TECHNICAL PROVISIONS

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TECHNICAL PROVISIONS

SECTION SP-11 MOBILIZATION

(SECTION 11)

11-01 DESCRIPTION

Work under this section shall include mobilization; furnishing, maintaining and removing sanitary restroom facilities; and temporary use of a portion of paved public roadways as a construction staging area.

Sanitary restroom facilities shall not be stored on the project site and shall be removed outside of working hours.

Just prior (ten calendar days maximum) to beginning work at the subject site, the Contractor shall jointly with the Engineer photograph and videotape the project site in sufficient detail to show the existing site conditions, including but not limited to the proposed alignment, staging areas, routes of ingress and egress for hauling and delivering, and all other areas that the contractor believes are appropriate. Contractor shall provide copy of video(s) to the City.

The Contractor shall arrange for and develop temporary construction staging areas for the storage and operation of construction equipment and supplies. The staging area shall be located outside of public right-of-way. No staging of equipment or material will be permitted on any public right-of-way. The Contractor must obtain written permission from the property owners to use their property in any fashion and provide copy of permission to City. All contractor, subcontractor, and supplier employees shall park at the temporary construction staging area only.

The Contractor shall submit a plan describing the construction staging area to the Engineer for approval. The Contractor shall not permit any waste or damage to be done to the staging area and shall maintain the area in good condition, free of litter and debris. Upon completion of the work, the area shall be restored to its pre-construction or better condition, including the repair of any damaged pavement, curbs, markings, or other public infrastructure components.

11-02 ENVIRONMENTAL REQUIREMENTS

The Contractor shall comply with all air pollution, water quality, and other environmental control rules, regulations, ordinances and statutes as apply to the project and the executing of the work performed pursuant to the Contract.

Water pollution control shall conform to the provisions of Section 13, "Water Pollution Control" of the Standard Specifications. The Contractor shall implement construction site best management practices for the control of non-storm water and point discharges, erosion and sediment control.

A Water Pollution Control Program (WPCP) shall be required for the project.

The Contractor shall be required to implement temporary construction site best management practices (BMP's) in accordance with the *Construction Site Best Management Practices (BMP's) Manual* issued by the State of California, Department of Transportation. The temporary construction site best management practices required for this Contract shall include, but are not limited to:

1. **Stockpile Management**: Implement BMP's, as appropriate, for soil stabilization and sediment control as applicable to stockpile of various materials.
2. **Mobile Operations**: Implement BMP's, as appropriate, for the control of equipment fueling and maintenance, concrete mixing and wash out, hauling and storage of materials. BMP's shall control the specific situations that mobile operations can create.
3. **Wind Erosion Controls**: Implement BMP's, as appropriate, for all disturbed soils on the project site that are subject to wind erosion when wind and dry conditions exist.
4. **Tracking Controls**: Implement BMP's, as appropriate, for the control of sediments and debris from the collection system.
5. **Non-Storm Water and Waste Management and Materials Pollution Controls**: Implement BMP's, as appropriate, to control the discharge of materials other than storm water to the storm water collection system.

The Contractor shall inspect BMP's regularly. Improperly installed, damaged or ineffective BMP's shall be corrected immediately.

11-03 TEMPORARY STORM DRAIN INLET PROTECTION FIBER ROLLS

Temporary storm drain inlet protection shall be constructed, installed, maintained, and removed at all drainage inlets within the boundaries of the project. The Contractor shall use sediment filter bags to protect the drainage inlet. Throughout the duration of the contract, the Contractor shall maintain and provide protection to meet the changing conditions around the drainage inlet.

Sediment filter bags shall be installed by removing the drainage inlet grate, placing the sediment bag in the opening, and replacing the grate to secure the sediment filter bag in place. Sediment Filter Bags shall be installed at all storm drain inlets within or adjacent to the project limits. Sediment Filter Bags shall be obtained from a commercial manufacturer, as approved by the Engineer.

When the temporary drainage inlet protection is no longer required the protection materials shall be removed and disposed of in accordance with the provisions in Section 14-10, "Solid Waste Disposal and Recycling," of the Standard Specifications.

Temporary drainage inlet protection shall be maintained to provide sediment holding capacity and to reduce runoff velocities. Temporary drainage inlet protection shall be repaired or replaced immediately if damage occurs.

Sediment deposits, trash, and debris shall be removed from temporary drainage inlet protection as needed or when directed by the Engineer. Removed sediment shall be deposited within the project limits so that the sediment is not subject to erosion by wind or by water. Trash and debris shall be removed and disposed of in accordance with the provisions in Section 14-10, "Solid Waste Disposal and Recycling," of the Standard Specifications. All Sediment Filter Bags shall be removed at the conclusion of the project.

Cleanup, repair, removal, disposal, or replacement due to improper installation or as a result of the Contractor's negligence shall not be considered as included in the cost for performing maintenance.

11-04 TEMPORARY FIBER ROLLS

Temporary fiber rolls shall be installed and maintained in accordance with the plans and these technical specifications.

When temporary fiber rolls are no longer required the fiber rolls shall be removed and disposed of in accordance with the provisions in Section 14-10, "Solid Waste Disposal and Recycling," of the Standard Specifications.

Temporary fiber rolls shall be repaired or replaced immediately if damage occurs.

Cleanup, repair, removal, disposal, or replacement due to improper installation or as a result of the Contractor's negligence shall not be considered as included in the cost for performing maintenance.

11-05 MEASUREMENT AND PAYMENT

See Section 9 of the Special Provisions for measurement and payment for Mobilization.

Full compensation for "Temporary Storm Drain Inlet Protection" and "Temporary Fiber Rolls" shall be considered as included in the contract lump sum price paid for Temporary Water Pollution Control and no separate payment will be made therefor.

SECTION SP-12 DUST CONTROL

(SECTION 12)

12-01 DESCRIPTION

Dust control shall conform to the provisions of Section 14-11.04, "Dust Control" of the Standard Specifications.

12-02 MEASUREMENT AND PAYMENT

Full compensation for "Dust Control" shall be considered as included in the price paid for various bid items and no additional compensation shall be allowed therefor.

END OF SECTION

SECTION SP-13 TEMPORARY TRAFFIC CONTROL

(SECTION 13)

13-01 DESCRIPTION (12-1.01)

Traffic control shall conform to the latest edition of "California Manual on Uniform Traffic Control Devices" issued by Caltrans, or State Standard Plan RSP T13, "Traffic Control System for Lane Closure on Two Lane Conventional Highways."

Any deviation in traffic control from the references mentioned above will not be allowed unless advance written approval is granted by the Engineer.

Attention is directed to Sections 7-1.03, "Public Convenience," 7-1.04, "Public Safety," and 12, "Temporary Traffic Control," of the Standard Specifications and to the Section SP-08 entitled "Public Safety." Nothing in these Special Provisions shall be construed as relieving the Contractor from his/her responsibility as provided in said Section 7-1.04.

Minor deviations from the traffic requirements of this section, which do not significantly change the cost of the work, may be permitted upon the written request of the Contractor, if in the opinion of the Engineer public traffic will be better served and work expedited. Such deviations shall not be adopted until the Engineer has indicated his written approval. All other modifications will be made by contract change order.

Contractor shall provide all markers, signs, delineators, barricades, portable flashing beacons, flaggers, etc. necessary to ensure the safe passage of traffic through the work zone.

13-02 LANE CLOSURE RESTRICTION

The Contractor shall maintain a minimum of one (1) lane of traffic open at all times in accordance with the hours of work specified in Section SP-8.02 "Hours of Work." The minimum width of a traffic lane shall be ten (10) feet. Flashing Arrow Boards shall be required for all lane closures. Lane closures are restricted to between the hours of 9:00 a.m. and 3:30 p.m.

13-03 CONSTRUCTION AREA SIGNS (12-3.11)

Construction area signs shall be furnished, installed, maintained, and removed, when no longer required, in accordance with the provisions in Section 12, "Temporary Traffic Control," of the Standard Specifications and these Special Provisions.

The Contractor shall notify the appropriate regional notification center for operations of subsurface installations at least two (2) working days, but not more than fourteen (14) calendar days, prior to commencing any excavation for construction area sign posts.

All excavations required to install construction area signs shall be performed by hand methods without the use of power equipment.

The location for each sign shall be approved in advance by the Engineer. The required size of each of the signs shall be 36" x 36" for W20-1, "Road Work Ahead," and 48" x 48" for G20-2, "End Road Work." Signs may be placed on movable stands, but must be in place before work begins each day. The sign panels for all construction area signs, including temporary signs, shall conform to Section 12-3.11 of the Standard Specifications.

13-04 TRAFFIC CONTROL SYSTEM

If any component in the traffic control system is displaced, or ceases to operate or function as specified, from any cause, during the progress of the work, the Contractor shall immediately repair said component to its original condition or replace said component and shall restore the component to its original location. During the hours of darkness, as defined in Division 1, Section 289, of the Vehicle Code, portable signs to be illuminated shall be, at the option of the Contractor, either: Illuminated signs in conformance with the provisions in Section 12-3.11B(3), "Portable Signs," of the Standard Specifications; or Reflexite vinyl microprism reflective sheeting signs; or 3M

high intensity reflectorized sheeting on aluminum substrate signs or Seibulite Brand Ultralite Grade Series, encapsulated lens retro-reflective sheeting signs; or approved equal.

