utilized by the Contractor, Lead Inspectors shall have ten years related construction inspection experience plus at least two years as a lead inspector, as a minimum. The Lead Inspectors shall report directly to the Project Quality Manager.

F. Inspection and test personnel shall have the experience and training commensurate with the work to be performed. Inspection personnel shall have a minimum of two years experience for the type of work to be inspected. Activities such as special process requiring qualified/certified production, inspection and test personnel shall be identified and the minimum competence level established and described in the Contractor's Quality Procedures. Inspectors shall report directly to the Lead Inspectors.

G. The personnel qualifications/certifications of Project Quality personnel shall be submitted to Metro for review and approval before assignment to the project.

3.1.2 Design Control

3.1.2.1 General

A. The Design/Builder's (D/B) design organization shall produce the complete final design of the Project as defined in the Project Definition Documents.

B. The design organization may be a consultant or an in-house design team that is qualified and experienced in the design of similar work. The design organization shall prepare design documents including but not limited to: design and construction

drawings, project specifications and other design and engineering reports, calculations and documents to complete the design in conformance with the Contract requirements.

C. The requirements of this Section shall be implemented by the D/B and imposed on all sub-tier design organizations. If the D/B subcontracts the design work to an outside design firm, that organization shall have its own parallel Design Quality Program and staff interfacing with the D/B's Quality organization. Subject to Metro approval, the design portion of the work may be described in a separate Project Design Quality Manual (PDQM) that is subordinate to the D/B's Project Quality Manual. The PDQM shall include the design control procedures to define the processes and responsibilities to control and verify that all contractual engineering design requirements are met. Interfaces among the design organizations and sub-consultants shall be described. The PDQM shall address applicable elements of Section 3.1.1 of this document and be submitted to Metro for review and acceptance within 14 days of NTP.

D. The Design organization shall designate a Design Manager (DM) to manage all Work performed by the D/B's design organization. The DM shall have sufficient experience and background necessary to lead the design effort for this Project. The D/B shall submit the DM's credentials to Metro for approval within 5 days of NTP.

E. The Design Organization shall designate a Design Quality Manager (DQM) to manage the implementation of the Design Quality Program. The credentials for the QDM shall be submitted for approval by Metro within 5 days of NTP. The design organization structure shall be depicted on an organizational chart in the PDQM The Design organization may implement a unified design quality program applicable to all design sub-consultants in lieu of individual quality programs for each sub-consultant. The DQM shall include a description of the interface with the D/B's organization.

F. If the design organization is a subconsultant to the D/B, a design coordinator shall be included in the D/B organization to serve as a point of contact with the design organization.

G. Every person engaged in the design process shall be trained on the provisions of the Design Quality Program.

3.1.2.2 Design Units

A. Within 30 days from NTP the D/B shall develop and submit for approval, a plan and schedule for packaging the design documents for the Work into a series of groupings or Design Units. The Design Units shall consist of Units of Work that provide a logical and efficient method for completing the Project within the approved project schedule and in conformance with Contract Documents. The project shall be divided into two broad categories, Facilities and Systems, and then divided into Design Units.

B. The Facilities portion of the Contract shall include but is not limited to: those structures that comprise the static physical portions of the project such as the bridges, utilities, streets, drainage facilities, fencing, access roads, retaining walls, landscaping, irrigation equipment, signage, stations and appurtenances forming the permanent structures.

C. The Systems portions of the Contract are those items and components that comprise the station communications, traffic signals, power system and, electrical and electronic portions of the permanent project.

3.1.2.3 Design Stages

A. As specified in the Contract or based on approval from Metro, the D/B shall make design review submittals to Metro and Third Parties at identified stages, or milestones in design progress such as 60%, 90%, etc. These milestones are to be identified in the Metro approved project schedule. Design documents submitted for a milestone review shall be identified on each drawing and document by a date and the milestone review (ex: 90%, mm/dd/yr).

B. The D/B is responsible for scheduling adequate time periods to allow completion of all design quality activities including intra- and inter-discipline reviews, Metro and Third Party reviews and comment disposition.

3.1.2.4 Third Party Coordination Plan

The D/B shall provide a Third Party Coordination Plan that includes the names of all Governmental and Utility entities and probable contact persons at each agency or entity. The Plan shall describe all interfaces, including the types of permits, approvals, Coordination and/or inspections anticipated for the Project. The Third Party Coordination Plan shall be submitted to Metro for approval within thirty (30) days of NTP.

3.1.2.5 Design Document Preparation

A. During the design process, the D/B shall develop project-specific Specifications in CSI format. The D/B shall prepare project specific drawings based on the specific materials, products, equipment, procedures and methods that the D/B intends to use to comply with Contractual requirements. Metro supplied specifications may be used if they are appropriate.

B. The Drawings shall conform to Metro CADD Standards unless otherwise directed by Metro. Drawings shall be suitable for reproduction in 11x17 inch size; every character and line shall be clearly distinguishable.

C. If any part of the design is prepared using Building Information Modeling (BIM), the D/B shall submit a BIM Implementation Plan that addresses the following:
   a. Preparation and control of the model and input data.
   b. Description of software used and version levels.
   c. Conformance with Metro CADD Standards and other Contract requirements.
   d. Provisions to allow Metro and Third party personnel to view the model and make comments.
   e. Checking process and relation to intra- and inter-discipline checking procedures.
   f. Design discipline procedures, inputs and interactions associated with BIM.
   g. Use of clash detection including documentation of process.
   h. Interface with non-BIM design on the Project.
   i. Provisions for incorporating as-built information.

D. As specified in the Contract, the D/B shall participate in Metro's Document Collaboration System.

E. Final design documents to be used for construction shall be signed and sealed by an appropriate architect or engineer currently registered in the State of California.

3.1.2.6 Design Process

A. All design documents, including but not limited to drawings, sketches, specifications, technical provisions, calculations, reports, studies, etc., shall be subject to design control and design review.

B. Design inputs, applicable City, County, State, Federal and Caltrans Codes and Standards, contract documents and other applicable quality and technical requirements shall be translated into design documents. Any as-built information being used shall be field verified prior to incorporation into design.

C. All calculations shall be formally checked by an independent and qualified reviewer. Documentation of the checking process shall be available to Metro for review.

D. Computer programs used for design calculations shall be validated to demonstrate that the program produces valid solutions. Evidence of validation shall be maintained and made available to Metro upon request. Changes to computer programs shall be controlled to ensure that changes are verified and approved by authorized individuals.

E. The Interim or Pre-final (60 – 90%) Design for each Design Unit shall include but not be limited to: general configuration of facilities and equipment, horizontal and vertical alignments, cross-sections, typical sections, plan and elevation views, equipment layouts, structure layouts, design reports and similar level of design for the features included in the Design Unit. All initial documentation required to request deviations from Metro or Third Party design criteria or standards shall be submitted with the review package.

F. Unless otherwise directed by Metro, the D/B shall conduct a constructability review of the 90% submittal and transmit a report of the results along with the submittal package.

G. The Final Design Unit Submittal shall include but not be limited to: detailed, 100% complete and checked Design Drawings, Project Specifications, reports, supporting calculations and design documentation necessary for final Metro and Third Party approval and for construction of the Design Unit Work. All documentation, including but not limited to: written approval of design deviations from Metro or Third Party design standards and/or criteria, shall be provided to Metro prior to the Final Design Submittal.

3.1.2.7 Design-Builder Internal Design Reviews

A. Prior to each milestone design stage submittal, the design organization shall conduct internal design reviews.

B. Design reviews shall be conducted to evaluate and determine that appropriate design, design interface, quality, safety and reliability standards have been specified; that parts, materials, equipment and processes are appropriate to the application. Design reviews shall verify that the design complies with contract requirements, including the following:

1. Accuracy;
2. Adequacy;
3. Conformance to standards of practice;
4. Compliance with codes and standards;
5. Cost effectiveness;
6. Quality; and
7. Fitness for purpose and/or function as specified in the Contract.

C. All design review activities shall be performed by individuals other than those who originated the design and with qualifications at least equal to those of the design originator.

D. Each design review process shall be conducted as a separate and independent review activity. Intra- and Inter-discipline reviews shall be conducted serially. It is the responsibility of the D/B to allow adequate time in the project schedule for design reviews.

E. Design reviews shall be documented and the records retained until the design package is issued for construction... Design review procedures and design review checklists shall be prepared and implemented for each design review process identified below:

1. Intradiscipline design review of design documents shall be performed within the originating engineering discipline to ensure the design is consistent with applicable design criteria, standards, codes and other governing requirement documents;

2. Intradiscipline design review shall verify that the resolutions of any previous review comments have been incorporated into the design documents.

3. Interdiscipline design review of design documents shall be performed after the intradiscipline reviews have been completed to verify design compatibility among interfacing engineering disciplines, and to identify and resolve any design conflicts;

4. Design interface review between (a) this contract area of responsibilities and existing Metro contracts and (b) among the Contractor's subcontracts shall be identified and subjected to design review.

5. During the design development process, Metro may meet with the design organization and review in-process design work. The DM is responsible for documenting the comments made in the meeting and for providing a written resolution within 15 days.

6. All comments resulting from each review process shall be resolved and incorporated into the design documents before a subsequent review is started.

3.1.2.8 Metro and Third Party Design Reviews

A. Metro and Third Party Design Reviews shall not commence until all required D/B Internal design reviews have been completed.

B. The D/B shall provide Metro three copies of each submittal that has been submitted to a local jurisdiction or other Third Party for approval within seven (7) calendar days.

C. Each Design Review Submittal package shall include Design Drawings, Project Specifications and supporting data, reports and such information as needed to advance to the next stage of design or the start of construction which ever is applicable.

D. The D/B shall submit Design Unit review document packages to all reviewers in accordance with his approved schedule using Metro's Document Collaboration System. Hard copies of the design documents, in the quantities required, shall be submitted to those Third Parties that do not have the capability to utilize Metro's Document Collaboration System. The D/B shall be responsible for submitting all necessary design documents to all applicable third party agencies including the City of Los Angeles and the applicable departments within the

city, the County of Los Angeles Department of Public Works, Caltrans and others. If the Third Party review is not concurrent with the Metro review, the Design Builder shall submit copies of the submittals made to the Third Parties.

E. Metro comments will be provided to D/B using the Document Collaboration System. Third Party comments will be provided to the D/B in written form by the Third Party in their format. The D/B may receive separate comment packages from each sub-unit and group within an organization that reviews a design submittal. Regardless of the form of the comments, the D/B is responsible for providing written responses and resolutions prior to re-submittal to Metro and Third Parties for all design review comments received.

F. Metro and Third Party design review comments shall be tracked until the comments are resolved. Design comments and resolutions shall be submitted to Metro with the next review cycle.

3.1.2.9 Design Review and Comment Resolution Meetings

A joint comment resolution meeting may be scheduled by the D/B to discuss responses to Metro and Third Party review comments and to determine the review comments to be incorporated into the design documents. More than one (1) joint comment resolution meeting per design submittal may be necessary in order to discuss all design review comments. The D/B shall prepare meeting notes of the comment resolution meetings and submit them to Metro within five (5) days for review and concurrence.

3.1.2.10 Certification of Design

A. When the design units are finalized for submittal to the D/B for construction, the DM shall conduct an assessment and evaluation of design and shall certify that the design satisfies the Contract requirements, including the following:

1. The design has been checked in accordance with the D/B's Metro-approved Quality Program Manual or Design Quality Manual;
2. The D/B has obtained all required Third Party approvals and permits;
3. The design documents meet the Contract requirements; and
4. The Work shown on the Design Documents is ready for construction to completion.

B. When the design units are finalized for submittal to the D/B for construction, the DQM shall certify that the design development process has been conducted in accordance with the D/B's Metro-approved Quality Program Manual or Design Quality Manual and procedures.

3.1.2.11 Design Review of Major Temporary Works

A. The D/B’s DM shall conduct a design review of Major Temporary Works that represent complex structures and that potentially may affect the safety, quality and durability of the Permanent Works. The review shall include the effect of the Major Temporary Works on the Permanent Works. Metro and Third Parties shall participate in the review. If the design of Major Temporary Works is being produced by the design organization, the design shall be included in the Final Design Unit review package and undergo formal review as part of the Design Unit documents.

B. If the D/B or a construction sub-contractor produces the Major Temporary Works design documents after the Design Unit documents have been approved and distributed, then the Major Temporary Works design documents must undergo a separate formal review with

Metro. The D/B shall check, review and certify Major Temporary Works Documents in accordance with Section 3.1.2.10, prior to their being issued for construction.

C. All necessary permits, clearances, and closures from government agencies shall be secured prior to construction.

3.1.2.12 Design Changes

A. Design changes, including field changes, shall be subject to the same design control and verification processes as the original design. Design changes to Final Design documents shall be approved in writing by the Engineer of Record of the original design or by a California-licensed professional engineer of appropriate experience if the original Responsible Engineer(s) is no longer available. All changes to designs, drawings, specifications, calculations, and reports shall be signed and dated by a California-licensed Professional Engineer (signed and sealed for design changes to Final Design documents).

B. The D/B's DM and DQM shall certify the design change in accordance with the requirements of Section 3.1.2.10. All changes shall be submitted to Metro prior to such changes being implemented for construction.

C. Design changes, including field changes shall be incorporated into the original document and re-issued after (4) four changes to a document have been made.

3.1.2.13 Design Support During Construction

A. The D/B is responsible for ensuring the technical integrity of the design. This responsibility includes the review and approval of construction submittals. The responsible architect or engineer (Designer of Record) shall also review and approve construction submittals for technical adequacy prior to construction.

B. The D/B's DM shall verify during construction that the conditions actually encountered are consistent with the approved Design Drawings, Construction Drawings and Project Specifications.

3.1.2.14 Final As-Built Design Documents

Construction "as-built" design documents for all Work performed shall be maintained by the D/B continuously as the Work progresses. A set of current status documents shall be maintained at the applicable jobsite at all times. A new revision of Project Record design documents shall be prepared and submitted to Metro at job completion. These documents shall incorporate all changes made during the construction of the project as well as other information required by the specifications. Refer to Section 01720 for Project Record Documents submittal requirements.

3.1.3 Instructions, Procedures and Drawings

A. Project and project support organizations activities and processes that affect quality and services shall be prescribed by and performed in accordance with documented instructions, procedures or drawings that include or reference appropriate quantitative or qualitative approval criteria for determining that prescribed results have been satisfactorily attained. The activity shall be described to a level of detail that will assure consistent and acceptable results.

B. Controlling project instructions and procedures shall be submitted to Metro Quality Management for review and approval thirty calendar days after the Notice-To-Proceed is issued. For subsequent Work, instructions, procedures, or drawings shall be submitted to Metro for review and approval within thirty calendar days before the Work is scheduled to start. Related Work may not proceed until the instructions and procedures are accepted by Metro.

C. Controlling instructions, procedures, drawings, and changes thereto shall be subject to configuration control.

D. Current issues of instructions, procedures and drawings shall be available at all locations where applicable Work is performed and obsolete documents shall be promptly removed from use and from the Work area.

3.1.4 Document Control

The preparation, issue and change of documents that specify quality requirements or prescribe activities affecting quality such as instructions, procedures or drawings shall be controlled to assure that correct and current documents are being used. Such documents, including changes thereto, shall be reviewed for adequacy and approved for release by authorized personnel. Changes to documents shall be reviewed and approved by the same organizations that performed the original review and approval. The reviewing organizations shall have access to pertinent background data or information upon which to base their approval.

3.1.5 Procurement Control

A. Products, materials and services shall be purchased from subcontractors and suppliers that have a demonstrated effective product quality history. Subcontractors and suppliers shall be evaluated and approved based on their ability to meet defined quality, safety and reliability performance standards. Project Quality shall participate in the evaluation process.

B. Metro specified quality and design requirements shall be passed down to subcontractors and suppliers. Where equipment procurement is involved the methods and means for handling, storage and packaging shall be defined in procurement documents. Subcontractors and suppliers performance shall be monitored and evaluated by Project Quality to ensure compliance to contract documents.

C. Records of supplier and subcontractor qualifications and performance monitoring shall be maintained by the Contractor and available to Metro upon request.

D. The Contractor shall evaluate materials and equipment to be used in the Work and prepare a Source Inspection List to identify materials that will be inspected at the supplier location. The Source Inspection List shall be submitted within 30 days of NTP for Metro review and approval. The Contractor shall conduct inspections based on the approved Source Inspection List.

E. Procurement documents shall be reviewed by Project Quality to ensure appropriate Project Quality requirements are specified in the procurement documents.

3.1.6 Process Control

A. Processes (construction, manufacturing, installation, testing, etc.) shall be planned, documented and approved by authorized individuals. Quality workmanship standards shall be stipulated in written standards. Individuals performing the work shall be trained and qualified in specific processes and quality workmanship standards.

B. Adequate in-process inspection and test points shall be included to ensure conformance to contract requirements. Metro may impose inspection and test points to verify compliance. Inspection by Metro does not relieve the Contractor from performing required inspections and tests.

C. In-process and completed Work shall be documented. Records of completed Work operations shall be maintained by the Contractor and available to Metro.

3.1.7 Control of Special Processes and Job Control Testing

A. Special processes and job control testing associated with hardware fabrication or construction shall conform to applicable Government Laws and Standards, Industry Standards and Metro contract requirements. Examples of special processes and job control tests may include, but are not limited to:

Special Processes	**Job Control Testing**
Metal Welding	Concrete
Non destructive Examination	Corrosion Control
Coatings	Soils
Plating	

3.1.8 Independent Testing Laboratory

A. Employ the services of an Independent Testing Laboratory to perform material qualification and job control testing utilizing personnel who are not affiliated with the Contractor and who are not affiliated with any Subcontractor performing Work on the Project. The Contractor shall pay for the Laboratory services.

B. Inspection and test laboratories performing special processes or job control testing shall have an appropriate current certification issued by a recognized regulatory agency. The Contractor's Laboratory shall be approved by Metro Quality Management before related Work is allowed to start. The Metro approved Laboratory shall not be changed without the written approval of Metro Quality Management.

C. Special process inspections and tests shall be accomplished by qualified technicians, certified inspectors or other qualified or certified individuals as specified in governing Codes or Standards, Industry Standards, Metro Specification or other applicable controlling document. The credentials of the technicians or inspectors performing

special process inspections or tests and job control tests shall be reviewed for compliance to applicable codes, standards, special training/tests etc. and accepted by the Design/Builder before inspections and tests are performed. Records of credentials shall be maintained by the Contractor at the jobsite and available to Metro upon request.

3.1.9 Inspection and Test

A. All Work performed under this contract shall be subject to Quality Control Inspection to ensure compliance to contract documents. Work activities subject to inspection include but are not limited to; material and equipment receiving, in-process and final construction activities, in-process tests, qualification tests, equipment installation and tests, and system integration testing and acceptance. Material and equipment procurements shall be subject to Source Inspection as determined by Metro Project Quality.

B. All Work shall be subject to continuous inspection during all work shifts and off-site work activities. Assignment of inspection personnel shall be consistent with the level of activity and complexity of work to be performed. Such inspections shall be by individuals other than those responsible for performing the Work.

C. Inspections shall be conducted in accordance with Quality Control Inspection Instructions and Field Inspection Checklists. Detailed Inspection Instructions shall be prepared and include workmanship standards for all in-process and final construction and installation activities. Inspection Instructions shall be approved by individuals with appropriate knowledge and expertise and shall be reviewed and accepted by Project Quality and Metro before related Work starts. Work may not proceed without inspection instructions and checklists in place for the specific work activity.

D. Inspection planning shall be prepared in support of the construction schedule and shall include identification of prerequisite requirements such as approved submittals, material certifications, verification of personnel certifications for special processes, equipment calibration verification, applicable inspection instructions and checklists are available, and the number of inspectors required, etc.

E. Sufficient inspection points shall be implemented to verify all Work is in accordance with contract documents

F. Each inspector shall document the results of daily inspections and surveillances on Daily Inspection Reports that include the applicable Quality Inspection Checklists. Results of inspections and tests shall be validated by printed name, signature and date on the test document by the test technician, reviewing test engineer or appropriate responsible individual and the inspector who witnessed the test.

G. .All inspection and test documents shall be maintained on the job site as quality records and available to Metro upon request.

H. Inspection and test personnel shall be trained and qualified in their areas of responsibility. Contractor shall verify appropriate certifications as required by Contract Documents, Government Codes and Standards, Industry Standards, etc. Certification records shall be maintained and available to Metro upon request.

I. Test Procedures shall be prepared for all test operations and specify as a minimum test prerequisites, test set-up, test parameters and acceptance criteria. Test procedures shall be prepared and approved by individuals with appropriate knowledge and expertise and shall be reviewed and accepted by Metro before the related test is performed.

J. Inspection personnel shall have sufficient organizational freedom to identify and report nonconforming conditions and have sufficient training, knowledge and experience to perform specific inspections.

K. All materials and each part or detail of the Work may also be subject to inspection and testing by Metro. In addition, when any Local Agency or Utility Owner is to accept or pay for a portion of the cost of the Work, its respective representatives have the right to inspect the Work. Such inspection does not make such person a party to the Contract nor will it change the rights of the parties hereto. Contractor hereby consents to such inspection and testing. Upon request from Metro, Contractor shall furnish information to such persons as are designated in such request and shall permit such persons access to all parts of the Work.

L. Metro may impose inspection hold points to verify compliance to contract documents during all phases of Work. The Contractor may not proceed with Work until each hold point has been released by Metro. Inspections by Metro do not relieve the Contractor from performing contractually required inspections.

M. Contractor shall not be relieved of obligations to perform the Work in accordance with the contract documents by reviews, tests, inspections or approvals performed by others. The reviews, inspections, tests and approvals conducted by Metro, Government agencies and others do not constitute acceptance of the materials or Work reviewed, tested or inspected, and Metro may reject or accept any Work or materials, request changes and/or identify additional Work which must be done at any time prior to the final approval date.

N. At all times before Final Acceptance, Contractor shall remove or uncover such portions of the finished construction as directed by Metro. After examination by Metro or designee, Contractor shall restore the Work to the standard required by the contract documents. If the Work exposed or examined is not in conformance with the requirements of the contract documents, then uncovering, removing and restoring the Work and recovery of any delay to any critical path occasioned thereby shall be at Contractor's cost. Furthermore, any Work done or material used without adequate notice to and opportunity for prior inspection by Metro may be ordered uncovered, removed or restored at Contractor's cost and with no entitlement for a time extension even if the Work proves acceptable after uncovering. If Work exposed or examined under this Section is in conformance with the requirements of the contract documents and adequate notice and opportunity for prior inspection was given to Metro then any delay to the Critical Path from uncovering, removing and restoring Work shall be considered a Metro Excusable Delay, and Contractor shall be entitled to a Contract

Modification for the cost of such efforts and recovery of the delay to any Critical Path occasioned thereby.

3.1.10 Inspection and Test Status

The status of inspections and tests shall be identified through the use of markings, stamps, tags, labels, routing cards, test reports, etc., indicating conformance or nonconformance. The status of inspections and tests shall be maintained throughout the construction and/or installation activities.

3.1.11 Control of Measuring and Test Equipment

A. Measuring and test equipment, including software when applicable, shall display the calibration status and shall be controlled by individual item to ensure the accuracy and reliability of the equipment is maintained on an ongoing basis. Control elements shall include:

1. Calibration standards shall be traceable to the National Institute of Standards and Technology (NIST).
2. Measuring and test equipment shall be uniquely identified i.e., equipment type, identification number, location etc.
3. The next calibration due date shall be clearly indicated on individual measuring and test equipment items.
4. Calibration intervals shall be identified, documented and periodically reviewed for effectiveness.
5. Handling, preservation and storage of measuring and test equipment shall ensure that the accuracy and fitness for use is maintained.
6. Measuring and test equipment calibration records shall be maintained and available for review by Metro.
7. Verification and documentation of developed software.

B. Measuring and test equipment found to be out of tolerance, damaged, or lost during use shall be documented on a nonconformance report. Work inspected or tested with out-of-tolerance or damaged equipment shall not be acceptable until the nonconformance is resolved and all characteristics previously inspected have been corrected and verified.

3.1.12 Control of Nonconforming Items

A. All items whether material, equipment, or hardware, including construction and testing that do not conform to Contract Documents, Reference Codes or Reference Standards shall be documented on a Nonconformance Report, segregated and controlled until the nonconforming condition(s) is analyzed, dispositioned, corrected and the corrective action verified. Only then may the items be returned to use. The organization responsible for creating the nonconforming condition(s) shall be responsible for investigating the cause of the nonconformance, and initiating corrective action including implementing steps to prevent recurrence. The cause of the problem, disposition, and corrective action shall be documented and available to Metro upon request.

B. Nonconforming hardware and materials shall be reviewed by qualified and authorized individuals to determine the appropriate disposition and corrective action. Disposition of nonconforming items and materials include:

- Rework to meet the original design.
- Repair to achieve fitness for use.
- Accept the condition as-is.
- Reject the condition and return the hardware and material to the supplier.

C. Repair and Accept-as-is dispositions shall be approved by Metro before affected Work proceeds.

D The status of nonconforming hardware and materials shall be maintained and status reports distributed to responsible organizations. This includes distribution to Contractor's senior management and Metro Quality Management at least monthly or as designated by Metro. Records associated with nonconforming hardware and materials shall be maintained and available to Metro upon request.

3.1.13 Handling, Shipping, Storage and Preservation

Methods and means for handling hardware and materials to prevent damage or deterioration shall be provided by the Contractor. Hardware and materials shall be stored in designated controlled areas such as stock rooms, designated hold areas, segregated areas, etc., to facilitate accountability and to prevent damage, deterioration and theft. The Contractor shall define methods for authorizing receipt and dispatching hardware and materials.

3.1.14 Quality Records

Quality records are documents that specify the design, document results of inspections and tests, and include all other related documents. Quality records shall be identified, collected indexed and stored in a manner that precludes damage, loss or deterioration. Specific retention times and location shall be designated and the records shall be accessible for use. At a minimum, quality records shall be identified by title, contract number, revision, date, and signed by an authorized individual. Quality records are considered valid only if stamped (controlled) or signed by an authorized individual. Corrections or revisions to quality records shall receive the same level of review and approval as the original document. Quality records shall be available for review by Metro upon request.

3.1.15 Quality Audits and Surveillance

A. Quality audits and surveillances shall be scheduled, planned, and conducted on an on-going basis covering all project quality related activities and project phases. The audit/surveillance schedule shall be maintained current and available to Metro upon request. Metro Quality Management may participate as an observer on audits/surveillances. Quality Audits consist of an evaluation of the effectiveness of a specific process. Quality Surveillances consist of an evaluation of the effectiveness of a specific activity.

B. Qualified, trained and experienced quality personnel independent of those responsible for the activity being audited shall conduct audits and surveillances. Records of qualifications, training and experience shall be maintained and available to Metro upon request.

C. Results of Quality audits and surveillances shall be documented and, at a minimum, distributed to management of the subject organization. Management of the subject organization shall be responsible for conducting investigative actions to determine and document the problem cause and implementing corrective actions to correct the problem and prevent recurrence. The reports of audits and surveillances shall be transmitted to Metro within seven (7) days of the last audit or surveillance activity.

3.1.16 Quality Training

Identify and document training needs to support Work in the contract documents and provide for the training of all personnel performing activities affecting quality. Personnel performing specific assigned tasks shall be qualified on the basis of appropriate education, training and experience. Records of training activities shall be retained as quality records and available to Metro upon request.

3.1.17 Access to Work Areas

A. Metro shall have access wherever Work is performed under this contract to conduct audits, inspections and tests to verify compliance to contract document requirements. Access includes onsite and offsite work areas and work areas of subcontractors and suppliers. Los Angeles Department of Transportation (LADOT), Los Angeles County Department of Public Works (LACDPW), and Caltrans shall also have access to Work performed on their facilities.

B. Audits, inspections and tests conducted by Metro, or other authorized Third parties shall not in anyway relieve the contractor of the responsibility to conduct required inspections and tests to ensure compliance to all contract document requirements.

3.1.18 Respond to Metro Nonconformances

The Contractor and any subcontractor shall respond to Metro issued Nonconformance Reports, Quality Action Requests and other documented reports of nonconforming or indeterminate conditions within the time period specified in the document. The response shall include a description of investigative actions, statement of the root cause of the problem, action to correct the problem to prevent recurrence, to the satisfaction of Metro.

3.1.19 As-Built Documents

Construction “as-built” design documents for all Work performed shall be maintained current as the Work progresses. Final as-built design documents shall be identified as “Project Records” in accordance with Section 01720-DB and delivered to Metro prior to requesting final Metro inspection of the applicable Work.

3.1.20 Readiness Review

The contractor shall participate in readiness reviews scheduled by Metro. Readiness reviews shall be conducted prior to the start of all specific Work activities or work elements to identify and finalize any prerequisite planning activities, review required submittals, inspections and tests required for the work activity and to discuss and assure a full understanding by all participants, including subcontractors, exists for all specific Work methods to be accomplished. Metro shall authorize the Work to proceed based on results of the readiness review. Work may not proceed without Metro’s approval.

3.1.21 Construction Work Plans

Prepare Construction Work Plans (CWP) for individual Work elements or as specified by Metro. The CWPs shall be submitted prior to the Readiness Review Meetings described in paragraph 3.1.20. The subject Work may not proceed until the CWP has been approved by Metro. All comments must be resolved and the CWP and any associated inspection checklists resubmitted for approval prior to commencement of the work described in the CWP. As a minimum, CWPs shall address:

A. Description of the Work and applicable Contract drawings and specification sections.

B. Include actions that are defined as "special events" in that the Work may constitute exposing the general public to danger, inconvenience or risk.

C. List of current required submittals to complete the Work activity.

D. Individual(s) and position(s) responsible for supervision of the Work Including contact information.

E. Planned start date of the Work, progress rate expected and extended Work hours required.

F. Prerequisite activities required including Third Party permits.

G. Include a Job Hazard Analysis (JHA) for the scope of Work.

H. Identification of the Inspections and/or tests to be accomplished, including the drawings and specifications to be used for acceptance.

I. Inspection hold points for all contractor, Metro and third party inspections identified on the inspection checklists.

3.2 FAILURE TO PERFORM

Nonconforming Work is Work that Metro determines does not conform to the requirements of the contract documents. Nonconforming Work shall be removed and replaced to be acceptable to Metro, at Contractor's cost; and Contractor shall promptly take all action necessary to prevent similar deficiencies from occurring in the future. The fact that Metro may not have discovered the nonconforming Work shall not constitute an acceptance of such nonconforming Work. In the event the Contractor fails to correct any nonconforming Work after receipt of notice from Metro requesting such correction and within the time specified in the notice, then Metro may cause the nonconforming Work to be remedied or removed and replaced and may deduct the cost of doing so from any moneys due or to become due Contractor and/or obtain reimbursement from Contractor for such cost. Remedy for Contractor's failure to perform will be in addition to any other rights or remedies available to Metro under this contract.

PART 4 – MEASUREMENT AND PAYMENT

4.1 MEASUREMENT – The Work of this Section will not be measured separately for payment.

4.2 **PAYMENT** - Payment will be made under the applicable Schedule of Values item for General Requirements – Project Quality Program.

END OF SECTION

SECTION 01501-DB

TEMPORARY UTILITIES

PART 1 - GENERAL

1.1 DESCRIPTION

A. The Work specified in this Section consists of furnishing, installing, operating, maintaining and removing temporary facilities, including electrical power, lighting, telephone, water, fire protection, storm drainage, and sewer, for use during construction and for testing equipment installed under this Contract.

B. For temporary sanitary facilities, see Section 01502-DB, Construction Facilities.

C. Submit temporary utility plans for approval by Metro and other agencies having jurisdiction (Caltrans, City of Los Angeles, and others).

D. Electrical Service

1. Provide and pay costs for installing and maintaining lighting and power for storage facilities and other construction facilities and areas, including sufficient power for testing equipment installed under this Contract.

2. Provide power centers for electrically operated and controlled construction facilities, including tools; equipment; testing equipment; interior construction lighting; and heating, cooling, and ventilation equipment.

3. Provide night security lighting at secured areas within construction limits at storage facilities and excavated areas.

4. Provide battery-operated or equivalent emergency lighting facilities at construction areas where normal light failures would subject employees to hazardous conditions. Test emergency lighting facilities monthly.

5. Bear costs of temporary electric service permits, fees and deposits required by governing authorities; and connection charges and temporary easements, including installation, maintenance and removal of equipment.

E. Metro Water Service

1. Furnish, install, and maintain temporary water system to serve areas within limits of Contract Worksite and construction staging area throughout construction period. Provide water for drinking, construction, sanitation,

first aid, fire protection and cleaning. Ensure that water service for temporary fire protection is sufficient to supply requirements in paragraph F, Fire Protection below.

2. Obtain permits and approvals from regulating authorities. Pay fees, deposits and connection costs including installation, maintenance and removal associated with temporary water systems.

F. Fire Protection

1. Provide and maintain continuously supplied wet temporary fire protection system as construction progresses for control of fires that may occur during construction. Temporary Fire Protection - Class I, Wet Standpipe in accordance with California codes.

2. Furnish, install, and maintain temporary standpipe and portable fire protection equipment throughout construction period.

3. Furnish, install, and maintain a temporary Class I, wet standpipe system throughout station box structure on each level. Space fire department outlets a maximum travel distance of 250 feet to any location. Provide outlets as specified below.

5. Maintain temporary water line in service until permanent wet standpipe is serviceable.

6. Contractor may use temporary water line for water during constrution.

7. Size temporary water line to minimum flow of 250 gallons per minute from most remote outlet.

G. Storm Drainage

1. Furnish, install, and maintain temporary storm drainage facilities throughout construction period. Do not impede drainage of adjacent private property or cause surface flow in streets and sidewalks to back up on to adjacent properties.

2. Provide facilities as required to drain areas outside appendage construction.

3. Provide connections to temporary storm drains.

4. Obtain permits and pay fees for temporary storm drainage connections.

H. Sewer Service

1. Furnish, install, and maintain temporary sewer utilities throughout the construction period to replace or relocate existing sewer service.

2. Obtain permits and pay fees for temporary sewer connections.

1.2 QUALITY CONTROL

A. Comply with Section 01460-DB, Project Quality Program Requirements.

B. Conform to Cal/OSHA and local codes. Provide UL listed products complying with NEMA.

1.3 REFERENCE STANDARDS

A. National Fire Protection Association (NFPA)

B. California Building Code (CBC)

C. NFPA 70, National Electrical Code (NEC)

D. California Fire Code (CFC)

E. City of Los Angeles Building Code

F. County of Los Angeles Building Code

1.4 SUBMITTALS

A. Working Drawings and manufacturer's literature. Show and describe temporary facilities, equipment and materials, including layout of temporary installations. Include water supplies and temporary fire protection plan.

PART 2 - PRODUCTS

2.1 ELECTRICAL SERVICE

A. Temporary Power and Lighting Equipment - Include fixtures, transformers, panelboards, switches, lamps, grounding, poles, conduits and wiring sized and capable of continuous service and capacity adequate to ensure complete operating system including sufficient power for testing equipment installed under this Contract. Comply with NFPA 70.

B. Provide temporary extension cords not longer than 200 feet to supply tools, except additional length may be used if equipment will be grounded within 200 feet of tool or power.

C. Ground portable power generators.

2.2 TELEPHONE SERVICE

Provide equipment compatible with local telephone company. Provide weatherproof enclosures for instruments and directories at exterior locations.

2.3 WATER SERVICE

A. Provide materials and equipment, sanitary and adequate for purposes intended, and satisfying requirements of codes and regulations pertaining to temporary water systems. Bottled products may be used if those products comply with codes. Clearly label portable containers having a dispensing tap and use only for drinking water. Provide single service disposable cups and sanitary container for dispensing cups.

2.4 FIRE PROTECTION

A. Provide wet standpipe system(s) and water supplies as required by Fire/Life Safety Committee (FLSC) as specified in paragraph 1.1 D., Wet Standpipe Systems above. Comply with NFPA 14, local codes and regulations.

B. Provide 20 pound, dry chemical type extinguishers with UL rating as required by (Los Angeles City and Los Angeles County) codes.

C. Provide 10 pound, all-purpose (ABC) dry chemical type extinguishers with a UL rating as required by (Los Angeles City and Los Angeles County) codes.

D. Maintain existing water mains and fire hydrants. Provide water fire hoses of capacities and pressure to use existing fire hydrants and water mains.

2.5 STORM DRAINAGE

A. Provide materials adequate to drain intended areas.

B. Ensure sanitary and storm drainage facilities remain separate.

PART 3 - EXECUTION

3.1 ELECTRICAL SERVICE INSTALLATION

A. Locate products to not interfere with materials handling equipment, storage spaces, traffic, and execution of Work. Install products to present a neat and orderly appearance, structurally sound. Maintain products to ensure continuous electrical service and safe Working conditions.

B. Install temporary lighting facilities in Work areas in conformance with Cal/OSHA. Illuminate each flight of stairs. Provide stairway lighting on circuits separate from other temporary lighting circuits. Use only shielded directional lamps to illuminate worksite.

C. Install temporary power facilities framework and mount in space served.

1. Provide distribution stations on an average of one for each 20,000 square feet of construction floor area, with not more than 300 feet distance between any two distribution stations.

2. Provide power centers on average of one for each 10,000 square feet of building area or station floor; locate power centers where electricity may be secured with an extension cord not longer than 100 feet.

3.2 TELEPHONE SERVICE

A. Install temporary telephone service in neat and orderly manner, make installation structurally and electrically sound, and ensure continuous service. Modify, relocate and extend service as Work progress requires. Place conduit and cable to not interfere with traffic, Work areas, materials handling equipment, storage areas, and Work of other contractors. Service lines may be aerial. Post telephone numbers and locations of emergency facilities including emergency hospitals, physicians, ambulance service, and police and fire departments in conspicuous locations at worksite and at telephone locations.

3.3 WATER SERVICE

B. Install systems in neat and orderly manner. Make systems structurally and mechanically sound. Maintain continuous service. Modify, relocate and extend systems as Work progresses.

C. Locate systems convenient to Work stations, sanitary facilities and first-aid stations; do not interfere with traffic, Work areas, materials handling equipment, storage areas, or Work of other contractors.

D. Provide sanitary bubbler drinking fountains, if potable water service is available. Disinfect water piping before using for potable water service.

E. Install vacuum breakers, backflow preventers and similar devices in manner and at locations which will prevent temporary water from returning to water mains.

F. Do not incorporate any part of temporary water distribution system into permanent water distribution system.

3.4 FIRE SERVICE

A. Install products in conformance with Cal/OSHA requirements.

1. Provide fire extinguishers and fire water supply accessible, functional, and clearly identified during construction period, maintain in-place until permanent fire protection systems are functional.

2. Furnish not less than one 10 pound, all-purpose (ABC) dry chemical fire extinguisher within 10 feet of cutting and welding operations.

3. Provide portable 20 pound (ABC), dry chemical type fire extinguishers, excepting those kept within 10 feet of cutting and welding operations.

B. Instruct construction personnel as to location and use of temporary fire protection equipment.

C. Conform to requirements of Los Angeles City Fire Department, Chief's LAFD Fire Code - Division 13 during critical interruptions of temporary fire protection service.

3.5 STORM DRAINAGE

A. Locate and install temporary storm drainage facilities where necessary to drain construction maintenance, or storage areas.

B. Maintain facilities in good working order.

PART 4 - MEASUREMENT AND PAYMENT

4.1 MEASUREMENT

A. The Work of this Section will be measured as a unit, acceptably completed.

4.2 PAYMENT

A. Payment will be made under the applicable Schedule of Values item for General Requirements - Nonspecific.

END OF SECTION

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SECTION 01502-DB

CONSTRUCTION FACILITIES

PART 1 - GENERAL

1.1 DESCRIPTION

A. The Work specified in this section consists of furnishing, installing, maintaining, and removing from the site the following construction facilities:

1. Sanitary facilities for workers, including toilets and washing facilities.

2. Other jobsite facilities as required by applicable regulations.

B. Provide disabled access at all facilities as required by applicable regulations.

1.2 SUBMITTALS

A. Drawings showing site locations for facilities, and list of furnishings and equipment.

PART 2 - PRODUCTS

2.1 SANITARY FACILITIES

A. Provide materials and equipment adequate for intended purposes; create no unsanitary conditions or code violations. Provide weatherproof, sightproof, ventilated, and sturdy enclosures for toilet and washing facilities.

1. Furnish, install, and maintain temporary sanitary facilities and services throughout construction period.

2. Provide portable toilet facilities complying with Cal/OSHA.

3. Provide separate or single user toilets to ensure privacy between sexes.

4. Furnish and maintain number of enclosed toilet facilities as follows:

a. Fewer than 20 employees, one toilet.

b. For 20 to 199 employees, one toilet and one urinal per 40 employees or fraction thereof.

c. For 200 or more employees, one toilet and one urinal per 50 employees or fraction thereof.

5. Provide general washing facilities adequate for number of employees.

6. Provide washing facilities consisting of temporary lavatories or sheet metal basins with faucets. Furnish soap, single-service paper towels, towel dispenser, and waste receptacle. Provide washing facilities with warm water at approximately 120°F.

7. Provide special washing facilities adequate for number of employees engaged in application of paints, coatings, and other volatile or hazardous materials.

8. Obtain municipal permits and pay fees for temporary sanitary sewer connections.

2.2 OTHER JOBSITE FACILITIES

A. Provide first aid stations and other safety and health facilities as required by applicable regulations.

PART 3 - EXECUTION

3.1 SCHEDULE

A. Facilities shall be complete and in place within 60 days after Notice to Proceed date, or by start of work at the site if sooner.

3.2 INSTALLATION

A. Provide sound, secure, and accessible installation in accordance with applicable codes and regulations.

3.3 SANITARY SERVICE

A. Install temporary sanitary and washing facilities in neat and orderly manner within limits of Work and convenient to Work stations. Make facilities structurally and mechanically sound. Anchor facilities to prevent dislocation; conceal from public view. Modify, relocate and extend facilities as required by progress of Work.

B. Connect washing facilities to public sanitary sewer.

C. Service toilets at time intervals to minimize accumulation of wastes and prevent creation of unsanitary conditions, but not less than once a week.

D. Provide janitorial service each workday. Furnish soap, paper towels, and toilet tissue. Sweep, mop, dust, and dispose of trash.

3.4 OTHER FACILITIES

A. Install other facilities in neat and orderly manner within limits of Work and convenient to Work stations. Make facilities structurally and mechanically sound. Anchor facilities to prevent dislocation; conceal from public view. Modify, relocate and extend facilities as required by progress of Work.

B. Connect washing facilities to public sanitary sewer.

C. Provide janitorial service each workday. Furnish soap, paper towels, and toilet tissue. Sweep, mop, dust, and dispose of trash.

3.5 COMPLETION OF CONSTRUCTION OPERATIONS

A. Upon completion of construction operations, or as otherwise required by Metro or its designee, remove construction facilities and restore the site.

PART 4 - MEASUREMENT AND PAYMENT

4.1 MEASUREMENT

A. Provision and maintenance of construction facilities will be measured per month, acceptably completed.

B. Removal of facilities and restoration of site will be measured as a unit acceptably completed.

4.2 PAYMENT

A. Payment will be made under the applicable Schedule of Values item for General Requirements - Nonspecific.

END OF SECTION

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SECTION 01505-DB

MOBILIZATION AND DEMOBILIZATION

PART1 – GENERAL

1.1 DESCRIPTION

A. The Work specified in this Section consists of preparatory work and operations, including those necessary for mobilizing personnel, tools, equipment, supplies and storage at the construction site; for establishment of temporary facilities; for other work which must be performed or costs incurred before beginning work on various contract items at the Worksite; and for demobilization upon completion of Work.

1.2 QUALITY CONTROL

A. Comply with Section 01460-DB, Project Quality Program Requirements.

B. Metro or its designee has right to reject construction tools, equipment, materials and supplies which are, in its opinion, unsafe, improper or inadequate. Bring rejected construction tools, equipment, materials, and supplies to an acceptable condition or remove them from Worksite.

1.3 SUBMITTALS

A. Refer to Section 01300-DB, Submittals, for submittal procedures.

B. Lay out construction site including fences and gates, access roads, parking, buildings, and storage areas, within seven days after Notice to Proceed date.

C. Certificates of Compliance for products specified in Part 2 - Products before delivery.

1.4 DELIVERY

A. Deliver to Worksite construction tools, equipment, materials and supplies in conformance with local governing regulations.

PART 2 - PRODUCTS

2.1 PROVIDE THE FOLLOWING

a. Provide construction tools, equipment, materials and supplies of types and quantities which will facilitate timely execution of Work and conform to California Code of Regulations and Building Code requirements.

PART 3 – EXECUTION

3.1 MOBILIZATION

A. Provide personnel, products, construction materials, equipment, tools, and supplies at worksite at time they are scheduled to be installed or utilized.

B. Locate plants appropriately close to portion of Work for which they will be used.

3.2 DEMOBILIZATION

A. Upon completion of work, remove construction tools, apparatus, equipment, unused materials and supplies, plant and personnel from worksite. For final cleaning requirements refer to Section 01710-DB, Closeout Requirements.

PART 4 – MEASUREMENT AND PAYMENT

4.1 MEASUREMENT

A. The work of this Section will be measured as a unit, acceptably completed.

4.2 PAYMENT

A. Payment will be made under the applicable Schedule of Values item for General Requirements - Nonspecific.

END OF SECTION

SECTION 01530-DB

TEMPORARY BARRIERS

PART 1 - GENERAL

1.1 DESCRIPTION

A. The Work specified in this Section consists of furnishing, installing, maintaining, replacing as necessary, and removing temporary barriers and traffic control devices. Temporary barriers include fencing, gates, K-rails, guard rails, and crash cushions.

1.2 QUALITY CONTROL

A. Comply with Section 01460-DB, Project Quality Program Requirements.

B. Provide and maintain temporary barriers acceptable to Metro or its designee and conforming to applicable codes.

1.3 SUBMITTALS

A. Refer to Section 01300-DB, Submittals, for submittal procedures.

A. Working Drawings showing complete layout including location of gates and construction details.

B. Test data per approval by the City of Los Angeles.

1.4 WORKSITE CONDITIONS

A. Repair and maintain damaged fences which are to remain in-place.

B. Remove and dispose of obstructions which interfere with construction of fences. Finish grade to minimize or eliminate undulation in profile of fence.

PART 2 - PRODUCTS

2.1 BARRICADES

A. Provide barricades, including K-rails, guard rails, and crash cushions, at indicated locations, complete with signs, general lighting, warning lights and similar devices where appropriate. Conform barricades controlling traffic to the Worksite Traffic Control Plan (WTCP) of applicable agency and Traffic Circulation Plans (TCP), the California Manual on Uniform Traffic Control Devices (California MUTCD), the Work Area Traffic Control Handbook

(WATCH Manual), Caltrans Standard Specifications and Standard Plans, and Standard Specifications for Public Works Construction (SSPWC) as adopted by the City of Los Angeles Board of Public Works as modified by the corresponding issue of City Standard Plan S-610. Metro will resolve conflicts among documents.

2.2 PUBLIC ROADWAY / WALKWAY

A. Erect structurally adequate, drained, covered pedestrian walkway where public roadway/walkway adjoins Worksite in areas which involve possibility that overhead construction operations may endanger safe passage of persons along roadway/walkway. Provide waterproofed heavy wood plank overhead decking, protective plywood enclosure walls, handrails, barricades, warning signs, and lights, and paint with two coats of white reflectorized traffic paint. Comply with requirements of governing authorities and Metro.

B. Provide pedestrian walkway surface with static coefficient friction of not less than 0.5 in accordance with California Code of Regulations (CCR) Title 24, per note 2.3 of Standard Plan S-601-2 of the Bureau of Engineering, City of Los Angeles.

2.3 FENCING

A. Panels - New or refurbished 4 feet by 8 feet, 3/4 inch exterior grade AC plywood acceptable to Metro or its designee.

B. Nails – Galvanized.

C. Fence Framing – As shown on Working Drawings.

D. Gate – Chain link or plywood as shown on Working Drawings. Provide gates, with locks, that open into Work area.

2.4 ACCESSIBILITY

A. Provide walkway accessibility in compliance with Temporary Barriers of CCR Title 24 requirements with a minimum width of 4 feet for wheelchairs.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Position temporary barriers to protect and inform traveling public, and serve construction Work. Relocate, modify, and extend barriers as required during course of Work in accordance with Worksite Traffic Control Plans and Detour Plans approved by the City of Los Angeles, Department of Transportation.

3.2 PLYWOOD PANELS

A. Mount on posts embedded in ground, on frames braced from behind, or fastened to concrete or asphalt surfaces. Show details on Working Drawings.

3.3 PAINT

A. As indicated on Working Drawings.

3.4 MAINTENANCE

A. Maintain temporary barriers, including K-rails, guard rails, and crash cushions, fences and gates in safe condition and appearance acceptable to Metro or its designee during use. Repaint as necessary to hide wear, weathering, and graffiti. Remove posters. Relocate fences as necessary to accommodate construction activities. Realign units if they become displaced as soon as misalignment is noted. Connect units together with adjacent units into continuous barricade.

3.5 TEMPORARY BARRIERS

A. Remove from Worksite when no longer required, upon acceptance by Metro or its designee.

3.6 FENCES AND GATES

A. Remove and dispose of when requirement for fences is complete. Remove only those portions of fencing directed by Metro or its designee.

PART 4 - MEASUREMENT AND PAYMENT

4.1 MEASUREMENT

A. The Work of this Section will be measured as a unit, acceptably completed.

4.2 PAYMENT

A. Payment will be made under the applicable Schedule of Values item for General Requirements - Nonspecific.

END OF SECTION

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SECTION 01545-DB

WORKSITE SAFETY REQUIREMENTS

PART 1 - GENERAL

1.1 DESCRIPTION

A. The Contractor shall establish, implement and maintain an effective Injury and Illness Prevention Program in accordance with California Code of Regulations (CCR) Title 8 Section 3203. The Contractor is solely responsible for keeping its records and seeing that its subcontractors records are updated and accurate.

B. The Contractor shall comply with the CCR Title 8, as well as all other federal, state and local regulations, statutes and codes applicable to its operations. Strict compliance with all applicable regulations as determined by Metro or its designee, shall be considered within the original scope of this Contract and shall not delay the schedule for performance of Work by the Contractor nor shall it be relied upon to form the basis of any claim. Compliance with determinations by Metro or its designee shall not relieve the Contractor from other obligations imposed by law or regulation nor serve as the basis of request for change to increase the cost of the Work.

C. The Contractor shall comply with Section 01545, 1.2. Compliance with all parts of Section 01545 shall be considered within the original scope of this Contract and shall not delay the schedule for performance of Work by the Contractor nor shall it be relied upon to form the basis of any claim.

1.2 REQUIREMENTS

A. Comply with both the CCR Title 8, and the Code of Federal Regulations (CFR) Title 29. Where the State and Federal regulations have differing requirements, the Contractor shall comply with that which is more stringent. The Contractor shall have full responsibility for maintaining conditions which are free from recognized hazards that are likely to cause physical harm to it's employees.

B. The Contractor shall comply with the provisions of the Construction Safety & Health Manual (Contract Part F). Compliance with Contract Part F shall be considered within the original scope of this Contract and shall not delay the schedule for performance of Work by the Contractor nor shall it be relied upon to form the basis of any claim.

C. Air Quality Testing - Perform air quality testing by qualified individuals. Maintain a record of the date, time and location of tests and levels of contaminants. Make all records, including printouts, and independent testing laboratory analyses of jobsite samples, available for review by Metro or its designee upon request.

D. Conform to Los Angeles City Fire Code Division 13 or the requirements of the authority having jurisdiction for the establishment of a fire watch in areas where welding operations and flame cutting are performed.

E. Comply with the requirements of CCR Title 8, Section 5192, Hazardous Waste Operations and Emergency Response, with respect to the handling of hazardous or contaminated wastes and mandated specialty training and health screening.

1.3 UNDERGROUND GAS CLASSIFICATION: NOT USED

1.4 SUBMITTALS - All submittals and re-submittals, when required, shall be considered within the original scope of this Contract and shall be submitted in accordance with Metro accepted submittal schedule so as to not delay the performance of Work by the Contractor.

Upon receiving notice of award of this Contract, the Contractor shall prepare and submit for review the submittals listed as A, B, C and D below and shall not receive permission to perform Work upon the Worksite for this Contract or any work order hereunder, until Metro has returned the submittals as "Accepted". Metro refusal to issue permission to perform Work upon the Worksite, either prior to Work beginning or during the Contractor's performance of the Work,, due to the Contractor's failure to submit listed safety submittals, or due to Metro rejection of unacceptable submittals, shall not constitute a basis for any claim of delay, interference, disruption or other similar types of claims nor serve as the basis of request for change or claim to increase the cost of the Work.

The Contractor shall submit for review the following items, other than those listed in the preceding paragraph, and acceptance by Metro upon request or as indicated during the pre-construction meeting.

A. Worksite specific Injury and Illness Prevention Program including both a Site Specific Emergency Action Plan, and a New Employee Training and Orientation Plan to be revised and resubmitted as conditions warrant.

B. Qualifications and certifications of designated Lead and other Heavy Civil Safety Representatives, and other first aid providers.

C. Job Hazard Analyses (JHA) Matrix for each construction operation or activity. Individual JHA's will be required to be submitted with sufficient review time prior to the start of any task included in this matrix. Metro reserves the right to request the completion of a JHA for any work activity undertaken as part of this Work regardless of whether the activity was listed by the contractor in the submitted matrix or not. Any request for a "non-listed" JHA shall be considered within the original scope of this Contract and shall be submitted in accordance with Metro accepted submittal schedule so as to not delay the performance of Work by the Contractor and shall not constitute a basis for any claim of delay, interference,

disruption or other similar types of claims nor serve as the basis of request for change or claim to increase the cost of the Work.

D. Alcohol and Drug Free Construction Workplace Program. Submit a Program in compliance with the requirements of Section 01545, Paragraph 3.17. Any employee of the contractor, both FLSC Exempt or Non-Exempt shall be included in and participate in the program. Program must also apply to each tier of sub-contractors.

A sample program, which complies with the requirements of Section 01545, Paragraph 3.17 is available from Metro Construction Safety Staff.

The Contractor shall also submit, upon approval of the Alcohol and Drug Free Construction Workplace Program, a monthly report which allows Metro to audit the activities of the Contractor in compliance with the requirements of Section 01545, Paragraph 3.17 while maintaining employee confidentiality.

E. Qualifications and/or certifications of individuals who will serve as Qualified or Competent Persons. These supervisory individuals are designated by the Contractor to supervise special high risk/high hazard safety programs such as (but not limited to) Fall Protection, Excavation, Hazardous Waste Operations and Confined Space Entry.

In addition, the contractor shall submit the qualifications, certifications and City of Los Angeles Licenses and National Certification (as applicable) for each crane operator and rigger.

This Submittal shall be re-submitted by the Contractor upon any change to the personnel submitted.

F. Fall Protection Program - Include details of procedures, equipment and training. This program shall be established and implemented to ensure that the Contractor's and sub-contractor's workers, exposed to a vertical fall of six (6) feet or more to another level, are properly protected. This program shall provide protection from hazards such as, but not be limited to: skylights (at any angle), floor and wall openings, leading edges, and steel erection. Methods of protection shall include, but not be limited to: fixed systems (guardrails, covers, nets, etc.), personal fall arrest systems and job specific fall protection plans. A key provision of this program shall be that no employee shall work in an unprotected manner while exposed to a vertical fall of six (6) feet or greater. The Fall Protection Program shall be submitted and accepted prior to any Work covered by the plan.

G. Regarding the training required by CCR Title 8, Section 5192, Hazardous Waste Operations and Emergency Response, with respect to the handling of hazardous or contaminated wastes and mandated specialty training and health screening - Submit a list of qualified personnel at least 15 days before commencing any

excavation; update at monthly intervals during ongoing excavation operations. Include, for each individual, the date of certification and sufficient evidence of training and medical screening to conform to appropriate laws, regulations and the requirements of this Contract. Plan to be revised and resubmitted as conditions warrant.

H. Excavation Action Plans for all excavation activities for which a protective system is required by CCR Title 8 Article 6. Include all drawings for any ground support system to be used during the excavation activity. Include the slopes and configurations of sloping or benching systems. All excavation submittals shall be submitted at least 15 days prior to the planned Work. Compliance with this provision and any stoppage of Work resulting from compliance with this provision shall be considered within the original scope of this Contract and shall not delay the schedule nor shall it be relied upon to form the basis of any claim for performance of Work by the Contractor.

I. Provide annual and four year certifications for all cranes operated on the Worksite by the Contractor and or subcontractors of any tier. Re-certification is required for any crane subjected to any upset, overloading, side pulling, shock loading or support failure, prior to any further use of the equipment on the Worksite.

J. Critical Lift Plans - Before making a critical lift, a critical lift plan shall be prepared by the crane operator, lift supervisor, rigger. The plan shall be reviewed and signed by all contractor personnel involved in the lift. The signed plan shall be submitted for acceptance by Metro. The lift shall not be under taken until the Contractor has received the Accepted Submittal from the MTA.

Critical Lift: A Critical lift is defined as a crane lift requiring detailed planning and additional or unusual safety precautions. Critical lifts include, but are not limited to:

- Lifts made with more than one crane
- hoisting of personnel with a crane
- a lift which will meet or exceed 80% of the rated capacity of the specific crane as indicated on the Manufacturer’s Load Charts or Tables
- lifts which the load will be lifted, swung, or placed out of the operator's view;
- , a lift which by it’s nature is unusual and not regularly (at least on a monthly basis) completed by the lifting crew (Crane operator, oiler & or riggers)
- any lift deemed Critical by Metro.

The Critical Lift Plan shall include, at minimum, the following elements:

1. The exact size and weight of the load to be lifted and all crane and rigging components which add to the weight. The manufacturer’s

maximum load limits for the entire range of the lift, as listed in the load charts, shall also be specified.

2. The plan shall specify the lift geometry and procedures, including the crane position, height of the lift, the load radius, and the boom length and angle, for the entire range of the lift.

3. The plan shall designate the crane operator, lift supervisor and rigger and state their qualifications.

4. The plan will include a rigging plan that shows the lift points and describes rigging procedures and hardware requirements.

5. The plan will describe the ground conditions, outrigger requirements, and if necessary, the design of mats, necessary to achieve a level, stable foundation of sufficient bearing capacity for the lift.

6. The plan will list environmental conditions under which the lift operations are to be stopped.

7. The plan will specify coordination and communication requirements for the lift.

Strict compliance with this paragraph as determined by Metro or its designee, shall be considered within the original scope of this Contract and shall not delay the schedule for performance of Work by the Contractor nor shall it be relied upon to form the basis of any claim. Compliance with determinations by Metro or its designee shall not relieve the Contractor from other obligations imposed by law or regulation nor serve as the basis of request for change to increase the cost of the Work.

K. Submit a list of qualified riggers to Metro for review and acceptance. The submittal shall include a description of each candidates experience and qualifications. This list shall be re-submitted by the contractor upon any changes in the personnel submitted.

L. Energy Isolation Program (Lock Out, Tag Out): Include details of procedures, equipment and training. This program shall be established and implemented to ensure that the Contractor's and Sub-contractor's workers exposed to sources of stored energy are properly protected. This protection shall provide protection from hazards such as, but not limited to: electrical, hydraulic, gravitational and compressed air or gas. The Energy Isolation Program shall be submitted and accepted prior to any Work covered by the plan.

M. Compressed Air Safety Program – Not Used

N. Track Maintenance Plan – Not Used

O. The Underground Emergency Response Team – Not Used

P. Injury and incident Reports – The contractor shall report to Metro immediately upon becoming aware of an incident or injury, illness involving an employee of the project (including MTA or third party staff) or a member of the public.

By the 10th calendar day of each month of the contract, the contractor shall submit for review and record injury and work hour statistics on the form provided by Metro. For the purposes of these reports the following definitions shall apply:

Incident: Any occurrence resulting in personal injury to a third party (defined as any person not employed by the Contractor or subcontractors) or property damage to any property, real or other, estimated at $500.00 or more.

Nonfatal recordable injuries and illnesses are: 1. Nonfatal occupational illnesses; or 2. Nonfatal occupational injuries which involve one or more of the following: Lost worktime, loss of consciousness, restriction of work or motion, transfer to another job, or medical treatment other than first aid.

Occupational injury is any injury such as a cut, fracture, sprain, amputation, etc., which results from a work-related event or from a single instantaneous exposure in the work environment.

Occupational illness is any abnormal condition or disorder, other than one resulting from an occupational injury, caused by exposure to factors associated with employment. It includes acute and chronic illnesses or diseases which may be caused by inhalation, absorption, ingestion, or direct contact.

Lost workday cases are those which involve days away from work, *or* days of restricted work activity, *or both*.

Lost workday cases involving days away from work are those which result in days away from work (not counting the day of injury or onset of illness), or a combination of days away from work and days of restricted work activity.

Lost workday cases involving restricted work activity are those which result only in restricted work activity, defined as follows:

- The employee was assigned to another job on a temporary basis; or
- The employee worked at a permanent job less than full time; or
- The employee worked at a permanently assigned job but could not perform all duties normally connected with it.

Q. Traffic Control and Protection Plans – In addition to the requirements for traffic control and protection that may be found elsewhere in this contract, Contractor shall submit, no less than thirty (30) days prior to deployment, detailed plans

for traffic controls (Management of Traffic Plans) including signs, devices and applications for required permits. Approved permits for traffic controls shall be submitted separately upon receipt from the permitting Authority.

1.5 WORKSITE CONDITIONS

A. Operating Rail Systems Not Used

B. Metro has developed a Hazard Communication Program which contains a list of Material Safety Data Sheets (MSDS) for hazardous substances known to be present at each operational location. Contractor shall confirm with local management the location of the site specific Hazard Communication Program, MSDS inventory and individual MSDS. The Contractor shall maintain a current list of all hazardous substances that will be used in Worksite operations. Unless the Contractor provides, in writing, an alternate method to be used to provide Metro employees access to Material Safety Data Sheets, copies of all Material Safety Data Sheets for substances appearing on the hazardous substance list shall be readily available at the Worksite.

C. Contractor's employees shall comply with all posted traffic safety regulations while operating motor vehicles upon Metro properties including but not limited to the properties, regardless of legal owner, included in the Scope of Work for this Contract. Employees walking or working in areas subject to vehicular and/or construction equipment traffic shall wear retro-reflective safety vests and or clothing that comply with the most recent publication of ANSI/ISEA Standard 107.

PART 2 - PRODUCTS

2.1 CONSTRUCTION EQUIPMENT AND TOOLS

A. Select and operate construction & personal protective equipment and tools in conformance with Section 01545, 1.2 (A) and in accordance with the manufacturer's specifications for the equipment or tools' intended use.

B. Equipment - All equipment, tools and or other items used to complete the Work shall be inspected by the Contractor to insure compliance with applicable regulatory standards. Equipment, tools and or other items are subject to periodic inspection by Metro. The Contractor shall promptly remove equipment rejected by Metro as not conforming with Section 01545, 1.2. This removal shall be considered within the original scope of this Contract and the Work shall be completed in such a manner so as to not delay the schedule for performance of Work by Contractor nor shall the removal serve as the basis of request for change to increase the cost of the Work or be relied upon to form the basis of any claim.

Metro has established a program by which equipment, tools and other items used to complete the Work shall be removed from service when it has been determined that the equipment, tools and other items present a potential for unintended injury when used as directed by the manufacturer. A tag with a prominent red and black message including the word "DANGER" may be utilized by Metro. This tag shall be known as a "Red Tag." The tag will be signed by Metro staff person, dated and note the specific reasons for the rejection. Any equipment, tool and or other item so tagged shall not be used to complete the Work until the condition noted on the tag has been corrected and the tag has been removed by the person who affixed the tag or their designee.

Any person who ignores, removes, damages or otherwise tampers with a Metro Red Tag shall be immediately removed from the Work by the Contractor and shall not return to the project without the written permission of the Metro Construction Safety Director or Manager or an authorized designee.

C. Special Safety Equipment - Where necessary for conformance with Section 01545 1.2, the Contractor shall provide special safety equipment and persons qualified to operate same to insure the safety of the Worksite. Such special safety equipment may include but is not limited to air quality measuring and monitoring equipment, noise measuring and monitoring equipment and other measuring devices related to industrial hygiene. Compliance shall be considered within the original scope of this Contract and shall not delay the schedule for performance of Work by the Contractor nor shall be relied upon to form the basis of a claim for delay. Equipment shall be used in accordance with the respective manufacturer’s design, directions, and intended use.

D. Electrical installations for construction activities shall conform with the most recent publication of the National Electrical Code ANSI/NFPA 70 for electrical installations and be acceptable to the City of Los Angeles and the State of California, Division of Occupational Safety and Health.

E. Electrical equipment and tools to be used on the Worksite, shall be listed by at least one of the following USA testing facilities: Underwriters Laboratories, Factory Mutual or other electrical testing laboratories. Any electrical tool or equipment which is not listed by at least one of the above testing facilities shall be removed from the Worksite.

2.2 SAFETY EQUIPMENT

A. All personal protective and other safety equipment placed into use at the Worksite shall conform to Section 01545, 1.2 (A) and shall include markings to show appropriate ANSI approval codes or other indications of approved usage. Equipment shall not be altered in any way without written approval by the respective manufacturer.

B. Persons entering the Worksite shall, at minimum, be equipped with the following personal protective equipment: hardhat, eye protection, and work boots. ANSI accepted protective footwear shall be worn by all personnel exposed to foot hazards or working below grade (steel toed recreational shoes are not permitted).

C. Not Used.

D. No person shall be allowed to wear recreational pants (shorts) or sleeveless shirts into any work areas of the Worksite.

2.3 TESTING EQUIPMENT

Air monitoring, and air flow testing equipment used in underground or other locations where there is the potential for an explosive atmosphere, shall be “permissible” as defined, tested and certified by the Mine Safety and Health Administration Laboratory of the U. S. Department of Labor.

2.4 DIESEL POWERED EQUIPMENT – NOT USED.

2.5 LEAD HEAVY CIVIL SAFETY REPRESENTATIVE(S)

The Contractor Lead Heavy Civil Safety Representative’s performance will be subject to periodic evaluation by the Metro Construction Safety Staff throughout the prosecution of the Work. Conclusions and recommendations of the review will be forwarded to the Resident Engineer for information or action. The contractor's Lead Heavy Civil Safety Representative shall at a minimum perform the following duties:

a. Document in writing daily safety inspections of the jobsite(s) and public areas contiguous and adjacent thereto and take *necessary* and *timely* corrective action(s) to eliminate unsafe acts and/or conditions and document outstanding safety compliance activities or behaviors.

b. Review foremen's *incident* and investigation reports, to ensure timely submission, and that corrective actions have been completed to prevent recurrence.

c. Provide line supervisors with relevant material for use in conducting weekly toolbox safety meetings.

d. Review safety meeting reports submitted by line supervisors to ensure adequacy of training as well as subject matter.

e. Conduct incident investigations and preserve incident sites. Prepare and submit the required reports to the RE for final distribution in accordance with the manual.

f. Develop and implement a safety training programs for line supervisors and employees as applicable to their specific jobs

g. Develop and implement incentive programs designed to recognize individual contractor/subcontractor employee safety efforts and contributions towards improvement of job site safety.

h. Attend the Monthly Safety Professionals and Monthly All Hands meetings as held by Metro as well as other meetings as directed by Metro or its designee.

i. Ensure that employees receive medical treatment for occupational injuries and that a written OSHA 300 log is maintained and available for review by Metro or designee without prior notice.

j. Ensure that all subcontractor employees at any tier comply with jobsite safety rules and regulations; and that the subcontractors' reports are completed in accordance with this Contract and according to the requirements of the applicable regulatory agencies.

k. Provide for control, availability, and use of safety equipment, including employee personal protective equipment.

l. Shall perform or supervise environmental testing on items including, but not limited to; noise, air flow, and air quality. Written records of such tests shall be kept and made available upon request. It is the Lead Heavy Civil Safety Representative's responsibility to ensure that the contractor complies with all pollution and environmental control requirements.

m. Attend scheduled meetings of the contractor and the construction manager.

n. Shall supervise other contractor Heavy Civil Safety Representatives assigned to the contract.

o. Conduct weekly safety meetings to be attended by all contractor/subcontractor and management personnel. Written records of these meetings shall be maintained at the worksite and made available to Metro upon request without prior notice.

p. Coordinate and participate in the development of Job Hazard Analyses, ensuring quality and timely submittals. Coordinate training of work crews and line supervision affected by each JHA.

2.6 HEAVY CIVIL SAFETY REPRESENTATIVE(S)

The Contractors Heavy Civil Safety Representative’s performance will be subject to periodic evaluation by the Metro Construction Safety Staff. Conclusions and recommendations of the review will be forwarded to the Resident Engineer for

information or action. The contractor's Heavy Civil Safety Representative(s) shall at a minimum:

a. Document in writing daily safety inspections of the jobsite(s) and public areas contiguous and adjacent thereto and take *necessary* and *timely* corrective action(s) to eliminate unsafe acts and/or conditions and document outstanding safety compliance activities or behaviors.

b. Review safety meeting reports submitted by line supervisors to ensure adequacy of training as well as subject matter.

c. Conduct incident investigations and preserve incident sites. Prepare and submit the required reports to the RE for final distribution in accordance with the manual.

d. Provide the safety training program for supervisors and employees as applicable to their specific jobs and as instructed by the Lead Heavy Civil Safety Representative.

e. Ensure that employees receive medical treatment for occupational injuries and that a written OSHA 300 log is maintained and available for review by Metro or designee without prior notice.

f. Ensure that all subcontractor employees at any tier comply with jobsite safety rules and regulations; and that the subcontractors' reports are completed in accordance with this manual and according to the requirements of the applicable regulatory agencies.

g. Provide for control, availability, and use of safety equipment, including employee personal protective equipment.

h. Shall perform environmental testing on items including, but not limited to; noise, air flow, and air quality. Written records of such tests shall be kept and made available upon request.

i. Conduct weekly safety meetings to be attended by all contractor/subcontractor and management personnel. Written records of these meetings shall be maintained at the worksite and made available to Metro upon request without prior notice.

j. Coordinate and participate in the development of Job Hazard Analyses, ensuring quality and timely submittals. Coordinate training of work crews and line supervision affected by each JHA.

PART 3 - EXECUTION

3.1 SAFETY PERSONNEL

A. To insure the safety of the Worksite, Contractor Safety Personnel shall not work more than eleven hours in any twenty-four hour period or more than fifty-five hours in any seven consecutive day period. Included in the definition of Contractor Safety Personnel are the Lead Heavy Civil Safety Representative, other Heavy Civil Safety Representative(s) and any other persons accepted in writing by Metro Construction Safety staff as Safety Representatives.

B. In the event the Contractor is performing work on more than one Contract for Metro at the same time, Contractor Safety Personnel shall not perform safety duties on more than one Contract during any twenty-four hour period.

C. The Contractor shall insure that only those Safety Representative(s) accepted in writing by Metro for employment on the Worksite is/are present at the Worksite whenever work is in progress at the Worksite. The absence of the required Safety Representative shall result in the immediate stoppage of all work at the Worksite. The Contractor is responsible for maintaining an adequate staff of safety personnel, whose qualifications have been submitted to and accepted in writing by Metro, in order to avoid work stoppages in the event of an expected or unexpected absence due to vacation, illness, personal emergency, resignation or termination of the assigned Safety Representative(s). Stoppage of work at the worksite due to the absence of qualified and accepted Underground Safety Representative(s), shall be considered within the original scope of this Contract and shall not delay the schedule for performance of Work by the Contractor nor shall it be relied upon to form the basis of any claim.

   The Contractor's Safety Representative(s) shall have the authority to direct immediate correction of any unsafe or unhealthful condition and, as necessary, to stop work until appropriate corrective measures have been completed. Compliance with this provision shall be considered within the original scope of this Contract and any stoppage of work resulting from compliance with this provision shall not delay the schedule for performance of Work by the Contractor nor shall it serve as the basis of request for change to increase the cost of the Work or be relied upon to form the basis of any claim.