The Traffic Control System shall be placed, maintained and removed under the direct supervision of a person who is certified by either the Institute of Transportation Engineers (ITE), the American Traffic Safety Services Association (ATSSA), the International Municipal Signal Association (IMSA) or the State of California Department of Transportation (Caltrans) as having successfully completed training in the design and operation of work zone traffic control.

The Contractor shall designate in writing the person who shall have the responsibility for supervising the activities associated with the Traffic Control System. Traffic Control System Plan as per Section 7-08, along with proof of certification, shall be submitted in writing at the Preconstruction meeting to the Engineer for approval. Any changes to plan, shall be provided to the Engineer for his approval, two (2) working days in advance of any planned activity, which requires traffic control. The person designated shall have the authority to stop the work if necessary.

Failure of the designated person to be present at the job site when any part of the Traffic Control is in place shall be considered a failure on the part of Contractor to perform a provision of the contract. The Engineer shall, in accordance with Section 8-1.06, "Suspensions" of the Standard Specification, suspend all work until such time satisfactory arrangements have been made to have a certified person on the job site at all times when the Traffic Control System is in place. The days on which the suspension is in effect shall be considered working days if such days are considered working days within their definition set forth in Section 8-1.05 of the Standard Specifications.

13-05 MEASUREMENT AND PAYMENT

See Section 9 of the Special Provisions.

END OF SECTION

SECTION SP-14 ADJUST UTILITY FRAMES, COVERS AND GRATES

(SECTION 14)

14-01 GENERAL

Frames and covers of existing utility boxes, manholes or other facilities shall be adjusted to grade in accordance with the provisions in Section 71-5.03B "Frames, Covers, Grates, and Manholes" of the Standard Specifications, even for non-drainage facilities. Contractor shall provide notice to utility owner of adjustment to be made.

If existing materials are in good condition, they may be reused subject to the Engineer's approval.

Debris protection shall be provided by installing cover plates or other acceptable methods approved by the Engineer, for keeping debris or foreign material from entering the system.

If any debris or foreign materials enter the system due to the Contractor's operations, the Contractor shall remove all the debris and foreign materials to the satisfaction of the Engineer. If the Contractor fails to do so, the City maintenance staff will clean the system and charge the Contractor for the cost incurred.

14-02 MEASUREMENT AND PAYMENT

See Section 9 of the Special Provisions.

END OF SECTION

SECTION SP-15 CONSTRUCTION STAKING

(SECTION 15)

15-01 DESCRIPTION

The Contractor will be responsible for providing all construction staking that may be required for the project.

15-02 MEASUREMENT AND PAYMENT

See Section 9 of the Special Provisions.

END OF SECTION

SECTION SP-16 EXISTING FACILITIES

(SECTION 16)

16-01 GENERAL

Attention is directed to Sections 5-1.36C, "Non-highway Facilities," and Section 15, "Existing Facilities," of the Standard Specifications.

16-02 OBSTRUCTIONS

The Contractor's attention is directed to the existence of certain underground facilities which may require that special precautions be taken by the Contractor to protect the health, safety and welfare of workmen and of the public. Facilities requiring special precautions include, but are not limited to: conductors of petroleum products, oxygen, chlorine, and toxic or flammable gases; natural gas in pipelines greater than 6 inches in diameter or pipelines operating at pressures greater than 60 psi (gage); underground electric supply system conductors or cables either directly buried or in duct or conduit which do not have concentric neutral conductors or other effectively ground metal shields or sheaths; and underground electrical conductors with potential to ground more than 300 volts. The Contractor shall notify the Engineer at least forty-eight (48) hours prior to performing any work in the vicinity of such facilities.

The Contractor shall call USA at (800) 227-2600 to mark the locations of all underground utilities at least forty-eight (48) hours before the intended start of excavation. The Contractor shall remove all project USA markings, Engineer markings, and Survey markings, prior to project completion.

Any damage to any utility due to the Contractor's operations shall be repaired or replaced by the Contractor to the satisfaction of the Engineer. Contractor shall use extra caution prior to excavating where utility lateral locations are not known, and shall repair property damage caused by damage to any utility.

Affected utility companies include but may not be limited to:

Pacific Gas & Electric Company	(925) 674-6494
AT&T	(925) 867-5551
Comcast	(925) 349-3520
Astound	(925) 459-1000
Contra Costa Water District	(925) 688-8044
City of Concord Sanitary Sewers	(925) 671-3013
City of Concord Storm Drains	(925) 671-3050
City of Concord Traffic Signals	(925) 671-3181

The Contractor is responsible for contacting the City of Concord Transportation Division (671-3093) at least 48 hours prior to either the disconnect of any traffic signal interconnect, or to subsurface work in the vicinity of the traffic signal interconnect system.

16-03 DELAYS

The Contractor shall receive no additional compensation for delays or inconvenience caused by utility relocations and/or adjustments. The delay caused by these relocations and/or adjustments shall not count towards the Contractor’s “working days.”

16-04 SURVEY MONUMENTS

Existing survey monuments shall be preserved, referenced or replaced pursuant to the requirements of State of California Streets and Highways Code Sections 732.5, 1492.5, and 1810.5 and Business and Professions Code Section 8771 and the following:

The Contractor shall not disturb permanent survey monuments or bench marks without consent of the Engineer. The Contractor shall bear the expense of replacing any monument or benchmark that may be disturbed without permission including: surveying performed by a Licensed Land Surveyor, filing Record of Survey documents with the San Mateo Surveyor, and constructing the new monument in accordance with the City of Concord Detail S-19. Replacement shall be done only with the direction of and in the presence of the Engineer.

Should the Contractor during the course of construction encounter a survey monument or bench mark not shown on the plans for the work, they shall promptly notify the Engineer in writing so that the monument or bench mark may be referenced accordingly, properly referenced, preserved, and/or restored.

16-05 REMOVALS

The Contractor shall remove and dispose of existing asphalt concrete, Portland cement concrete curb, gutter, sidewalk, curb ramp, and valley gutter that is to be replaced and any existing asphalt concrete tapers to be removed and disposed of. When curb and gutter and/or roadway pavement are removed, the Contractor shall immediately place portable delineators along the edge of the pavement. Portable delineators shall be 36-inch minimum height, orange with white reflectors. The delineators shall be maintained by the Contractor until new curb and gutter are placed. All materials removed shall be legally disposed of.

Existing concrete to be removed shall be sawcut at the nearest joint or score line. Any existing concrete damaged by reason of the Contractor's operations outside this limit shall be repaired at the Contractor's expense. The repair shall be made by removing and replacing the entire portion between weakened plane joints or score lines. The repair shall be in a manner satisfactory to the Engineer and shall be at the Contractor's expense.

Concrete to be removed shall be marked in the field by the Contractor and accepted by the Engineer prior to removal.

Existing concrete and asphalt concrete taper to be removed varies in thickness. No additional compensation shall be given for varying concrete thickness. Concrete removed shall be disposed of outside the highway right of way in accordance with the provisions in Section 14-10, "Solid Waste Disposal and Recycling" of the Standard Specifications.

Sawcut slurry shall be prevented from entering the storm drain system by covering or barricading storm drains. The Contractor shall vacuum and dispose of the slurry off-site in accordance with Section 14-10, "Solid Waste Disposal and Recycling" of the Standard Specifications.

16-06 RESTORE EXISTING IRRIGATION SYSTEM AND LANDSCAPING

Any irrigation system and/or landscaping damaged during the installation of curb, gutter, sidewalk and curb ramps shall be replaced in kind by the Contractor.

The Contractor's attention is directed to the existence of private irrigation facilities not shown on the Plans. It is anticipated that some of these facilities will be in conflict with the proposed improvements or may be damaged during construction.

The irrigation system in conflict with the new sidewalk and curb ramps shall be repaired and/or relocated to clear the new sidewalk and curb ramp construction. The Contractor shall coordinate replacement/relocation of the irrigation system with the property owners. The Contractor shall remain responsible for irrigating the landscape area until the irrigation system is fully functional.

16-08 MEASUREMENT AND PAYMENT

The Contractor is referred to Section 9 for measurement and payment.

Full compensation for restoring existing irrigation system and landscaping if impacted by the Contractor shall be considered as included in the prices paid for the various items of work and no separate payment will be made therefor.

END OF SECTION

SECTION SP-17 CLEARING AND GRUBBING

(SECTION 17)

17-01 DESCRIPTION

This work shall be done in accordance with Section 17-2, “Clearing and Grubbing,” of the Standard Specifications, these Special Provisions, and as directed by the Engineer.

This work includes, but is not limited to: clearing, grubbing, demolition, removal of all objectionable material such as debris, trees (including stumps and roots), and disposal of material at the end of each working day from within the specified work area as shown on the plans and as specified herein.

Vegetation shall be cleared and grubbed only within the excavation and embankment slope lines. Existing vegetation outside the areas to be cleared and grubbed shall be protected from injury or damage resulting from the Contractor's operations.

Activities controlled by the Contractor, except cleanup or other required work, shall be confined within the graded areas of the roadway.

Nothing herein shall be construed as relieving the Contractor of the Contractor's responsibility for final cleanup of the highway as provided in Section 4-1.13, "Cleanup," of the Standard Specifications.