D. The Contractor shall have a designated full time Lead Heavy Civil Safety Representative who is accepted in writing by Metro Construction Safety Staff for employment on the Worksite and who shall perform only safety related functions as defined in this Contract.

   The Lead Heavy Civil Safety Representative shall meet the following qualifications: A full-time supervisory employee of the Contractor responsible for the implementation of the Contractor’s safety and health program at the Worksite. Five years heavy civil construction experience including two years of full time responsibility for construction safety programs. Current certification in good standing as a Construction Health & Safety Technician and Red Cross (or equivelent) First Aid and CPR.

The Lead Heavy Civil Safety Representative must be assigned full time to the jobsite whenever Work is in progress. The Lead Heavy Civil Safety Representative shall regularly work the day shift, attend required meetings and be fully cognizant of all project-specific safety practices, processes, rules and procedures, and maintain regular contact with MTA-designated Safety Personnel.

E. The Contractor shall utilize other Heavy Civil Safety Representatives for second and third shift(s) are accepted by Metro for employment on the Worksite and who shall perform only safety related functions as defined in this Contract. Heavy Civil Safety Representatives shall meet the following qualifications: A full-time supervisory employee of the Contractor responsible for the implementation of the Contractor's safety and health program at the Worksite. Three years heavy civil construction experience including one year of full time responsibility for construction safety programs. Current certification in good standing as a Construction Health & Safety Technician and Red Cross (or equivelent) First Aid and CPR. The Heavy Civil Safety Representative must be assigned full time to the jobsite whenever Work is in progress. Safety Representatives utilized by the Contractor shall be acceptable to Metro for employment on the Worksite.

3.2 CONFINED SPACE OR UNDERGROUND AIR MONITORING

A. All air monitoring activities shall conform to Section 01545, 1.2 (A) and (B).

B. Select and use equipment capable of providing printed logs of gas tests.

C. Operate and maintain a gas monitoring system as required by Section 01545, 2.3. Perform air monitoring and sample analyses as required by Section 01545, 1.2 (A) and (B).

D. Begin testing for toxic and explosive gases as soon as the excavation or drilled hole has progressed to a level of five feet below surface level.

E. Test air quality in the most stagnant portions of excavation to ensure there is no accumulation of explosive or other dangerous gases.

F. Maintain a handwritten record which includes, but is not limited to, test date, time, exact location, contaminant levels, and name of the tester. This written log is to be supplemented by the logs printed from the testing device's memory. This written log shall be kept on file for the duration of the contract and shall be made available for review upon request.

3.3 CONFINED SPACES

A. Work in confined spaces shall be completed in conformance with Section 01545, 1.2 (A).

B. Perform confined space operations under the immediate supervision of a competent person as defined in CCR Title 8 who is fully familiar with the requirements for safe entry, egress, ventilation and air monitoring procedures and capable of enforcing strict compliance.

C. Include confined space permitting system in the Contractor's written Injury and Illness Prevention Program and implement for all confined space areas on the Worksite.

D. Areas on the work site designated as confined spaces shall have prominent sign posted at the entrance identifying the area as a confine space and list requirements for entry.

E. Air samples shall be taken before any entry into the confined space and continuously throughout the work period. Maintain a handwritten record which includes, but is not limited to, test date, time, exact location, contaminant levels, and name of the tester. Air monitoring records shall be kept at the entry point of the confined space and shall be available for review upon request.

3.4 CRANE OPERATIONS

A. All crane operators shall have passed the requirements of certification examinations by the National Commission for the Certification of Crane Operators (NCCCO) for the particular crane type to be operated and copies of said licenses shall be submitted to Metro or its designee.

B. All crane operations where the load is beyond the direct view of the operator shall be observed by a signal person who can directly observe the load and be observed by the operator. Stop load movement in the event the signal person is unable to observe the load or fails to continuously observe the load and signal the operator.

C. Prior to operating cranes on the Worksite, all crane operators shall have successfully completed testing that verifies the crane operator's ability to read and understand the load chart for the equipment to be operated. This testing may be performed by an independent certifying agency or a qualified member of the Contractor's supervisory staff who is acceptable to Metro, has a minimum of five years heavy civil construction experience, and can satisfactorily demonstrate the ability to read and understand load charts and rigging tables to Metro or its designee when requested, without prior notice. Written records of this testing shall be maintained on the Worksite and made available to Metro for review without prior notice.

D. Re-certification is required for any crane involved in an incident involving but not limited to upset, overloading, side pulling, shock loading, or support failure. Re-certification and written acceptance by the manufacturer is also required for any

modification to a crane. Make crane acceptance and certification records available for review by Metro or its designee without prior notice.

Any re-certification of a crane required for compliance with this section shall be considered within the original scope of this contract and shall not delay the schedule for performance of Work by Contractor nor shall it be relied upon to form the basis of a claim for delay.

E. Every crane shall have the following documents with them at all times they are to be operated:

i. A copy of the operating manual developed by the manufacturer for specific make and model of the crane;

ii. A copy of the operating manual for any crane operator aids which the crane is equipped;

iii. A copy of the most recent wire rope inspection record.

A copy of the checklist used for the inspection shall be maintained at the Worksite. Start-up pre-operational inspections shall be conducted by the operator before every operational (shift) of the crane.

3.5 RIGGING

Rigging activities, regardless of the equipment used to hoist or move the materials shall comply while the following requirements:

A. Comply with Paragraph 1.2.A

B. Chain Rigging - Strict compliance with the following requirements for the use of chain slings as determined by Metro or its designee, shall be considered within the original scope of this Contract and shall not delay the schedule for performance of Work by the Contractor nor shall it be relied upon to form the basis of a claim for delay. Compliance with determinations by Metro or its designee shall not relieve the Contractor from other obligations imposed by law or regulation nor serve as the basis of request for change to increase the cost of the Work.

i. Only alloyed chain shall be used as rigging.

ii. Alloy steel chain slings shall have permanently affixed durable identification stating size, grade, rated capacity, and reach.

iii. Alloy steel chain slings shall not be used with loads in excess of the rated capacities prescribed in Table N-184-1, found in 29 CFR 1910.184. Slings not included in this table shall be used only in accordance with the manufacturer's recommendations. When used with alloy steel chains,

hooks, rings, oblong links, pear-shaped links, welded or mechanical coupling links, or other attachments shall have a rated capacity at least equal to that of the chain.

iv. Job or shop hooks and links, makeshift fasteners formed from bolts and rods, and other similar attachments shall not be used.

v. Chain shall be inspected before initial use and at least monthly thereafter. In addition to the daily inspection, a thorough periodic recorded inspection of alloy steel chain slings in use shall be made on a regular basis, to be determined on the basis of (A) frequency of sling use; (B) severity of service conditions; (C) nature of lifts being made; and (D) experience gained on the service life of slings used in similar circumstances. Such inspections shall in no event be at intervals greater than once every month. Chains shall be cleaned before they are inspected, as dirt and grease can hide nicks and cracks. The most recent inspection record for each chain shall be kept at the worksite and made available for review upon request.

vi. Wear: If the chain size at any point of any link is less than that stated in table N-184-2, found in 29 CFR 1910.184, the sling shall be removed from service.

vii. Stretch (compare the chain with its rated length or with a new length of chain): If the length is increased 3% the chain must be thoroughly inspected; if the length is increased by 5% or more the chain shall be replaced.

viii. Deformed (twisted or bent): Chain slings with cracked or deformed master links, coupling links, other components, or any chain in which a link assembly does not hinge freely with the adjoining link shall be replaced.

C. The rigging of loads shall be completed under the supervision of a qualified rigger.

D. The fork of any industrial forklift shall not be altered in any way to allow the attachment of a shackle or other rigging device. Rigging equipment, shall not be directly supported or attached to the forks. A forklift may only be used to lift materials securely attached to pallets or when utilizing a manufacturer accepted or approved attachment that allows for the use of rigging equipment.

E. Only safety hooks, or properly moused hooks shall be used. Suspended loads shall be controlled by tag lines.

F. Hooks, shackles, wire rope, synthetic slings, and other rigging equipment subject to wear must be thoroughly inspected at regular intervals by a qualified rigger and repaired or replaced as required. Records of such inspections shall be maintained by the contractor and made available to Metro for review upon request and without prior notice.

G. All rigging equipment which is removed from service due to wear or defect shall be either destructively discarded or returned to the manufacturer. Records of such removals shall be maintained by the contractor and made available to Metro for review upon request and without prior notice.

H. Rigging equipment shall be inspected by a qualified rigger prior to each lift for obvious damage or defects. Equipment found to be damaged or defective shall be retired in compliance with Paragraph 1.2.A.

3.6 PROTECTION FROM FALLS

A. Comply with Section 01545 1.2 (A)

B. Workers exposed to a vertical fall of six (6) feet or more to another level shall be properly protected through either a fixed barrier, personal positioning system or personal fall arrest system. This includes hazards such as, but not be limited to: work within 6 feet of a roof edge (regardless of pitch), skylights (at any angle), floor and wall openings, leading edges, and steel erection. No employee shall work in an unprotected manner while exposed to a vertical fall of six (6) feet or greater. The use of any system not specifically listed above requires submittal and approval of a Site and Task Specific Fall Protection Plan prior to the start of the subject work or task.

C. Maintain the Worksite in an organized and clean manner, as accepted by Metro, to reduce the potential for slips, trips and falls. Compliance with this provision shall be considered within the original scope of this Contract and shall not delay the schedule for performance of Work by Contractor nor shall it serve as the basis of request for change to increase the cost of the Work or be relied upon to form the basis of any claim.

D. Ladders – The following restrictions apply to the use of portable ladders on Metro worksites:

i. Ladders shall be utilized in compliance with Section 01545 1.2 (A) as well as the Manufacturer's written instructions.

ii. Only ladders constructed of non-conductive materials shall be permitted.

iii. "A" frame type ladders shall be used only on clean, smooth and level surfaces. "A" frame ladders shall not be used in place of an extension type ladders by leaning the ladder against a fixed vertical surface or similar structure.

iv. Extension ladders shall be either: secured at the top and bottom using wire or rope of suitable strength, secured at the bottom utilizing the manufacturer provided spiked feet and at the top using wire or rope of suitable strength

3.7 AERIAL LIFTS

A. Aerial lifts mounted on the bed of trucks shall be installed by an authorized manufacturer.

B. Personnel who operate the aerial lifts shall be trained by the manufacturer in the safe operation of the lift.

C. All personnel shall wear and use a personal fall protection system while on the lift. The lanyard shall be anchored to the lift's designated anchor point.

D. Aerial lifts shall only be used within the guidelines of the manufacturer.

3.8 EXCAVATIONS

A. All excavation activities shall comply with Section 01545 1.2 (A).

B. All excavation operations shall be under the immediate supervision of a Competent Person, as defined in CCR Title 8, who is fully familiar with the requirements for safe excavation procedures and capable of enforcing strict compliance. The support system shall be designed by a civil engineer, licensed in the State of California and the support system plan shall be available for review by Metro without prior notice.

3.9 LOCK OUT/TAG OUT PROCEDURES

Include written lock out/tag out procedures in Contractor's Injury and Illness Prevention Program. Submit specific procedures as part of job hazard analysis submittals. At all times comply with Section 01545 1.2

3.10 HEALTH AND SAFETY PLAN

A. Comply with the requirements CCR Title 8 Section 5192 Hazardous Waste Operations and Emergency Response, with respect to the handling of hazardous or contaminated wastes and mandated specialty training and health screening. The plan is to be revised and resubmitted as conditions warrant.

B. Comply with Section 01545 1.2 (A)

C. Provide training to construction personnel, subject to exposure during the course of excavation, prior to entering any excavation sites. Provide necessary yearly refresher training as required by Section 1.2 (A).

3.11 HOUSEKEEPING

The Worksite shall be maintained in a clean and neat manner. All scrap, trash, and other refuse shall be placed in containers prior to the end of each work shift. Trash containers shall be scheduled for regular emptying or replacement.

Immediate emptying or replacement shall be ordered by the Contractor in the event a container is filled prior to the scheduled emptying or replacement.

3.12 FUEL TRUCKS AND FUELING OPERATIONS

Prior to use, all fuel trucks shall be inspected and approved by the local fire department where required. The contractor shall comply with the requirements of the City of Los Angeles Fire Department. All approvals must be submitted to Metro for review and acceptance and be maintained on site for review without prior notice.

A. Fuel trucks with a cargo tank capacity of 120 gallons or more shall be inspected and approved by the California Highway Patrol. All approvals must be submitted to Metro for review and acceptance and be maintained on site for review without prior notice.

B. Warning placards and signage shall be permanently affixed to each side and the rear of the vehicle in accordance with LADOT and California Vehicle Code requirements.

C. Fuel trucks shall be equipped with a fire extinguisher with a minimum rating of 20-B. The fire extinguisher shall be securely mounted to the truck and accessible for immediate use.

D. Fueling operations are prohibited below grade without a special permit from the fire department where required. The permit shall be kept on file in the contractor's office and available upon request without prior notice.

E. All equipment shall be shut down during fueling. This includes, but is not limited to, loaders, cranes, portable generators and compressors.

F. All stationary fuel and oil storage tanks shall conform to Section 1.4.B of this document, and local fire department rules and regulations.

G. All stationary above ground storage tanks shall be equipped with a liquid resistant berm or other spill containment system capable of containing the entire volume of the storage tank without releasing liquid into the natural ground or water discharge system.

3.13 TEMPORARY PRECAST AND CONCRETE DECK - Not Used.

3.14 HDPE – Not Used.

3.15 TREATED TIMBER – Not Used.

3.16 ACCESS & EGRESS

The contractor shall provide adequate means of access to the work areas. This access may consist of ladders, scaffolds, doorways, aisles, stair towers and elevators, ramps, driveways, access roads/ramps, etc.. Means of access and egress shall be maintained in a clear and orderly manner. All access ways shall conform to Paragraph 1.2.A of this document.

A. When the contractor utilizes stairways/stair-towers for access into the work area, the contractor shall provide stairs that are at least 3 feet wide and permit 2-way traffic.

B. The design and erection of stairways and stair-towers shall conform to manufactures specifications.

C. Contractor shall provide at least one route of access/ egress which is of adequate size and construction to allow the manual movement of a fully loaded stokes basket, ambulance gurney or similar device to and from the work areas that are either above or below grade level.

D. Contractors shall provide at least one route of access/egress which is adequate size and construction to allow two way pedestrian traffic to and from the work areas that are either above or below grade level.

E. A single route of access/ egress may be constructed to comply with paragraphs C and D above.

F. Stairways/Stair Towers: During construction, stairs shall be provided on all structures that are two or more floors or more than 20 feet in height or depth.

G. Permanent stairway placement shall occur as soon as practical.

H. All parts of stairways shall be free of hazardous projections. Debris and other loose material shall not be allowed to accumulate on stairways.

I. Permanent steel stairways having hollow pan type treads and landings that are to be used prior to concrete placement shall have the pans filled with solid material to the level of the nosing.

J. Temporary stairs shall be at least 36 inches wide, and erected to the manufactures specification. Wooden treads for temporary service shall be full width of the stairs treads.

K. Riser height and tread width shall be uniform throughout any flight of stairs.

L. Elevators used for the movement of personnel from one level to another shall comply with Section 1.2.A of this document.

3.17 ALCOHOL AND DRUG FREE CONSTRUCTION WORKPLACE PROGRAM

The Contractor and any Subcontractors of any tier with subcontracts exceeding twenty-five thousand dollars ($25,000) are subject to these requirements. At the time of execution of the Contract, the Contractor shall submit to Metro an alcohol and drug-free construction workplace program which at a minimum shall include the following:

A. An alcohol and drug-free construction workplace policy statement notifying its employees and subcontractor employees that the unlawful manufacture, distribution, dispensing, possession, or use of alcohol or a controlled substance is prohibited in the Contractor's construction workplace and specifying the actions that will be taken against employees for violation of such prohibition.

B. Establishment of an on-going alcohol and drug-free awareness program to inform its employees about:

    1. The Contractor's policy of maintaining an alcohol and drug-free construction workplace.

    2. The dangers of alcohol and drug abuse in the construction workplace.

    3. Any available alcohol and drug counseling, rehabilitation, and employee assistance programs.

    4. The penalties that may be imposed upon an employee for alcohol and drug abuse violations occurring in the construction workplace.

C. Provide to all employees engaged in the performance of the Contract a copy of the alcohol and drug free policy statement.

D. As a condition of initial employment of any Contractor's employee, employment shall be conditional until pre-employment drug screening has been passed. Drug test types shall be performed according to current national standards by a certified laboratory or certified “instant” test device(s).

E. Notification to all employees, in writing, that as a condition of employment the employee will:

    1. Abide by the terms of the policy statement.

    2. Upon request by the Contractor, agree to submit to a drug screening/alcohol test if either of the following exists:

        a) Reasonable suspicion exists to believe the employee is under the influence or possession of drugs, alcohol or other controlled substances; or

b) Employee is involved in an incident or situation that results in an injury to the employee or any other individual during the performance of the employee's assigned duties or property damage.

Drug test types shall be performed according to current national standards by a certified laboratory or certified "instant" test device(s).

3. Notify the employer, in writing, of the employee's conviction under a criminal drug statute for a violation occurring in the construction workplace no later than five (5) calendar days after such conviction.

4. Notify the employer of employee's use of prescription drugs which may impair alertness during the performance of the employee's assigned duties.

5. Upon reasonable suspicion of a violation of policy, submit to a search and inspection upon entering, while working or leaving the Work Site.

6. Upon returning to active employment from rehabilitation for alcohol or drug abuse, sign a "Return to Work Agreement", agreeing to unannounced testing for a period of one (1) year, maintaining an acceptable attendance and performance record and participation in follow-up treatment/counseling recommendations by the treatment program.

7. Permit the notification of Metro's contracting officer by the contractor, in writing, within ten (10) calendar days after receiving notice from an employee or otherwise receiving actual notice of an employee's conviction under a criminal drug statute for a violation occurring in the construction workplace. The notice shall include the name and position title of the employee.

8. Understand that within thirty (30) calendar days after receiving notice of a conviction, the employer shall take one of the following actions with respect to an employee who is convicted of a drug abuse violation occurring in the construction workplace.

   a) Taking appropriate personnel action against such employee up to and including termination, or

   b) Requiring such employees to satisfactorily participate in a drug abuse assistance or rehabilitation program approved by a Federal, State or local health, law enforcement or other appropriate agency.

9. That the employer will provide, throughout the construction period, periodic seminars and instruction to site superintendents, supervisory personnel including foremen and other key employees in the characteristics, behavior and detection of alcohol and drugs.

10. That the employer is required by contract to submit, on a monthly basis, certain anonymous information regarding the number of new employees, number of retested employees, and billing or inventory invoices as well as other information that allows Metro to audit the activities of the Contractor in compliance with the Alcohol and Drug Free Construction Workplace Program.

F. The Contractor, if an individual, agrees by award of the Contract, not to engage in the unlawful manufacture, dispensing, possession, or use of a controlled substance in the performance of the Contract.

G. If the Contract involves the use of Union Craft personnel in performing the Work, the Contractor may wish to obtain a Memorandum of Understanding regarding its Alcohol and Drug-Free Construction workplace program from the Unions involved.

PART 4 - CONTRACTOR RESPONSIBILITY

Nothing in this specification shall release or relieve the Contractor and its subcontractors and suppliers from its safety responsibilities as described above. Any time a Cal-OSHA or Fed-OSHA representative seeks access to the Worksite, the Contractor's Heavy Civil Safety Representative on duty shall immediately contact the designated Metro Safety Representative to inform and seek direction on how to proceed. It is understood that the Worksite belongs to Metro and the Contractor has no authority to prohibit access to Cal-OSHA/Fed-OSHA representatives, except as described herein. If the Contractor's Safety Representative fails to meet any of the duties and obligations described above, the individual may be removed immediately by Metro and the Contractor and its employee shall have no recourse against Metro.

Compliance with the provisions of this Part shall be considered within the original scope of this Contract and shall not delay the schedule for performance of Work by Contractor nor shall it serve as the basis of request for change to increase the cost of the Work or be relied upon to form the basis of any claim.

PART 5 - MEASUREMENT AND PAYMENT

5.1 MEASUREMENT - The Work of this Section will be measured as a unit, acceptably performed.

5.2 PAYMENT will be made under the applicable Schedule of Values item for General Requirements – Nonspecific.

END OF SECTION

SECTION 01547-DB

WORKSITE SECURITY REQUIREMENTS

PART 1 - GENERAL

1.1 DESCRIPTION

A. The work in this Section consists of providing, operating, and maintaining security at the work site during construction. Security refers to the protection of both Metro property and the property of the Contractor from theft, vandalism, pilfering, or other destructive activities. It is the Contractor's sole responsibility to provide protection for any property (including equipment and supplies) under the Contractor's care, custody, and control.

B. The Contractor shall establish, implement, and maintain an effective, site specific Security and Loss Prevention Program (the Program). The Contractor is solely responsible for record keeping and insuring that subcontractors are informed of and comply with the Program.

C. The Contractor shall comply with CCR Title 8, as well as all other federal, state, and local regulations, statutes, and codes applicable to security operations. Strict compliance with all applicable regulations, as determined by Metro or its designee, shall be considered within the original scope of this Contract and shall not delay the schedule for performance of Work by the Contractor nor shall it be relied upon to form the basis of a claim for delay. Compliance with determinations by Metro or its designee shall not relieve the Contractor from other obligations imposed by law or regulation nor serve as the basis of request for change to increase the cost of the Work.

D. The Contractor shall comply with Section 01547-DB, 1.2. Compliance with all parts of Section 01547-DB shall be considered within the original scope of this Contract and shall not delay the schedule for performance of Work by the Contractor nor shall it be relied upon to form the basis of a claim for delay.

1.2 REQUIREMENTS

A. The Program shall comply with CFR 1926.800 (b) (3), which states: "The employer shall control access to all openings to prevent unauthorized entry underground. Unused chutes, manways, or other openings shall be tightly covered, bulkheaded, or fenced off and shall be posted with warning signs indicating " Keep Out " or similar language."

B. The Program shall include methods of protecting physical structures above, below, or at grade from trespassers and malicious mischief.

C. On Projects involving multiple Prime Contractors and Contracts, each Prime Contractor shall coordinate with all other Prime Contractors to ensure that all Project areas are adequately patrolled by the Prime Contractor's Security Sub-Contractor. For the purposes of this paragraph, a Prime Contractor is defined as any Contractor, Joint Venture Partnership, or other business Entity which enters into a Contract for Construction or Construction related Work with Metro.

D. The Contractor and subcontracted Security Firm(s) shall coordinate with Local Law Enforcement and the Metro Security Department for patrol enhancement via Metro's Third Party Coordinator.

E. The Contractor shall comply with the requirements of the current revision of the Construction Safety and Health Manual (CSHM) regarding the protection of the public, group tours, site visitors, and office safety.

1.3 SUBMITTALS

All submittals and resubmittals, when required, shall be considered within the original scope of this Contract and shall be submitted in accordance with the Metro accepted submittal schedule so as to not delay the performance of Work by the Contractor.

Upon receiving notice of award of this Contract, the Contractor shall prepare and submit for review the submittals listed as A, B, and C below and shall not receive permission to perform Work upon the Worksite for this Contract or any work order thereunder, until Metro has returned the submittals as "Accepted." Metro refusal to issue permission to perform Work upon the Worksite, due to the Contractor's failure to submit listed safety submittals, or due to Metro rejection of unacceptable submittals, shall not constitute a basis for any claim of delay, interference, disruption, or other similar types of claims.

A. The Contractor shall submit for acceptance by Metro a written site specific Security and Loss Prevention Program that outlines the method of property and asset protection to be used by the Contractor and is to be revised and resubmitted as conditions warrant. Metro shall review and approve written plans from the Contractor identifying measures for securing project related Worksites. The Program shall address both active and passive security measures to be implemented by the Contractor and shall include, but is not limited to, the following.

    1. Security Guard Service – Not Used

    2. Lighting / Illumination – The Contractor shall provide and maintain adequate lighting throughout each Worksite including but not limited to staging, lay-down areas, and employee parking lots.

3. Office Security – All Contractor office facilities shall be secured to prevent entry and shall be provided with alarm systems.

4. Physical Barriers – Contractor shall provide and install perimeter fencing. Access areas shall be closed and locked at the end of shift or when work is completed in the area.

5. Project warning signage – Contractor shall provide signs such as 'Keep Out - No Trespassing."

Upon acceptance by Metro, the Contractor shall implement the accepted Program. Metro will monitor the performance of the Contractor's Program to ensure that adequate security is provided during the construction of the project.

B. Should conditions change, the Contractor will be required to resubmit an updated site specific Security and Loss Prevention Program that reflects the changes in conditions. Any resubmittal, when required, shall be considered within the original scope of this Contract and shall be submitted in accordance with Metro accepted submittal schedule so as to not delay the performance of Work by the Contractor.

1.4 WORKSITE CONDITIONS

A. Operating Rail Systems – Not Used

PART 2 - PRODUCTS

2.1 SECURITY EQUIPMENT AND TOOLS

A. Select, provide, and retain a reputable uniformed armed security guard service. Security guards assigned by the security subcontractor shall be assigned to only Project worksites for patrol and other security related activities.

B. Provide security guards with motor vehicles to enhance patrolling the entire project during construction work activities including holidays and weekends. Personnel assigned by the security subcontractor shall perform only duties directly related to the security function.

C. Security guards shall be equipped with cell phones to enhance their ability to report incidents in a timely manner and allow direct contact with emergency communications dispatchers.

D. Security guards shall be provided with Personnel Protective Equipment (PPE) to ensure compliance with Section 01545-DB.

PART 3 - EXECUTION

3.1 SECURITY PERSONNEL

In the event the Contractor employs or subcontracts security services, the following requirements shall be met:

A. Contractor shall ensure that security guard service is on time and on duty providing security protection during construction activities, including on holidays and weekends.

B. Contractor shall ensure that security guard service employs personnel who are professional, well-groomed and wear clean, pressed uniforms.

C. Security subcontractor shall provide personnel who are bonded and certified as security officers. Security personnel shall be properly licensed and certified to bear and use service weapons if or when so equipped. Contractor shall audit and review the security subcontractor's recruitment policies and procedures to ensure that appropriate background checks and training are completed.

D. Contractor shall ensure that security personnel receive orientation training regarding construction sites and known or potential hazards and methods for recognizing and avoiding known or potential hazards.

PART 4 - MEASUREMENT AND PAYMENT

4.1 MEASUREMENT

The Work of this Section will be measured as a unit, acceptably performed.

4.2 PAYMENT

Payment will be made under the applicable Schedule of Values item for General Requirements - Nonspecific.

END OF SECTION

SECTION 01550-DB

TEMPORARY ACCESS ROADS AND PARKING AREAS

PART 1 - GENERAL

1.1 DESCRIPTION - The Work specified in this Section consists of designing, locating, laying out, constructing, maintaining, and removing temporary access roads and parking areas.

1.2 QUALITY CONTROL

A. Comply with Section 01460-DB, Project Quality Program Requirements.

B. Provide materials and construction and maintenance methods to satisfy emergency response requirements of local fire jurisdictions and adequate for loading, density of traffic, and weather conditions expected at temporary access roads and parking areas during construction period.

1.3 SUBMITTALS - Refer to Section 01300-DB, Submittals, for submittal procedures. Layout and details for construction of roads and parking areas, and approval from local jurisdiction.

PART 2 - PRODUCTS

2.1 MATERIALS AND EQUIPMENT - Adequate for intended use and capable of being maintained properly through the construction period.

PART 3 - EXECUTION

3.1 INSTALLATION - Locate temporary access roads and parking areas to serve construction Work adequately and result in minimum interference with performance of Work. Relocate, modify and extend facilities, as required, during course of Work. On-street parking by Contractor employees will not be permitted within vicinity of Worksite.

3.2 TEMPORARY TRAFFIC CONTROLS - Provide temporary traffic controls and permits if required at junctures of temporary roads with public roads, including warning signs for public traffic and stop signs for construction road entrances onto public roads. Comply with requirements and recommendations of local traffic authorities.

3.3 MAINTENANCE - Maintain temporary access roads and parking areas in a safe and useable condition acceptable to Metro or its designee during construction period.

3.4 REMOVAL - After completion of construction, remove materials used for building of temporary roads and parking areas. Restore soils compacted by traffic to density of surrounding soils.

PART 4 - MEASUREMENT AND PAYMENT

4.1 MEASUREMENT - The Work of this Section will be measured as a unit, acceptably completed.

4.2 PAYMENT - The Work of this Section will be paid for under the applicable Schedule of Values item for General Requirements - Nonspecific.

END OF SECTION

SECTION 01564-DB

ENVIRONMENTAL SAFETY AND HEALTH PROGRAM

PART 1 - GENERAL

1.1 DESCRIPTION

A. Contaminated and Hazardous Soils may be encountered during Work. In order to properly handle these types of soil, Contractor shall prepare and implement an Environmental Safety and Health Program and shall require that all its subcontractors performing excavation, transport, and handling of soils comply with the Environmental Safety and Health Program.

B. The Work specified in this Section consists of preparation, implementation, and maintenance of the Environmental Safety and Health Program for the duration of the Work, especially during excavation, handling, and transportation of Contaminated and Hazardous Soils. It is anticipated and considered as part of the Scope of Work that Contractor performs Work in areas and with substances requiring protective equipment and clothing, up to Level C Protection.

C. Contractor shall be responsible for excavating and stockpiling contaminated and hazardous soils. Refer to paragraph 3.2 C for details.

D. By definition, contaminated and hazardous soils include drill mud resulting from pile drilling operations. For handling of groundwater encountered during pile drilling, refer to Section 01566-DB, Pollution Controls.

E. Testing, transport, and disposal of all generated contaminated and hazardous soils will be the responsibility of Southern California Gas Company. This includes but will not be limited to all required soil profiling, lab analysis, stockpiling, segregation, loading, and proper transport and disposal by a licensed waste hauler.

1.2 QUALITY CONTROL

A. Comply with Section 01460-DB, Project Quality Program Requirements.

B. Reference Standards

1. California Code of Regulations, Title 8

2. Code of Federal Regulations, 29 CFR 1910 et seq. and 1926 et seq.

1.3 SUBMITTALS

A. Effectively written and coherent Site Specific Safety and Health Plan as defined in CCR Title 8, 5192 (b) (1-4), within 21 days of receiving Notice to Proceed.

B. Certificates of training (minimum initial 24 hour hazardous waste training and 8 hour annual refresher), respiratory protection and fit-testing, and medical clearance, before start-up of excavation and drilling activities.

C. Certificate of training (Hazardous Waste Training and 8 hour supervisory training), experience, and credentials of the Site Safety and Health Officer.

D. Monthly status report of contaminated soil management, including excavated quantities of contaminated soil and work performed using Personal Protective Equipment (PPE). This report must include updated quantities of excavated contaminated soils; the date, time, and number of affected workers; and total number of hours the Contractor performed work in Level C Protection.

PART 2 - PRODUCTS

2.1 MATERIALS

PPE and monitoring equipment shall conform to requirements set forth by Cal/OSHA, Federal OSHA, and Contractor's Environmental Safety and Health Program.

PART 3 - EXECUTION

3.1 PREPARATION

A. Implement an Environmental Safety and Health Program for excavation, handling, and transportation of Contaminated and Hazardous Soils. As part of this Program, prepare a Site Specific Safety and Health Plan. The Safety and Health Plan shall bear the certification of a Certified Industrial Hygienist (CIH) licensed by the American Board of Industrial Hygiene.

B. Select a team of individuals to be included in the Environmental Safety and Health Program. These individuals must be hazardous waste trained, medically qualified, and fit-tested with an appropriate respirator to excavate and/or handle Contaminated and Hazardous Soils. Prior to excavation and/or handling of Contaminated and Hazardous Soils, submit a list of individuals that are part of this team, including their current certificates (training, medical clearance, and respiratory fit-testing). Include their names and titles/positions. Any additional individuals who may handle Contaminated and Hazardous Soils shall be included in the Environmental Safety and Health Program, including replacement individuals and any new position that require

Contaminated and Hazardous Soil handling. Any excavation, transportation, and handling of Contaminated and Hazardous Soils must be performed by qualified individuals enrolled in the Environmental Safety and Health Program.

C. Designate a full-time Site Safety and Health Officer to recognize hazards, and implement and manage the Environmental Safety and Health Program. The Safety and Health Officer can be a Safety Engineer, provided he/she is qualified to conduct air monitoring and identify environmental hazards, and meets all training requirements set forth in 8 CCR 5192 (e) in addition to the qualifications set forth in the Construction Safety and Security Manual. As a minimum, the Safety and Health Officer shall monitor air quality and hazards to personnel and the Work area during excavation, handling, and transporting of Contaminated and Hazardous Soils, and assign PPE and other equipment necessary for the implementation of the Safety and Health Program.

D. Supply a direct reading Organic Volatile Analyzer equipped with a Photo-Ionization Detector (PID) and an initial supply of PPE readily available for use by the team. Replenish the PPE to ensure that a supply of PPE is always available to prevent any delays.

E. The Contractor is responsible for any delays associated with lack of preparation, PPE, or trained and qualified personnel.

3.2 PERFORMANCE

A. Provide, without delay to Work, hazardous waste trained, medically qualified, and respirator fit-tested workers, and PPE and other equipment, as necessary for implementation and maintenance of the Environmental Safety and Health Program.

B. Provide a Site Safety and Health Officer to implement and manage the Environmental Safety and Health Program. Site Safety and Health Officer must meet the requirements set forth in CCR, Title 8, 5192 (e), in addition to qualifications set forth in the Construction Safety and Security Manual. The Site Safety and Health Officer must be qualified and properly trained to monitor hazards to the extent required under the Specification, and implement the Site-Specific Safety and Health Plan.

C. The Contractor shall have the responsibility to perform the excavation and stockpiling of soils for disposal by Southern California Gas Company. The excavated soils shall be stockpiled for sampling and testing within the assigned phase area. Contaminated / hazardous and clean soils shall be stored in separated piles / tanks. Contaminated soils shall be stored on visqueen sheets or in tanks to protect the ground. Contaminated / hazardous piles shall be protected from weather with cover sheets prior to disposing from the site legally. Southern California Gas Company will be responsible for loading, unloading, and transporting all contaminated / hazardous soils to appropriately

classified disposal sites. Reference Southern California Gas Company Environmental Safety and Health Program Contract No. C0970 01564-DB-4 issued 08/20/10. The Southern California Gas Company contractor will make necessary arrangements with disposal sites and pay for all disposal fees. The Southern California Gas Company contractor will submit copies of disposal documents such as waste manifests to Metro for record. Contractor will be responsible for all SCAQMD Rule 1166 permitting requirements. Contractor will be responsible for loading, unloading, and transporting non-contaminated soils.

D. Contractor shall assume for bidding purposes that all excavated soil is contaminated.

E. Contractor is responsible for the safety and health of its employees and its subcontractors. Contractor shall conduct air monitoring to ensure compliance with monitoring requirements under the Environmental Safety and Health Program, Site Specific Safety and Health Plan, Cal/OSHA, and any other local, state, or federal requirements. Dust control and suppression mitigation measures shall be employed by Contractor. However, Metro reserves the right to conduct air sampling and monitoring to determine the required minimum Level of Protection.

F. In the event the Contractor encounters or suspects contamination, promptly implement measures described in Contractor Site Specific Safety and Health Plan and immediately notify Metro or its designee. The Contractor must use the team; that is, those individuals enrolled in the Environmental Safety and Health Program, to excavate and/or handle Contaminated Soil. Ventilation shall be modified, if necessary, or if directed by Metro, to increase airflow and effectively reduce air contaminants, prior to and during excavation and handling of Contaminated and Hazardous Soils. If Excluded Hazardous Waste Operations are required, Contractor shall adequately protect the safety and health of its employees and subcontractors' employees while working in areas not affected.

PART 4 - MEASUREMENT AND PAYMENT

4.1 MEASUREMENT

Work of this Section involving contaminated soils will be measured as a unit, acceptably completed.

4.2 PAYMENT

Payment for the Work of this Section involving contaminated soils will be made under the applicable Schedule of Values item for Earthwork – Handling of Contaminated Soils.

END OF SECTION

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SECTION 01565-DB

CONSTRUCTION NOISE AND VIBRATION CONTROL

PART 1 - GENERAL

1.1 DESCRIPTION

A. The Work specified in this Section consists of eliminating or minimizing noise and vibration generated by construction activities, and of complying with applicable noise regulations, specification requirements, and noise and vibration limits specified within this Section.

B. Use equipment with effective noise-suppression devices and employ other noise control measures such as enclosures and barriers necessary to protect the public. Schedule and conduct operations in a manner that will minimize, to the greatest extent feasible, the disturbance to the public in areas adjacent to the construction activities and to occupants of buildings in the vicinity of the construction activities.

C. Submit a Noise Control Plan and a Noise Monitoring Plan, as specified in this Section. Both plans shall be prepared by an Acoustical Engineer meeting the qualifications specified in paragraph 3.2.A.2. Do not operate noise generating construction equipment at the construction site prior to acceptance of the Noise Control and Monitoring Plans. Update Noise Control Plan every three months.

D. Compliance with the requirements of this Section may require the use of equipment with special exhaust silencers or noise attenuating enclosures, and construction of temporary enclosures or noise barriers around activities. Use haul routes and staging areas, as approved by Metro and the City of Los Angeles, to minimize noise at residential and other sensitive receptor sites. Do not operate trucks used for removal of excavated material and delivery of construction materials on local residential streets or on streets that pass by schools during school hours, unless specifically accepted by Metro.

E. Definitions

1. Construction Site: For purposes of noise and vibration control requirements, the Contract limits of construction. This includes Right-of-Way lines, property lines, construction Easement Boundary or property lines, and Contractor staging areas outside the defined boundary lines, used expressly for construction.

2. Noise Level Measurements: Unless otherwise indicated, the use of A-weighted and "slow" response settings of instruments complying with

Type 2 requirements of latest revision of American National Standards Institute (ANSI) S1.4, Specification for Sound Level Meters.

3. A-Weighted Noise Levels: Decibels (referenced to 20 micro-Pascal) as measured with A-weighting network of standard sound level meter, abbreviated dBA.

4. C-Weighted Noise Level: Decibels (referenced to 20 micro-Pascal) as measured using the C-weighting network on a sound level meter complying with the criteria for a Type 1 (Precision) or Type 2 (General Purpose Sound Level Meter), as defined in the current revision of ANSI Standard S1.4. Use the FAST setting on the sound level meter to measure the C-weighted sound level.

5. Vibration Measurements: The use of a vibration transducer, amplifier, peak detector, and frequency band filters complying with ANSI S2.4.

6. Vibration: Velocity in microinches per second. Vibration levels are expressed as velocity levels in Decibels referenced to one microinch per second, abbreviated VdB.

7. Daytime: The period from 7:00 AM to 9:00 PM Monday through Friday local time, and Saturdays and Sundays, 8:00 AM to 6:00 PM.

8. Nighttime: Periods other than daytime.

9. Noise Sensitive Locations: Residential areas, institutions, hospitals, parks, and other locations so named herein.

10. L_{max}: The maximum measured sound level.

11. One-hour L_{eq} A-weighted Equivalent Sound Level: The continuous sound level that represents the same sound energy as the varying sound levels over one hour.

12. Sound Transmission Class (STC): A single number rating calculated in accordance with ASTM E413, using values of sound transmission loss. It provides an estimate of the performance of a partition in certain common sound insulation problems.

13. Stationary/Continuous Noise: Daytime noise from stationary sources, and parked mobile sources that produce repetitive or long-term noise lasting more than two hours.

14. Mobile/Intermittent Noise: Daytime noise from non-stationary mobile equipment operated by a driver, or from source of intermittent, non-recurring on long-term basis, non-scheduled, non-repetitive, short-term noises (not lasting more than two hours).

H. Metro or its designee will monitor Contractor's performance of tasks specified, and will inspect necessary records, reports and procedures.

I. Designate staff member as Noise and Vibration Control Representative to be trained by and work with the Acoustical Engineer specified in Paragraph 3.2 of this Section.

1.2 QUALITY CONTROL

Comply with the requirements of the following:

A. Section 01460-DB, Project Quality Program Requirements

B. California Code of Regulations (CCR).

C. California Health and Safety Code (CHSC).

D. City of Los Angeles Building Code, Chapter XI, Los Angeles Noise Ordinance.

E. Caltrans Standard Specifications Section 14-8 “Noise and Vibration”

F. Code of Federal Regulations (CFR).

G. Environmental Protection Agency (EPA), State and local authorities.

H. Federal Occupational Safety and Health Act (OSHA) and California Occupational Safety and Health Act (Cal/OSHA).

1.3 REFERENCE STANDARDS

1. American National Standards Institute (ANSI)

   ANSI S1.4 Specification for Sound Level Meters

   ANSI S2.4 Auxiliary Analog Equipment for Shock and Vibration Measurements

2. American Society for Testing and Materials (ASTM)

   ASTM E90 Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements

   ASTM C423 Standard Test Method for Sound Absorption and Sound Absorption Coefficients by the Reverberation Room Method

   ASTM E413 Classification for Rating Sound Insulation

3. International Electrotechnical Commission (IEC) - IEC 179 Precision Sound Level Meters

4. Occupational Safety and Health Act (OSHA) regulations.

5. Society of Automotive Engineers (SAE)

   SAE J88 Sound Measurement Off-Road Work Machines - Exterior

   SAE J366 Exterior Sound Level for Heavy Trucks and Buses

   SAE J994 Alarm-Backup- Electric Laboratory Performance Testing, Standard

   SAE J1446 On-Machine Alarm Test and Evaluation Procedure for Construction and General Purpose Industrial Machinery

1.4 RESPONSIBILITIES OF CONTRACTOR

A. Perform Work within the permissible noise levels, work schedule limitations, and procedures provided for in this Section and applicable Federal, state, county, and municipal codes, regulations, and standards.

   1. City of Los Angeles prohibits work on city streets from 7 to 9 am and from 3:30 to 7 pm. Verify requirements. Obtain permit from Bureau of Engineering for peak hour exemption.

   2. Permit from Police Commission is required for weekend or nighttime work.

B. Other than those provided herein, be responsible for obtaining, at Contractor's own expense, permits, variances, equipment certifications, and other documents required by this Section and by applicable Federal, state, county, and municipal codes, regulations, and standards.

C. With regard to noise monitoring, include the following:

   1. Furnish instrumentation for noise monitoring that complies with the standards specified in Paragraphs 1.1 G.3. and 1.1 G.4., and that is capable of measuring the sound levels defined in Paragraphs 1.1 G.10 and 1.1 G.11.

   2. Collect and report noise monitoring data, report whether the noise monitoring data indicates compliance under Paragraph 3.1, and submit a Noise Measurement Report to Metro or its designee on a weekly basis.

   3. Provide access to Metro or its designee to review measured data and coordinate the Contractor's schedule for noise monitoring.

4. Implement noise abatement measures as required by this Section, based on the Contractor's noise monitoring data and nuisance conditions reported by Metro or its designee.

1.5 SUBMITTALS

Refer to Section 01300-DB, Submittals, for submittal procedures.

A. Qualifications and work experience of the acoustical engineer as specified in paragraph 3.2 of this Section. This submittal is required prior to the submittal of the Noise Control and Noise Monitoring Plans.

B. Contractor's Noise Control Plan as specified in paragraph 3.2 of this Section.

C. Contractor's Noise Monitoring Plan and the weekly Noise Measurement Reports as specified in paragraph 3.3 of this Section.

D. Noise measurement equipment makes and models, and calibration conformance certificates as specified in paragraph 3.4 of this Section.

E. Equipment noise certification reports as specified in paragraph 3.4 of this Section.

F. Shop and Working Drawings, computations, material data, and other criteria for noise abatement measure, identified in the Noise Control Plan and for moveable noise barriers, noise barrier fences, and noise control curtains as specified in paragraphs 2.2, 2.3 and 2.4 herein. Have drawings and computations stamped by a Registered Professional Engineer in the State of California.

G. Contractor's Weekly Vibration Measurement Reports as specified in Part 3.5 below.

PART 2 - PRODUCTS

2.1 NOISE CONTROL MATERIALS

Noise control materials may be new or used. Used materials shall be sound and free of damage and defects and shall be of a quality and condition to perform their designed function.

2.2 NOISE BARRIER FENCES

A. Use material that will last for the duration of construction of this Contract. Construct using two layers of 3/4 inch Medium Density Overlay (MDO) plywood sheeting or acceptable equal.

B. Line the construction site side with glass fiber or mineral wool type noise-absorbing material at least 2 inches thick. Protect this material using wire mesh or perforated sheets that are corrosion resistant and that have at least 30 percent open area and provision for water drainage.

C. Provide a wall assembly with STC 25 or greater, based on certified sound transmission loss data taken according to ASTM E90 and a Noise Reduction Coefficient (NRC) rating of NRC 0.70 or greater, based on certified sound absorption coefficient data taken according to ASTM C423.

D. Construct gates and/or doors in the fence, either hinged or rolling, of the same or equally effective material as the noise barrier fence. Construct gates and doors in the fence to ensure that the edges overlap the fence to eliminate gaps. During nighttime hours maintain gates and doors in a closed position except for brief periods of time to allow access to the Construction Site.

E. Attach lagging to support posts designed so that the fence will withstand 80 mph wind loads plus a 30 percent gust factor.

F. Provide flush mating surfaces of wall sides when walls are joined together or at corners. Close gaps between wall sections and between bottom edge of walls and grade with material that will completely close the gaps and be dense enough to attenuate noise.

G. Be responsible for the design, detailing, and adequacy of the framework and supports, posts, attachment methods, and other appurtenances required for the proper erection of the noise control walls.

H. The design details for the noise control wall footing, steel posts, supports, and framework shall be prepared and stamped using a Professional Engineer licensed in the State of California. Submit the design and detailed engineering to Metro or its designee.

2.3 MOVEABLE NOISE BARRIERS

A. Construct moveable barriers of 1-inch Medium Density Overlay (MDO) plywood sheeting, or other acceptable material with an STC 25 rating or greater.

B. Line barriers on construction site side with glass fiber or mineral wool type sound absorbing material at least 2 inches thick. Protect this material by wire mesh or perforated sheets that are corrosion resistant and that have at least 30 percent open area, with provision for water drainage.

C. Provide materials and details of construction sufficiently weather-resistant to last through the duration of construction of this Contract.

D. Construction Details

1. Attach barrier panels to support frames constructed in sections to provide a moveable barrier utilizing the standard temporary precast concrete median barrier or other supports.

2. When barrier units are joined together, overlap the mating surfaces of the barrier sides or make flush with each other. Close gaps between barrier units, and between the bottom edge of the barrier panels and the ground, with material that will completely close the gaps and be dense enough to attenuate noise.

3. The height of the barriers – as needed to meet noise control plans.

2.4 NOISE CONTROL CURTAINS

A. Noise control curtain - A durable, flexible composite material featuring a noise barrier layer bonded to a sound-absorptive material on one side.

B. Noise barrier layer - A rugged, impervious material with a surface weight of at least 1 pound per square foot.

C. Sound-absorptive material - Include a protective facing, and securely attached to one side of the noise barrier layer over its entire surface.

D. Noise control curtain materials - Abuse resistant, exhibiting superior hanging and tear strength during construction. The curtain barrier material shall have a minimum breaking strength of 120 Ib/in. and a minimum tear strength of 30 Ib/in. Based on the same test procedures, the curtain absorptive material facing shall have a minimum breaking strength of 100 Ib/in. and a minimum tear strength of 7 Ib/in.

E. Noise control curtain materials - Corrosion resistant to most acids, mild alkalies, road salts, oils, and grease.

F. Noise control curtain materials - Fire retardant, and approved by the City of Los Angeles Fire Department prior to procurement.

G. Sound-absorptive material - Mildew resistant, vermin proof, and non-hygroscopic.

H. Noise control curtain - STC rating of STC 25 or greater, based on certified sound transmission loss data taken according to ASTM Test Method E90.

I. Noise control curtain - NRC rating of NRC 0.70 or greater, based on certified sound absorption coefficient data taken according to ASTM C423.

J. Construct gates and doors of a material with a STC 25 or greater rating.

K. Construction Details

1. Install the noise control curtains in vertical segments extending the full curtain height. Overlap seams and joints by a minimum of 2 inches and seal using hook fasteners or double grommets. Use construction details according to the manufacturer's recommendations.

2. Secure the curtain at ground level and/or at intermediate points by framework and supports.

3. Be responsible for the design, detailing, and adequacy of framework, supports, ties, attachment methods, and other appurtenances required for the proper installation of the curtain.

4. The design and details necessary for the noise control curtain framework and supports shall be prepared and stamped by a Professional Engineer licensed in the State of California. Submit the design and detailed engineering to Metro or its designee for review prior to procurement.

PART 3 - EXECUTION

3.1 NOISE LEVEL LIMITS

A. Stationary/Continuous Noise: Prevent noise intrusion from stationary sources, and parked mobile sources which produce repetitive or long-term noise lasting more than 2 hours, from exceeding limits shown on Table 1.

B. Mobile/Intermittent Noise: Prevent noise from non-stationary mobile equipment operated by a driver, or from sources of intermittent, non-recurring on a long term basis, non-scheduled, non-repetitive, short term noises (not lasting more than 2 hours), from exceeding the limits shown on Table 2.

C. Nighttime operations noise limits are established by LAPD and Metro Project Noise and Vibration Criteria as shown on Tables 1 and 2 appended to this section. The LAPD limits are based on construction ambient L_{eq} measurements plus 5 dBA. The LAPD limits apply for the hours of 9:00 PM to 7:00 AM Monday through Friday, 9:00 PM Friday to 8:00 AM Saturday, 6:00 PM Saturday to 8:00AM Sunday, and 6:00PM Sunday to 7:00AM Monday. Enforcement will be based on a 15 minute average measurement.

D. At the surface of the construction site during nighttime hours, use only equipment that, operating under full load, meets the noise limits specified in Table 3 when measured according to the test procedures used for equipment noise certification as specified in paragraph 3.4 of this Section.

E. Contractor is prohibited from operating equipment at night that does not meet nighttime noise emission limits in Table 3 below. If the Contractor's existing

equipment on-site does not meet nighttime noise emission limits for surface construction activities specified in Table 3 or falls out of compliance, remove the non-compliant equipment promptly from nighttime service by immediately parking and turning off equipment when it is safe to do so.

F. Trucks operating off-site between the hours of 12:00 midnight and 5:00 AM have lower noise emission limits (80 dBA at 50 feet) than normally required by the Motor Vehicle Code. All trucks used for these nighttime hours must be certified in accordance with Section 3.4 of this section. Take necessary steps to comply with this limit, which may include fitting this equipment with high grade engine exhaust silencers and engine casing sound insulation.

3.2 NOISE CONTROL PLAN

A. Requirements

1. Within 15 days of Notice To Proceed (NTP), submit to Metro or its designee the name, address, and qualifications of the Acoustical Engineer responsible for preparing and overseeing the implementation of the Noise Control Plan.

2. The minimum requirements for the Acoustical Engineer - Bachelor of Science degree or higher degree, from a qualified program in engineering, physics, or architecture offered by an accredited university or college, and 5 years of experience in noise control engineering and construction noise analysis, or current enrollment as a full Member or Board-certified Member in the Institute of Noise Control Engineering. In addition to the basic requirements shown above, the Acoustical Engineer must demonstrate substantial and responsible experience in preparing and implementing construction noise control and monitoring plans on construction projects conducted in an urban setting, calculating construction noise levels, and designing and overseeing the implementation of construction noise abatement measures.

3. Within 45 days of NTP, submit the Noise Control Plan to Metro or its designee.

4. Noise Control Plan - Include the following for nighttime construction activities that may occur at the surface of the construction site:

a. Site Drawing - Prepare a scaled drawing of the construction site indicating the following:

1) Contract name and number

2) Contractor's name

3) Date

4) Scale

5) Direction of North

6) Noise sensitive locations near the construction site

7) Construction equipment locations used during nighttime hours, designated by the code letter used in Column (a) in Part A of the Noise Control Plan Form, Figure 4.

8) Locations of the noise levels calculated for residential, commercial, and industrial areas as specified in paragraph 3.2 A.4.c.

9) Locations and types of noise abatement measures that may be required to meet codes and regulations as indicated by the calculations as specified in paragraph 3.2 B.

b. Equipment Inventory - Prepare an inventory of equipment used during nighttime hours by providing the following information in the indicated columns of Noise Control Plan Form, Figure 4.

1) Column (a) - Code letter in sketch to indicate position of equipment on site and to identify Certificates of Noise Compliance

2) Column (b) - Appropriate equipment category from Table 3

3) Column (c) - Equipment manufacturer and model, if known at the time of the Plan's preparation

4) Column (d) - Unique identifier (ID), such as registration number, if known at the time of Plan preparation

5) Column (e) - Equipment horsepower

6) Column (f) - Noise emission limit from Table 3

7) Column (g) - Estimated noise level at 50 feet; if greater than the value in Column (f), source noise control device (e.g. mufflers) must be used to comply with limit

8) Column (h) - Estimated date of first use on site

9) Column (i) Estimated date of last use on site

c. Noise Calculations - Prepare calculations of nighttime L_{max} and 1-hour L_{eq} noise levels expected at the nearest residential, commercial, and

industrial property line based on the equipment noise levels given in Part A of the Noise Control Plan Form. Determine the nearest property lines from noise-sensitive locations. Calculate preliminary 1-hour L_{eq} construction noise projections for those sensitive locations and insert with locations into Table 5. Make the calculations for locations where noise emitted by applicable equipment will cause the greatest noise level for each type of land use, for nighttime periods, if necessary. Provide the results on Part B of the Noise Control Plan Form with calculations included below the results, and with the locations for the calculations indicated on the site sketch. The noise calculation procedure shall be as follows:

1) Calculate L_{max} according to the method outlined below:

   $L_{max}(equipment) = EL - 20 \log_{10} (D/50)$

   where:

   EL = Estimated equipment noise level at 50 feet, in dBA.

   D = Distance from the equipment to property-line location, in feet.

   Then, combine the individual contributions of each piece of equipment to obtain the overall maximum construction noise level at each location as follows:

   $L_{max}(overall) = 10 \log_{10} (SUM\ 10\ ^{[Lmax(equipment)/10]})$

2) Calculate 1-hour L_{eq} according to the methodology recommended by the US Federal Highway Administration ("Highway Construction Noise: Measurement, prediction and mitigation," US Department of Transportation, Federal Highway Administration Special Report, March 1977) as follows:

   First, calculate the construction 1-hour L_{eq} at each property-line location for each item of equipment using the following equation:

   One-hour $L_{eq}(equipment) = EL - 20 \log_{10}(D/50) + 10 \log_{10} (UF/100)$

   where:

   EL = Estimated equipment noise level at 50 feet, in dBA.

   D = Distance from the equipment to the property-line location, in feet.

UF = "Usage factor," expressed as the percent of time that the equipment is operated at full power while on site. This factor shall be estimated by the Contractor and/or the qualified acoustical engineer. Guidelines for the selection of usage factors are provided by the US Environmental Protection Agency (Noise From Construction Equipment and Operations, Building Equipment, and Home Appliances, US Environmental Protection Agency Report NTID 300.1, December 31, 1971).

Then, combine the individual contributions of each piece of equipment to obtain the overall construction 1-hour L_{eq} at each location as follows:

One-hour L_{eq}(overall) =10 $\log_{10}$ (SUM $10^{[\text{one-hour Leq (equipment)}/10]}$)

3) Compare the calculated L_{max} and 1-hour L_{eq} values with the Contract limits specified in Paragraph 3.1.

d. Description of Required Noise Abatement Measures as specified in paragraph 3.2 C. of this Section.

5. Update the Noise Control Plan at 3-month intervals (based on Metro or its designee's initial acceptance date) and resubmit the Plan within 10 days of the start of each quarterly period. Update and resubmit the Noise Control Plan upon any major change in work schedule, construction methods, or equipment operations not included in the most recent Plan.

B. Noise Abatement Measures - If the results of the noise calculations prepared in accordance with paragraph 3.2 A.4.c. indicate that noise level limits listed under paragraph 3.1 will be exceeded, identify proposed noise abatement measures, their anticipated effects (dBA reductions), and a schedule for their implementation. Recalculate the noise levels at the nearest sensitive receptor location property lines which include the anticipated noise reduction effects and submit the results on Part B of the Noise Control Plan Form. Include, as backup documentation to Part B of the Noise Control Plan, drawings, sketches, and suitable calculations which demonstrate anticipated noise reduction benefits and that proposed structures or facilities comply with applicable building code requirements.

C. Noise Reduction Methods - To the extent required to meet the noise limits specified by this Section, include noise reduction measures listed below, or others of the Contractor's devising, to minimize construction noise emission levels. Noise reduction measures include, but are not limited to, the following:

1. Scheduling truck loading, unloading, and hauling operations so as to minimize noise impact near noise sensitive locations and surrounding communities.

2. Locating stationary equipment so as to minimize noise impact on the community.

3. Do not leave equipment pieces idling when not in use.

4. Limiting the use of enunciators or public address systems, except for emergency notifications.

5. Maintaining equipment such that parts of vehicles and loads are secure against rattling and banging.

6. Limit the time that steel decking or plates for street decking or covering excavated areas are in use.

8. Grading of surfaced irregularities on construction sites to prevent the generation of impact noise and ground vibrations by passing vehicles.

9. Schedule Work to avoid simultaneous activities that both generate high noise levels.

3.3 NOISE MONITORING PLAN

A. Requirements

1. Have the Noise Monitoring Plan prepared and administered by the Contractor's Acoustical Engineer.

2. Within 45 days of NTP, submit the Noise Monitoring Plan to Metro or its designee, specifying the nighttime and daytime construction activities, monitoring locations, equipment, procedures, schedule of measurements, and reporting methods to be used.

3. Furnish noise monitoring data to Metro or its designee on a weekly basis. Include measurements taken during the previous week.

4. In the event that the measured noise levels exceed allowable limits, immediately notify Metro or its designee and immediately implement additional Noise Abatement Measures as specified in the Noise Control Plan. See also Part 3.1.E above.

5. If the measured nighttime levels exceed the noise limits specified in this Section, reduce the noise levels by appropriate abatement measures in order to comply with the nighttime Noise Variance requirements or terminate the nighttime construction activity responsible for the noise limits

exceedance until the daytime hours when higher noise levels are permitted.

B. Measurement Locations

1. Measure noise-sensitive locations in the vicinity of the construction site for noise levels. These locations may change during the Contract and shall be updated as required by Metro.

2. Prepare and submit a scaled plan indicating monitoring locations, including measurements to be taken at construction site boundaries and at nearby residential, commercial, and industrial property lines.

C. Not Used

D. Not Used

E. Measurement Equipment

1. Perform noise measurements with an instrument that is in compliance with the criteria for a Type 1 (Precision) or Type 2 (General Purpose) Sound Level Meter as defined in the current revision of ANSI Standard S1.4.

2. Provide sound level meters capable of measuring the L_{max} and 1-hour Leq on both the A-Weighted and C-Weighted scales required by regulatory criteria and Noise Level Limits.

3. Calibrate sound level meters, microphones, and calibrators for certified laboratory conformance at least once a year. Submit a current certificate of conformance to Metro or its designee prior to using the sound level meter and submit updated certificates following subsequent calibrations on a yearly basis for the duration of this Contract or upon the completion of repairs to the instrument.

F. Measurement Procedure

1. Field calibrate the sound level meter using an acoustic calibrator, according to the manufacturer's specifications, prior to each measurement.

2. Except as otherwise indicated, perform measurements using the A-weighting network and the SLOW response of the sound level meter.

3. Measure impulsive or impact noises using the C-Weighting network and the FAST response of the sound level meter.

4. Fit the measurement microphone with an appropriate windscreen at the location of the sensitive receptor at least 4 to 6 feet away from the nearest reflective surface.

5. Take noise measurements at noise sensitive locations within 150 feet of the construction site at least once each week and after a change in construction activity or construction location. Measurement periods - a minimum of 20 minutes.

6. Construction noise measurements shall coincide with daytime and nighttime periods of maximum noise-generating construction activity, and shall be taken during the construction phase or activity that has the greatest potential to create annoyance or to exceed applicable noise regulations and restrictions.

7. If, in the estimation of the person performing the measurements, outside noise sources contribute significantly to the measured noise level, repeat the measurements (with the same outside source contributions) when construction is inactive to determine the background noise level.

8. Submit noise data to Metro or its designee on a weekly basis using the Noise Measurements Report Form provided in Figure 2. Note the type of measurement (e.g. baseline, on-going construction, etc.) on the form.

9. Clearly identify monitoring locations and sketch on the back of the Noise Measurements Report Form, Figure 2, along with the locations of and distances from any noise-sensitive location.

10. Identify construction equipment operating during the monitoring period and the locations sketched on the back of the Noise Measurements Report Form, along with the locations and distances to any noise sensitive location.

3.4 EQUIPMENT NOISE CERTIFICATION

A. Requirements for Construction Equipment

1. Ensure that Contractor and Subcontractor equipment, of the categories listed in Table 3, to be used (during nighttime hours at the surface of the construction site) for a total duration greater than 5 days, shall be tested for compliance with the stated noise emission limits by the Acoustical Engineer during the first day of use on the construction site or at an alternative site acceptable to Metro or its designee.

2. Retest equipment as described above at 6-month intervals while in use on-site, and certify new equipment before being placed into service at the site.

3. For each piece of equipment tested, submit a noise report to Metro or its designee by completing the Application for Certificate of Equipment Noise Compliance provided in Figure 3. Ensure that the equipment identification

number used for the Certificates is consistent with the identification number used in the Noise Control Plan.

4. Do not use equipment of the categories listed in Table 3, as described above, on-site without valid certificates of noise compliance submitted as required.

B. Test Procedures for Construction Equipment

1. Operate engine-powered equipment by the Contractor or Contractor's representative at maximum governed rpm under full load conditions during the tests under the supervision of the Acoustical Engineer.

2. Test portable and mounted impact hammers, such as hoe rams and jackhammers to be used for concrete breaking, by the Acoustical Engineer during the first day of actual operation at the construction site under maximum load conditions as rated by the equipment manufacturer.

3. Noise certification measurements - As specified in paragraph 3.3 F. of this Section. Use an acoustic calibrator of the type recommended by the sound level meter manufacturer prior to measurements.

4. If possible, make measurements at two locations: (a) 2 feet outside the right side of the equipment casing, at a distance of 50 feet and height of 5 feet above ground level, and (b) 2 feet outside the left side of the equipment casing, at a distance of 50 feet and a height of 5 feet above ground level, with the equipment operating as indicated in items 3.4.B.1, 2, or 3 above for a minimum period of one minute. Reduce measurements made at less than 50 feet, because of space limitations at the test site, by the values given in Table 6 to estimate the 50-foot sound level.

C. Compliance

1. Submit a noise report to Metro or its designee for each item of equipment used on the surface of the construction site during nighttime hours of the categories listed in Table 3. Submit the report on the form shown in Figure 3 with certification by the Acoustical Engineer that equipment noise emissions do not exceed those prescribed in Table 3.

2. If the noise levels obtained during the tests exceed those specified in Table 3, remove such equipment from nighttime use until such equipment is modified and retested, or substitute other equipment to meet the noise level requirements.

3. Upon compliance Metro or its designee will mark the noise report indicating Metro or its designee's concurrence, including the certification date and equipment identification number, for verification by Resident Engineer.

Keep the noise reports readily available on file in the construction field office for inspection by Metro or its designee upon request.

4. The Certificate of Noise Compliance will remain valid for a period of 6 months only. Delays caused by the certification refusal or by time lost in improving the rejected equipment or finding alternate acceptable equipment will not be a basis for monetary or time delay claims, or for avoidance of liquidated damages or withholding of payment.

5. Equipment shall be subject to spot noise level testing by Metro or its designee's discretion to determine that the equipment in use meets the requirements specified in Table 3. If such tests are requested by Metro or its designee, locate and operate the equipment as directed by Metro or its designee at the designated site so as to facilitate the measurements. Provide Metro or its designee with a copy of the results of the measurements. If such tests demonstrate that any equipment does not comply with this part, Metro or its designee will revoke the certificate of Noise Compliance and the Contractor will take the equipment out of use according to Part 3.1 E above until compliance is achieved. A new Certificate of Noise Compliance will be issued upon proof of compliance.

3.5 VIBRATION LEVEL LIMITS

A. Measures applied to limit noise levels may in some cases limit vibration levels also. Measures specified above for noise levels are applicable.

B. All Areas - Conduct construction activities so that vibration levels at a distance of 50 feet from construction limits or at nearest affected building (whichever is closer) do not exceed root-mean-square (rms.) unweighted vibration velocity levels in vertical direction over a frequency range of 1 to 100 Hz as listed in Table 6.

C. Vibration levels at buildings affected by construction operations refer to vertical direction vibration on ground surface or building floor, or 50 feet from Construction Limits, whichever is closer.

D. Conduct weekly measurements of vibration during peak vibration generating construction activities. If the construction set-up changes more often than weekly, conduct vibration measurements as often as the set-up changes. Furnish vibration monitoring data to Metro or its designee on a weekly basis. Include measurements taken during the previous week.

3.6 CONSTRUCTION SITE NOISE CONTROL

A. Perimeter Noise Barrier Fence

1. Provide perimeter noise barrier fences where required. The noise barrier fences may not provide sufficient noise reduction to meet the daytime or nighttime noise limits specified in this Section. It is the Contractor's responsibility to meet these limits by other methods such as installing additional fixed barrier fences or movable barriers, raising the height of the noise barrier fences, and providing additional noise control measures specified in Paragraphs 3.8 and 3.9, as indicated.

2. Construct gates and/or doors in the fence, either hinged or rolling, of the same or equally effective material as the noise barrier fence. Construct gates and doors in the fence to ensure that the edges overlap the fence to eliminate gaps. During nighttime hours maintain gates and doors in a closed position except for brief periods of time to allow access to the Construction Site.

B. Noise Barrier Fences - Not Used

C. During nighttime construction activities shield noise generating equipment to the extent that the line-of-sight is broken between the equipment's engine exhaust stack and/or engine casing and any residential building or structure where sleep activity occurs within 500 feet of that activity.

D. In no case expose public to construction noise levels exceeding 90 dBA (slow), or to impulsive noise levels with a peak sound pressure level exceeding 115 dBC maximum transient level as measured on general purpose sound level meter on C-weighting and fast meter response.

3.7 CONSTRUCTION METHODS - EQUIPMENT

A. Minimize the use of impact devices, such as jackhammers, pavement breakers, and hoe rams. Where possible, use concrete crushers or pavement saws rather than hoe rams for tasks such as concrete deck removal and retaining wall demolition.

B. Pneumatic impact tools and equipment used at the construction site shall have intake and exhaust mufflers recommended by the manufacturers thereof, to meet relevant noise ordinance limitations and Metro project criteria shown in Part 3.1 above.

C. Equip noise producing equipment, e.g., jackhammers and pavement breakers, with acoustically attenuating shields or shrouds recommended by the manufacturers thereof, to meet relevant noise ordinance limitations.

D. Line or cover hoppers, conveyor transfer points, storage bins, and chutes with sound-deadening material.

E. Provide mufflers or shield paneling for other equipment, including internal combustion engines, recommended by manufacturers thereof.

F. As required to meet the noise limits specified in Part 3.1 above, use alternative procedures of construction, and select proper combination of techniques that generate least overall noise and vibration. Such alternative procedures include the following:

1. Use electric welders powered from utility main lines instead of riveting or electric generators/welders.

2. Mix concrete off-site instead of on-site.

3. Employ prefabricated structures instead of assembling on-site.

G. Use construction equipment manufactured or modified to dampen noise and vibration emissions, such as:

1. Use electric instead of diesel-powered equipment.

2. Use hydraulic tools instead of pneumatic impact tools.

3. Use electric instead of air- or gasoline-driven saws.

3.8 CONSTRUCTION METHODS - OPERATIONS

A. Operate equipment so as to minimize banging, clattering, buzzing, and other annoying types of noises, especially near residential areas during the nighttime hours.

B. To the extent feasible, configure the construction site in a manner that keeps noisier equipment and activities as far as possible from noise sensitive locations and nearby buildings.

C. Install equipment with back-up alarms operated by Contractor, vendors, suppliers, and subcontractors on the construction site, with either audible self-adjusting back-up alarms or manual adjustable alarms. The self-adjusting alarms shall automatically adjust to a minimum of 5 dBA and a maximum of 10 dBA over the surrounding background noise levels and have an operating range between 77-97 dBA. Set the manual adjustable alarms at the low setting, 87 dBA. Installation and use of alarms shall be consistent with the performance requirements of the current revisions of SAE J994, J1446, and OSHA regulations.

D. In no case shall the above restrictions limit the Contractor's responsibility for compliance with applicable Federal, state, and local safety ordinances and regulations and other Sections of the Contract Documents.

E. Maximize physical separation, as far as practicable, between noise generators and noise receptors. Separation includes following measures:

1. Provide enclosures for stationary items of equipment and barriers around particularly noisy areas on site.

2. Locate stationary equipment to minimize noise and vibration impact on community, subject to acceptance of Metro or its designee.

F. Minimize noise-intrusive impacts during most noise sensitive hours.

1. Plan noisier operations during times of highest ambient noise levels.

2. Keep noise levels relatively uniform; avoid excessive and impulse noises.

3. Turn off idling equipment.

4. Phase in start-up and shut-down of site equipment.

G. Select truck routes for muck disposal so that noise from heavy-duty trucks will have minimal impact on sensitive land uses (e.g., residential).

1. Conduct truck loading, unloading, and hauling operations so that noise and vibration are kept to a minimum.

2. Route construction equipment and vehicles carrying soil, concrete, or other materials over streets and routes that will cause least disturbance to residents in vicinity of Work.

3. Submit haul routes and staging areas to the City of Los Angeles, Bureau of Engineering and LADOT, 30 days before required date.

3.9 CONSTRUCTION METHODS - MOVEABLE NOISE BARRIERS

A. Install moveable noise barriers in accordance with paragraph 2.3, Moveable Noise Barriers, as required to comply with the Noise Control Plan and to meet the noise limits specified in this Section, to shield the public from construction noise during the course of the Contract.

B. Provide readily removable noise barriers so that they may be repositioned, as necessary, to provide noise abatement for non-stationary and stationary processes.

C. Installation, Maintenance, and Removal

1. Install the barriers such that the sound-absorptive surfaces face the noise source.

2. Maintain the moveable noise barriers and repair damage that occurs, including, but not limited to, keeping barriers clean and free from graffiti and maintaining structural integrity. Promptly repair or replace gaps, holes, and weaknesses in the barriers, and openings between or under the units, with new material.

D. The use of moveable noise barriers is a minimum noise control requirement that may not provide sufficient noise reduction to meet the daytime or nighttime noise limits specified in this Section. It is the Contractor's responsibility to meet these limits by other methods such as installing additional moveable noise barriers, installing noise barrier fences, and providing additional noise control measures specified in paragraphs 3.9.A, B and C as indicated.

3.10 CONSTRUCTION METHODS - NOISE CONTROL CURTAINS

A. Install noise control curtains in accordance with paragraph 2.4, Noise Control Curtains, as required to meet the noise limits specified in this Section, to shield the public from construction noise during the course of the Contract.

B. The noise control curtains shall be readily moveable so that they may be repositioned, as necessary, to provide noise abatement for non-stationary and stationary processes.

C. Installation, Maintenance and Removal

1. The noise control curtains shall be installed without any gaps such that the sound-absorptive side faces the construction activity to be shielded.

2. Maintain the noise control curtains and promptly repair any damage that may occur. Gaps, holes, or weaknesses in the curtain, or openings between the curtain and the ground, shall be promptly repaired by the Contractor.