All tree and stump removal shall be approved by the Engineer. Roots 1/2 inch diameter and larger shall be removed 2 feet below existing ground surface. Fill all stump and root holes and excavations with on-site soil and compact to a minimum of 90% relative compaction.

17-02 PRESERVATION OF PROPERTY

Contractor’s attention is directed to Standard Specifications Section 5-1.36, “Property and Facility Preservation.” Protect existing improvements to remain in place including utilities, vegetation, irrigation, curbs, paving and drainage facilities. Repair, replace, or restore any damaged items as required and directed.

All existing private improvements, such as irrigation, landscaping, etc., that conflict with the new improvements shall be removed and restored to original or better condition in new locations as approved in advance by the Engineer.

17-03 REMOVAL AND DISPOSAL OF MATERIALS

All material removed, unless designated to be salvaged, shall become property of the Contractor and shall be disposed of outside City's right-of-way in accordance with Section 14-10, "Solid Waste Disposal and Recycling" of the Standard Specifications.

17-04 EXISTING TREES

This project includes work on streets with mature trees adjacent to the roadway. In some locations, the tree canopy may extend over the roadway. It is the responsibility of the Contractor to conduct his/her operations near tree canopies such that the work is accomplished without damage to trees. The Contractor may, at his/her option, trim said trees in order to facilitate his/her construction operations. Any trimming that may be required must be approved at least two (2) working days in advance by the Engineer.

Tree trimming shall be approved and supervised by a certified arborist and done in accordance with "Pruning Standards," published by the Western Chapter of the International Society of Arboriculture.

17-05 MEASUREMENT AND PAYMENT

Full compensation for **"Clearing and Grubbing"** shall be considered as included in the contract prices paid for the various bid items and no separate payment will be made therefor.

SECTION SP-18 CONCRETE IMPROVEMENTS

(SECTION 18)

18-01 GENERAL

Existing and new concrete facilities including, but not limited to, curb ramps, curb, gutter, sidewalk, and driveways shall be removed and replaced or constructed at the locations indicated on the plans or as directed by the Engineer.

All new curb ramps and island passageways shall have detectable warning surfaces installed.

COORDINATION

Contractor shall notify the City 48 hours in advance of concrete removal.

If there are tree roots larger than 1" in size present at locations where concrete repairs are specified, Contractor shall obtain approval from a licensed arborist prior to cutting, pruning or removing any tree roots while performing concrete repairs. Contractor shall apply root control barriers as shown in City Standard Details 13F and 11F prior to placing new concrete.

Contractor shall comply with the "Pedestrian Safety and Traffic Control" requirements identified in the "Traffic Control" technical specification section and the City's Guidelines.

SUBMITTALS

The Contractor shall furnish a concrete mix design to the Engineer at least ten (10) working days prior to the start of the work.

Color Matched Concrete: The Contractor shall submit product data and manufacturer's instructions for color additives and shall submit Samples for Color Verification. Color Verification Samples shall be 8 inch by 10 inch samples (or a comparable size approved by the engineer) with specified colors indicating color of additive identification numbers and the required mixing ratio.

18-02 MATERIAL AND EQUIPMENT

Concrete shall conform to the 2023 Caltrans Standard Specifications, Section 73 Concrete Curbs and Sidewalks.

CONCRETE MIX DESIGN

The Contractor shall furnish a concrete mix design to the Engineer at least ten (10) working days prior to the start of the work, based on the following guidelines:

All concrete facilities shall be constructed with Class B, 5 Sack mix which meets the following requirements:

Compressive Strength: 3000 psi @ 28 days (2500 psi min in 48 hrs for commercial driveways)
Maximum Slump: 4 inches
Lamp Black: 1 lb. / cy*,
*Lamp Black is excluded from Colored Matched concrete. Color matched concrete additive shall be in compliance with the approved color sample provided in the submittals.

In addition, Polypropylene fiber reinforcement shall be added at the following rate:

General Concrete Facilities including curb, gutter, sidewalk, access ramps, residential driveways, etc. - 1.5 Ibs/cy (0.01% by volume), 3/4" min. length

The Contractor shall be responsible for all costs associated with the required mix design.
The Contractor shall comply with the “lamp black” color requirements in the City Standards.

ROOT CONTROL BARRIER

Plastic root control barrier shall be 40 mil thick HDPE plastic sheeting eighteen inches (18”) wide.

18-03 EXECUTION

GENERAL

All work shall conform to Section 73, “Concrete curbs and sidewalks”, of the State Standard Specifications. All handicap access ramps shall comply with Title 24 and current UBC requirements, as well as City Standard Details included herein.

Concrete removal work shall conform to the provisions in Section 16-05, "Removals" of the Special Provisions and these Technical Specifications. The existing concrete shall be sawcut full depth prior to removal. Any concrete broken due to the Contractor's failure to comply with these requirements shall be removed and replaced at the Contractor's expense. All concrete removed shall become the property of the Contractor to be disposed of outside the right of way at the end of each work day.

The line and grade of the replaced facilities shall conform to the existing facilities. In most instances, this will consist of a straight line between existing facilities.

Root control barriers shall be installed where roots are present at locations where sidewalk, curb and gutter and curb ramps are being replaced throughout the project. Root control barriers shall be installed per the City Standard Details 13F and 14F.

The Contractor shall flow line water test all repaired curbs and gutters, cross gutters, and other repaired drainage facilities in the presence of the City's Inspector.

Access ramps shall be constructed at intersections such that ramp landing falls within the limits of the striped crosswalk or just past the painted stop bar or limit line.

PROTECTION OF EXISTING FACILITIES

The Contractor shall protect existing facilities from damage, and discoloration from concrete splash. Adjacent concrete facilities shall be covered during concrete placement to prevent concrete splash and excess concrete from staining the adjacent concrete. After initial placement, strikeoff and finishing, the protection shall be removed and the adjacent concrete cleaned.

Vertical existing facilities such as light poles, walls, etc. shall be protected with plastic extending a minimum of three feet above the concrete surface. After initial placement, strikeoff and finishing, the protection shall be removed and the vertical surfaces cleaned.

SUBGRADE

After the subgrade is prepared, moisture conditioned, and compacted to 95% relative compaction at zero to three percent over optimum moisture content, the Contractor shall continuously maintain the sub-grade in a uniform condition at the moisture content obtained during sub-grade compaction until the concrete is placed.

In locations where existing concrete improvements are being replaced, existing base material may be re-compacted and used without over excavation and placement of additional base rock. For new concrete improvements, over excavation and placement of base material in accordance with the City's Standard Details shall be required.

FORMING

Wooden forming shall be of two inch nominal thickness staked at two foot intervals. The maximum gap at the bottom of the forms shall be 1-3/4 inches.

TOLERANCES

The maximum variation from design elevation shall not exceed +/- 0.02 feet. In some instances, particularly in critical drainage areas, tolerances may be reduced to zero. Concrete facilities shall be installed to maintain or provide positive drainage. Questions regarding applicable tolerances shall be directed to the Engineer forty-eight hours in advance of the work.

When shown on the drawings, the concrete shall be set at the design elevations. When existing facilities are to be removed and replaced, they shall conform to the existing elevations and grades. Generally, this will be at a straight line between the start and end points of the removal.

ADJUSTING UTILITY BOXES AND MANHOLES IN SIDEWALK AND RAMPS

Contractor shall refer to "Utility Box Adjustments" Technical Specifications section.
Pull boxes located in ramp construction areas shall be replaced and set to finished grade.

PLACING AND FINISHING

The concrete shall be deposited on a moist grade in such a manner as to require as little re-handling as possible. Workmen shall not be allowed to walk in the freshly mixed concrete with boots or shoes coated with earth or foreign substances.

In general, adding water to the surface of the concrete to assist in finishing operations shall not be permitted.

Before final finishing is completed and before the concrete has taken its initial set, the edges shall be carefully finished with the radius shown on the plans or a radius to match the existing construction.

Concrete shall be thoroughly consolidated against and along the faces of all forms and adjacent concrete. After the forms are removed, excess concrete below the form surface shall be removed to be flush with the form face.

All new concrete shall match existing facilities in texture, color, and appearance. Surfaces shall be broom finished transversely to the line of pedestrian traffic. The Contractor shall clean at his expense all discolored concrete. The concrete may be cleaned by abrasive blast cleaning or other methods approved by the Engineer. Repairs shall be made by removing and replacing the entire unit between scoring lines or joints.

CONCRETE PROTECTION

The Contractor shall always have materials available to protect the surface of the fresh concrete against rain. These materials shall consist of burlap, curing paper, or plastic sheeting. If plastic sheeting is used, it shall not be allowed to contact finished concrete surfaces.

The Contractor shall also protect the concrete against traffic and vandalism. If the concrete is damaged or vandalized, the Contractor shall make the necessary repairs at its own expense. The repair procedure for damaged or vandalized concrete shall be approved in advance by the Engineer.

CURING

Concrete shall be cured by protecting it against loss of moisture, rapid temperature change, and mechanical injury for at least three days after placement. White or clear liquid membrane compound shall be used. After finishing operations have been completed, the entire surface of the newly placed concrete shall be covered by the curing medium. The edges of the concrete exposed by the removal of forms shall be protected immediately to provide these surfaces with continuous curing treatment.