PART 4 - MEASUREMENT AND PAYMENT

4.1 MEASUREMENT

The Work of this Section will be considered a part of the construction operations requiring noise and vibration controls, and will not be separately measured for payment.

4.2 PAYMENT

No separate payment will be made for this item.

END OF SECTION

TABLE 1

ALLOWABLE SOUND LEVELS OF TOTAL CONSTRUCTION SITE NOISE

AFFECTED STRUCTURE OR LAND USE		MAXIMUM ALLOWABLE CONTINUOUS NOISE LEVEL, dBA (Lmax)	
		DAYTIME 7:00 AM to 8:00 PM	NIGHTTIME All other periods including all day Sunday and legal holidays.
Residential	Single family residence not along major arterials	60	50
	Land uses along an arterial or in multifamily residential areas, including hospitals	65	55
	In commercial areas, including hotels	70	60
		24 Hours	
Commercial	In noise sensitive, semi-residential/ commercial areas, including schools, libraries, churches, etc.	70	
	In non-noise sensitive commercial areas with no nighttime residency	75	
Industrial	All locations	80	

TABLE 2

ALLOWABLE SOUND LEVELS OF SHORT-TERM* CONSTRUCTION EQUIPMENT

STRUCTURE OR LAND USE		MAXIMUM ALLOWABLE INTERMITTENT NOISE LEVEL, dBA (Lmax)	
		DAYTIME 7:00 AM to 8:00 PM	NIGHTTIME All other periods including all day Sunday and legal holidays.
Residential	Single family residence not along major arterials	75	60
	Land uses along an arterial or in multifamily residential areas, including hospitals	80	65
	In commercial areas, including hotels	80	70
		24 Hours	
Commercial	In noise sensitive, semi-residential/ commercial areas, including schools, libraries, churches, etc.	85	
	In non-noise sensitive commercial areas with no nighttime residency	85	
Industrial	All locations	90	

*SHORT-TERM is defined in Paragraph 3.1.B.

TABLE 3

NOISE EMISSION LIMITS FOR CONSTRUCTION EQUIPMENT USED DURING NIGHTTIME HOURS;
MEASURED AT 50 FEET FROM CONSTRUCTION EQUIPMENT*

Equipment Category	L_{max} Level (dBA)
Backhoe	75
Bar Bender	75
Chain Saw	81
Compactor	75
Compressor**	65
Compressor (other)	75
Concrete Mixer	71
Concrete Pump	77
Crane	81
Dozer	81
Front End Loader	75
Generator***	69
Gradall	81
Grader	81
Paver	81
Pneumatic Tools	81
Scraper	81
Tractor	79

* Noise emission limits apply to equipment used at surface of the construction site during nighttime hours of 9 pm to 7 am.

** Portable Air Compressor that is rated at 75 cfm or greater and that operates at greater than 50 psi

*** Use Quiet Generators from MQ Power, or equivalent to meet the noise limits.

TABLE 4

NOISE SENSITIVE LOCATIONS

Not Used

TABLE 5
PRELIMINARY NOISE PROJECTIONS
(See Drawing Prepared According to Part 3.2A.4a)

	Receiver #1	Receiver #2	Receiver #3	Receiver #4

TABLE 6
ADJUSTMENTS FOR CLOSE-IN EQUIPMENT NOISE MEASUREMENTS

	Measurement Values to be Subtracted from Measured Sound
Distance (Feet)	Level to Estimate Sound Level at 50 Feet (dBA)
19-21	8
22-23	7
24-26	6
27-29	5
30-33	4
34-37	3
38-42	2
43-47	1
48-50	0

TABLE 7
CONSTRUCTION VIBRATION LIMITS

VIBRATION TYPE AND PERMISSIBLE AGGREGATE DURATION	LIMIT
Sustained (≥1 hr/day)	0.01 in/sec (80 VdB re 10^{-6} in/sec)
Transient (<1 hr/day)	0.03 in/sec (90 VdB re 10^{-6} in/sec)
Transient (<10 min/day)	0.10 in/sec (100 VdB re 10^{-6} in/sec)

FIGURE 1
QUARTERLY NOISE CONTROL PLAN FORM - PART B

QUARTERLY NOISE CONTROL PLAN (DUPLICATE AS NEEDED)

Contract No.: _____ Contract Name: _____

Contractor: _____ Site: _____

Date: _____ Land Use: _____

Resubmit every 3 months.

PART B: RESIDENTIAL, COMMERCIAL AND INDUSTRIAL PROPERTY NOISE LEVELS

	Calculated Noise Levels (dBA)*	
	Calculated one hour L_{eq} (dBA)	Calculated Lmax (dBA)
Nighttime		

NOISE ABATEMENT MEASURES ANTICIPATED EFFECTS

CALCULATIONS - attach additional sheet(s) as needed.

* see Paragraph 3.2 A.4.c.

Contract No(s):

Date:

Time:

FIGURE 2

NOISE MEASUREMENTS REPORT FORM

Measured By: _____ Of: _____

(Company)

Monitoring Address: _____

(Provide Sketch on Back)

Location No: _____ Wind Speed: _____ Km/Hr Direction: _____

(MPH x 1.6)

Location of Sound Level Meter: (No closer than 15 meters from equipment and 3 meters from building)

Monitoring was Conducted: _____ Meters from Equipment (_____)

(Type(s): Leave Blank for Baseline)

Land Use: □ Residential/Institutional □ Business/Recreational □ Industrial

Sound Level Meter: Make and Model: _____ □ A - Weighted Sound Level (Slow)

□ C - Weighted Sound Level (Fast)

Duration of Measurement: _____

(20 minutes to 1 hour)

Calibration		Field Notes (example: 2200-2205 H, Airplane 90 dB: etc.)
one-hour L_{eq}		
L_{50}		
L_{10}		
$L_{1.0}$		
MAX_L		
Allowable Noise Limit		

Check one of the following:

□ Ongoing Construction □ Post-Construction: _____ □ Baseline Conditions

(Contract)

(Complete all that apply below)

Active Contract(s): _____

(List all contracts that contribute to measured noise)

Complaint Response: _____

(Describe: Include Log-In Number)

Abatement Follow-up: _____

(Describe)

FIGURE 3
EQUIPMENT SOUND LEVEL DATA REPORTING FORM

APPLICATION FOR CERTIFICATE OF EQUIPMENT NOISE COMPLIANCE

Contractor Name: _____
Contract Name & Number: _____

Equipment Type: _____
Manufacturer & Model Number: _____
Identification Number: _____
Rated Power & Capacity: _____
Operating Condition During Test: _____

Measured Sound Levels at 20 to 50 feet:

Measured Values and Distance:
Right Side: _____ dBA (SLOW), at _____ feet
Left Side: _____ dBA (SLOW), at _____ feet

Estimated Values at 50-Foot Distance:
Right Side: _____ dBA (SLOW).
Left Side: _____ dBA (SLOW).

Maximum Values Allowed for this Equipment: _____ dBA (SLOW) at 50 feet.

If equipment sound level exceeds maximum value allowed, indicate action taken to achieve compliance:

_____
_____
_____

Name, Address & Phone No. of Acoustical Engineer _____
_____

Authorized Signature: _____ Date: _____
CONTRACTOR'S APPROVAL:
Authorized Signature: _____ Date: _____
ENGINEER'S CONCURRENCE:
Authorized Signature: _____ Date: _____

FIGURE 4
QUARTERLY NOISE CONTROL PLAN FORM - PART A

QUARTERLY NOISE CONTROL PLAN - NIGHTTIME CONSTRUCTION ACTIVITIES
AT THE SURFACE OF THE CONSTRUCTION SITE (DUPLICATE AS NEEDED)

Contract No.: _____ Contract Name: _____ Contractor: _____

_____

Site: _____ Date: _____ Resubmit every three months

(ATTACH SITE SKETCH)

PART A: EQUIPMENT INVENTORY

Code letter (a)	Equipment				Noise Limit (f)*	Estimated Noise at 50'* (g)	Date Begin (h)	Date End (i)
	Category (b)	Model (c)	ID# (d)	HP (e)				

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SECTION 01566-DB

POLLUTION CONTROLS

PART 1 - GENERAL

1.1 DESCRIPTION

A. The Work in this Section consists of eliminating or minimizing air, soil, and water pollution generated by construction activities and of complying with all legal requirements applicable to any Contractor-generated hazardous wastes including preparation and implementation of a Contractor Generated Waste Management Plan, a Contractor-Generated Wastewater Management Plan, and a Storm Water Pollution Prevention Plan.

B. This Section includes provisions for contaminated or hazardous groundwater. See Section 01564-DB, Environmental Safety and Health Program, for provisions for contaminated drilling mud.

C. Metro or its designee will monitor Contractor's performance of tasks specified, and will inspect necessary records, reports and procedures.

D. Contractor shall delegate environmental control, pollution monitoring, and record keeping requirements to Contractor's Safety Engineer, Contractor's Environmental Manager, or most appropriate personnel.

E. Contractor shall designate a qualified staff member as Pollution Control Representative.

1.2 DEFINITIONS

A. Contractor-Generated Hazardous Waste: Hazardous waste and solid waste generated, released, or discharged by the Contractor or the Contractor's agents or Subcontractors or their respective employees not related to hazardous waste and hazardous materials scope that is defined as part of this project.

B. Contractor-Generated Waste Management Plan: A written waste management plan properly governing Contractor-generated hazardous wastes, prepared and implemented in accordance with Title 22, Division 4.5, California Code of Regulations (CCR), and all other applicable laws and regulations.

C. Stormwater Pollution Prevention Plan: A written document plan that details the requirements described herein related to the management of stormwater and stormwater runoff during construction. The plan preparer and the plan implementer must be certified by the California Stormwater Quality Association (CASQA) as a Qualified SWPPP Developer (QSD).

1.3 SUBMITTALS

Refer to Section 01300-DB, Submittals, for submittal procedures.

A. Contractor-Generated Waste Management Plan - Required within 30 days after effective date of Notice to Proceed with required documents.

B. Stormwater Pollution Prevention Plan - Required under the Clean Water Act, NPDES General Permit for Construction discharges, and related federal and state laws and regulations: required within 30 days of effective date of NTP.

C. Wastewater Management Plan - Required within 30 days of effective date of NTP. Submit monthly reports of daily monitoring wastewater discharges as specified in paragraph 3.2.

D. Dust Control Monitoring Plan - Required within 30 days of effective date of NTP. Submit monthly reports of periodic air monitoring.

E. Sewer Connection and Location Drawings (if proposed).

F. Storm Drain Connection and Location Drawings (If proposed)

PART 2 - PRODUCTS

2.1 Provide products required for Work in accordance with Standard Specifications for Public Works Construction (SSPWC) and supplements adopted by Board of Public Works of City of Los Angeles as modified by corresponding issue of Brown Book, and as indicated.

PART 3 - EXECUTION

3.1 AIR POLLUTION CONTROLS

A. Criteria for Fugitive Dust - Detailed descriptions and explanations of specific impact mitigation measures are contained in South Coast Air Quality Management District (SCAQMD) Rules and Regulations (Rule 403, Fugitive Dust). Features of mitigation options are described below as a courtesy to the Contractor. The language of the current version of Rule 403 governs. Also see Rule 1186, PM_{10} Emissions from Paved and Unpaved Roads, and Livestock Operations. Contractor shall also comply with the City of Los Angeles Building Code Excerpt 96.02.

1. Prepare a Dust Control Monitoring Plan.

2. Do not cause or allow emissions of fugitive dust from any transport, handling, construction, or storage activity to remain visible in the atmosphere beyond property line of the emission source.

3. Take precautions to minimize fugitive dust emissions from operations involving demolition, excavation, grading, clearing of land, and disposal of solid waste. Utilize at least one Best Available Control Measure (BACM) for each source of fugitive dust.

4. Do not cause or allow particulate matter to exceed 50µg/m^3 when determined as difference between upwind and downwind samples collected on high volume particulate matter samplers or other EPA approved equivalent method for PM-10 monitoring at the property line for a 5-hour period during the time of active operations. The decision to conduct sampling will be made by SCAQMD and SCAQMD will conduct necessary sampling. Metro will inform Contractor if the decision is made, and Contractor will be responsible for paying Ambient Air Analysis Fees pursuant to SCAQMD Rule 304.1.

5. Prevent or immediately remove the track-out of bulk material onto public paved roadways as a result of Contractor's operations, or take at least one of the actions listed in Table 3 of Rule 403, and prevent the track-out of bulk material onto public paved roadways, and remove such material at any time track-out extends for more than 50 feet onto any paved public road, and remove all visible roadway dust tracked-out upon public paved roadways at the end of each Work day when active operations cease.

B. As a minimum, use the following procedures and techniques:

1. Trucks transporting soil, sand, other excavated materials, or backfill materials to or from the sites shall be covered with a tarpaulin from the point of origin to the point of unloading.

2. Daily, or more frequently if necessary, water down and sweep streets around and near the site that have heavy volumes of construction vehicles carrying debris and excavated materials, and adjacent sidewalks.

3. Establish regular cycles and locations for cleaning trucks that haul soil from site.

4. Water down construction sites according to SCAQMD Rule 403, as required to suppress dust, during grading, handling of excavation soil or debris, or demolition.

5. If conveyors are used, cover all transfer points along conveyor system moving soil. Minimize drop height to the stockpile. Provide a sprinkler system that will apply water to soil before it drops to stockpile.

6. Any adopted measures developed by SCAQMD on Best Available Control Measures (BACM) for Fugitive Dust and Rule 403 shall be incorporated into the site operations for fugitive dust control.

C. Not Used

D. Burning of wastes is prohibited. Remove scrap and waste material and dispose of in accordance with laws, codes, regulations, ordinances, and permits.

E. Use construction equipment designed and equipped to prevent or control air pollution in conformance with most restrictive regulations of EPA, State, and local authorities. Maintain evidence of such design and equipment and make available for inspection by Metro or its designee.

F. Establish and maintain records of routine maintenance program for internal combustion engine powered vehicles and equipment used on Project. Keep records available for inspection by Metro or its designee.

G. Implement Fugitive Dust Measures listed in tables 1, 2 and 3 of SCAQMD Rule 403 and perform record keeping in accordance with Sections (e)(1)(A)(iv) and (e)(1)(A)(v) of said rule. Make records available to Metro or its designee for inspection.

3.2 WATER POLLUTION CONTROLS

It is anticipated that Contractor will generate two water streams during construction: stormwater and construction wastewater (resulting from truck wash-downs, construction activities (including CIDH pile construction), etc.). Contractor has the option of adopting a zero discharge option (meaning all water will be collected and hauled off-site), discharging only stormwater, or discharging both waste streams in accordance with applicable permits. Each choice has a set of restrictions and requirements.

A. Zero discharge option - Contractor shall not discharge any wastewater on site. All wastewaters must be hauled offsite for disposal. None of the remaining requirements of paragraph 3.2 apply if this option is chosen.

B. Stormwater discharge option - Contractor will not be allowed to discharge construction wastewater (other than stormwater) from the site if Contractor chooses to file a Notice of Intent (NOI) with the State Water Resources Control Board to comply with the terms of the General Permit to Discharge Stormwater associated with construction activity. If Contractor chooses to file a NOI, Contractor must collect truck wash-downs and general construction wastewater (other than stormwater and dispose of it off-site. The NOI requires the Contractor to prepare a Stormwater Pollution Prevention Plan and submit it to the State Water Resources Control Board, and submit a Notice of Termination when construction is complete.

C. All wastewaters - If Contractor elects this option, Contractor shall notify Metro of its intent immediately. Contractor may discharge truck wash-down and

other construction generated wastewater (in addition to stormwater) if Contractor complies with the remaining requirements of this Subsection.

1. Discharges to the sanitary sewer will require a Discharge Permit from the City of Los Angeles Bureau of Sanitation. The Contractor must obtain and comply with all terms and conditions of the permit, including discharge limitations. The sewer permit may contain a total discharge limitation between 100,000 and 150,000 gallons per day, and may contain hour restrictions for water discharges.

2. No discharges other than stormwater may be discharged into the storm drain, unless Contractor obtains an applicable NPDES permit from the Los Angeles Regional Water Quality Control Board. Contractor is responsible for obtaining NPDES permits if desired. If used, Contractor must comply with all terms and conditions of their NPDES permit. Discharges to the storm drain must be in compliance with the NPDES permit.

3. Submit a fully detailed waste water management plan for Project discharges for approval by Metro.

4. Prepare and submit a Storm Water Pollution Prevention Plan in accordance with paragraph 1.3.B.

5. All connections and transport of waste waters shall be by closed conduit. If necessary install and maintain pumps to deliver waste waters to their destination(s) described herein. All connections may be made only on Metro or City of Los Angeles properties/ rights-of-way.

6. Metro will determine water quality by sampling and analysis.

7. Contractor Testing Requirements – At the frequency required by permit, sample and test effluent quality for those parameters of Contractor's responsibility. Record daily discharged quantities. Submit certified monthly reports not later than 7 days after the end of the month detailing the daily flows and the testing data.

8. Contractor Noncompliance - Contractor shall bear any fines incurred as a direct result of Contractor's failure to treat those parameters set forth herein that Contractor is responsible for. Metro is intolerant towards noncompliant discharges.

9. Contractor has the option to haul and dispose of waste waters at a disposal facility.

10. Do not discharge pollutant wastes such as chemicals, fuels, lubricants, bitumens, raw sewage, and other harmful wastes onto the land nor into or

alongside rivers, streams, and impoundments, nor into gutters, storm drains, or channels leading thereto.

11. Control use of lubricating oils, hydraulic fluids, greases, and other such products. Promptly clean up and properly dispose of materials contaminated by spillage or leakage of products. Comply with storage and containment requirements of these materials in accordance with California Stormwater Permit Regulations.

D. It is anticipated that contaminated or hazardous groundwater will be encountered within the boreholes during placement of the CIDH piles. Contractor will be required to store all generated waste water into an onsite storage tank, profile the waste water, and dispose of it through a certified waste hauler per Caltrans and Federal regulatory guidelines for waste water disposal. The estimated total volume is 5,000 gallons. Waste water profiling will be required to be performed by a state certified third party analytical laboratory.

E. Contractor shall assume for bidding purposes that all waste water generated from CIDH pile boreholes is contaminated (nonhazardous).

3.3 SOLID AND HAZARDOUS WASTE CONTROLS

This Section applies to Contractor-Generated Hazardous Waste.

A. Contractor-Generated Hazardous Waste Management Plan - Prepare and implement a Contractor-Generated Waste Management Plan to properly govern Contractor-Generated Hazardous Wastes in accordance with Title 22, Division 4.5, CCR, and all other applicable laws and regulations. Metro or its designee will have the right to review, modify and approve the Contractor-Generated Waste Management Plan, and to provide quality assurance/quality control monitoring on Contractor's implementation of said Plan.

B. Waste Generation - Be responsible for, and indemnify, defend, and hold Metro harmless against, any and all costs (including attorney's fees and costs), demands, claims, damages, losses, and delay costs ("Claims") arising from or associated with the management, abatement, removal, remediation, clean-up, transport, reuse, recycling, storage, and disposal of any and all Contractor-Generated Hazardous Waste; or any noncompliance with the Contractor-Generated Waste Management Plan.

C. Waste Classification - In the event that Contractor or Metro reasonably suspects that Contractor has generated, released, or discharged Contractor-Generated Hazardous Waste, Contractor shall bear all costs of sampling and monitoring tests and other investigations to determine whether said waste is Solid Waste or Hazardous Waste in accordance with all federal, states and local requirements, including, without limitation, RCRA and Title 22, CCR

Chapter 30, Article II (as amended, modified or replaced from time to time). Metro reserves the right (but not the obligation) to perform its own physical and chemical analyses and tests on suspected Contractor-Generated Hazardous Waste. Contractor shall furnish samples, at Contractor's cost, as directed by Metro.

D. Disposal Regulations - Be responsible for the management, abatement, removal, remediation, clean-up, transport, reuse, recycling, storage, and disposal of any and all Contractor-Generated Hazardous Waste in accordance with all laws, rules, regulations, and orders, including without limitation, Title 22, Chapter 30 et seq. California Code of Regulations, California Health and Safety Code Section 25100 et. seq., Titles 23 and 26, California Code of Regulations, and any and all regulations of the waste disposal facility to be used. Proposed disposal practices and procedures must be approved by Metro.

E. Haul Routes - Haul routes for transporting solid or hazardous wastes are subject to the approval of City of Los Angeles, or other agency. Post copy of Haul route permit at Worksite.

PART 4 - MEASUREMENT AND PAYMENT

4.1 MEASUREMENT

The Work of this Section will be measured as a unit, acceptably complete.

4.2 PAYMENT

Payment for the Work of this Section involving contaminated groundwater will be made under the applicable Schedule of Values item for Earthwork – Handling of Contaminated Groundwater. Payment for other Work of this Section will be made under the applicable Schedule of Values item for General Requirements (Unspecified).

END OF SECTION

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SECTION 01578-DB

CONTROLLING TRAFFIC

PART 1 - GENERAL

1.1 DESCRIPTION

A. This Work of this Section consists of furnishing, erecting, and maintaining temporary barricades, signs, flaggers, lights, road surfaces, pavement markings for detours, miscellaneous parking lot striping, and other safeguards necessary to protect life, health, and safety of the public during performance of Project Work for duration of Contract.

B. Comply with traffic control requirements of Metro, Caltrans, and City of Los Angeles as applicable.

C. Job Coordination

1. Coordinate construction to offer the least possible obstruction and inconvenience to the public; do not have under construction a greater length or amount of Work than can be properly performed with due regard to conveniences of public and public safety. Finish Work as Project progresses insofar as practicable.

2. Permit public traffic to pass through Work areas with as little inconvenience and delay as possible. Except as specified below, keep existing roads and streets adjacent to or within limits of Project open and maintain in a good and safe condition for traffic. Remove deposits and debris from roadway and repair damage resulting from construction operations.

3. Maintain existing traffic controls and street lighting systems at crossings in operation for benefit of public during progress of Work.

4. Conduct construction operations in manner to cause as little inconvenience as possible to adjacent property owners. Maintain convenient access to driveways, houses, businesses, and buildings along line of Work.

5. Limit length of open excavation for underground construction to 50 feet or less at each construction location. Follow City of Los Angeles specifications for trench excavations on City streets. Protect open trench excavations in accordance with applicable portions of Caltrans Standard Specifications at end of each day's operations.

6. Submit written proposal to Metro its designee regarding the temporary removal or relocation of bus stops or shelters in conflict with Work and

obtain prior acceptance of Metro or its designee and the respective local agencies before proceeding with such removal or relocation.

7. Traffic Signals

    a. Provide temporary traffic signals to convey traffic through Project. Design temporary traffic signals to minimize inconvenience to general public.

    b. Submit proposed temporary traffic signal Shop Drawings to Caltrans and local jurisdiction for review and acceptance prior to installation or alteration of traffic signals.

8. Maintain access for fire, ambulance, and law enforcement emergency vehicles at all times. Access requirements may require Contractor to temporarily suspend its operations until emergency is over.

9. Perform operations in manner to cause minimum disruption in access to adjacent properties. Should denial or disruption of access to adjacent property be necessary to accomplish Work, notify Metro or its designee in advance of denial or disruption and post a notice of denial in a conspicuous place on right-of-way line or temporary construction easement line on property. After acceptance by Metro or its designee, notify affected party in writing at least 48 hours in advance of actual denial or disruption.

    a. Posted sign - Minimum 18 inches by 36 inches with minimum 2-1/2 inch high lettering describing the closure dates.

    b. If construction is delayed, requiring dates of access disruption to be changed, revise dates on sign accordingly, comply with requirements of governing agency, and notify Metro or its designee.

10. Perform Work under the work schedule limitations and procedures of applicable Federal, state, county, and municipal codes, regulations, and standards.

    a. City of Los Angeles prohibits work on city streets from 7 to 9 am and from 3:30 to 7 pm. Verify requirements. Obtain permit from Bureau of Engineering for peak hour exemption.

    b. Permit from Police Commission is required for weekend or nighttime work.

11. Maintenance of Traffic

a. Maintaining traffic on the El Monte Busway, Route 101 and freeway ramps shall conform to Caltrans requirements and on local city streets shall conform to City of Los Angeles requirements. No work that would require a closure shall

be performed on the El Monte Busway. Local authorities shall be notified at least 5 business days before work begins.

b. The contractor shall cooperate with local authorities to handle traffic through the work area and shall make arrangements to keep the work area clear of parked vehicles. Personnel vehicles of the contractor's employees shall not be parked within the Caltrans right of way, except under the existing El Monte Busway structure as approved by Caltrans.

c. A written schedule of planned closures for the next week period, defined as Sunday noon through the following Sunday noon, shall be submitted by noon each Monday. A written schedule shall be submitted not less than 25 days and not more than 125 days before the anticipated start of any operation that will:

- Reduce horizontal clearances, traveled way, including shoulders, to two lanes or less due to such operations as temporary barrier placement and paving
- Reduce the vertical clearances available to the public due to such operations as pavement overlay, overhead sign installation, or falsework.

d. Closure Schedule shall show the locations and times of the proposed closures. The Closure Schedule request forms furnished by the Metro shall be used. Closure Schedules submitted to Metro with incomplete or inaccurate information will be rejected and returned for correction and resubmittal. The Contractor will be notified of disapproved closures or closures that require coordination with other parties as a condition of approval.

e. Contingency Plan - A detailed contingency plan shall be prepared for reopening closures to public traffic. The contingency plan shall be submitted to the Engineer within one business day of Metro's request.

f. Late Reopening of Closures - If a closure is not reopened to public traffic by the specified time, work shall be suspended. No further closures are to be made until Metro has accepted a work plan, submitted by the Contractor that will insure that future closures will be reopened to public traffic at the specified time. The Engineer will have 2 business days to accept or reject the Contractor's proposed work plan. The Contractor will not be entitled to compensation for the suspension of work resulting from the late reopening of closures.

g. Falsework - Openings shall be provided through bridge falsework for the use of public traffic at each location where falsework is constructed over the Vignes Street on- and off-ramps. The type, minimum width, height, and number of openings at each location, and the location and maximum spacing of falsework lighting, if required for each opening, shall conform to Caltrans requirements.

Erection and removal of falsework at locations where falsework openings are

required shall be undertaken one location at a time. During falsework erection and removal, public traffic in the lanes over which falsework is being erected or removed shall be detoured or stopped. Falsework erection shall include adjustments or removal of components that contribute to the horizontal stability of the falsework system. Falsework removal shall include lowering falsework, blowing sand from sand jacks, turning screws on screw jacks, and removing wedges. The Contractor shall have necessary materials and equipment on the site to erect or remove the girders falsework in any one span or over any one opening before detouring or stopping public traffic.

1.2 QUALITY CONTROL

A. Comply with Section 01460-DB, Project Quality Program Requirements.

1.3 REFERENCE STANDARDS

1. Caltrans Standard Specifications and California Manual on Uniform Traffic Control Devices (California MUTCD).

2. Standard Specifications for Public Works Construction (SSPWC).

3. Requirements of each city directly affected by the Contractor's activities.

4. Work Area Traffic Control Handbook (WATCH Manual).

5. Applicable portions of the California State Vehicle Code.

1.4 SUBMITTALS

Refer to Section 01300-DB, Submittals, for submittal procedures.

A. Traffic Handling Plan (THP) for approval by Caltrans and affected local jurisdictions before starting Work. Submit an updated WTCP when necessary to modify traffic operation or undertake a construction activity which creates a different traffic pattern.

B. Copies of approved Traffic Handling Plans from affected local jurisdictions in accordance with Section 01300-DB, Submittals.

C. Approved haul route plan and an approved disposal, grading, excavation, and erosion permit to Metro or its designee before starting Work.

D. Notify individual owners of adjacent property in writing, before impairing access to public ways adjacent thereto or prohibiting stopping/parking of vehicles.

PART 2 - PRODUCTS

2.1 TRAFFIC CONTROL DEVICES

Conform to Section 12 of Caltrans Standard Specifications, these Specifications, and City of Los Angeles standards.

2.2 CONSTRUCTION AREA SIGNS

Term "Construction Area Signs" includes temporary signs required for direction of public traffic through or around Work during construction. Such signs are shown in California MUTCD. Deliver new signs or signs in like-new condition to Project. Sign panels - Product of commercial sign manufacturer. Do not use double-faced signs.

2.3 CHANNELIZING DEVICES

Use portable delineators or traffic cones, conforming to the provisions in Section 12-3.04 and Section 12-3.10, respectively, of the Caltrans Standard Specifications, for channelizing devices used in delineating lane transitions. Use signs of flexible material with reflective bands for nighttime visibility as specified.

2.4 BARRICADES

Constructed of wood with metal connectors and fasteners suitable for the use intended. Paint with two coats of white enamel. Stripe rails with orange and white stripes as specified in Section 12-3.02 of the Caltrans Standard Specifications. For temporary barriers refer to Section 01530-DB, Temporary Barriers.

2.5 TEMPORARY AND INTERIM TRAFFIC SIGNALS

Conform to Caltrans and LADOT standards.

2.6 TEMPORARY STRIPING

Temporary striping and markings used during construction - existing, or when required, of type and width acceptable to Caltrans or City of Los Angeles as applicable and to Metro or its designee.

2.7 BARRIERS

Use Type K rail barriers to separate edge of traveled way from open excavations, as a vertical obstruction other than curb; to isolate construction Work areas as indicated on Contract Drawings; and as requested by Metro or its designee. Comply with provisions of Section 01530-DB, Temporary Barriers.

PART 3 - EXECUTION

3.1 GENERAL FOR ALL CITIES

A. Traffic Safety

1. Provide flaggers, signs, temporary pavement markings, and other devices, and erect and maintain barricades, lights, guards, standard construction signs, warning signs, and detour signs, as necessary to warn and protect public from injury and damage as a result of Contractor's operations which may occur on streets affected by such operations.

2. Patrol traffic control area and reset disturbed signs and traffic control devices immediately. Remove or cover non-applicable signs during periods not needed.

3. Upon failure of Contractor to provide immediately such flaggers, or to provide, erect, maintain, or remove such barricades and lights, and erect, maintain, or remove signs when ordered to do so by Metro or its designee, Metro or its designee shall be at liberty, without further notice to Contractor or its Surety, to provide necessary flaggers, to provide, erect, maintain, or remove barricades and lights, and to erect, maintain, and remove signs, at Contractor's expense.

4. In event a traffic signal or beacon is made inoperative, due to Contractor's operations, provide uniformed flaggers or suitable traffic control devices for control and movement of traffic during time that signal or beacon is inoperative at no additional cost to Metro. Immediately ask City to deploy traffic control officers to direct traffic while signal or beacon is repaired. Types of traffic control devices used are subject to review and acceptance of Metro or its designee and LADOT.

B. Temporary Traffic Controls

1. Provide temporary traffic controls at juncture of temporary access roads with public roads, including warning signs for public traffic, and "STOP" signs for construction road entrance onto public roads. Comply with requirements of local traffic authorities.

2. Maintenance - Maintain temporary access roads and parking areas in a safe and useful condition during construction period.

3. Removal and restoration - Remove materials utilized for building of temporary roads and parking areas. Restore temporary access opening to original condition, such as curb and gutter and driveway aprons.

C. Street Closures

1. Street closures require 30-day advance notification; obtain permission from local jurisdiction prior to such street closure.

2. Maintain pedestrian access to adjacent buildings.

3. At least 30 days prior to start of construction, submit to Metro or its designee and respective city, for review and acceptance, a detailed traffic plan and construction schedule for construction activity within each city.

PART 4 - MEASUREMENT AND PAYMENT

4.1 MEASUREMENT

The Work of this Section will be measured as a unit, acceptably completed.

4.2 PAYMENT

Payment will be made under the applicable Schedule of Values item for General Requirements - Nonspecific.

END OF SECTION

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SECTION 01580-DB

TEMPORARY SIGNS

PART 1 - GENERAL

1.1 DESCRIPTION

The Work specified in this Section consists of furnishing, installing, maintaining, and removing Metro field signs, one safety sign, one general construction sign, and project sponsor and funding signs. Erect temporary signs not later than 20 calendar days after Notice to Proceed (NTP) date, or as directed by Metro or its designee.

1.2 QUALITY ASSURANCE

A. Comply with Section 01460-DB, Project Quality Program Requirements.

1.3 REFERENCE STANDARDS

A. The Engineered Wood Association (APA).

PART 2 - PRODUCTS

2.1 SIGNS

A. Provide signs painted by a professional sign painter.

B. Panel - New, 3/4 inch, A-B Exterior Grade, APA douglas fir plywood with inset hardwood edges and mitered corners.

C. Frame and Cleats - New, construction grade lumber.

D. Posts - Pressure preservative treated, new, construction grade lumber.

2.2 HARDWARE

Brass, aluminum, or galvanized steel, of sizes and types which will enable sign assemblies to resist a wind velocity of 50 mph.

2.3 SAFETY SIGN NUMBER TAGS

Removable aluminum or galvanized steel, with 4-inch-high blue numerals and steel tag hooks.

2.4 PAINT

Primer and exterior semigloss alkyd enamel.

2.5 LETTERING

Typeface size and spacing as indicated on attachments to this Section.

2.6 CONTENT

For signs not shown in this section, comply with Metro requirements and submit design and content for Metro approval.

PART 3 - EXECUTION

3.1 INSTALLATION OF POSTS

Set posts in ground, fill annular space with soil, and tamp to compact soil around posts and secure in plumb position. Locations - Established by Metro or its designee.

3.2 PAINT

Paint frame, cleats and panels with one coat primer and two coats enamel. Provide colors, arrangements, letters, and numbers as indicated.

3.3 MAINTENANCE

Maintain signs in a neat and clean condition. Repaint surfaces that exhibit deterioration as determined by Metro or its designee. Repair or remove and replace damaged signs with new signs.

3.4 REMOVAL

Remove signs and posts when removal is ordered by Metro or its designee. Fill sign post holes with earth and tamp to original density.

PART 4 - MEASUREMENT AND PAYMENT

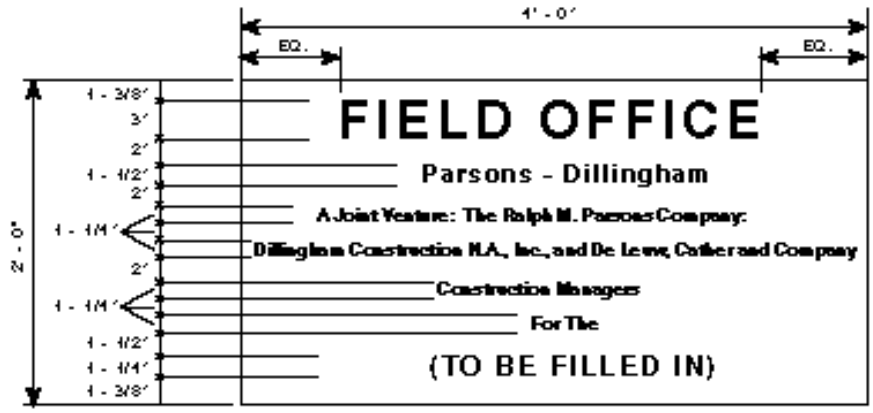
4.1 MEASUREMENT

The Work of this Section will be measured as a unit, acceptably completed.

4.2 PAYMENT

Payment will be made under the appropriate Schedule of Values item for General Requirements.

END OF SECTION



LETTERS SHALL BE HELVETICA MEDIUM, AND SHALL BE PANTONE - PROCESS BLUE.
BACKGROUND SHALL BE WHITE. ALL COPY SHALL BE CENTERED

AUTHORITY FIELD OFFICE SIGN

LETTERS SHALL BE NEWS GOTHIC, AND SHALL BE PANTONE - PROCESS BLUE.
BACKGROUND SHALL BE WHITE. ALL COPY SHALL BE CENTERED

SAFETY SIGN

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SECTION 01590-DB

CONSTRUCTION FACILITIES

PART 1 - GENERAL

PART 2 - PRODUCTS

PART 3 - EXECUTION

3.1 FIELD OFFICES FOR METRO

A. Contractor shall provide and maintain a trailer for office space to be used by Metro staff. The trailer shall be large enough to accommodate a minimum of 4 people, conference room, computer networking room and toilet facilities.