The concrete shall be allowed to cure for seventy-two hours prior to placing adjacent asphalt concrete.

JOINTS

Control joints shall be placed at a maximum spacing of ten feet.

Control joints in all PCC facilities, except sidewalks, shall be formed by tooling a deep joint or by using expansion joint material. If expansion joint material is used, a minimum of two 1/2 inch by eighteen inch dowels shall be used with additional dowels placed every twenty-four inches.

Control joints in sidewalks may be made using a tooled joint which shall extend a minimum of 1/4 of the depth of the concrete and shall not be less than 1-1/2 inches in depth.

In sections of new curb and gutter adjacent to an existing tree, a deep joint shall be placed through the curb and gutter, aligned with the center of the tree trunk.

Expansion joints shall be required at a maximum of forty foot intervals on curbs, curbs and gutters, cross gutters, swales, and sidewalks. Expansion joints shall also be required on all corners of curbs, curbs and gutters, sidewalks, at the outside boundary of access ramps, and other locations with discontinuities or reentrant corners which may cause cracking.

CLEANUP AND BACKFILL

After the concrete is placed, cured, and the forms have been removed, the Contractor shall clean the site of all concrete and forming debris. The aggregate base shall be replaced to match the existing base and compacted to 95% relative compaction. A 12 inch asphalt plug will be used and the width of the plug shall be 2 feet minimum.

After curing has been completed and the forms have been removed from the new curb and gutter or sidewalk, the void between the new concrete and the existing parkway shall be filled with clean native material or imported topsoil and the entire parkway left in a clean and orderly condition.
For concrete removed but not replaced, the resulting void after excavation shall be backfilled with clean native material or topsoil.

DETECTABLE WARNING SURFACE (DWS)

All curb ramps shall have a detectable warning surface installed in conformance with the latest Caltrans Standard Plan (RSP) A88A, and local City requirements. The color of the DWS installed shall be Federal Yellow (FED 33538) and confirmed by the City Engineer.

Where shown on the project plans, each existing ramp shall be removed in their entirety and replaced with a new ramp. A cast in place DWS product shall be installed at each new ramp, in conformance with these Technical Provisions. Locations for this work are identified on the project plans.

WATER VALVE LOCATING ENGRAVINGS

Contractor shall replace all water valve locating engravings located on the top and face of existing concrete curb that is to be removed and replaced. Engravings shall either be set/stamped into the finished concrete surface prior to curing or engraved after the curing process.

The purpose of the engravings is to identify the location and offset of the existing water valves from the face of curb.

An arrow is engraved on the top of curb to point in the direction of the water valve being identified. The offset distance in feet from the face of curb shall be engraved in the face of curb in roman numerals. The engravings (arrows and roman numerals) shall be approximately 3-inches tall and a width of 1-2 inches.

After concrete has cured and engraving is placed, inside the engraving shall be painted blue. The paint shall only be placed within the engraved area and not on the surrounding flush concrete surface.

18.04 MEASUREMENT AND PAYMENT

Included in Section 9 of the Special Provisions.

END OF SECTION

SECTION SP-19 MEDIAN PAVERS

(SECTION 19)

19-01 GENERAL

Existing median pavers and bollard sleeves shall be removed as indicated in the plans. Removed bollard sleeves shall become the property of the contractor and hauled offsite for disposal. Median pavers shall be replaced or constructed at the locations indicated on the plans or as directed by the Engineer.

COORDINATION

Contractor shall notify the City 48 hours in advance of median paver removal.

Contractor shall comply with the "Pedestrian Safety and Traffic Control" requirements identified in the "Traffic Control" technical specification section and the City's Guidelines.

SUBMITTALS

The Contractor shall submit:

Product Data:
Manufacturer's data sheets on each product to be used, including:
1. Storage and handling requirements and recommendations
2. Installation Methods
3. Cleaning and maintenance instructions provided by the cleaning agent manufacturer.

Shop Drawings:
Indicate perimeter conditions, conforming and joining with existing pavers, paver layout, patterns, color arrangement, installation and setting details.
Indicate layout, pattern, and relationship of reconstructed pavers to existing pavers.

REFERENCES

American Society of Testing and Materials (ASTM):

1. ASTM C 33 – Standard Specification for Concrete Aggregates.
2. ASTM C 136 – Method for Sieve Analysis for Fine and Course Aggregates.
3. ASTM C 140 C 33 – Specification for Concrete Aggregates.
4. ASTM C 136 – Method for Sieve Analysis for Fine and Coarse Aggregate.
5. ASTM C 140 – Sampling and Testing Concrete Masonry Units.
6. ASTM 144 – Standard Specification for Aggregate for Masonry Mortar.
7. ASTM C 936, Specification for Solid Interlocking Concrete Paving Units.
8. ASTM C 979, Specification for Pigments for Integrally Colored Concrete.
9. ASTM D 698 – Test Methods for Moisture Density Relations of Soil and Soil Aggregate Mixtures Using a 5.5-lb (2.49 kg) Rammer and 12 in. (305 mm) drop.
10. ASTM C 1319 – Standard Specification for Concrete Grid Paving Units.
11. ASTM D 1557 – Test Methods for Moisture Density Relations of Soil and Soil Aggregate Mixtures Using a 10-lb (4.54 kg) Rammer and 18 in. (457 mm) drop.
12. ASTM D 2940 – Graded Aggregate Material for Bases or Subbases for Highways or Airports.
13. ASTM D 5269 – Standard Specification for Topsoil Used for Landscaping Purposes.

19-02 MATERIAL AND EQUIPMENT

CONCRETE PAVERS

Concrete Pavers shall be solid interlocking paving units complying with ASTM C 936 and made from normal-weight aggregates.

1. Compressive Strength: 8000 psi (55 MPa) average with minimum 7,200 psi (50 MPa).
2. Absorption: 5 percent average, with maximum of 7 percent.
3. Pigment in accordance with ASTM C 979.
4. Manufacture materials in individual layers on production pallets.
5. Manufacture materials to produce solid homogeneous matrix in produced unit.

Units shall be sound and free of defects that would interfere with proper placement of unit or impair strength or performance of construction.

Minor cracks incidental to usual methods of manufacture, or chipping resulting from customary shipment and delivery shall not be deemed grounds for rejection.

BEDDING SAND

Grading of sand samples for the bedding course and joints shall be done in accordance with ASTM C 136. Bedding Sand shall conform to the requirements in ASTM C 33.

JOINT SAND

Joint Sand shall conform to grading requirements of ASTM C 144.

19-03 EXECUTION

GENERAL

1. Spread sand evenly over the base course and screed to a nominal 1 in. (25 mm) thickness, not exceeding 1-1/2 in. (40 mm) thickness.
2. Screeded sand should not be disturbed. Place sufficient sand to stay ahead of laid pavers. Do not use the bedding sand to fill depressions in the base surface.
3. Ensure that pavers are free of foreign materials before installation.
4. Lay pavers in pattern(s) as shown on Drawings. Maintain straight pattern lines.
5. Joints between pavers on average shall be between 1/16 inch and 3/16 inch (2 mm to 5 mm) wide. Consult manufacturer for recommended joint widths.
6. Fill gaps at the edges of the paved area with cut pavers or edge units.
7. Cut pavers to be placed along the edge with a double blade paver splitter or masonry saw.
8. Use a low amplitude, high frequency plate vibrator to vibrate the pavers into the sand.
9. Use Table 3.01 below to select size of compaction equipment:

Table 3.01

Paver Thickness	Minimum Centrifugal Compaction Force
60 mm	3000 lbs. (13 kN)
80 mm	5000 lbs. (22 kN)

10. Vibrate the pavers, sweeping dry joint sand into the joints and vibrating until they are full. This will require at least two or three passes with the vibrator. Do not vibrate within 3 ft. (1 m) of the unrestrained

edges of the paving units.

11. All work to within 3 ft. (1 m) of the laying face must be left fully compacted with sand-filled joints at the completion of each day. I. Sweep off excess sand when the job is complete.
12. Final surface elevations shall not deviate more than 3/8 inch (10 mm) under a 10 ft. (3 m) long straightedge.
13. Surface elevation of pavers shall be 1/8 inch to 1/4 inch (3 to 6 mm) above adjacent drainage inlets, concrete collars, or channels.
14. Contracts shall reapply sand as necessary to paver joints for a period of 90 days after completion of work.
15. After removal of excess sand, check final elevations for conformance to Drawings.

19-04 MEASUREMENT AND PAYMENT

Included in Section 9 of the Special Provisions.

END OF SECTION

SECTION SP-20 SLURRY SEAL

(SECTION 20)

20-01 GENERAL

Slurry seal shall conform to section 37-3.02 of the Caltrans Standard Specifications.

The slurry seal aggregate shall be Type II.

Asphaltic emulsion used for slurry seal shall be Grade PMCQS-1h cationic.

20-02 MEASUREMENT AND PAYMENT

Included in Section 9 of the Special Provisions.

END OF SECTION

SECTION SP-21 ASPHALT CONCRETE

(SECTION 21)

21-01 GENERAL

Asphalt concrete shall be Type A HMA and conform to section 39-2 of the Caltrans Standard Specifications.

The HMA aggregate gradation shall be ¾ inch.

The grade of asphalt binder shall be Grade PG64-10.

Grinding asphalt concrete pavement shall conform to section 39-3.04 of the Caltrans Standard Specifications.

21-02 MEASUREMENT AND PAYMENT

Included in Section 9 of the Special Provisions.

END OF SECTION

SECTION SP-22 FENCES

(SECTION 22)

22-01 RELOCATE FENCES

Fences shall be relocated as shown on the plans and in accordance with these technical specifications.

Relocated fences shall be placed on new foundations to match existing.

22-02 MEASUREMENT AND PAYMENT

Included in Section 9 of the Special Provisions.

SECTION SP-33 SIGNALS, LIGHTING AND ELECTRICAL WORK

(SECTION 33)

33-01 DESCRIPTION (86-1.01) (87-1.01)

The work described in this section shall be done in accordance with Section 86 and Section 87 of the 2023 edition of the State Standard Specifications, the 2023 edition of the State Standard Plans, the City Standard Plans and Specifications, Construction Plans, the subsequent revisions to said specifications and plans, and these Special provisions unless otherwise specified.

In case of conflict between any of the contract documents, the document, which takes precedence over and shall be used in lieu of such conflicting portions, shall be as specified in Section 5-1.02 of the State of California Standard Specifications.

If a discrepancy exists,

The governing ranking of Contract parts in descending is:

1. Special provisions
2. Project Plans
3. Revised standard specifications
4. Standard specifications
5. Revised standard plans
6. Standard plans
7. Supplemental project information

33-02 COST BREAKDOWN

The Contractor shall furnish to the Engineer a cost break-down in accordance with these special provisions.

Determine quantities required to complete work. Submit the quantities as part of the schedule of values. Provide a schedule of values for each lump sum bid item. Do not include costs for traffic control system in the schedule of values. The cost break-down shall be submitted to the Engineer for approval within 15 days after the contract has been approved. The sum of the amounts for the units of work listed in the cost break-down for electrical work shall be equal to the contract lump sum price bid for the work. The approved cost break-down may be used to determine partial payments during the progress of the work and as the basis of calculation adjustment in compensation for the term or items of electrical work due to changes ordered by the Project Engineer.

The cost break-down for the contract lump sum items shall, as a minimum, include the following items:

- Foundations – each type
- Standards and poles – list by each type
- Conduit – list by each size and installation method. The agreed upon price shall include trench and pavement restoration, replacement of existing traffic loops and restoration of any curb, gutter and/or sidewalk damaged due to conduit installation.
- Pull boxes – each type
- Conductors and cable – each size and type

- Vehicle signal heads and hardware – each type
- LED signal indications –each type
- Pedestrian signal heads and housings – each type
- Accessible Pedestrian Signal System (APS)
- Luminaires and photoelectric unit
- Emergency Vehicle Preemption equipment – each component
- Cabinet and controller installation (including foundation)
- Service cabinet equipment and enclosures (including foundation)
- Battery Backup System (BBS) including batteries
- Loop detectors
- Luminaires and lighting fixtures
- Pan Tilt Zoom (PTZ) camera including cables and all fixtures
- Video Detection Camera including cables and all fixtures

33-03 EQUIPMENT LIST AND DRAWINGS (86-1.01C(1))

All product submittals shall be provided to the City, 15 calendar days prior to equipment and material orders.

The Contractor shall submit to the City, for approval, all applicable submittals including, but not limited to, name of manufacturer, manufacturer's catalog cut sheets, schematic wiring diagrams, material descriptions, and any other material relevant to the components included in these Special Provisions. These submittals shall be approved by the Engineer, prior to any equipment deliveries to the City. Any equipment that is delivered to the City and rejected by the City shall be removed and replaced at the Contractor's expense.

The Project Manager shall supply two (2) sets of 11"x17" copies of the as-built signal plans to City staff after completion of the project.

Submit a schedule of values within five (5) days of Contract approval.

33-04 MAINTAINING EXISTING ELECTRICAL SYSTEMS (87-21.03B)

Maintaining existing electrical systems shall conform to the provisions of Section 87-21.03B, "Maintaining Existing Electrical Systems," of the State Specifications. Existing traffic signal systems shall be kept in effective operation for the benefit of the traveling public during the progress of the work, except when shut down is permitted. The traffic signal shutdowns shall be limited to Monday through Thursday only to the hours of 9:00 a.m. to 3:30 p.m. Monday through Thursday only, and shall be permitted only during the switch over from existing to new controller operation, unless prior approval is obtained from the Engineer. For critical intersections traffic signal cabinet replacements and signal switch overs shall be done during night time and/or weekends. Traffic signal shut downs shall be done with direction from the City Traffic Signal Technician or City Inspector.

Temporary standards with signal equipment may be required during modification of existing signal systems. The Contractor shall provide temporary equipment if the Engineer deem necessary. The Contractor shall provide a temporary traffic control plan that includes "stop ahead" and "stop" signs clearly visible to the motoring public and approved by the Traffic Engineer. Stop signs on barricades are not allowed. The cost of the temporary system shall be included in the lump sum price paid for traffic control and no additional compensation shall be allowed.

The Contractor shall notify the Engineer 72 hours prior to any operational shutdown of existing signal system.

Any existing equipment or devices damaged during an ongoing construction projects (examples: installation of a new traffic signal, modification of an existing traffic signal, ADA accessibility projects, street repaving projects, etc.), the contractor shall replace damaged equipment or devices with new ones at no cost to the City. Those

equipment shall include but not limited to signal cabinet, controller, PPB's, Accessible Pedestrian Signal (APS), loops, wiring, SIC, BBS, APS, signs, etc.

If an ongoing project require temporary changes in striping to facilitate the work, the contractor shall be responsible for implementing the temporary striping including restoration to original striping at no cost to the City.

The contractor shall be responsible for cleaning up and restoring the rock sump on any pull boxes (existing or new) that has been adjusted or replaced as part of the project. The contractor shall take extra care to insure that no debris enter any conduit during construction.

Full compensation for performing the work in these specifications shall be included in the prices paid for the various contract items of work and no additional compensation will be allowed therefor.

33-05 SCHEDULING OF WORK (87-1.03)

Notify the Department of Transportation, Electrical and Signal Maintenance Superintendent at (415) 330-6500, 3 days before performing work on any existing system in Caltrans ROW.

The shutdown of traffic signal systems is allowed only at nighttime on a weekend between the hours of 11pm and 6am Saturday or Sunday at Caltrans intersections.

The initial installation and turn-on of new equipment shall be made on a Tuesday, Wednesday, or Thursday, if not a holiday. The turn-on shall be the first order of work for that day and all facets of the traffic signal installation shall be functional.

Present at the time of the turn-on shall be a representative from the Electrical Contractor, Controller/cabinet Manufacturer (when applicable), networking switch manufacturer (when applicable), Video Detection Camera (when applicable), Pan Tilt Zoom Camera (when applicable), Public Works - Maintenance Services Staff, and Community Development Department (Engineering and Transportation Division) Staff. The contractor shall assume the responsibility of contacting and coordinating all the stake holders as mentioned above.

In the event that the Contractor is unable to respond to a problem that develops during the functional test, or for any reason is unable to correct the problem in a timely fashion, as determined by City staff, the City staff may have its own maintenance personnel work on the problem. Any such work performed by the City shall not invalidate the guarantee provided for in these Specifications, and shall be at the Contractor's expense.

All vehicular and pedestrian signal indications including APS systems shall remain covered with burlap or approved equal during installation of new traffic signals. Those covers shall only be taken off on the day of turn on. If the turn on is not successful, all indications described above shall be covered again with burlap or approved equal and remain covered till the successful turn on of the new traffic signal.

All existing stop signs on minor and major streets (if applicable) shall be removed only on the day of a successful turn on of the new signal.

First intersections for the work to be completed are along Clayton Rd between Ellis Street and Washington Boulevard, Monument Boulevard between Carey Drive and Reganti Drive, and Treat Boulevard between Winton Drive and Bel Air Drive.

33-06 FOUNDATIONS (87-1.03E(3))

Schedule 40 PVC (as shown on the plans) with bell bushings shall be used in all cabinet and pole foundations except for traffic signals in Caltrans right of way. A 5/8 inch, 10-foot ground rod shall be installed in the controller cabinet foundation including service cabinet foundation.

The cabinet foundation shall have a 36"x 20"x6" recessed area for all conductors. Edges/corners of the foundation shall use chamfer strip. Forms exposed portions of the foundation to present a neat appearance and shall be true to line and grade.

The top of the foundation posts and standards, shall be finished to curb or sidewalk grade except special foundations or as directed by the Engineer. Forms shall be rigid and securely braced in place. Conduit ends and anchor bolts shall be placed in proper position and to proper height. Anchor bolts shall be installed a maximum of

1:40 from vertical and shall be held in place by rigid top and bottom templates. The bottom template shall be made of steel and shall be at least ½ inch thick. The bottom template shall provide proper spacing and alignment of anchor bolts near the embedded bottom end and shall be installed before placing footing concrete.

The mortar shall be no thicker than thickness of the highest leveling nut/nuts leveling plus or minus ½". The highest leveling nut shall be set to grade.

The controller cabinet pad and service enclosure shall have a concrete walkway to access it from the existing sidewalk.