B. Installation:

1. Contractor shall install office trailer for Metro staff within 30 calendar days after Notice to Proceed and shall remain until at least 120 calendar days after Substantial Completion of the Project, unless agreed to by Metro in writing.

2. Meet all local building code requirements.

3. The office space/trailer shall be located close to Metro Gateway Headquarters, for the purpose of accessing via communication cabling existing Metro ITS voice and data communication systems. Verify placement of office trailer with Metro. Contractor shall trench and backfill trench, installation of a minimum 2” conduit between office trailer and Gateway Building. Conduit shall be terminated, at each end, with a 18”x18”x8” Type 3R Telephone Termination enclosure (Cooper B-Line Part Number 18188 RTC or equivalent). Coordinate with Metro ITS Department for conduit installation and termination.

C. The field office shall have the following:

1. Minimum of 2 exits from each trailer if more than one trailer is required.

2. Each exit shall be secured with a door lock and deadbolt lock, all key alike.

3. Security bars, insect screens and blinds on each window. Windows shall be able to be opened and lockable.

4. Accessible for disabled persons meeting ADA requirements.

5. Electrical, telephone, water, and sewer, etc. connections including any permits for the trailer and pay for their costs for the duration of the Contract.

6. Heating, ventilation, and air conditioning system capable of maintaining temperatures between 65 and 75 deg. F. in all spaces throughout the year;

7. Men and women toilet rooms, each with running hot and cold water.

D. Provide the following spaces:

1. Offices: 1 - 100 square feet private office for one workstation and a 200 square foot private office for two workstations. Each office shall have a lockable door. Furnish 8 sets of keys for each lock.

2. Receptionist area.

3. Conference room.

4. Communication Closet: 12 square feet for voice and data networking equipment. Contractor shall provide ¾" plywood backboard floor to ceiling on one wall. A telecommunication grounding system shall be furnished, comprising of an external ground rod (Eritech Part Number 615880 or equivalent) and interior telecommunications main grounding busbar (TMGB) (Chatsworth Products Inc. Part Number 40158-012 or equivalent). A minimum No. 2/0 AWG copper conductor shall be installed for the telecommunications service grounding conductor. Busbar shall be installed 2 feet AFF. Busbar lug hardware shall be provided. The connection to exterior Type 3R termination enclosure shall be through the floor and not through the wall, and shall be a minimum 2" conduit stubbed out a minimum of 8" AFF. Two (2) quad A.C. outlets shall be provide on wall with plywood. Each quad A.C. outlet shall be on its own dedicated circuit breaker and rated for 20 Amps. Quad A.C. outlet #1 shall be installed 2 feet AFF. Quad A.C. outlet #2 shall be installed 2 feet below ceiling. Both A.C. outlets shall be installed one foot away from adjacent wall. Door shall be lockable with a deadbolt lock. Furnish 8 sets of keys for each lock.

E. Office equipment to provided by Contractor:

1. For each work station and reception area, provide:

a. Desk.

b. Chair.

c. Two drawer locking filing cabinet.

d. Bookcase.

e. Trash basket.

f. Wall mounted white board.

2. For the field office:

a. Conference table of sufficient size for seating 12 people.

b. 12 stackable or folding chairs.

c. A Canon imageRUNNER ADVANCE C5045 high speed, color copier/printer/scanner machine with the following attributes:

1) Shall be networked to Metro system for printing from Metro workstation computers.

2) Handle paper sizes 8-1/2 in. x 11 in., 8-1/2 in. x 14 in. and 11 in. x 17 in. Contractor shall provide paper supply for each sized paper.

3) Shall be capable to print from any Metro workstation computer.

4) Shall be capable to scan, and email documents through the data network.

5) Contractor shall provide applicable toner cartridges or ink cartridges for the duration of the project.

6) Contractor shall provide equipment maintenance service for the duration of project, including all parts and supplies.

7) Coordinate with Metro ITS Department setup and network printing, scanning, and emailing functions.

d. Files cabinets:

1) 3 - 4-drawer letter sized, lockable, file cabinets.

2) 1 - 4 drawer legal sized, lockable, file cabinet.

3) 1 – 4 drawer, legal size., lockable, fire proof, file cabinets

e. Table for coffee maker, minimum 24 in. x 48 in.

f. One (1) each Drafting table with drawing and drafting stool on casters

g. Potable electrical water cooler and dispenser and bottled water supplied for the duration of the project.

h. Fire extinguisher(s).

i. First aid chest, OSHA approval with maintenance and supplies.

F. Additional requirements:

1. Each workstation and conference room shall have outlets for electrical, telephone and data network. Outlets for telephone and data network shall be double gang boxes. Outlets for telephone and data network shall be homerun back to communication closet via surface mounted raceway (Panduit "Pan-Way®" or equivalent) or ¾" EMT conduit stubbed through floor. If ¾" EMT conduit is installed, then the Contractor shall install two (2), a voice and data, 2" conduits in the communication closet, that are stubbed out a minimum of 8" AFF.

2. All interior spaces, overhead lighting that meets the requirements of U.S. and California Occupational Safety and Health administration (OSHA/CAOSHA) and building and electrical codes for office space, a minimum circuit capacity of 20 amperes, and at least four duplex receptacles for each office space.

G. Electronic Office Equipment: Metro shall cable workstations for voice and data. Metro shall install and configure workstation computers. Metro shall network workstations computers. Metro shall install and program telephones. Metro shall take delivery of fax machine from Contractor and install and program fax. Contractor shall install and program Canon imageRUNNER ADVANCE color copier (Metro will provide Contractor, through a RFI, the following copier network configuration information: IP address, email addresses of Metro employees, name of Metro's Canon printer server, and name of Metro's Canon print queue). Contractor's equipment and infrastructure shall not interfere with Metro's network. Contractor's network shall be on a different sub-net than Metro and will not connect to Metro's hub or other devices.

H. Maintenance:

1. Daily janitorial service (except holidays), maintained trash and paper recycle containers, soap replacement, toilet paper replacement, paper towel replacement, garage bag replacement and trash and paper recycle pickup service. All supplies provided by contractor for duration of contract.

2. Maintaining exterior areas of office spaces, including access to parking areas.

I. Completion of Construction Operations

1. Upon completion of construction operations, or as otherwise required by Metro or its designee, remove field office and furnishings and restore the site.

PART 4 – PAYMENT

A. Payment for this work and items in this section will be made under the applicable Schedule of Values item for General Requirements (Nonspecific).

END OF SECTION

SECTION 01591-DB

CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL

PART 1 - GENERAL

1.01 DESCRIPTION

A. Work Includes: Procedures for ensuring optimal diversion of construction and demolition waste generated by the Project, and documentation procedures for tracking waste generation and diversion.

1.02 DEFINITIONS

A. Certified Mixed Debris Processing Facility: A solid waste processing facility that accepts loads of mixed debris for the purpose of recovering reusable and recyclable materials and disposing of the non-recyclable residual material.

B. Class III Landfill: A landfill that accepts non-hazardous solid waste such as household, commercial, and industrial solid waste. A Class III landfill shall have a California Integrated Waste Management Board (CIWMB) solid waste facilities permit and is regulated by the Local Enforcement Agency.

C. Construction and Demolition (C&D) Debris: Solid waste and recyclable materials that result directly from construction and demolition of buildings and other structures, do not contain hazardous waste (as defined in CCR Title 22, Section 66621.3, et seq.), and contain no more than 1 percent putrescible wastes by volume, calculated on a monthly basis. C&D debris includes, but is not limited to: asphalt, concrete, portland cement, brick, lumber, wallboard, roofing material, ceramic tile, pipe, glass, and associated packaging.

D. Disposal: Acceptance of solid waste at a legally operating facility for the purpose of landfilling.

E. Diversion: Activities that result in reducing the amount of waste disposed at a landfill. This can include source reduction activities, composting, recycling, and reuse.

F. Inert Backfill Site: A location, other than inert fill or other disposal facility, to which inert waste is taken for the purpose of filling an excavation, shoring, or another soils engineering operation.

G. Inert Fill: A facility that can legally accept inert waste such as asphalt and concrete exclusively for the purpose of disposal.

H. Inert Debris / Inert Waste: Solid waste and recyclable materials that are source separated or separated for reuse, do not contain hazardous waste (as

defined in CCR, Title 22, section 66261.3 et. seq.) or soluble pollutants at concentrations in excess of applicable water quality objectives, and do not contain significant quantities of decomposable waste. Inert debris may not contain more than 1 percent putrescible wastes by volume calculated on a monthly basis. Gravel, rock, soil, sand, and similar materials, whether processed or not, that have never been used in connection with any structure, development, or other human purpose are not inert debris.

I. Mixed Debris: Material that includes commingled recyclable and non-recyclable construction and demolition debris.

J. Mixed Debris Processing Facility: A solid waste processing facility that accepts loads of mixed debris for the purpose of recovering reusable and recyclable materials and disposing of the non-recyclable residual materials. Refer also to Certified Mixed Debris Processing Facility.

K. Permitted Waste Hauler: A company that possesses a valid and current permit from the County of Los Angeles to collect and transport solid waste from individuals or businesses in the County of Los Angeles.

L. Recycling: The process of sorting, cleaning, treating, and reconstituting materials for the purpose of using the altered form in the manufacture of a new product. Recycling does not include burning, incinerating, or thermally destroying solid waste.

    1. On-site recycling - Materials are sorted and processed for use in an altered form in the Project (e.g., concrete is crushed for use as base for a parking lot on the site).

    2. Off-site recycling - Source-separated materials are hauled to another location and used in an altered form in the manufacture of a new product.

M. Recycling Facility: An operation that can legally accept materials for the purpose of processing the materials into an altered form for the manufacture of a new product. Depending on the types of materials accepted and operating procedures, a recycling facility may or may not be required to have a Solid Waste Facilities permit from the CIWMB or be regulated by the Local Enforcement Agency.

N. Reuse: Materials that are recovered for use in the same form. This includes materials that are reused on-site or off-site.

O. Salvage: Materials recovered for reuse or sale or donation to a third party.

P. Source Reduction: Any action causing a net reduction in the generation of solid waste. Source reduction includes, but is not limited to, reducing the use of non-recyclable materials, replacing disposable materials and products with

reusable materials and products, reducing packaging, and reducing the amount of yard waste generated.

Q. Source-Separated Materials (Construction and Demolition Debris): Material that is sorted at the site of generation by individual material type for the purpose of reuse or recycling, e.g., loads of concrete that are source-separated for delivery to a base course recycling facility to be crushed into road base material.

R. Solid Waste: Waste that the CIWMB has deemed acceptable for disposal at a Class III landfill; shall not include source-separated material.

S. Transfer Station: A facility that can legally accept solid waste for the purpose of temporarily storing the materials for reloading onto other trucks and transporting materials to a landfill for disposal, or recovering some materials for reuse or recycling. Transfer stations must be permitted by the CIWMB and regulated by the Local Enforcement Agency.

1.03 SUBMITTALS

A. Waste Management Plan (WMP): Conduct a site assessment and estimate the types and quantities of materials, under the Project, that are anticipated for on-site or off-site processing, recycling, reuse, or disposal.

1. Not more than 10 working days after Notice to Proceed, submit a written WMP. The plan shall show the percentage of recycling for inert debris expected from the Project and the percentage recycling for the remaining C&D debris expected from the Project. While no minimum amounts of recycling have been established for this project, Contractor shall make every reasonable effort to achieve a minimum of 50 percent by weight of material that is recycled, reused, salvaged, or otherwise diverted from landfill.

2. Approval of the Contractor's WMP will not otherwise relieve the Contractor of responsibility for adequate and continuing control of pollutants and other environmental protection measures.

5. Dirt and excavation spoils, whether reused as fill or not, will not be counted in the calculation of diverted and disposed materials.

B. Solid Waste Diversion and Disposal Report (SWDD Report): One week prior to the first of every month, and prior to Contractor's monthly progress estimate for payment, Contractor shall prepare and submit a written SWDD report quantifying all material generated in the Project which was either disposed or diverted from disposal through reuse or recycling during the time period covered by the SWDD report and progress payment. Include in the Report a cumulative history of the diversion and disposal for the Project. Attach

supporting documentation including manifests, weigh tickets, receipts, reports, invoices, and other supporting documents specifically identifying the project, the recyclables and solid waste generated by the Project, and where the material was sent. The final SWDD report shall cover the complete time period of the Project and shall contain a list of the total waste disposed and/or diverted for each reporting period. The final SWDD report and supporting documentation shall be submitted within 30 Calendar Days of Project completion. Use forms acceptable to Metro and provide data sufficient for achieving related LEED credits and prerequisites.

1.04 WASTE MANAGEMENT PLAN SUBMITTAL MEETING

A. On or about 5 working days after Notice to Proceed, Metro's designee will schedule and attend a meeting with the Contractor to discuss the proposed WMP submittal. This meeting shall be held to allow Metro and the Contractor an opportunity to develop a mutual understanding regarding the recycling and reuse requirements and programs.

1.05 REUSE, SALVAGE, AND RECYCLING OPTIONS

A. Contractor shall make use of as many reuse and salvage options as is feasible. One option is the California Materials Exchange (CalMAX), a free program sponsored by the CIWMB.

B Recycling shall include both on-site and off-site recycling of source-separated materials, as well as mixed debris recycling efforts.

C. On-site recycling program shall produce a quality product to meet the specifications identified in the Contract Documents, subject to approval. Estimate the amount of material to be used in the Project and include a program for off-site recycling of any excess material that cannot be used in the Project.

D. Develop and implement a program to include source separation of solid waste, to the greatest extent feasible, of the following types:

1. Asphalt

2. Concrete and concrete block

3. Rock

4. Wood (lumber)

5. Green material (e.g., tree trimmings)

6. Metals

E. Mixed Debris Recycling: Develop and implement a program to transport loads of commingled construction and demolition materials that cannot be feasibly source separated to a mixed debris recycling facility.

1.06 HAULING AND DISPOSAL OPERATIONS

A. Hauling: Arrange the collection and hauling of C&D debris by a locally permitted waste hauler.

B. Recycling And Processing Facilities: Transport C&D debris to recycling or processing facilities. Contractor shall be familiar with the requirements for acceptance of C&D materials at the recycling and processing facilities before the material is delivered. Always call facilities in advance to verify requirements.

C. Disposal Facilities: Transport C&D debris that cannot be delivered to a recycling or processing facility, to a transfer station or disposal facility that can legally accept the materials for the purpose of disposal.

D. Site Disposal: Do not burn, bury, or otherwise dispose of solid waste on the Project Worksite.

PART 2 – PRODUCTS – Not Used

PART 3 – EXECUTION – Not Used

PART 4 – MEASUREMENT AND PAYMENT

4.01 MEASUREMENT

A. Work of this Section will be measured as a unit, acceptably completed.

4.02 PAYMENT

A. Payment will be made under the applicable Schedule of Values item for General Requirements – Nonspecific.

END OF SECTION

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SECTION 01620-DB

STORAGE AND PROTECTION

PART 1 - GENERAL

1.1 DESCRIPTION

The Work specified in this Section consists of providing storage and protection of equipment, materials, products, and supplies to be incorporated into construction and indicating such storage areas on a Working Drawing, with locations and dates when such areas will be available for each purpose.

1.2 SUBMITTALS

A. Refer to Section 01300-DB, Submittals, for submittal procedures.

B. Working Drawings - Show locations of storage areas. Do not locate storage areas in dedicated streets, within drip line of shrubs and trees indicated to remain, in pedestrian ways, or on private property without approval of property owner.

C. Descriptions of proposed methods and locations for storing and protecting products.

PART 2 - PRODUCTS

2.1 MATERIALS

Materials required for storage and protection of items specified - Durable, weatherproof, and factory finished or painted to present appearance acceptable to Metro or its designee.

PART 3 - EXECUTION

3.1 STORAGE

A. Confine operations, including storage of materials, to areas authorized or accepted by Metro.

B. Temporary buildings such as storage sheds, shops, and offices may be erected by Contractor only with acceptance of Metro or its designee; construct with labor and materials furnished by Contractor without additional expense to Metro. Temporary buildings and utilities remain property of Contractor; remove upon completion of Work.

C. Palletize materials, products, and supplies to be incorporated into construction; store off the ground, in areas indicated as storage areas on Contract Drawings and on accepted Working Drawings.

D. Store items in manner to prevent damage and facilitate inspection. Leave seals, tags, and labels intact and legible. Maintain access to products to allow inspection. Protect products which would be affected by adverse environmental conditions.

E. Store items in manner to prevent damage to Metro's property.

F. Replace materials damaged or lost during storage with acceptable materials. Damaged materials may be repaired for use in this Contract only when specifically allowed by Metro or its designee.

G. Do not stack lumber higher than 8 feet in unsecured areas. Conform to Cal/OSHA requirements. Periodically inspect stored products to ensure that products are stored as specified and are free from damage and deterioration. Do not remove items from storage until they are to be incorporated into Work.

H. Do not stack materials for incorporation into Work or for methods and means of construction higher than 5 feet when using city streets, sidewalks, or decking as a temporary storage area. Keep access to fire alarms and hydrants clear. Do not temporarily store materials within 15 feet of fire alarm and hydrant facilities.

I. Do not store hydraulic fluids, gasoline, liquid petroleum, gases, explosives, diesel fuel, and other flammables in excavations, except a one day supply of diesel fuel may be stored in open excavations.

3.2 LABELLING

Label storage cabinets and sheds which will contain flammable substances and explosive substances FLAMMABLE—KEEP FIRE AWAY and NO SMOKING with conspicuous lettering and conforming to Cal/OSHA requirements.

3.3 HOLDING AREA

Provide secure bond or holding area for non-conforming material awaiting disposition, in accordance with Section 01460-DB, Project Quality Program Requirements.

PART 4 - MEASUREMENT AND PAYMENT

4.1 MEASUREMENT

The Work of this Section will be measured as a unit, acceptably completed.

4.2 PAYMENT

Payment will be made under the applicable Schedule of Values item for General Requirements - Nonspecific.

END OF SECTION

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SECTION 01700-DB

CLOSEOUT PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Administrative and procedural requirements for Contract closeout, including, but not limited to, the following:

a. Substantial Completion procedures.

b. Final Acceptance procedures.

c. Warranties.

d. Final cleaning.

2. Contractor shall also meet closeout requirements of Caltrans and the City of Los Angeles.

B. Related Sections:

1. Section 01782-DB, Operation and Maintenance Manuals, for operation and maintenance manual requirements.

2. Section 01720-DB, As-Built Drawings and Current Status Documents, for submitting Project Record Documents.

3. Section 01750-DB, Spare Parts and Replacement Materials.

1.2 SUBSTANTIAL COMPLETION

A. Preliminary Procedures: Before submitting a Notice of Substantial Completion, in addition to requirements under General Conditions GC-22, Substantial Completion, complete the following. List items below that are incomplete with request.

1. Prepare a list of items to be completed and corrected (punch list), the value of items on the list, and reasons why the work is not complete.

2. Advise Metro of pending insurance changeover requirements.

3. Submit specific warranties, workmanship bonds, maintenance service agreements, final certifications, and similar documents.

4. Obtain and submit releases permitting Metro and Third Parties unrestricted use of the work and access to services and utilities. Include occupancy permits, operating certificates, and similar releases.

5. Submit evidence acceptable to Metro that Caltrans, the City of Los Angeles, and other Third Parties have accepted the Work as substantially complete.

6. Prepare and submit project record documents, operation and maintenance manuals, final completion construction photographic documentation, damage or settlement surveys, property surveys, and similar final record information.

7. Deliver tools, spare parts, extra materials, and similar items to location designated by Metro. Label with manufacturer's name and model number where applicable.

8. Make final changeover of permanent locks and deliver keys to Metro. Advise Metro's personnel of changeover in security provisions.

9. Complete startup testing of systems.

10. Submit test/adjust/balance records.

11. Terminate and remove temporary facilities from project site, along with mockups, construction tools, and similar elements.

12. Advise Metro of changeover in heat and other utilities.

13. Submit changeover information related to Metro's occupancy, use, operation, and maintenance.

14. Complete final cleaning requirements, including touchup painting.

15. Touch up and otherwise repair and restore marred exposed finishes to eliminate visual defects.

B. Inspection: Submit a written Notice of Substantial Completion. After receipt of request, Metro will either proceed with inspection or notify Contractor of unfulfilled requirements. Metro will obtain concurrence from Caltrans before issuing a Certificate of Substantial Completion. Metro will prepare the Certificate of Substantial Completion after inspection or will notify Contractor of items, either on Contractor's list or additional items identified by Metro, that must be completed or corrected before certificate will be issued.

1. Reinspection: Request reinspection when the work identified in previous inspections as incomplete is completed or corrected.

2. Results of completed inspection will form the basis of requirements for final completion.

1.3 FINAL ACCEPTANCE

A. Preliminary Procedures: Before submitting a Request for Final Acceptance, in addition to requirements under General Conditions GC-23, Final Inspection and Acceptance of the Work, complete the following:

1. Submit a final Application for Payment.

2. Submit certified copy of Metro's Substantial Completion inspection list of items to be completed or corrected (punch list), endorsed and dated by Metro. The certified copy of the list shall state that each item has been completed or otherwise resolved for acceptance.

3. Submit evidence acceptable to Metro that Caltrans, the City of Los Angeles, and other Third Parties have certified final acceptance of the Work.

4. Submit evidence of final, continuing insurance coverage complying with insurance requirements.

5. Submit pest-control final inspection report and warranty.

6. Instruct Metro's personnel in operation, adjustment, and maintenance of products, equipment, and systems.

B. Inspection: Submit a written Request for Final Acceptance. On receipt of request, Metro will either proceed with inspection or notify Contractor of unfulfilled requirements. Metro will obtain Caltrans currence before issuing a Certificate of Final Acceptance. Metro will prepare a Certificate of Final Acceptance after inspection or will notify Contractor of construction that must be completed or corrected before certificate will be issued.

1. Reinspection: Request reinspection when the work identified in previous inspections as incomplete is completed or corrected.

1.4 LIST OF INCOMPLETE ITEMS (PUNCH LIST)

A. Organization of List: Include name and identification of each space and area affected by construction operations for incomplete items and items needing correction including, if necessary, areas disturbed by Contractor that are outside the limits of construction.

1. Organize list of facilities or spaces in sequential order, starting with exterior areas first and proceeding from lowest to highest.

2. Organize items applying to each facility by major element. For architectural spaces, include categories for ceiling, individual walls, floors, equipment, and building systems.

3. Include the following information at the top of each page:

   a. Project name.

   b. Date.

   c. Name of Engineer.

   d. Name of Contractor.

   e. Page number.

4. Submit list of incomplete items in the following format:

   a. PDF electronic file.

   b. Three paper copies of product schedule or list, unless otherwise indicated. Metro will return two copies.

1.5 WARRANTIES

A. Submittal Time: Submit written warranties on request of Metro for designated portions of the work where commencement of warranties at other than date of Substantial Completion is indicated.

B. Partial Occupancy: Submit properly executed warranties within 15 days of completion of designated portions of the work that are completed and occupied or used by Metro during construction period by separate agreement with Contractor.

C. Organize warranty documents into an orderly sequence based on the table of contents of the Specifications.

1. Bind warranties and bonds in heavy-duty, three-ring, vinyl-covered, loose-leaf binders, thickness as necessary to accommodate contents, and sized to receive 8-1/2-by-11-inch paper.

2. Provide heavy paper dividers with plastic-covered tabs for each separate warranty. Mark tab to identify the product or installation. Provide a typed description of the product or installation, including the name of the product and the name, address, and telephone number of installer.

3. Identify each binder on the front and spine with the typed or printed title "WARRANTIES," project name, and name of Contractor.

4. Scan warranties and bonds and assemble complete warranty and bond submittal package into a single indexed electronic PDF file with links enabling navigation to each item. Provide table of contents at beginning of document.

D. Provide additional copies of each warranty to include in operation and maintenance manuals.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Cleaning Agents: Use cleaning materials and agents recommended by manufacturer or fabricator of the surface to be cleaned. Do not use cleaning agents that are potentially hazardous to health or property or that might damage finished surfaces.

1. Use cleaning products that meet Green Seal GS-37, or if GS-37 is not applicable, use products that comply with the California Code of Regulations maximum allowable VOC levels.

PART 3 - EXECUTION

3.1 FINAL CLEANING

A. General: Perform final cleaning. Conduct cleaning and waste-removal operations to comply with local laws and ordinances and Federal and local environmental and antipollution regulations.

B. Inspect interior and exterior surfaces, including concealed spaces, in preparation for Substantial Completion and occupancy.

C. Cleaning: Employ experienced workers or professional cleaners for final cleaning. Clean each surface or unit to condition expected in an average commercial building cleaning and maintenance program. Comply with manufacturer's written instructions.

1. Complete the following cleaning operations before requesting inspection for certification of Substantial Completion for entire project or for a portion of project:

a. Clean project site, yard, and grounds, in areas disturbed by construction activities, including landscape development areas, of rubbish, waste material, litter, and other foreign substances.

b. Sweep paved areas broom clean. Remove petrochemical spills, stains, and other foreign deposits.

c. Rake grounds that are neither planted nor paved to a smooth, even-textured surface.

d. Remove tools, construction equipment, machinery, and surplus material from Project site.

e. Remove surplus materials, except materials intended for maintenance and operation.

f. Clean exposed exterior and interior hard-surfaced finishes to a dirt-free condition, free of stains, films, and similar foreign substances. Remove dirt, dust, litter, corrosion, solvents, discursive paint, stains, and extraneous markings. Avoid disturbing natural weathering of exterior surfaces. Restore reflective surfaces to their original condition.

g. Remove debris and surface dust from limited access spaces, including roofs, plenums, shafts, trenches, equipment vaults, manholes, attics, and similar spaces.

h. Sweep concrete floors broom clean in unoccupied spaces.

i. Vacuum carpet and similar soft surfaces, removing debris and excess nap; shampoo if visible soil or stains remain.

j. Clean transparent materials, including mirrors and glass in doors and windows. Remove glazing compounds and other noticeable, vision-obscuring materials. Replace chipped or broken glass and other damaged transparent materials. Polish mirrors and glass, taking care not to scratch surfaces.

k. Remove labels that are not permanent. File detachable labels with manufacturer's specifications for specific material and include in operation and maintenance manuals for Metro's records.

l. Touch up and otherwise repair and restore marred, exposed finishes and surfaces to specified condition. Replace finishes and surfaces that cannot be satisfactorily repaired or restored or that already show evidence of repair or restoration.

    1) Do not paint over "UL" and other required labels and identification, including mechanical and electrical nameplates.

m. Wipe surfaces of mechanical and electrical equipment, elevator equipment, and similar equipment. Remove excess lubrication, paint and mortar droppings, and other foreign substances.

n. Replace parts subject to operating conditions during construction that may impede operation or reduce longevity.

o. Clean plumbing fixtures to a sanitary condition, free of stains, including stains resulting from water exposure.

p. Remove calcification and repair damage from calcification and other chemicals.

q. Replace disposable air filters and clean permanent air filters. Clean exposed surfaces of diffusers, registers, and grills.

r. Clean ducts, blowers, and coils if units were operated without filters during construction or that display contamination with particulate matter upon inspection. Note that this is a major work item that requires coordination with other closeout procedures.

s. Clean light fixtures, lamps, globes, and reflectors to function with full efficiency. Replace burned-out bulbs, and those noticeably dimmed by hours of use, and defective and noisy starters in fluorescent and mercury vapor fixtures to comply with requirements for new fixtures.

t. Protect work that has been cleaned, and do not allow cleaning operations to damage or soil previously cleaned work.

u. Leave project clean and ready for occupancy, in a clean, neat, and workmanlike condition acceptable to Metro.

D. Pest Control: Engage an experienced, licensed exterminator to make a final inspection and rid project of rodents, insects, and other pests. Prepare a report.

E. Construction Waste Disposal: Comply with waste disposal requirements in Section 01591-DB, Construction Waste Management and Disposal.

PART 4 - MEASUREMENT AND PAYMENT

4.1 MEASUREMENT

A. Work of this Section will be measured as a unit, acceptably completed.

4.2 PAYMENT

A. Payment will be made under the applicable Section of Values item for General Requirements – Closeout Requirements.

END OF SECTION

SECTION 01710-DB

CLEANING

PART 1 - GENERAL

1.1 DESCRIPTION

The Work specified in this Section consists of maintaining a clean, orderly, hazard-free Worksite, and adjacent public roads and sidewalks. For final cleaning see Section 01700-DB, Closeout Procedures.

1.2 WORKSITE CONDITIONS

A. Safety Requirements

1. Maintain Worksite in a neat, orderly and hazard-free condition until final acceptance of Work, in conformance with local governmental requirements. Keep catwalks, underground structures, Worksite walks, public sidewalks, roadways, and streets, along with public and private walkways adjacent to Worksite, free from scrap, trash, debris, and hazards.

B. Hazards Control

1. Store, control, and dispose of hazardous and toxic products, wastes, and containers in accordance with local requirements and Section 01566-DB, Pollution Controls.

2. Store volatile wastes in covered metal containers, and remove wastes from Worksite daily.

3. Do not accumulate wastes that create hazardous conditions.

4. If volatile and noxious cleaning substances are being used in spaces not naturally ventilated, provide artificial ventilation.

PART 2 - PRODUCTS

2.1 CLEANING MATERIALS

Use types of cleaning materials recommended by manufacturer of products whose surfaces are to be cleaned.

PART 3 - EXECUTION

3.1 INTERIM CLEANING

A. Clean Worksite and adjacent areas three times each Workday, or more often if required by Metro or its designee, during construction of Contract. Maintain structures, grounds, and other areas of Worksite, including public and private properties immediately adjacent to Worksite, free from accumulations of waste materials including trash and litter not generated by the Contractor. Place waste materials in metal containers. Maintain construction area in broom-clean condition; remove debris and scrap material from Work area throughout each shift. Remove soil accumulations and mud resulting from construction activities from adjacent street surfaces and sidewalks.

B. Remove or secure loose material on open decks and on other exposed surfaces at end of each workday, or more often, in manner which will maintain Worksite hazard-free. Secure material in a manner which will prevent dislodgement by wind and other forces.

C. Sprinkle waste materials with water or approved chemical palliative to prevent blowing of dust.

D. Promptly empty waste containers when full, and legally dispose of contents at dumping areas off Metro's property.

E. Control handling of waste materials. Do not permit materials to be dropped or thrown from structures.

F. Remove spillage of construction-related material from haul routes in accordance with Section 01566-DB, Pollution Controls.

3.2 FINAL CLEANING

A. Refer to Section 01700-DB, Closeout Procedures.

PART 4 - MEASUREMENT AND PAYMENT

4.1 MEASUREMENT

The Work of this Section will be measured as a unit, acceptably completed.

4.2 PAYMENT

Payment will be made under the applicable Schedule of Values item for General Requirements - Nonspecific.

END OF SECTION

SECTION 01720-DB

AS-BUILT DRAWINGS AND CURRENT STATUS DOCUMENTS

PART 1 - GENERAL

1.1 DESCRIPTION

A. Work specified in this Section consists of maintaining, annotating and delivering Current Status and the final As-Built Project Record Drawings, Specifications, Logs, and Product Data in both hard copy and electronic file formats (including PDF, TIF, CADD, Word, and Excel files) as defined below. For Shop and Working Drawings refer to Section 01300-DB, Submittals. Work includes but is not limited to as-builts for Work done below grade, at-grade, above grade, on bridges, highway crossings, stations, architectural structures, and facilities of Caltrans, the City of Los Angeles, and other Third Parties.

B. Definitions

1. As-Built Document Log - The updated Current Status Document Log submitted at an interim milestones and at Contract completion.

2. Current Status Documents - A set of Construction Drawings and Shop/Working Drawings and a copy of the Construction Specifications marked and maintained by Contractor to show current As-Built status of construction in progress. When submitted, these shall be referred to as milestone or final as-built documents as appropriate.

3. Contractor Furnished Drawings – Working Drawings and Shop Drawings produced by the Contractor, which become supplements to the Contract.

4. Project Record Documents - Construction Drawings, Shop Drawings, Working Drawings, Construction Specifications, and Product Data that are revised and approved which depict the final as-built field configuration of Work items. Project Record Documents also include all original diaries, logs, notebooks, accounts, records, reports, and other documents prepared in the performance of the Contract, collected, organized, and properly identified. All Third Party coordination and approval shall be completed and incorporated into the Project Record Set.

5. As-Built Specifications - Project Specifications reflecting changes during construction.

6. Current Status Document Log – A log of all drawings and Specifications including the following information:

Drawings

- Revision No.
- Revision Issue Date
- Description of any field changes which are marked on the drawing, if applicable.
- Reference to Shop or Working Drawings, if applicable.
- Schedule for submittal of As-Built document.

Specifications

- Revision No.
- Revision issue date

1.2 QUALITY CONTROL

A. Print legibly and clearly relevant construction changes/data on current print of Current Status Documents to a high standard of quality. Have work done by a person qualified in the work performed.

B. The Contractor shall update and maintain the Current Status Documents and Log on at least a weekly basis.

C. Record additional construction information on As-Built or Current Status Documents.

D. Prepare materials to a high standard of quality, such as the standards set forth below. Refer to Section 01720-DB, As-Built Drawings and Current Status Documents, for marking details on as-built drawings. Of the reference standards cited below, first comply with standards of the agency having jurisdiction (Metro, Caltrans, or the City of Los Angeles); follow NIBS or ASME standards for items not addressed by agency standards.

E. Reference Standards

1. Metro

   CADD Standards Manual

2. Caltrans

   Plans Preparation Manual
   Available at: www.dot.ca.gov/hq/oppd/cadd/usta/ppman/default.htm
   or through http://dot.ca.gov/hq/esc/techpubs/

CADD Users Manual
Available at: www.dot.ca.gov/hq/oppd/cadd/usta/caddman/default.htm
or through www.dot.ca.gov/hq/oppd/cadd/rsc_files/webpage.htm

3. City of Los Angeles

   Standard Plans and SSPWC with Brown Book

4. National Institute of Building Sciences, Building Smart Alliance (NIBS)

   U.S. National CAD Standard
   Available at: www.buildingsmartalliance.org/index.php.ncs

5. American Society of Mechanical Engineers (ASME)

   ANSI/ASME Y14.100, Engineering Drawing Practice
   Available at: http://catalog.asme.org/

1.3 SUBMITTALS - Refer to Section 01300-DB, Submittals, for submittal procedures.

A. Current Status Documents Log - Within 90 days from approval of the Baseline Schedule, submit for acceptance the Current Status Document Log in Excel, PDF, and hard copy formats. Submit the Log every 90 days or whenever requested by Metro.

   1. The schedule for submittal of Project Record documents should reflect the Work scheduled on the accepted Baseline Schedule.

B. Submit monthly progress reports on status of Current Status Documents and As-Built documents in Excel, PDF, and hard copy formats. List the status of each drawing under design, drawing for work under construction, drawing for work completed, and Specification section. The report shall highlight changes that have occurred and identify anticipated future changes.

C. Monthly progress copies of Current Status Drawings.

D. The Resident Engineer (RE) will review the Current Status Documents in conjunction with the monthly payment request. Current Status Documents must to be kept at Contractor's field office at all times (unless otherwise specified). In the event these documents are not maintained, Metro will defer monthly payment for this pay item.

E. Milestone As-Built Drawings - Within 30 days after each milestone identified in the Metro accepted Contract Schedule, submit one hard copy and electronic CADD files in both AutoCAD and PDF format of all related As-Built Drawings and Specifications referenced to applicable Shop or Working Drawings which

have been revised to indicate final As-Built Condition of Work, along with the latest revision of the Current Status Document Log. Deliver a certification with the submittal attesting that documents are a true and complete record of the Contract and the Work along with Third Party approval stamp and signature on drawings concerning Third Party.

F. Upon completion of all Contract Work and on a mutually agreed schedule with Metro, submit updated AutoCAD electronic files, PDF files, Word files, Excel files, and hard copies of all Project Record Documents and the updated As-Built Document Log.