33-07 STANDARDS, POLES, PEDESTALS, AND POSTS (86-1.02J)

The factory pole identification number shall be stamped on the top of the base plate with minimum ½ inch Characters in lieu of the riveted stamped identification number on the shaft above the hand hole as described on the State Standard Plan ES-7M.

Traffic signal poles shall be set back from face of curb no less than 30 inches to face of standard or pole, and the base plate installed parallel to the flow (direction) of traffic unless otherwise specified by the Engineer. All poles shall be leveled using a level on the pole shaft and adjust for the pole taper. All signal poles and signal standards shall be galvanized unless otherwise specified.

Within the downtown periphery, all signal poles and signal standards shall be powder coated (Minimum two coats) "TIGER Drylac Powder Coatings" Super durable 038/80020, Jet Black, SAT/SM, 35min338F/170C-15min392F/200C, B.:773276598 (www.tiger-coatings.com, www.tiger-coatings.us, 1-800-243-8148) or Valmont, Color: Jet Black RAL 9005, Valmont Specification: F540DO (1-800-825-6668).

Outside of downtown area, all signal poles and signal standards shall be galvanized. All holes drilled for wire entry (i.e. pedestrian and vehicle terminal compartments, and APS/pedestrian push button) shall be filed to remove all sharp edges. Any incorrectly drilled or otherwise damaged poles must be repaired by a certified welder to the manufacturer's specifications at the expense of the contractor. Signal mast arms shall not have a negative angle. If so, the contractor shall contact the Manufacturer and correct the negative angle issue. Signal standard shall be Type 1-A or as shown on the project plans.

33-08 CONDUIT INSTALLATION (87-1.03B)

Conduit Installation shall be per section 87-1.03B Conduit Installation of the State Specifications except as modified herein.

Where 6 or more 3-inch conduit enter a no. 6 pull box, the conduit must enter at an angle not greater than 45 degrees from the horizontal.

Use Type 3 conduit for underground installation.

Use Type 3, Schedule 80 conduit in a foundation; and between a foundation and the nearest pull box.

If the delay to vehicles will be less than 5 minutes

Conduit shall be installed by directional drilling or jacking and boring methods unless otherwise noted. The work shall include trench backfill and restoration per details on the plans. Furthermore, regardless of which method is chosen, the Contractor shall pothole as needed to locate existing utilities. The Contractor shall assume all risk associated with chosen method of installation, and shall fully locate and verify utilities prior to conduit installation. No additional compensation shall be allowed due to delays or changes in installation method.

Conduit runs shall have no more than 180° of bends, unless authorized by the Engineer, and shall enter the pull box vertically at 90°. When trenching is allowed for conduit installation, the top of the installed conduit shall be a minimum of 24 inches below finished grade in the street section. Where the asphalt concrete (AC) portion of the roadway cross section is greater than 24 inches in depth, the finished height of the conduit shall be two (2) inches below the AC section. When using a rock wheel for the trench in unpaved areas, the trench shall be back filled with two inches of commercial grade sand with the remainder being 2% red oxide concrete, 5 sack concrete.

Conduit installed in non-paved areas shall be covered with conductive plastic underground warning tape six inches above the conduit.

Schedule 40 Polyvinyl Chloride (PVC). If installed by directional boring Schedule 80 High Density Polyethylene (HDPE) shall be used throughout the project as shown on the plans. All conduits shall be three inches (3") minimum or otherwise as shown on the plans or specified in these standard specifications. The contractor at his sole expense may use larger conduit subject to approval by the Engineer. Where larger conduit is used, it shall be for the entire length of the run. No reducing couplings shall be permitted underground. All conduits shall enter through the bottom of the box.

The ends of conduits in pull boxes shall have Bell Bushings and be a minimum of two inches and a max of four inches from the bottom of the pull box.

Splicing of the cable shall not be allowed in any of the home run pull boxes. The contractor shall install

33-09 PULL BOXES (86-1.02C)

Unless otherwise noted on the plan, all pull boxes shall be tier 22 of the Quazite "PG" style construction, or approved equal, and shall be gray in color except otherwise specified. Pull box lids shall be tier 8 have a non-skid surface. At locations other than adjacent to the controller cabinet, number 6 (17" x 30") pull boxes shall be used throughout the project unless otherwise specified on the plans.

Pull boxes shall be set square to face of the curb and shall be leveled with the existing grade.

33-10 COVER MARKING (86-1.02C(1))

Marking shall be clearly defined, uniform in depth, and parallel to either the long or short sides of the cover. All pull boxes containing street lighting, interconnect, or service exclusively, shall be supplied with pull box lids that accurately reflect their contents. All pull box lids shall be tier 8 and shall have the words "Traffic Signal," "Street Lighting," "Interconnect," or "Service" on the lid, and shall not be of the bolt-down type. Lids shall be protected or reversed during the course of construction. All lids damaged or scuffed from construction shall be immediately rejected and shall be replaced by the Contractor at no expense cost to the City.

33-11 INSTALLATION OF PULL BOXES (87-1.03C)

Install a pull box on a bed of crushed rock.

On all runs, the spacing of pull boxes shall not exceed 200 feet measured along the conduit or as shown on the plans. If required, the contractor shall install additional pull boxes to facilitate the work. On those runs exclusively for copper "interconnect," the spacing of pulling points or pull boxes shall not exceed 300 feet, unless otherwise directed by the Engineer. No drain hole or grout shall be placed in the sump area.

A minimum of six inches of ¾ inch drain rock shall be placed under each pull box. All pull boxes shall be inspected and approved prior to pulling any conductors.

33-13 CONDUCTORS AND CABLE INSTALLATION (87-1.03F)

Conductors shall be permanently identified as to function. Identification shall be placed on each conductor, or each group of conductors comprising a signal phase and location in each pull box and near the end of terminated conductors, Identification labels shall be embossed and shall be direct labeling method. Labels shall be fastened to the conductors in such manner that they will not move along the conductors. Labeling shall be performed by mechanical methods. Labeling are required for loops, signal conductors, SIC and any other conductors within cabinet and pull boxes. Only poly-based lubricants shall be used. Conductors shall not be pulled into conduits until the pull boxes have been set to grade and ¾ inch aggregate installed. Conductors shall not be pulled into conduits unless a representative from City's Traffic Signal Section is present to observe the operation. The end of all unused conductors and cables shall be sealed.

All conductors and cables shall be pulled through the conduits with the same wire pull. Slipping of conductors shall not be allowed. Only mule tape shall be used to pull conductors. Each conduit shall be left with a mule tape. Separate pull boxes shall be installed to accommodate splicing of loop wires including termination or as shown on the plans.

The warning tape must have a printed message that reads: *CAUTION: CITY OF CONCORD FACILITIES BELOW CALL* 1 - (925) 671-3361.

All conductors must be copper.

An equipment grounding conductor must be bare.

AWG #10, AWG #12 and AWG #14 conductors shall be solid with 45 mils thickness. AWG #8 conductor shall have seven (7) strand with 45 mils thickness and AWG #2 conductors shall be stranded with 60 mils thickness.

The signal conductors shall be organized in a bundle to allow for easy identification for Wires and cables.

The signal conductors in the cabinet shall be bundled and labeled by phase that reflect the pole location. Per construction plans. Signal conductors wire ties shall be a minimum of 12" from the termination at the load Bay. All conductors require bundling inside the cabinet shall be bundled and terminated neatly.

33-14 CONDUCTOR AND CABLES SPLICES (87-1.03H)

Use Method B to insulate a splice.

Conductors shall not be spliced in the home run pull box/boxes adjacent to the controller, but shall be continued to terminals in the cabinet. All conductors, including neutrals, shall be spliced by methods shown on State Standard Plan ES-13A. Splices shall be soldered using 60-40 rosin core solder only. Splices shall be insulated by Method "B" as described on State Standard Plan ES-13A. Separate neutrals shall be used from terminal block to pull boxes for all vehicle, pedestrian and push button assemblies. Separate neutrals shall be used for all mast arm signal heads. No jumpers shall be allowed. All splices and terminals shall be soldered.

33-15 BONDING OR GROUNDING (87-1.03J)

The grounding jumper at each pole shall run continuous to the adjacent pull box attached to the bond wire using Copper C-Tap, or equivalent, compression connector and shall be soldered with 60-40 rosin core solder. All grounding wire shall be No. 8 AWG 7 strand bare copper wire.

33-24 SIGNAL HEADS (87-1.03R)

Until ready for use, signal faces shall be securely covered so that no signal indications are visible. A flash hole no larger than one inch in diameter may be placed in front of each lens. Traffic signal heads shall be of polycarbonate construction with matte black. Pedestrian signal housing shall be of aluminum construction with matte black. Mounting hardware shall be as per State Standard Plan (ES-4A), unless otherwise indicated on the Project Plans.

Terminal compartments, Mast Arm Side (MAS) mount, curved washers, and slip fitters shall be bronze. Traffic signal frameworks, heads, framework, pedestrian housings, clamshell, and pedestrian button housing shall be factory powder coated matte black per these special provisions and all shall be furnished and installed by the contractor. "Knock Out" type seals are not acceptable for sealing unused pipe thread connections to terminal compartments, or top/bottom of signal heads. Connections shall be sealed with threaded fittings with a rubber gasket, or by the use of an "ornamental cap" designed for such purpose.

The Contractor shall exercise care at the time the signal heads are installed to insure that the gaskets provided for the mounting of the heads are installed on the outside of the housing to provide a watertight seal. Gaskets shall not be placed on the inside of the housing. All back plates shall be louvered with 5-inch border and shall be aluminum, unless otherwise indicated on the Project Plans. All back plates shall be powder coated black or matte black with a yellow retroreflective border per Caltrans revised standard specifications and be able to universally fit the existing signal heads the City has installed. Signal visors shall be aluminum (12" diameter X 12" depth), shall be tunnel type and shall be powder coated black or matte black.

Signal heads and frame work, as a unit, shall be installed by the Contractor at the job site. Extreme care shall be taken by the Contractor's workers during the installation of the signals, frame works, and heads. Any scarred marks or cosmetic damage to the equipment caused from tools or installation processes shall be cause for rejection and shall be replaced at the expense of the Contractor.

Yellow retroreflective border backplates shall be Pelco, or approved equivalent.

33-25 LED SIGNAL MODULES (86-1.02R(4)(B))

The purpose of this specification is to provide the minimum performance requirements for 12 inch circular (ball and arrow), "walking person", "upraised hand" icons and 16X18 inch countdown pedestrian signal modules. This specification refers to definitions and practices described in "Vehicle Traffic Control Signal Heads (VTCSH): Light Emitting Diode (LED) Circular Signal Supplement", "Vehicle Traffic Control Signal Heads: Light Emitting Diode (LED) Vehicle Arrow Traffic Signal Supplement" and "Pedestrian Traffic Control Signal Indicators" (PTCSI): Light Emitting Diode (LED) Signal Modules, as published by The Institute of Transportation Engineers. They may be purchased online from www.ite.org. The contractor shall furnish and install all LED modules as shown on the plans.

General:

- Referenced vehicle type LED modules shall fit in all standard, incandescent vehicle traffic signal housings.
- Circular ball LED signal modules shall contain no more than 18 LEDs.
- The modules may be used for the replacement of the reflector, socket, gasket, and lens assembly of existing warranty expired LED vehicle signal indication or may be used for new installations.
- Each module shall consist of smooth lens with the same appearance and color as incandescent lenses.
- Each module shall consist of LED circuit board inclusive of all the LEDs and required circuit components.
- Each module shall have a rigid housing for protection in shipping, handling and installation.
- Each module shall have a one-piece neoprene gasket.
- The power supply shall be integral to the LED module and shall be one piece.
- 36 inch 16-18 AWG wire shall have leads with quick connect insulated terminals and also be provided with quick connect to fork terminal adapters.
- Lens type for green, yellow and red vehicular indications (ball and arrow) shall be tinted. LED modules covered by this specification include the following types and all modules shall be “Dialight Hi-Flux LED” type or approved equal.
- 12 inch Circular Red
- 12 inch Circular Yellow
- 12 inch Circular Green
- 12 inch Circular Red Arrow
- 12 inch Circular Yellow Arrow
- 12 inch Circular Green Arrow
- 16”X18” Countdown Pedestrian Modules

Contractor shall provide exact catalog number for each module provided.

Identification and Labeling:

Each individual LED signal module shall be identified for Warranty purposes and clearly marked with:

- Manufacturer's name
- Date of manufacture
- Nominal operating voltage
- Unit serial number
- Operating voltage

- Power consumption in Watts. No indication may exceed 20 watts
- Manufactured in Conformance with the ITE LED Circular Signal Supplement, June 27, 2005
- Manufactured in Conformance with the ITE LED Vehicle Arrow Traffic Signal Supplement, July 1, 2007
- Manufactured in Conformance with the ITE LED Pedestrian Traffic Signal Modules, August 4, 2010 Certification and Testing Standards:
- All 12 inch circular LED Signal Indications shall fully and completely comply with all sections of ITE VTCSH LED Circular Supplement specifications dated June 27, 2005.
- All 12 inch Arrow LED Signal Indications shall fully and completely comply with all sections of ITE VTCSH LED Vehicle NTOW Traffic Signal Supplement dated July 1, 2007.
- All 16 inchX18 inch Countdown Pedestrian Signal Modules shall fully and completely comply with all sections of ITE PTSCI LED Pedestrian Traffic Signal Module Specifications dated August 4, 2010. Modules shall be fully compliant with CAMUTCD 2014 Section 4E.07 and be fully preemption compatible. The modules shall include a 6" visor. The modules shall countdown the flashing "Don't Walk" prior to clearance interval and shall fit into existing 16" traffic signal housing built to PTSCI standards without modification to the housing. They shall require no special wiring or electronic modules to operate.
- All indications shall be tested to be in full compliance to all sections of the ITE VTCSH & PTSCI standards without exceptions and reports for each module shall be provided by the third party tester. Test report must list the LED manufacturer's model number and the model number must match the bid model number.

Optical Visibility:

All LED Arrow modules shall be OMNI-DIRECTIONAL. That is, an LED traffic signal module that provides the same luminous intensity signal to the driver regardless of the orientation of the arrow icon or placement of the circular indication.

Warranty:

- ALL LED traffic signal modules supplied shall be warranted for five (5) years against manufacturing defects.
- Failures due to acts of God, abuse, and accidents are excluded from warranty coverage.
- Vendors expressly warrant that all modules furnished shall be new, and shall be free from defects in material or workmanship.
- Vendor shall replace or correct defects if any modules not conforming to the foregoing warranty promptly, without expense to the City, when notified of such non-conformity by the City.
- In the event of failure of Vendor to correct defects in or replace non-conforming modules promptly, City, after reasonable notice to the Vendor, may take such corrections or replace such modules and charge Vendor for the cost incurred by the City in doing so.
- For each defective module returned, one new module shall be returned to the City. Vendor shall pay shipping for both ways for modules found to be defective and under warranty.
- Warranty shall commence from date of receipt of the modules by the City.

33-26 PROGRAMMED VISIBILITY SIGNAL SECTIONS (86-1.02R(4)(A)(II))

Programmed visibility signal face and its installation shall comply with sections 86-1.02R(4)(a)(ii), and the following requirements:

- Power to signal heads shall be automatically removed when rear door is opened.
- Have a nominal 12 inch diameter circular or arrow indication.
- Comply with ITE publication ST-017B for color and arrow configuration.

- Shall have a cap visor.
- Shall be mountable with ordinary tools and capable of servicing without tools.
- Shall have an adjustable connection that provides incremental tilting from 0 to 10 degrees above or below the horizontal while maintaining a common vertical axis through couplers and mountings.
- Visibility of each programmed visibility signal face shall be capable of adjustment or programming, within the face. When programmed, each signal face's indication must be visible only in those areas or lenses to be controlled except that during dusk and darkness a faint glow to each side is allowed.
- A signal technician qualified to program the programmed visibility signal heads shall be present when signal heads are placed in operation.
- Programmed visibility signal heads shall be programmed as recommended by the manufacturer.

33-31 ACCESSIBLE PEDESTRIAN SIGNALS (86-1.02T) (87-1.03T)

A manufacturer's representative must program the accessible pedestrian signals at all the signalized intersections shown on the plans.

The housing for a push button assembly must be made of UV-stabilized, self-extinguishing structural plastic.

When the extended pushbutton press is used, program the signals with messages for each street as follows:

1. During the pedestrian clearance interval, the message heard must be *Wait to Cross* <Street Name> *Wait*.

Pedestrian signals and pedestrian detectors (push buttons) shall conform to the accessible pedestrian signal (APS) requirements of these Technical Specifications and shall be installed as shown on the plans. All APS and push buttons shall be furnished and installed by the Contractor. For all new signal project, signal modification project, curb ramp enhancement project, and any project involving replacement of existing pedestrian push button shall use APS system only. All APS and push buttons shall be Polara Navigator brand or approved equal.

System Description:

The Audible-Tactile Pedestrian Signal System shall consist of all electronic control equipment, mounting hardware, push buttons and signs, which are designed to provide both a push button with a raised vibrating tactile arrow on the button, along with a variety of audible sounds for different pedestrian signal functions.

Substantiating documentation for meeting ISO, NEMA, IEC, and FCC requirements must be supplied from an outside Testing Services Laboratory.

General Description:

- (PBS), as described be The System shall consist of a Central Control Unit (CCU) and Pedestrian Push Button Stations low, and an iOS device w/ the iOS client application or Windows PC with BLE dongle and Windows client application, for programming the system settings.
- The System shall be manufactured by an ISO 9001:2008 (minimum) registered company.
- The System shall meet the requirements of Made in America and/or The Buy American Act.

Design Compliance:

- The System shall meet the functionality requirements of MUTCD 2009 – 4E and CAMUTCD 2014 – 4E.
- The System shall meet NEMA TS 2 Section 2.1 Temperature & Humidity requirements, or TS4 equivalent.
- The System shall meet NEMA TS 2 Section 2.1 Transient Voltage Protection requirements, or TS4 equivalent.
- The System shall meet NEMA TS 2 Section 2.1 Mechanical Shock and Vibration requirements, or TS4 equivalent.
- The System shall meet IEC 61000-4-4, IEC 61000-4-5 Transient Suppression requirements.