G. As-Built Drawings to LABOE, LABSL, LABSS, LADOT, and ITA:

Once the As-Built work done by the Contractor is approved by the City, the Contractor shall arrange for the transfer of As-Built information onto the electronic drawing files in electronic format. Hard copies of the updated hard copy Current Status Drawing sheets shall be submitted to the City and Metro each month. Upon completion of the Rearrangement work, the Party that performed the work shall furnish the other Party with reproducible "As-Built" drawings showing all Replacement Facilities installed by the performing Party, within sixty (60) working days after completion of work for each set of drawings. All "As-Built" drawings (whether provided by Metro, by Consultant, or by Contractor) shall be in hard copy and electronic format which conforms to the following:

1. LABOE:

- Street Improvement Plans - AutoCAD and hard copies to be scanned with Tif w/ 300 DPI min. after all signatures.
- Stormdrain Plans - AutoCAD and hard copies to be scanned with Tif w/ 300 DPI min. after all signatures.
- Structure Plans - AutoCAD and hard copies to be scanned with Tif w/ 300 DPI min. after all signatures.
- Sewer Plans - MicroStation and hard copies to be scanned with Tif w/ 300 DPI min. after all signatures.

2. LABSL:

All Plans - AutoCAD and hard copies to be scanned with Tif w/ 300 DPI min. after all signatures.

3. LABSS:

All Plans - MicroStation and hard copies after all signatures.

4. LADOT:

   Traffic Signal Plans – Consult LADOT for requirements.

5. ITA:

   All Plans - AutoCAD 2008 and hard copy.

6. All City Agencies:

   All Plans - Must bear Inspector's full printed name, signature, and date for acceptance.

H. As-Built Drawings to Caltrans:

6. Upon completion of the Project, deliver to Caltrans a complete set of As-Built Documents and design files that incorporate all design changes and details of Accepted Work that occurred throughout the Project. As-Built Documents must be submitted in both hard copy and electronic form and conform to the Caltrans Plans Preparation Manual, the Caltrans CADD Users Manual, and Caltrans practice. The As-Built Documents shall meet the format and content requirements of Final Design Documents, following Caltrans standards and requirements as approved by Metro. Required submittals include corrected full-size hardcopy structure plans; survey documents and records of survey (including monument perpetuation under Business and Professions Code 8771); and Record Documents as requested by Caltrans.

PART 2 - PRODUCTS

2.1 DOCUMENTS

A. Current Status Drawings

B. Current Status Specifications

C. Current Status Document Log

D. As-Built Drawings and Specifications

E. Project Record Documents

PART 3 - EXECUTION

3.1 SAFEKEEPING OF FIELD DOCUMENTS - During times when the documents are not being updated, store drawings, logs, specifications, and product data in a fire

resistant locked cabinet or provide off-site backup to prevent inadvertent destruction of documents.

3.2 MARKING CURRENT STATUS DOCUMENTS

A. Stamp each page of Drawings and Specifications of the Current Status Documents "CURRENT STATUS." Lettering on stamp: 1/2 inch and 1/4 inch for Drawings and Specifications respectively.

B. Legibly record construction As-Built information on a weekly basis. Include reference of a Change, Change Notice, RFI responses, Non-Conformance Reports, shop drawings and other related information to the extent that the As-Built information requires a markup on Contract drawings. Attach to the current status Drawing any markups or sketches as a result of design modifications or RFIs. Pertinent information must be shown on the Drawing. Do not cover up Work unless relevant information has been recorded.

C. Clearly identify Change Order revision by Change Order numbers. Where more than one change is made in an area of a drawing, clearly identify the changes graphically by marking a copy of the preceding changes. Insert these copies into set of Current Status Documents on top of preceding record in a manner to preclude losing or damaging document.

D. Mark changes in a clearly distinguishable manner and cloud the changes.

E. When a new revision of a document is issued, stamp the superseded document "SUPERSEDED" and keep in Current Status Document set for future reference of previous mark-ups and for use for production of As-Built Drawings. The Contractor need not transfer the data recorded on superseded drawings onto the new revision but shall list all revisions on the drawing index.

3.3 PREPARING PROJECT RECORD DOCUMENTS

A. For drawings and specifications created by the Contractor, prepare a new revision for each drawing and specification. Include “Project Record” in the revision block for drawings and in the footer for specifications. Drawings not changed by As-Built conditions include the word "UNCHANGED" in the revision block. Incorporate all field as-built information as well as the information required in Paragraph 3.4. Seal the documents and submit electronic files and hard copies as directed by Metro. Submit the updated Current Status Document Log as part of this package.

B. For drawings and specifications created by Metro or its consultant, mark and stamp “AS-BUILT” latest revisions of the Contract Drawings and Specifications for the As-Built condition. Lettering on stamp: 1/2 inch and 1/4 inch high for Drawings and Specifications respectively. Clearly define revisions in minimum

of 1/8 inch letter on a hard copy of Drawings and Specifications. Stamp Drawings not changed by As-Built conditions with the word "UNCHANGED" above the "AS-BUILT" label.

C. Use clouds to define extent of the change.

D. Mark As-Built conditions to the extent they deviate from contract requirements on a copy of the latest revision of the Drawings or Specifications. Specific information required on each category of Drawings is specified in Paragraph 3.4. If drawing does not facilitate such changes, furnish a Shop Drawing showing the details and cross-reference each drawing.

3.4 REQUIRED INFORMATION ON CURRENT STATUS AND PROJECT RECORD DRAWINGS - The following requirements are applicable to Contractor's Work under each category as required. Provide as-built measurements with reference to datum used for dimensioning on appropriate drawings.

A. Civil and Utility Drawings

1. Street paving drawings - Measure distances and elevations indicated for As-Built condition and indicate in black or highlight adjacent to the design elevations for sidewalks, curbs and gutters, catch basins, tops of manhole covers, valve boxes, and other protrusions in street paving or storm drain or sanitary sewer plan and profile.

2. As applicable, obtain approval from agency having jurisdiction prior to submitting Project Record Drawings.

B. Right-of-Way Drawings - These drawings will be revised for archives by Metro or its designee. The Contractor need not include these drawings in his submittal.

C. Architectural and Structural Drawings - Dimension of all items related to the nearest 1/4 inch.

1. Elevator Drawings: See Section 01046-DB, Elevator Interface, for requirements.

D. Mechanical Drawings

1. Piping and duct drawings - Reference on Log appropriate Construction Drawings and Shop Drawings indicating revisions to materials or routing of piping or ducts that are different from those indicated. Locate with a tape measure locations and elevations of bends, valves, flanges, enlargements, anchors, cleanouts, etc. in relations to walls, finished floors or other

convenient reference points. Show on Shop Drawings and/or Construction Drawings as appropriate.

2. Equipment drawings - Reference on index appropriate Construction Drawings and Shop Drawings for location of equipment and locations of major controls in relationship to walls and finished floor or other appropriate reference points. Show on Shop Drawings or Construction Drawings as appropriate.

E. Electrical / System Drawings

1. Connection diagrams - Cross-reference Shop Drawings with related diagrams to these drawings. Provide grounding connection records.

2. Conduit runs - Provide dimensions to indicate the location and elevation of panels and junction boxes in relationship to walls and finished floor with reasonable accuracy. Show cross sections and dimensions for all embedded conduits, cable trays, and concealed conduits on Shop and Lift Drawings. Provide cross-references between the Construction Drawings and Shop Drawings, and show cross-references on the As-Built Document Log.

3. Labeling – Provide tagging and labeling of conduits and cables/wires and the related schedules.

4. Locations of equipment - As specified in paragraph 3.4 D, Mechanical Drawings.

5. Locations of cables – Provide locations of cables, pull boxes, and handholes along with the assigned circuit records.

F. All As-Built Documents

The Contractor shall deliver to Metro As-Built Documents that shall depict the final completed Project, including all changes and data showing all items such as the electrical systems, drainage systems, lighting systems, underground utilities, traffic controls, signing placement, layout and profile plans, bridge plans, typical sections, and all other relevant plans. The Contractor shall deliver to Metro all other relevant data, including any operation and maintenance manuals for the mechanical and electrical systems.

The As-Built Drawings relating to bridges shall show the actual profile grade elevations at each substructure centerline and the tip elevation of drilled shafts or pile foundations on the bridge layouts. The Contractor shall

obtain and record actual beam seat elevations prior to placing beams or girders.

The Contractor shall ensure that the As-Built Documents meet the requirements of the Construction Documents and the following additional requirements:

- As-Built Documents shall include all base mapping (topography), design plans (including shop drawings), design calculations, design reports, specifications, and electronic CADD data.

- The Contractor shall ensure that all title blocks of calculation sheets include the calculation title, file number, page number, initials of the designer and the checker, and dates of design and checking.

- The Contractor shall ensure that all calculations indicate the design requirement, the assumptions made, the methods used, the source of the information, and the cross-reference for the applicable design drawings.

- The Contractor shall ensure that all structure calculations and bridge rating calculations performed using software are independently checked by a California-licensed Professional Engineer with ten years minimum experience. The Contractor shall ensure that hand calculations are verified.

- The Contractor shall ensure that all calculations are readily accessible, clear, understandable, concise, complete, and accurate.

- The Contractor shall ensure that all calculations are bound and numbered with a table of contents.

- The Contractor shall ensure that all calculations identify the code or standard utilitized and indicate the specific section referenced in the right hand column.

- In the calculations, the Contractor shall reference the computer programs used and provide all computer output, analysis and reports in an organized manner.

- The Contractor shall ensure that all manual calculations are printed, neatly and legibly, on 8-1/2-inch by 11 inch or 11 inch by 17 inch standard computation sheets.

For each bridge, an as-built plan file is required. This plan shall be a coordinate- correct plan, in accordance with datum requirements included in Technical Provisions, representing the actual coordinates of the outside edge of deck, gutter lines, beam centerlines, substructure footings, abutment

bridge seats, wingwalls, and other items identified in the Preliminary Bridge Plans. The file name extension shall be .ASB.

The Contractor shall ensure that the As-Built Documents reflect the actual condition of the constructed Work. The Contractor's Project Manager shall sign, seal, and date the title sheet of the As-Built Drawings to certify that the Project was completed in accordance with the Contract Documents, the governmental approvals, and applicable law.

The Contractor shall submit to Metro for approval two complete hard copies of all As-Built Documents and one set of electronic files on CD-ROM of all As-Built Documents. Documents not obtainable in a native digital format shall be provided as PDF files. Metro will advise the Contractor of the status of its approval of the As-Built Documents within 30 days of receipt. Formal written approval of the As-Built documents must be granted by Metro before Final Acceptance of the Work.

Along with the As-Built Documents, the Contractor shall collect, properly identify, and deliver to Metro all other materials required to complete the submittal of the Project Record Documents.

3.5 NOT USED

3.6 CONTRACTOR FURNISHED DRAWINGS

A. Contractor Furnished Drawings - Drawings provided by Contractor and used for fabrication, assembly, or installation of permanent facilities (Shop Drawings) or for construction of temporary structures or controls (Working Drawings). Prepare drawings to a high standard of quality, as specified in Paragraph 1.2, or other relevant lower tier standards defining equal drafting quality.

B. Produce drawings on D size (22 inches by 34 inches) reproducible, sepia quality or better. Provide company logo on drawing and have drawing sealed by an engineer registered in the State of California complete with sealer's name, full signature, and registration expiration date, where required by Specifications.

C. Use distinct drawing numbers to avoid duplication. Do subsequent revisions to these drawings. Include clouds, triangles, and description of the revision in the revision block and indicate whether initiated by Contractor.

D. Include these drawings in the Current Status Documents. Update for changes as specified in other parts of this section.

E. Revise originals of these drawings to show the As-Built conditions as indicated.

F. Upon completion of construction or as directed by the RE, submit updated As-Built Document Log and revised drawings as noted above.

PART 4 - MEASUREMENT AND PAYMENT

4.1 MEASUREMENT - The Work of this Section will be measured as a unit, acceptably performed.

4.2 PAYMENT - Payment will be made under the applicable Schedule of Values item for General Requirements – Closeout Requirements.

END OF SECTION

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SECTION 01730-DB

OPERATION AND MAINTENANCE MANUALS

PART 1 - GENERAL

1.1 GENERAL

A. Description: The Work specified in this Section consists of preparing and submitting operation and maintenance data for equipment, mechanical and electrical systems, and products and materials.

1.2 SUBMITTALS

A. Refer to Section 01300-DB, Submittals, for submittal procedures.

B. Submit 2 copies of preliminary draft or proposed formats and outlines of contents before start of Work. Metro will review draft and return one copy with comments.

C. Submit 2 completed operation and maintenance manuals in final form (for review and comment) not less than 150 days before Final Acceptance tests.

D. For equipment or component parts of equipment put into service during construction, submit complete documents within 10 days after acceptance.

E. Submit 6 copies and one PDF of completed operation and maintenance manuals not less than 30 days before scheduled date of Substantial Completion. Draft copies will be reviewed and returned with Metro's comments. Revise content of document sets as required prior to Substantial Completion.

F. Submit 6 copies and one PDF of revised volumes in final form before Substantial Completion will be certified, in accordance with Section 01700-DB, Closeout Procedures.

1.3 CONTINUOUS UPDATING PROGRAM

A. Furnish one copy of letter indicating that suppliers have been notified to provide updated operation and maintenance data, service bulletins, and other information pertinent to equipment, as it becomes available.

PART 2 - PRODUCTS

2.1 OPERATION AND MAINTENANCE MANUALS

A. Assemble operation and maintenance manuals using manufacturer's latest standard commercial data and prepare as follows:

1. Submit data bound in 8-1/2 inch x 11 inch D style 3-ring binders with durable plastic covers having sleeves on inner sides of cover.

2. Paper: 8-1/2" x 11" white bond, 20 lb. or thicker.

3. Text: Word processed; where necessary, typewritten.

4. Printed data: Manufacturers' catalog cuts, brochures, and operation and maintenance data. Clear reproductions will be acceptable.

5. Drawings: 8-1/2" x 11", bound in with text. Larger drawings are acceptable, provided they are folded to fit into a pocket inside rear cover of manual. Reinforce edges of large drawings.

6. Prints of drawings: Black on white, sharp in detail, and suitable for making reproductions.

7. Flysheets: Separate each portion of the manual with colored, neatly prepared flysheets briefly describing contents of the ensuing portion.

8. Prepare binder cover with the following information:

OPERATION AND MAINTENANCE INSTRUCTIONS

OPERATION AND MAINTENANCE DATA OF (STRUCTURE OR FACILITY)

(TITLE AND NUMBER OF CONTRACT)

(ADDRESS)

(City, State)

(General subjects of this Manual)

_____

Signed/Metro or its designee

_____

Acceptance Date

9. Digital Files: Submit PDF of each section of operation and maintenance data.

2.2 ORGANIZATION – Organize operation and maintenance instructions by system, ordered by operation sequence, and identified by specification section. For each category, identify significant design criteria and provide a list of equipment, before detailed data on specific components.

2.3 CONTENTS OF MANUAL - Include following:

A. Index of volumes, in each volume of multiple volume systems.

B. Index, in and for each volume. List and combine the literature, for each system, in sequence of operation.

C. Names, addresses and telephone numbers of Contractor, suppliers and installers.

D. Names, addresses and telephone numbers of manufacturers' nearest service representatives.

E. Names, addresses and telephone numbers of local parts vendor and service agency.

F. Anticipated date Metro assumes responsibility for maintenance.

G. Description of system and component parts.

H. Pre-operation check or inspection list.

I. Procedures for starting, operating and stopping equipment.

J. Post-operation check or shutdown list.

K. Inspection and adjustment procedures.

L. Emergency operating instructions.

M. Accepted test data.

N. Maintenance schedules and procedures.

O. One copy of each wiring diagram.

P. One copy of each piping diagram.

Q. One copy of each duct diagram.

R. One copy of each accepted Shop Drawing.

S. Manufacturers' parts lists with catalog names, numbers and illustrations.

T. Exploded view of each piece of equipment with part designations.

U. List of manufacturers' recommended spare parts, prices and quantities for two years of operation.

V. List of special tools and test equipment required for the operation, maintenance, adjustment, testing and repair of the equipment, instruments and components.

W. Scale and corrosion control procedures.

X. Dismantling and reassembly instructions.

Y. Troubleshooting and repair instructions.

Z. Calibration procedures.

AA. Ordering information.

BB. Transmittal memo and document Table of Contents clearly to identify if any warranties/guarantees and spare parts are included in the manual and the relevant page numbers on which they are noted.

3.4 LANDSCAPE COMPONENTS MANUAL

A. Provide Landscape Irrigation, full sized drawings showing irrigation controllers and stations. Color code specific areas that are controlled by each station and label accordingly.

B. Provide a specific drawing of valve locations and clearly depict which sprinkler heads, and type, are controlled by each valve, including pipe sizes and reducer locations.

C. Provide a reduced index for each controller that will be attached inside each controller.

PART 3 - EXECUTION

3.1 MANUAL FOR MATERIALS AND FINISHES

A. Building Mechanical and Electrical Products and Equipment: Include product data, with catalog number, size, composition, and color and texture designations. Include information for reordering custom manufactured products.

B. Architectural Materials and Finishes: Include complete product data from manufacturer or fabricator, including alloy composition of architectural metals and identification of standards with which materials comply.

C. Instructions for Care and Maintenance: Include manufacturer's recommendations for cleaning agents and methods, precautions against detrimental agents and methods, and recommended schedule for cleaning and maintenance.

D. Moisture Protection and Weather Exposed Products: Include product data listing applicable reference standards, chemical composition, and details of installation. Include recommendations for inspections, maintenance, and repair.

E. Additional Requirements: As specified in individual product specification sections.

3.2 MANUAL FOR EQUIPMENT AND SYSTEMS

A. Items include but are not limited to elevator, heating and ventilation, fire alarm and suppression system, and generator and associated electrical components.

B. Operating Procedures: Include start-up, break-in, and routine normal operating instructions and sequences. Include regulation, control, stopping, shut-down, and emergency instructions. Include summer, winter, and special operating instructions.

C. Maintenance Requirements: Include routine procedures and guide for preventive maintenance and troubleshooting; disassembly, repair, and reassembly instructions; and alignment, adjusting, balancing, and checking instructions.

D. Include servicing and lubrication schedule, and list of lubricants required.

E. Include manufacturer's printed operation and maintenance instructions.

F. Include sequence of operation by controls manufacturer.

G. Include original manufacturer's parts list, illustrations, assembly drawings, and diagrams required for maintenance.

H. Include control diagrams by controls manufacturer as installed.

I. Include Contractor's coordination drawings, with color-coded piping diagrams as installed.

J. Include charts of valve tag numbers, with location and function of each valve, keyed to flow and control diagrams.

K. Include list of original manufacturer's spare parts, current prices, and recommended quantities to be maintained in storage.

L. Include test and balancing reports.

M. Additional Requirements: As specified in individual product specification sections.

PART 4 - MEASUREMENT AND PAYMENT

4.1 MEASUREMENT

A. Work of this Section will be measured as a unit, acceptably completed.

4.2 PAYMENT

A. Payment for work of this Section will be made under the applicable Schedule of Values item for General Requirements – Closeout Requirements.

END OF SECTION

SECTION 01750-DB

SPARE PARTS AND REPLACEMENT MATERIALS

PART 1 - GENERAL

1.1 DESCRIPTION - The Work specified in this Section consists of furnishing, packaging, shipping, delivering, and unloading spare parts and replacement materials.

PART 2 - PRODUCTS

2.1 FURNISH spare parts and replacement materials as indicated or as recommended by manufacturer in quantities sufficient for two years' operation.

2.2 PREPARE schedules of proposed spare parts and replacement materials and submit for Metro approval. Include supporting materials such as manufacturers' recommendations for specific systems and products. Modify schedules as requested by Metro. Obtain final Metro approval of schedules within 90 days after Notice to Proceed.

2.3 INCLUDE lists of spare parts and replacement materials in Operation and Maintenance Manuals as specified in Section 01730-DB, Operation and Maintenance Manuals.

PART 3 - EXECUTION

3.1 PACKAGE and label spare parts and replacement materials in moisture proof containers suitable for shipment and storage. Include copy of shipping list inside package and attach copy to exterior of package. Submit procedures for packaging of spare parts for review and acceptance by Metro or its designee prior to any delivery of spare parts.

3.2 SHIP spare parts and materials as directed by Metro or its designee.

3.3 DELIVER spare parts and materials prior to the date of Substantial Completion as required under Section 01700-DB, Closeout Procedures.

3.4 UNLOAD spare parts and materials in manner which will prevent damage to packages and contents. Metro or its designee will open packages and inspect spare parts and materials for damage. Damaged parts and materials will be returned to Contractor to be replaced with undamaged parts and materials, at no additional cost to Metro.

3.5 PRESERVATIVE COATINGS - Apply to all materials subject to corrosion.

PART 4 - MEASUREMENT AND PAYMENT

4.1 MEASUREMENT

A. The Work of this Section will be measured as a unit, acceptably completed.

4.2 PAYMENT

A. Payment will be made under the applicable Schedule of Values item for General Requirements - Nonspecific.

END OF SECTION

SECTION 01811-DB

SUSTAINABILITY REQUIREMENTS

PART 1 – GENERAL

1.01 SUMMARY

A. Section includes requirements for sustainable design and construction in accordance with the listed Metro references. The Metro references, in turn, rely in large measure on the Leadership in Energy and Environmental Design (LEED) program of the United States Green Building Council (USGBC), as set forth in the listed LEED references. To the fullest extent possible, the Contractor shall design and construct the Work in accordance with the Metro references and the provisions and methodology of the LEED program, and the completed project shall be LEED compliant at the highest LEED certification level possible.

1.02 REFERENCES

A. Metro references

1. Energy and Sustainability Policy (June 28, 2007).

2. Sustainability Implementation Plan (June 17, 2008).

3. Bus Rapid Transit (BRT) Supplemental Sustainable Design Criteria (SSDC) Guideline (June 30, 2008).

4. Freeway Supplemental Sustainability Design Criteria (SSDC) Guideline (June 30, 2008).

B. LEED references (Note: Due to the complexity and rapidly evolving nature of the LEED program, frequent changes are being made to the references listed here. All current material pertaining to each of these references may be reviewed at usgbc.org by selecting "LEED" and then selecting "LEED Resources"; frequent review of this website is recommended.)

1. LEED Reference Guide for Green Building Design and Construction (2009 Edition).

2. LEED for New Construction Rating System.

3. LEED-NC v3.0 Preliminary Project Checklist, a copy of which is included as Appendix A to this section.

4. LEED 2009 Minimum Program Requirements (MPR).

5. LEED 2009 MPR Supplemental Guidance.

C. Definitions

1. LEED Accreditation: The process of qualification, preparation, and examination by which an individual achieves recognition as a LEED Accredited Professional (LEED AP) as awarded by the Green Building Certification Institute (GBCI). An individual who is recognized as a LEED AP has demonstrated the knowledge and skills necessary to lead and/or participate in projects that seek LEED certification.

2. LEED Certification: The process of design and construction of a project meeting the LEED 2009 Minimum Program Requirements to incorporate the energy and environmental design provisions of the LEED program, including preparation and submittal of the necessary documentation to enable third-party verification of completion in accordance with those provisions. Upon successful completion of the verification process, certifications are awarded by the Green Building Certification Institute at one of several levels. In ascending order the levels are LEED Certified, LEED Silver, LEED Gold, and LEED Platinum.

3. LEED Compliant: As used herein, the process of design and construction by which the Contractor shall incorporate the energy and environmental design provisions of the LEED program, including preparation and submittal of the necessary documentation to enable Metro or its representative to verify that the project has been designed, constructed, and completed in accordance with those provisions. No LEED Certification will be sought.

D Reference Standards: The Work shall conform in all respects to the latest versions of all reference standards cited elsewhere in the Project Definition Documents - Technical, except with respect to the LEED credits, which shall be based on the versions of the standards cited in the listed LEED references.

1.03 ADMINISTRATIVE REQUIREMENTS

A. Design Requirements (by Contractor)

1. Identify a member of the Contractor whose role will be sustainable design manager.

2. Prepare and submit a sustainable design implementation plan, setting forth in detail the process by which sustainable design will be incorporated in the project, and a schedule for the various steps in the process.

3. Identify, or assist Metro in identifying, a Commissioning Agent (CxA) whose relationship to the project will comply with LEED requirements.

4. The Owner's Project Requirements (OPR) shall be consistent with the requirements of the Project Definition Documents - Technical. The copy of the LEED Checklist that is included elsewhere in this section indicates the LEED credits that appear to be achievable, those that may be achievable, and those that are not likely to be achievable. The Contractor is required to offer suggestions and otherwise endeavor to increase the number of credits that can be achieved and thereby enhance the sustainability of the project.

5. Plan, arrange, organize and conduct a sustainability charrette at the beginning of the design phase. All professional design disciplines of the Contractor, the Commissioning Agent, all major subcontractors, Metro project staff, and others as directed by Metro shall participate in the charrette. Arrange the charrette agenda and the charrette process to include a comprehensive review of the sustainability provisions of the Project Definition Documents - Technical, all LEED credits, and preparation of a LEED Checklist indicating which credits will be sought, which credits may be sought, and which credits will not be sought. Prepare and submit a report of the charrette and include the LEED Checklist.

6. Prepare and submit the written Basis of Design (BOD) for the project, and include therein all design provisions that will be incorporated in response to the Owner's Project Requirements, indicating which LEED credit or credits each design provision is intended to achieve.

7. Prepare and submit a written report of the progress of the design process each month in appropriate form.

B. Commissioning Requirements (by Commissioning Agent)

1. Review the Owner's Project Requirements and prepare and submit a written report of that review in appropriate form.

2. Attend and participate in the sustainability charrette.

3. Review the Basis of Design and prepare and submit a written report of that review in appropriate form.

4. Review the project design documents at intervals throughout the design process as required by the LEED Reference Guide and as required by the LEED requirements for Fundamental Commissioning and Enhanced Commissioning. Prepare and submit a written report of each such review in appropriate form. Include in each review a comparison of the documents to the Owner's Project Requirements and the Basis of Design to assure compliance with both the OPR and the BOD, and suggest appropriate adjustments to both the Owner's Project Requirements and the Basis of Design as needed to coordinate them with the project design documents.

5. Provide all other commissioning activities as needed to fulfill the LEED requirements for Fundamental Commissioning and Enhanced Commissioning. Prepare and submit a written report of each such activity in appropriate form.

C. Construction Requirements (by Contractor)

1. Identify a member of the Contractor whose role will be that of the on-site sustainable construction manager.

2. Prepare and submit a sustainable construction implementation plan, setting forth in detail the process by which sustainable construction practices will be incorporated in the project, and a schedule for the various steps in the process.

3. Prepare a written report of the progress of the construction process each month in appropriate form.

1.04 LEED SUBMITTALS

A. Design Submittal: Prepare and submit the LEED Design Phase Submittal documents for all credits for which Design Phase Review is possible.

B. Construction Submittal: Prepare and submit the LEED Construction Phase Submittal documents for all credits attempted in both the design phase and the construction phase.

1.05 QUALITY ASSURANCE

A. Design Quality: The sustainable design manager shall be a LEED Accredited Professional (LEED AP) with documented experience in not less than three LEED projects of similar size and complexity.

B. Commissioning Quality: The Commissioning Agent (CxA) shall be accredited as such as provided by the LEED requirements for Fundamental Commissioning and Enhanced Commissioning, with documented experience in not less than three LEED projects of similar size and complexity.

C. Construction Quality: The sustainable construction manager shall be a LEED Accredited Professional (LEED AP) with documented experience in not less than three LEED projects of similar size and complexity.

D. Submit documentation of the accreditations and experience of each of the individuals listed.

PART 2 – PRODUCTS - Not Used

PART 3 – EXECUTION - Not Used

PART 4 – MEASUREMENT AND PAYMENT

4.01 MEASUREMENT

A. Work of this Section will be measured as a unit, acceptably completed.

4.02 PAYMENT

A. Payment will be made under the applicable Schedule of Values item for General Requirements – Sustainability Requirements.

END OF SECTION

LEED-NC v3.0 Preliminary Project Checklist

Union/Patsaouras Plaza Busway Station
Los Angeles, California

Yes	?	No				
			Sustainable Sites		**26** Points	**Notes**
Y			Prereq 1	**Construction Activity Pollution Prevention**	Required	
Y			Credit 1	**Site Selection**	1	
		N	Credit 2	**Development Density & Community Connectivity**	5	
		N	Credit 3	**Brownfield Redevelopment**	1	
Y			Credit 4.1	**Alternative Transportation**, Public Transportation Access	6	
		N	Credit 4.2	**Alternative Transportation**, Bicycle Storage & Changing Rooms	1	
		N	Credit 4.3	**Alternative Transportation**, Low-Emitting and Fuel-Efficient Vehicles	3	
		N	Credit 4.4	**Alternative Transportation**, Parking Capacity	2	
		N	Credit 5.1	**Site Development,** Protect of Restore Habitat	1	
		N	Credit 5.2	**Site Development,** Maximize Open Space	1	
Y			Credit 6.1	**Stormwater Design,** Quantity Control	1	
Y			Credit 6.2	**Stormwater Design,** Quality Control	1	
	?		Credit 7.1	**Heat Island Effect,** Non-Roof	1	
	?		Credit 7.2	**Heat Island Effect,** Roof	1	
	?		Credit 8	**Light Pollution Reduction**	1	
			Water Efficiency		**10** Points	**Notes**
Y			Prereq 1	**Water Use Reduction,** 20% Reduction	Required	
		N	Credit 1	**Water Efficient Landscaping**	2 to 4	
	?		Credit 2	**Innovative Wastewater Technologies**	2	
	?		Credit 3	**Water Use Reduction**	2 to 4	
			Energy & Atmosphere		**35** Points	**Notes**
Y			Prereq 1	**Fundamental Commissioning of the Building Energy Systems**	Required	
Y			Prereq 2	**Minimum Energy Performance**	Required	
Y			Prereq 3	**Fundamental Refrigerant Management**	Required	
Y			Credit 1	**Optimize Energy Performance**	1 to 19	
		N	Credit 2	**On-Site Renewable Energy**	1 to 7	
Y			Credit 3	**Enhanced Commissioning**	2	
	?		Credit 4	**Enhanced Refrigerant Management**	2	
Y			Credit 5	**Measurement & Verification**	3	
		N	Credit 6	**Green Power**	2	
			Materials & Resources		**14** Points	**Notes**
Y			Prereq 1	**Storage & Collection of Recyclables**	Required	
		N	Credit 1.1	**Building Reuse**, Maintain Existing Walls, Floors & Roof	1 to 3	
		N	Credit 1.2	**Building Reuse**, Maintain 50% of Interior Non-Structural Elements	1	
Y			Credit 2	**Construction Waste Management**	1 to 2	
	?		Credit 3	**Materials Reuse**	1 to 2	
Y			Credit 4	**Recycled Content**	1 to 2	
Y			Credit 5	**Regional Materials**	1 to 2	
	?		Credit 6	**Rapidly Renewable Materials**	1	
	?		Credit 7	**Certified Wood**	1	
			Indoor Environmental Quality		**15** Points	**Notes**
Y			Prereq 1	**Minimum IAQ Performance**	Required	
Y			Prereq 2	**Environmental Tobacco Smoke** (ETS) **Control**	Required	
		N	Credit 1	**Outdoor Air Delivery Monitoring**	1	
Y			Credit 2	**Increased Ventilation**	1	
		N	Credit 3.1	**Construction IAQ Management Plan**, During Construction	1	
		N	Credit 3.2	**Construction IAQ Management Plan**, Before Occupancy	1	
Y			Credit 4.1	**Low-Emitting Materials**, Adhesives & Sealants	1	
Y			Credit 4.2	**Low-Emitting Materials**, Paints & Coatings	1	
Y			Credit 4.3	**Low-Emitting Materials**, Flooring Systems	1	
	?		Credit 4.4	**Low-Emitting Materials**, Composite Wood & Agrifiber Products	1	
		N	Credit 5	**Indoor Chemical & Pollutant Source Control**	1	
		N	Credit 6.1	**Controllability of Systems**, Lighting	1	
		N	Credit 6.2	**Controllability of Systems**, Thermal Comfort	1	
		N	Credit 7.1	**Thermal Comfort**, Design	1	
		N	Credit 7.2	**Thermal Comfort**, Verification	1	
Y			Credit 8.1	**Daylight & Views**, Daylight 75% of Spaces	1	
Y			Credit 8.2	**Daylight & Views**, Views for 90% of Spaces	1	
			Innovation & Design Process		**6** Points	**Notes**
	?		Credit 1.1	**Innovation in Design**: Provide Specific Title	1	
	?		Credit 1.2	**Innovation in Design**: Provide Specific Title	1	
	?		Credit 1.3	**Innovation in Design**: Provide Specific Title	1	
	?		Credit 1.4	**Innovation in Design**: Provide Specific Title	1	
	?		Credit 1.5	**Innovation in Design**: Provide Specific Title	1	
Y			Credit 2	**LEED® Accredited Professional**	1	
			Regional Priority		**4** Points	**Notes**
	?		Credit 1.1	**Regional Priority**: Provide Specific Title	1	
	?		Credit 1.2	**Regional Priority**: Provide Specific Title	1	
	?		Credit 1.3	**Regional Priority**: Provide Specific Title	1	
	?		Credit 1.4	**Regional Priority**: Provide Specific Title	1	
			Project Totals	**(pre-certification estimates)**	**110** Points	

Yes ? No

Certified 40-49 points **Silver** 50-59 points **Gold** 60-79 points **Platinum** 80-110 points

SECTION 01910-DB

COMMISSIONING

PART 1 - GENERAL

1.01 SUMMARY

A. Metro is pursuing LEED compliance for the project under the Leadership in Energy and Environment Design (LEED) program of the U.S. Green Building Council. For an explanation of what LEED compliance entails, see Section 01811-DB, Sustainability Requirements. The project must satisfy the fundamental commissioning requirements of LEED Prerequisite EA1 as well as the enhanced commissioning requirements of LEED Credit EA3.

B. The equipment and systems to be commissioned include, at a minimum:

1. HVAC equipment
2. Domestic hot water system
3. Exhaust air systems
4. HVAC instrumentation and control system
5. Emergency power system (including generator, automatic transfer switch, and fuel oil system)
6. Lighting control systems

1.02 DEFINITIONS

A. Acceptance: A formal action taken by the appropriate entity (which may or may not be contractually defined) to declare that some aspect of the project meets defined requirements, thus permitting subsequent activities to proceed.

B. Approval: Acceptance that a piece of equipment or system has been properly installed and is functioning in the tested modes according to the contract documents.

C. Checklists: Verification checklists that are developed and used during all phases of the commissioning process to verify that Metro's project requirements are being achieved. This includes checklists for general verification as well as testing, training, and other specific requirements. Various checklists are prepared by the Commissioning Agent and the Contractor to document equipment, system, or test completion.

D. Commissioning Authority (CxA): The entity selected by Metro to lead, plan, schedule, and coordinate the commissioning team to implement the commissioning process.

E. Commissioning Plan: An overall plan developed by the commissioning agent that provides the structure, schedule, and coordination planning for the commissioning process.

F. Commissioning Process: A quality-focused process for enhancing the delivery of a project. The process focuses on verifying and documenting that the facility and all of its systems and assemblies are planned, designed, installed, tested, operated, and maintained to meet Metro's project requirements.

G. Commissioning Team. The commissioning team includes the Commissioning Authority, Metro, Contractor, subcontractors, manufacturer's representatives, vendors, and engineers, and specifically includes those with responsibility for mechanical, plumbing, and electrical systems, testing and balancing, controls, and design and installation of commissioned systems.

H. Construction Checklist: A form used by the Contractor to verify that appropriate components are on-site, ready for installation, correctly installed, and functional. Also see "Checklists" and "Prefunctional Checklists."

I. Construction Documents: Construction documents consist of the contract documents (agreement, agreement supplements, conditions of the contract, specifications, drawings, and modifications) and resource documents made available for the Contractor's information.

J. Coordination Drawings: Drawings showing the work of all trades to illustrate that equipment can be installed in the space allocated without compromising equipment function or access for maintenance and replacement. These drawings graphically illustrate and dimension manufacturers’ recommended maintenance clearances.

K. Control System: A component of environmental, HVAC, security, and fire systems for reporting/monitoring and issuing of commands to/from field devices.

L. Data Logging: Monitoring and recording of flows, currents, status, pressures, etc., of equipment using stand-alone data recorders separate from the control system or the trending capabilities of control systems.

M. Deficiency: A condition in the installation or function of a component, piece of equipment, or system that is not in compliance with the contract documents.

N. Factory Testing: Testing of equipment on-site or at the factory, by factory personnel, with or without a Metro representative present.

O. Functional Testing: Testing of a complete system and demonstration of control of equipment and interaction of equipment or systems. Initially performed by Contractor and witnessed afterward by the Commissioning Agent or Metro.

P. Issues Log: A formal and ongoing record of problems or concerns – and their resolution – that have been raised by members of the commissioning team during the course of the commissioning process.

Q. Owner's Project Requirements (OPR): A written document that details the functional requirements of a project and the expectations of how it will be used and operated. This includes project goals, measurable performance criteria, cost considerations, benchmarks, success criteria, and supporting information. (Sometimes called "Project Intent.")

R. Prefunctional Checklists: Checklists to document the complete installation of equipment or systems. Prefunctional checklists are completed by the Contractor prior to equipment start-up, using forms provided by the Commissioning Agent.

S. Quality Based Sampling: A process for evaluating a subset (sample) of the total population. The sample is based upon a known or estimated probability distribution of expected values; an assumed statistical distribution based upon data from a similar product, assembly, or system; or a random sampling that has scientific statistical basis.

T. Seasonal Performance Tests: Performance tests that are deferred until the system will experience weather conditions closer to its design conditions.

U. Simulated Condition: Condition that is created for the purpose of testing the response of a system (e.g., raising/lowering the set point of a thermostat to see the response).

V. Startup: The initial starting or activating of dynamic equipment.

W. Systems Manual: A system-focused composite document that includes operation and maintenance data and additional information of use to Metro during the occupancy and operations phase.

X. Test Procedure: A written protocol that defines methods, personnel, and expectations for tests conducted on components, equipment, assemblies, systems, and interfaces among systems. Performance testing covers the dynamic functions and operations of equipment and systems using manual or monitoring methods. Performance testing is the dynamic testing of

systems under full operation. Systems are tested under various modes, such as during low cooling loads, high loads, component failures, unoccupied, varying outside air temperatures, fire alarm, power failure, etc. The systems are run through all of the control system's sequences of operation, and components are verified to respond as the sequences state.

Y. Training Plan: A written document that details the expectations, schedule, budget, and deliverables of commissioning process activities related to training of project operating and maintenance personnel, users, and occupants.

Z. Verification: The process by which specific documents, components, equipment, assemblies, systems, and interfaces among systems are confirmed to comply with the criteria described in the Owner's Project Requirements. Verification testing is performed by the Contractor and witnessed by the Commissioning Agent.

AA. Trending: Monitoring, by a building management system or other electronic data gathering equipment, and analyzing of the data gathered over a period of time.

BB. Warranty Period: The one-year period after Substantial Completion during which Contractor is contractually obligated to correct any deficiencies or defects.

1.03 COORDINATION

A. Coordinate with the Commissioning Agent the activities of the commissioning team to ensure an effective commissioning process. Integrate commissioning activities with other project activities to reduce duplication of effort as much as possible. Ensure that subcontractors, manufacturers, and vendors participate as required.

B. Commissioning Process. Commissioning includes the following general tasks:

1. Meetings: Commissioning team initially meets to agree on scope of work, tasks, schedules, deliverables, and responsibilities for implementation of the Commissioning Plan. Coordinate other meetings as required.

2. Commissioning Plan: Developed by the Commissioning Agent. Provides guidance in execution of process. Commissioning tasks shall be included in the construction progress schedule.

3. Submittals: Submit equipment documentation, including detailed startup procedures, for review by the Commissioning Agent during normal submittal process.

4. Startup/Prefunctional Checklists: The Commissioning Agent works with the Contractor to develop startup plans and documentation formats. The Commissioning Agent provides prefunctional checklist forms to be completed during startup process. Contractor and subcontractors review procedures.

5. Functional Performance Test Checklists: The Commissioning Agent develops specific functional performance test procedures and checklist forms for equipment and systems. Contractor and subcontractors review procedures.

6. Startup and Checkout Process: Perform and document startup and system operational checkout procedures. Execute prefunctional checklists.

7. Functional Performance Tests: After completion of prefunctional testing, startup, and testing, adjusting, and balancing (TAB), perform functional performance testing under direction of the Commissioning Agent.

8. Deficiencies and Resolution: The Commissioning Agent documents items of noncompliance in materials, installation, and operation. Correct items and coordinate re-testing at no expense to Metro.

9. Operation and Maintenance Documentation: The Commissioning Agent reviews for completeness.

10. Training: The Commissioning Agent reviews and coordinates training to be provided by Contractor, and verifies that it is completed.

11. Seasonal Testing: Deferred or seasonal testing is conducted if required.

1.04 MEETINGS

A. Scoping Meeting: Attend meeting with the Commissioning Agent, Metro's technical staff, and design and construction personnel involved in commissioning. Review commissioning scope of work, tasks, schedule, deliverables, and responsibilities for implementation of the Commissioning Plan.

B. Controls Integration Meeting: Attend meeting with the Commissioning Agent and design and construction personnel involved in commissioning. Ensure

attendance by subcontractors involved in mechanical, electrical, controls, and TAB work.

C. Additional Meetings: Coordinate additional meetings as necessary.

D. Meeting Agendas and Minutes: The Commissioning Agent prepares agendas and minutes for meetings.

1.05 REPORTING

A. Regular Reports: The Commissioning Agent provides regular reports to Metro, with increasing frequency as construction and commissioning progress.

B. Progress Reports: The Commissioning Agent regularly communicates with team, apprising them of progress and schedule changes.

C. Commissioning Report: The Commissioning Agent compiles final report which summarizes tasks, findings, and documentation of commissioning process. Report includes completed prefunctional checklists, functional performance testing records, identified deficiencies, recommendations, and summary of commissioning activities.

1.06 SUBMITTALS

A. Submit under Section 01300-DB, Submittals.

B. Number: Submit two additional copies of items to be reviewed by the Commissioning Agent, including all standard submittals relating to equipment or systems to be commissioned.

C. Commissioning Agent Review: The Commissioning Agent will review submittals related to commissioned equipment. The Commissioning Agent may submit written requests for additional information from Contractor and subcontractors.

D. Product Data: For equipment, including detailed startup procedures and specific Metro responsibilities to keep warranties in effect.

E. Construction Documents: Contract documents, changes, and approved submittals related to commissioned systems, for use by the Commissioning Agent.

F. Startup Plans: For equipment to be commissioned.

G. Prefunctional Check Certification: Certification that system is ready for start-up. Include nameplate data, installation checklist, and list of any incomplete

work. Use forms provided by the Commissioning Agent. Comply with specifications and approved submittals.

1. Signatures: Only individuals who have completed or witnessed line item task may initial or check item on forms.

H. Startup and Checkout Report: For each item or system to be commissioned. Include checklist and list of any start-up procedures not successfully completed. Use forms provided by the Commissioning Agent. Submit within two days after test.

I. Design and Operations Narrative: For controls, if requested by the Commissioning Agent.

J. Operation and Maintenance Data – Draft: Early submittal for completeness review prior to close-out.

K. Operation and Maintenance Data – Final: Include updating of original sequences of operation to record (as-built) conditions.

L. Draft Training Materials: Early submittal for review prior to close-out.

M. Sequences of Operation: Complete and detailed temperature control sequences of operation for each piece of equipment, regardless of information provided in the specifications. Include:

1. Narrative description of system, describing its purpose, components, and function.

2. Interactions and interlocks with other systems.

3. Delineation of control interactions between packaged controls and building automation system, including list of monitored points, controlled points, and adjustable points.

4. Written sequences of control for packaged controlled equipment.

5. Sequences of control for modes of operation (Startup, Warm-up, Cool-down, Normal Occupied, Unoccupied, Emergency Shutdown, etc.).

6. Capacity control sequences and equipment staging.

7. Temperature and pressure control sequences (setbacks, resets, etc.).

8. Sequences for control strategies (economizer control, optimum start/stop, optimization, demand limiting, etc.).

9. Effects of power or equipment failure with standby component functions.

10. Sequences for alarms and emergency shutdowns.

11. Seasonal operational requirements.

N. Control Drawings: Include:

1. Key to abbreviations.

2. Schematic graphic depictions of systems and each component.

3. Schematics, including system and component layout, of equipment that control system monitors, enables, or controls, even if equipment is primarily controlled by packaged or integral controls.

4. Full points list, including for each point:

a. Controlled system.

b. Point abbreviation.

c. Point description.

d. Point type (digital/analog, input/output).

e. Display unit.

f. Control point or setpoint (yes/no).

g. Monitoring point (yes/no).

h. Intermediate point (yes/no).

i. Calculated point (yes/no).

O. Control Record Documents: As-built control drawings and sequences of operation, to be included in final controls operation and maintenance manual submittal.

P. Control Plan: Written step-by-step procedures to test, checkout, and adjust control system before functional performance testing begins.

Q. Control Certification: Upon completion of control system checkout.

PART 2 – PRODUCTS

2.01 TEST EQUIPMENT

A. Standard testing equipment required to perform startup and initial checkout and required performance testing shall be provided by the Contractor for the equipment being tested. This includes, but is not limited to, two-way radios, meters, and data recorders. Data recorders may be provided by the Commissioning Agent at the option of the Commissioning Agent.

B. Testing equipment shall be of sufficient quality and accuracy to test and/or measure system performance within the tolerances provided in the specifications. If not otherwise noted, the following minimum requirements apply:

1. Temperature sensors and digital thermometers shall have a current certified calibration to an accuracy of 0.5 deg F and a resolution of + or - 0.1 deg F.

2. Pressure sensors shall have an accuracy of + or - 2.0 percent of the value range being measured (not full range of meter) and shall have been calibrated within the last year.

3. All equipment shall be calibrated according to the manufacturer's recommended intervals and when dropped or damaged. Calibration tags shall be affixed or certificates readily available.

C. Sensor and Actuator Calibration: Field-installed temperature, relative humidity, CO, CO_2, refrigerant, O_2, and/or pressure sensors and gauges, and actuators (dampers and valves) on all equipment, shall be calibrated. Verify that locations are appropriate and away from causes of erratic operation. Submit to the Commissioning Agent through Metro the calibration methods and results. All test instruments shall have a current certified calibration record. Sensors installed at the factory with calibration certification provided need not be field calibrated. Contractor shall field verify all installed sensors.

1. Sensor Calibration Methods:

a. All Sensors: Verify that sensor locations are appropriate and away from causes of erratic operation. Verify that sensors with shielded cable are grounded only at one end. Ensure that sensor pairs that are used to determine a temperature difference differ by less than 0.2 deg F. Ensure that sensor pairs that are used to determine a pressure difference differ by less than 2 percent of reading. Tolerances for critical applications may be tighter.

b. Sensors without Transmitters: Standard application. Make a reading with a calibrated test instrument within 6 inches of the site sensor. Verify that the sensor reading [via the permanent thermostat, gauge, or building management system (BMS)] is within the tolerances in the table below of the instrument-measured value. If not, install offset in BMS, calibrate, or replace sensor.

c. Sensors with Transmitters: Standard application. Make a reading with a calibrated test instrument within 6 inches of the site sensor. Verify that the sensor reading [via the permanent thermostat, gauge, or building management system (BMS)] is within the tolerances in the table below of the instrument-measured value. If not, install offset in BMS, calibrate, or replace sensor.

Tolerances, Standard Applications

Sensor	Required Tolerance (+/-)	Sensor	Required Tolerance (+/-)
Cooling coil, chilled and condenser water temperatures	0.4 deg F	Flow rates, water Relative humidity	4% of design 4% of design
AHU wet bulb or dew point	2.0 deg F	Combustion flue temps	5.0 deg F
Hot water coil and boiler water temperatures	1.5 deg F	Oxygen or CO_2 monitor	0.1% pts
Outside air, space air, duct air temperatures	0.4 deg F	CO monitor	0.01% pts
Watt-hour, voltage, and amperage	1% of design	Natural gas and oil flow rate	1% of design
Pressures, air, water and gas	3% of design	Barometric pressure	0.1 in. of Hg
Flow rates, air, water	10% of design		

d. Valve and Damper Stroke Setup and Check EMS Readout: For each valve and damper actuator position checked, verify the actual position against the BMS readout. Set pumps or fans to normal operating mode. Command valve or damper closed, visually verify that valve or damper is closed, and adjust output zero signal as required. Command valve or damper open, verify that position is full open, and adjust output signal as required. Command valve or damper to a few intermediate positions. If actual valve or damper position doesn't reasonably correspond, repair or replace actuator.

e. Closure for Heating Coil Valves (NO): Set heating setpoint 20 deg F above room temperature. Observe valve open. Remove control air or power from the valve and verify that the valve stem and actuator position do not change. Restore to normal. Set heating setpoint to 20 deg F below room temperature. Observe the valve close. Restore to normal.

f. Closure for Cooling Coil Valves (NC): Set cooling setpoint 20 deg F above room temperature. Observe the valve close. Remove control air or power from the valve and verify that the valve stem and actuator position do not change. Restore to normal. Set cooling setpoint to 20 deg F below room temperature. Observe valve open. Restore to normal.

PART 3 – EXECUTION

3.01 STARTUP, CONSTRUCTION CHECKLISTS, AND INITIAL CHECKOUT

A. Startup and Checkout Plan: The Commissioning Agent will assist the project commissioning team members responsible for startup of any equipment. The primary role of the Commissioning Agent in this process is to ensure that there is written documentation and that each of the manufacturer-recommended procedures has been completed. The Commissioning Agent shall provide prefunctional checklist forms, and startup shall be identified in the commissioning scoping meeting and on the checklist forms.

1. Prefunctional checklist forms indicate required procedures to be executed prior to equipment startup.

2. Contractor shall determine which trade is responsible for executing and documenting each of the line item tasks and transmit the checklists to the responsible subcontractors. Each form may have more than one trade responsible for its execution.

3. The Contractor or subcontractor responsible for the purchase of the equipment shall develop a comprehensive startup plan (with assistance from the Commissioning Agent) by combining the manufacturer's detailed startup and checkout procedures and the prefunctional checklists.

4. The Contractor shall submit the full startup plan to the Commissioning Agent, through Metro, for review and approval.

5. The Commissioning Agent will review and approve the procedures and the documentation format for reporting. The Commissioning Agent will return the procedures and the documentation format to the Contractor, through Metro.

6. Contractor shall transmit the full startup plan to the subcontractors for their review and use.

B. Execution of Construction Checklists and Startup:

1. Four weeks prior to scheduled startup, Contractor shall coordinate startup and checkout with Metro andthe Commissioning Agent. The execution and approval of the construction checklists, startup, and checkout shall be directed and performed by the Contractor, subcontractor, or vendor. Signatures of Contractor and the applicable subcontractors are required for verification of completion of their work.

2. Metro shall observe, at minimum, the procedures for each piece of primary equipment, unless there are multiple units, in which case a sampling strategy may be used. The Commissioning Agent may observe all testing.

3. For lower-level components of equipment, (e.g., sensors, controllers), the Commissioning Agent shall observe a sampling of the startup procedures.

4. Prefunctional checklist documentation (see attached) is to be used by the Contractor or subcontractor to document equipment is ready for startup.

5. The subcontractors and vendors shall execute startup and provide completed startup and construction checklists to the Contractor. Contractor shall submit to the Commissioning Agent, through Metro, a signed and dated copy of the completed startup and construction checklists.

6. Only individuals who have direct knowledge and witnessed that a line item task on the checklist was actually performed shall check off that item. It is not acceptable for witnessing supervisors to fill out these forms.

C. Deficiencies, Non-Conformance, and Approval in Checklists and Startup (Master Issues Log):

1. Contractor shall ensure that the subcontractors clearly list any outstanding items of the initial startup and construction checklist procedures that were not completed successfully, on an attached sheet. Submit the form and list of outstanding deficiencies, through Metro, to the Commissioning Agent within two days of test completion.

2. The Commissioning Agent will review the report and issue either a non-compliance report or an approval form, through Metro, to the

Contractor. Ensure that the installing subcontractors or vendors correct areas that are deficient or incomplete in the checklists and tests in a timely manner. Notify Metro as soon as outstanding items have been corrected, and resubmit an updated startup report with a Statement of Correction on the original non-compliance report. When satisfactorily completed, the Commissioning Agent will recommend approval of the execution of the checklists and startup of each system.

3.02 FUNCTIONAL PERFORMANCE TESTING

A. Objectives and Scope: Demonstrate that each system is operating correctly and complies with the contract documents. Verification procedures shall be directed, witnessed, and documented by the Commissioning Agent.

B. Developing Test Procedures: The Commissioning Agent develops test procedures and forms. Before test procedures are finalized, Contractor shall provide to Metro and the Commissioning Agent all requested documentation and a current list of changes affecting equipment or systems, including an updated points list, program code, control sequences, and testing parameters. Using the testing parameters and requirements in the technical specifications, the Commissioning Agent shall update/develop specific test procedures and forms to verify and document proper operation of each piece of equipment and system. Provide assistance to the Commissioning Agent as needed in developing the final procedures and ensure that subcontractors, vendors, and manufacturers provide assistance as needed. Test procedure is subject to Metro's review and approval.

C. Test Methods: Conduct tests by direct manipulation of system inputs (heating or cooling sensors), by manipulation of system inputs and outputs using building automation system, or by short-term monitoring using stand-alone data monitors.

1. Performance testing and verification may be achieved by manual testing or by monitoring the performance and analyzing the results using the control system’s trend log capabilities or by stand-alone data loggers. The Commissioning Agent may substitute specified methods or require an additional method to be executed other than what was specified, with the approval of Metro. The Commissioning Agent will determine which method is most appropriate for tests that do not have a specified method.

2. Simulated Conditions: Simulating conditions is permitted, although timing the testing to experience actual conditions is encouraged wherever practical.

3. Overridden Values: Overriding sensor values to simulate a condition, such as overriding the outside air temperature reading in a control system to be something other than it really is, is permitted.

4. Simulated Signals: Using a signal generator which creates a simulated signal to test and calibrate transducers and DDC constants is generally recommended over using the sensor to act as the signal generator via simulated conditions or overridden values.

5. Altering Setpoints: Rather than overriding sensor values, and when simulating conditions is difficult, altering setpoints to test a sequence is acceptable.

6. Indirect Indicators: Relying on indirect indicators for responses or performance shall be allowed only after visually and directly verifying and documenting, over the range of test parameters, that indirect readings through the control system represent actual conditions and responses.

7. Setup: Each performance test shall be conducted under conditions that simulate actual conditions as closely as is practically possible. The Contractor / subcontractors assisting the Commissioning Agent in executing the test shall provide all necessary materials, system modifications, etc., to produce the necessary flows, pressures, temperatures, etc., necessary to execute the test according to the specified conditions. At completion of the test, the Contractor/subcontractors shall return all affected equipment and systems to their approved operating settings.

D. Problem Solving: The burden of responsibility to solve, correct, and retest malfunctions/failures is with the Contractor.

E. Coordination and Scheduling: Provide sufficient notice to Commissioning Agent regarding completion schedule for prefunctional checklists and startup of equipment and systems. Functional testing does not begin until prefunctional, startup, and TAB is completed for a given system. Controls are not functionally tested until points have been calibrated and prefunctional checklists are complete.

1. The project may require TAB, startup, and performance testing to be executed in phases. Phasing shall be coordinated with Metro and the Commissioning Agent and shall be reflected in the construction progress schedule and commissioning schedule by Contractor. Final performance testing of all systems shall be as required by the phasing plan. Performance testing of complete systems as a whole will be performed before final turnover of the entire project.

3.03 DOCUMENTATION, NON-CONFORMANCE, AND APPROVAL OF TESTS

A. Documentation: The Commissioning Agent shall witness and verify/pre-approve the documentation of the results of functional performance tests.

B. Non-Conformance:

1. Corrections of minor deficiencies identified may be made during the tests at the discretion of the Commissioning Agent. In such cases the deficiency and resolution will be documented on the procedure form or on an attached sheet.

2. Cost of retesting a performance test shall be borne by Contractor.

3. Contractor shall submit in writing to Metro, at least as often as commissioning meetings are being scheduled, the status of each outstanding discrepancy identified during commissioning. Discussion shall cover explanations of any disagreement and proposals for their resolutions.

a. The Commissioning Agent retains the original non-conformance forms until the end of the project.

b. Retesting shall not be considered a justified reason for a claim of delay or for a time extension by Contractor.

C. Approval: The Commissioning Agent notes each satisfactorily demonstrated function on the test form. Final approval of the performance test by Metro is made after review by the Commissioning Agent.

3.04 DEFERRED TESTING

A. Unforeseen Deferred Tests: If any check or test cannot be completed due to the project completion level, required occupancy condition, or other deficiency, execution of checklists and performance testing may be delayed upon approval of the Commissioning Agent. These tests will be conducted in the same manner as the seasonal tests as soon as possible. Services of necessary parties will be negotiated.

B. Seasonal Testing. During the correction period, seasonal testing (tests delayed until weather conditions are closer to the system's design) shall be completed as part of this contract. The Commissioning Agent shall coordinate this activity through Metro. Tests will be executed by Contractor and documented by the Commissioning Agent. Deficiencies shall be corrected by Contractor/subcontractors under Commissioning Agent observation. Final adjustments to the O&M manuals and record documents due to the testing shall be made by Contractor.

3.05 TRAINING OF METRO PERSONNEL

A. Contractor shall coordinate training, schedule subcontractors, and ensure that training is completed. Training shall be coordinated, through Metro, with the Commissioning Agent.

B. Contractor shall ensure that each subcontractor and vendor (mechanical, plumbing, fire, electrical, specialty, etc.) complies with the following:

1. Provide, to the Commissioning Agent through Metro, a training plan 60 days before the planned training covering the following elements:

a. Equipment.

b. Intended audience.

c. Location of training.

d. Objectives.

e. Subjects covered (description, duration of discussion, special methods, etc.).

f. Duration of training on each subject.

g. Instructor for each subject.

h. Methods (classroom lecture, manufacturer's quality video, site walk-through, actual operational demonstrations, written handouts, etc.).

2. Provide designated Metro personnel with comprehensive orientation and training in the understanding of the systems and the operation and maintenance of each piece of equipment that makes up the system.

3. Training shall normally start with classroom sessions followed by hands-on demonstration/training on each piece of equipment.

3.06 OPERATIONS AND MAINTENANCE MANUALS

A. Contractor shall prepare detailed O&M documentation as identified in other sections.

B. The Commissioning Agent shall review the O&M documentation for completeness and organization.

C. Commissioning Record in O&M Manuals.:

1. The Commissioning Agent will compile, organize, and index the following commissioning data by equipment into labeled, indexed, and tabbed three-ring binders and deliver it to Contractor, to be included with the O&M manuals.

    a. Commissioning Plan.

    b. System reports including design narratives and criteria including sequences. Each system shall contain the startup plan and report, approvals, corrections, construction checklists, completed performance tests, trending and analysis, training plan, and recommended re-commissioning schedule. Checklists (attached) are to be prepared by the installing MEP equipment provider and forwarded by Contractor via Metro to the Commissioning Agent for review.

    c. Final Commissioning Report including an executive summary, list of participants and roles, brief building description, overview of commissioning and testing scope, and a general description of testing and verification methods. For each piece of commissioned equipment, the report should contain the disposition of the commissioning authority regarding the adequacy of the equipment, documentation, and training meeting the contract documents in the following areas: (1) compliance of equipment with contract documents, (2) equipment installation, (3) performance and efficiency, (4) equipment documentation and design intent, and (5) operator training. Outstanding non-compliance items shall be specifically listed. Recommendations for improvement to equipment or operations, future actions, commissioning process changes, etc., shall also be listed. Each non-compliance issue shall be referenced to the specific performance test, inspection, trend log, etc. where the deficiency is documented. The performance and efficiency section for each piece of equipment shall include a brief description of the verification method used (manual testing, BAS trend logs, data loggers, etc.) and shall include observations and conclusions from the testing.

PART 4 – MEASUREMENT AND PAYMENT

4.1 MEASUREMENT

A. No separate measurement will be made for work of this section.

4.1 PAYMENT

A. Payment will be made under the applicable Schedule of Values item for General Requirements – Nonspecific.

END OF SECTION

SECTION 02090-DB

ARTIFACTS

PART 1 - GENERAL

1.1. DESCRIPTION - The Work specified in this Section consists of:

A. Artifacts removal, cataloging, packing, or crating, and shipping to a designated storage facility and storing artifacts to be re-used in accordance with Metro's instructions.

B. Protection of artifacts, including those to remain in place.

1. Protect existing artifacts, structures, properties and improvements from damage, by approved methods.

2. Leave in place temporary protection after Work is completed and when directed by Metro.

C. Removal from storage and re-installing artifacts that are indicated to be reused.

D. Note that the artifacts are old, valuable, and inherently fragile.

1.2. QUALITY CONTROL

A. Comply with Section 01460, Project Quality Program Requirements.

B. Employ a qualified rigger having similar experience in hoisting and moving operations required for Work specified in this Section.

C. Perform Work of this Section under supervision of an experienced superintendent or others, as directed by Metro or its designee, as required to facilitate removal, protection, hoisting, and transportation of artifacts.

D. Codes and Regulations - Perform required artifacts removal and protection in accordance with Los Angeles Building Code, and regulations, safety standards, and requirements of federal, state, and local authorities having jurisdiction, including applicable requirements of following:

1. ANSI A10.6.

2. NFPA 241.

3. State of California Construction Safety Orders.

4. Local rules and regulations for protection of the public and control of noise, dust, dirt, and other pollutants.

1.3 REFERENCE STANDARDS

1. American National Standards Institute (ANSI)

   ANSI A10.6 Demolition Operations - Safety Requirements

2. National Fire Protection Association (NFPA)

   NFPA 241 Safeguarding Construction, Alteration, and Demolition Operations.

1.4 SUBMITTALS - Refer to Section 01300, Submittals, for submittal procedures.

A. Progress schedule for removal, protection, and storage of artifacts as indicated. Include requirements for special equipment, hoisting apparatus, and transportation.

B. Inventory of artifacts. Include verification of conditions of artifacts (whether they are to remain in place or be removed) indicated by Metro to be reused under this or future contracts.

   1. List each artifact, inventory number, location of artifact prior to removal, condition of artifact, preparation required for protection, and methods of storage and transportation.

   2. Indicate if shoring/support is required for removal of artifacts, lifting and jack points, crate materials, size, and packing information.

   3. Shoring and support designs for acceptance - Contractor may use existing inventory and photographs of artifacts as basis for verified information, subject to acceptance by the Metro or its designee.

   4. Verify information on artifacts. Include relationships of individual component parts and identify materials. Include plans, elevations, and special joining methods or details, and anchorage information.

C. Photographs of artifacts in place, showing relationship to surrounding area. On eight inch by 10-inch prints, label photographs stating artifact name, number, inventory number, condition, and other pertinent information.

D. Artifacts log, showing artifact number, name, condition of artifact at removal, and condition of artifact as delivered to storage location. Sign and date log; include mover, and person accepting delivery at warehouse or storage facility. At completion of warehousing operation, furnish log to Metro or its designee.

E. List of completed projects of similar size and nature to this Project, listing name of project, owner and general contractor, if any. List key personnel, performing Work of this Section, giving names and data relating to experience in similar related Work.

F. Contractors Experience - Provide proof of a minimum of ten years of experience in museum quality art handling, packing, and shipping. Shall be a professional art moving company.

1.5 WORKSITE CONDITIONS

A. Conditions of structures and artifacts - After Metro's approval of specified artifacts information and photographs, Metro assumes no further responsibility for actual condition of artifacts to be removed and stored.

B. Partial removal and storage - Items indicated for salvage and storage off Worksite may be removed and transported to storage locations as Work progresses. Erect protection for artifacts to remain in place, as Work progresses.

C. Protection - Provide temporary barricades and other forms of protection as required to protect personnel and general public from injury due to removal of artifacts.

1. Provide shoring, bracing, support, or cage to prevent movement, settlement, or collapse of structures or elements to be removed, and adjacent areas to remain.

2. Protect from damage, existing Work, and structures to remain and become exposed after removal of artifacts.

3. Provide temporary weather protection during interval between demolition and removal of existing artifacts on exterior surfaces, and installation of new construction to insure that no water leakage or other damage occurs to structure or interior areas of existing building.

4. Promptly repair to previous existing condition unnecessary or avoidable damage caused to adjacent facilities and surfaces, caused by artifacts removal, at no additional cost to Metro.

5. Conduct artifacts removal operations and debris removal in a manner to ensure minimum interference with roads, streets, walks, and adjacent occupied or used facilities.

6. Maintain existing utilities indicated to remain in service and protect against damage to utilities during artifacts removal operations.

7. Use temporary enclosures and other suitable methods to limit dust and dirt rising and scattering in air, to the lowest practical level. Comply with governing regulations pertaining to environmental protection.

8. Temporary enclosures: For protection of artifacts to remain in place, provide weatherproof temporary enclosures around those items listed in the attached schedule.

PART 2 - PRODUCTS

2.1. MATERIALS - New, of highest grade, free from defects, and of recent manufacture; conform to following requirements. Where product names and numbers are indicated and are not available, furnish products equal to original specification, as approved by Metro.

A. Packing Paper - Sheets and rolls to wrap around miscellaneous objects.

B. Styrofoam Pellets for packing objects in crate or corrugated craft-paper boxes.

C. Packing Foam - Use with separating plastic sheet between fragile artifacts such as

glass globes or shades and crates.

D. Cardboard Boxes - Cardboard boxes - Two and three ply corrugated craft-paper boxes and divider sheets to be used for fragile artifacts before placing them in wood crates.

E. Polyethylene Bags - Self-closing for packing small objects such as anchor screws, etc.

F. Heavy Gauge Polyethylene Sheet - Six mil, large rolls.

G. Tarpaulin - Sized to cover.

H. Signs/Labels - Non-staining type, impermeable to marker pens and attached to artifact on the unexposed surfaces by means of non-staining water soluble glue: Jade 403 or approved equal.

I. Tags - Similar to labels and attached to artifacts by means of plastic nylons ties.

J. Wax Crayons - For marking on unexposed face of artifacts only.

K. Plastic Rope - Polypropylene, 3/8 inch wide.

L. Tape: 3M #336.

M. Cloth Rope - Cloth bands or straps where hold is required for heavier artifacts.

N. Heavy Cotton or Linen Fabrics: 4,000 series canvas or 9,004 series drills.

O. Polyethylene Foam - Two inch and three inch thick sheets.

P. Lumber - Two inch by four construction grade Douglas Fir, straight, true, and free of cracks and defects.

Q. Plywood - Exterior grade, 3/4 inch thick.

R. Pallets - Adequate size and strength for object to be moved. Only new pallets will be accepted.

PART 3 - EXECUTION

3.1. SPECIAL COORDINATION - Following Metro’s or its designee's review of submitted information and comments, schedule a meeting to include Metro or its designee, Conservator Consultant, Contractor, and subcontractors for artifacts removal and salvage. Establish detailed procedures including provisions for loads, deflection, and safety for major artifacts and individual shorting conditions. Confirm limited removal procedures, dissembling, hoisting, crafting protection and shipping procedures, standards and methods.

A. Logical Sequence - Plan sequence of removal Work so that smaller objects are removed before larger objects in an area.

B. Obtain Metro’s Conservator Consultant's approval for deviations from methods, materials, and procedures previously established, at start of Work.

C. Basic cleanliness and tidiness is required for handling objects to prevent and minimize damage and soiling of artifacts surfaces.

D. Collection Points - Allocate areas and develop several packing stations in building to minimize handling artifacts without appropriate packing to farther distances.

3.2. INSPECTION - Prior to commencement of artifacts removal Work, inspect areas in which Work will be performed. Photograph existing conditions of structure, surfaces, equipment and surrounding properties showing conditions which could later be misconstrued as damage resulting from removal and salvage Work; file with Metro or its designee prior to starting Work. Include date, time, and photographer's name on each print from negative, not typed or stamped on prints.

3.3. LABELS AND TAGS - Provide labels and tags, as required, indicating artifact number, original location of artifacts, as indicated in the schedule.

3.4. INSTALL protective tape, packing paper, or polyethylene sheet as indicated in artifacts schedule.

3.5. DESIGN - Shoring Supports.

3.6. REMOVAL AND PROTECTION

A. Loosen and unfasten bolts, nuts, and mounting hardware. If unfastening is unsuccessful, remove surrounding masonry or plaster to expose anchoring. Remove artifacts as a complete unit, if possible.

B. Saw off anchors embedded in concrete to remove artifacts.

C. Pack paper wrapped artifacts in wooden crates. Use foam pellets for wooden or metal surfaced artifacts. Use packing foam for objects having glass or other fragile surfaces. Pack singly in a crate. Use rigid foam as outer layer for heavier artifacts. Screw lids onto crates using pre-drilled holes, after objects are in place.

D. Pack larger artifacts into plywood boxes. Do not allow plywood surface, box hardware and fasteners to damage surface of artifacts or apply pressure on those surfaces.

E. Protect in-site objects with polyethylene sheets wrapped and taped or with protective foam and plywood box construction as indicated in schedule. Provide plywood boxes - Withstand possible blows from small tools and equipment used during future construction. Use sufficient packing foam or foam boards to withstand such shocks. Locate bolts for plywood boxes on surfaces which allow repairs.

F. Protect marble tile, slate floors, and stone steps with six mil polyurethene, indoor/outdoor carpet and 1/2-inch plywood. Level surfaces by adding carpet where required.

3.7. TRANSPORTATION AND HANDLING

A. Transport and handle artifacts using an experienced rigger qualified in handling and transporting of large artworks and artifacts. Accomplish task required through use of

hoists and moving equipment. Complete Work in manner to cause no damage to artifacts. Prior to transporting, pack, label, and rig artifacts for transportation and handling. For large pieces requiring special shoring and rigging, the rigger shall supervise the packing, shoring, and removal directly, and assume responsibility for packing and transportation.

B. Hoisting - Through use of steel beams, angles or channels (adequately braced and anchored to artifact), steel cables and spreader bars; and lift into place by cranes, forklifts, or jacks of adequate capacity.

C. Provide air suspension ride truck or approved equal so as to minimize vibration and damage. Transport by approved means, properly rigged and packed to avoid damage.

D. Set down crates gently. Move carts and dollies slowly.

3.8 STORAGE

A. Store artifacts indoors. Until artifacts are removed and transported to storage facility and logs and documentation and inspections have been reviewed and accepted by Metro or its designee, maintain following conditions on Worksite or in warehouse.

1. Storage environment - Keep artifacts clean and dry, in an acid free environment with no severe temperature and humidity changes. Maintain temperature at 75°F with a relative humidity of 50 percent to 55 percent.

2. Place artifacts on pallets at least four inches high or on metal shelves. Do not stack artifacts upon each other. Position to allow for inspection, ease of handling, and moving.

3.9. DISPOSAL OF EXCESS MATERIALS - Remove debris, rubbish, and other materials resulting from artifacts removal from building site. Transport and dispose of materials off the Worksite.

A. If hazardous materials are encountered during artifacts removal, comply with applicable regulations, laws, and ordinances concerning removal, handling, and protection against exposure and environmental pollution.

B. Burning of removed materials is not permitted on the Worksite.

3.10. CLEAN-UP AND REPAIR

A. Upon completion of Work, remove tools, equipment, and demolished materials from Worksite.

B. Repair removal Work performed in excess of that required. Return structure and surfaces to remain, to condition existing prior to commencement of Work as indicated. Repair adjacent construction or surfaces soiled or damaged by artifacts removal Work.

PART 4 - MEASUREMENT AND PAYMENT

4.1. MEASUREMENT - The Work of this Section will be measured as a unit, acceptably completed.

4.2. PAYMENT will be made under:

Allowance No. 2 - Artifacts

END OF SECTION