- The System shall meet FCC Title 47, Part 15, Class A Electronic Noise requirements.
- The Push Button Station (PBS) Enclosure shall meet NEMA 250 – Type 4X requirements.
- The Central Control Unit (CCU) Enclosure shall meet NEMA 250 – Type 1 requirements.

Functional Requirements:

- The System shall support at least 16 PBS's per intersection (on at least 1 channel) controlled by a single base unit located in the traffic control cabinet.
- The System shall be able to be set to vibrate a tactile arrow button during the WALK interval following a button push and/or every time the walk comes up.
- The System shall have the field-selectable function known as "LOCATE TONE". This means that during the FLASHING DON'T WALK and the DON'T WALK intervals, the system shall provide a locating tone that emanates from the Pedestrian Push Button Station. The system shall provide at least 3 different sounds to choose from.
- The System shall have the field selectable function known as "Extended Push Activation". This is defined as the audible WALK message shall only be activated and audible during the WALK interval if the button is depressed for a field selectable minimum period of time (from 0.5 to 6 seconds). Also, for the following walk and clearance intervals, the volumes have a separately settable minimum and maximum volume level.
- The System shall have the field selectable function known as "Informational Message". This means that a custom message giving the location of the street to cross and the intersection (or other information) will be vocalized only when the button is depressed for a minimum field selectable time.
- The System shall provide a "Wait" message that plays once the button is activated until the Walk cycle goes into effect. This message must have the field selectable option of OFF or repeating every 4, 6, 8 or 10 seconds.
- The System shall have standard "Travel Direction" options that may be selected at the time of installation.
- The System shall have at least 10 field selectable WALK sound options including a cuckoo, a chirp, an MUTCD rapid tick or custom voice message.
- The System shall provide at least 7 Ped-clearance sound choices including audible countdown (field selectable). The audible countdown shall represent the time remaining during the pedestrian Clearance interval. Timing is automatically adjusted to the CLEARANCE INTERVAL timing, provided by the traffic controller.
- The System shall provide 2 language capabilities, selectable by user (as a field selectable feature).
- The System shall provide an Emergency preemption message in conjunction with a preemption system (selectable feature).
- The system LOCATE TONE, WALK, and DON'T WALK audible features shall have independent assignable minimum and maximum volume limits. CLEARANCE volume level shall be controlled by WALK volume setting.
- All sounds for all PBS's shall be synchronized.
- The system shall have a non-visible, ambient sensing microphone located in the pedestrian station in an environmentally protected housing.
- The LOCATE TONE volume shall adjust automatically in response to ambient noise with field selectable adjustment levels from -30dB below to +20dB above ambient in 2.5dB increments.
- All other sounds volumes shall adjust automatically in response to ambient noise with field selectable adjustment levels from -30dB below to +20dB above ambient in 5dB increments.

- The system shall utilize high quality digital audio technology, with a minimum 16-bit sample at a 48 kHz sample rate.
- The PBS firmware and voice messages shall be updatable via Bluetooth. There shall be no requirement for the IC chips or module hardware to be removed or exchanged in order to complete a firmware or audio update.
- The System shall have the option to mute sounds on all crosswalks except activated crosswalk (selectable feature).
- The System shall have a real time clock capable of keeping time when there is no system power, for at least 2 years from the date of manufacture.
- The System shall have the ability to have four separate program configurations with all features available, and any single configuration can be selected through an external input.
- The System shall provide a user settable calendar function, allowing four separate configuration profiles to be configured to become active at different times of the day on a daily, weekly, or holiday basis.
- The entire System shall be configurable from any PBS over Bluetooth.
- The entire System shall be configurable from the CCU over Wi-Fi or Ethernet.
- All field access to selectable options using a Bluetooth, Wi-Fi or Ethernet devices shall be protected using password security.

Central Control Unit (CCU):

- The CCU-S shall be installed inside the Traffic Cabinet and powered by the AC supply mains (115 VAC).
- The CCU will provide data for the push buttons.
- The CCU shall be either a shelf mount (CCU-S) or rack mount (CCU-C) assembly
- The CCU-C shall be installed inside the 300 series Traffic Cabinet's Input File, replacing 2 PED isolator boards and receiving power from the rack (24VDC).
- The CCU-S shall provide internal power to operate up to 16 PBS's.
- A 24 volt power brick shall power up to 16 PBS's in a CCU-C configuration.
- The CCU shall control at least 16 PBS's.
- The CCU shall be logically configurable to assign any PBS to one of 16 traffic phases.
- The CCU-S shall receive pedestrian phase Walk, Don't Walk and Clearance inputs from either the traffic cabinet load switches or an SDLC input.
- The CCU-C shall receive pedestrian phase Walk, Don't Walk and Clearance inputs from a Transport Electrical Equipment Specification (TEES) C4S connector.
- The CCU shall be able to self-test all PBS's and put a corresponding phase into recall should a PBS assigned to a phase fail the self-test.
- The CCU-S shall provide optically isolated general purpose inputs.
- The CCU-S shall be used with a 4-cable interface harness assembly.
- The CCU shall have internal storage to log several hundred events with a date-time stamp for each event.
- The CCU shall have an internal real-time clock capable of being set in the field and propagating the time to each connected PBS.
- The CCU firmware shall be updatable via either Wi-Fi or Ethernet. There shall be not requirement for the IC chips or module hardware to be removed or exchanged in order to complete the firmware update.

- The CCU shall monitor PED interval conflicts and signal affected PBS's to an off state when a conflict occurs.
- The CCU-S shall meet NEMA 250 – Type 1 enclosures requirements.
- The CCU shall have a backlit LCD screen and button interface to allow placing test calls and display status.

Pedestrian Push Button Station (PBS):

- The PBS shall be mounted to a pole by banding or bolting
- The PBS will allow the pedestrian to place calls to the traffic controller and provides vibro-tactile feedback during the Walk cycle.
- This equipment shall be typically mounted on a pole, near the start of the crossing.
- The PBS shall be a single fixture that contains a 2" activation area, in which resides an ADA compliant vibro-tactile push button with a raised directional tactile arrow, and a sign mounted above the button.
- The PBS Speaker shall be 8 Ohms, 6 Watt, and weather-proof.
- The button shall be cast aluminum, nickel-plated and powder coated black around the arrow, to provide high contrast to arrow color. The PBS arrow shall allow for change in orientation to one of four directions.
- The PBS Arrow Button Actuation shall use Hall Effect Sensor technology rated to greater than 20 million operations.
- The PBS Arrow Button Push Force shall have three adjustable pressure settings between approximately 1 and 3lbs to activate a button push.
- The PBS Arrow Button shall pulse and vibrate at approximately 20 Hz with displacement factor based on pounds of force used to actuate.
- The PBS shall have a rear facing speaker projecting sound from front and back, providing 360º omnidirectional sound performance.
- The PBS shall include internal Conflict Monitoring that monitors WALK, and DON'T WALK input signals for conflict conditions; disables system operation and logs errors if conflict occurs.
- The PBS firmware and voice messages shall be updatable via Bluetooth. There shall be no requirement for the hardware to be changed out to update.
- The system shall operate with the vendor's client application to record and upload cumulative ped count and call data.
- The PBS shall meet or exceed NEMA 250 type 4X enclosure requirements.
- The PBS Construction shall be:
    - FRAME: Cast Aluminum, Powder Coated Black.
    - HOUSING: Reinforced, UL-listed Thermoplastic.
    - MESSAGE SIGN: Aluminum, Powder Coated, Ink Markings, or Reflective Vinyl Sheeting
    - PUSH BUTTON: Aluminum, Powder Coated.
- Electronic circuits (printed circuit board assemblies) shall be in a water-tight housing/enclosure or encapsulated with a thermoplastic polyamide having a UL94-V0 flammability rating and allowing light and RF transmissions (i.e. over-molded), for environmental protection. The housing/closure or encapsulation shall be capable of providing NEMA 250 4X protection to all covered components.
- The PBS Message Marking at the time of order may specify the Message Sign Markings to be the International Walking Person or the Informational Explanations for the three (3) distinct pedestrian displays (WALK, DON'T WALK, and PED CLEAR) that a pedestrian would see on an active pedestrian signal.

- Push button station frame shall be capable of holding a 5”*7-3/4” or larger pedestrian sign (see attached in Appendix “A” for detail) or as shown on the project plans.
- The clearance between center of the installed push button and finished grade shall be 40” or as shown on the project plans.

Field Programming via Client Application (Apple iOS v8.0 or higher devices or a PC with Windows 7, 8 or 10):

- The iOS and PC applications shall be upgradable.
- The iOS and PC applications shall notify the user when a newer version of the client application is available.
- The iOS and PC applications shall notify the user when newer PBS and CCU firmware is available.
- The iOS and PC applications shall provide the mechanism to download the latest PBS and CCU firmware.
- The iOS and PC applications shall be capable of setting all volumes and features of the APS system specific to the PBS’s.
- The iOS and PC applications shall be capable of setting/updating configuration options for a single PBS or all PBS’s on the intersection for most functions from a single PBS or CCU. (Global updating).
- The iOS and PC applications shall be capable of storing, modifying, loading, and emailing PBS configuration settings.

Warranty:

Each piece of APS equipment shall have a full three (3) years warranty from the date of delivery to the City corporation yard. This includes all associated fixtures. The Contractor shall be responsible for replacement or repair of any defective part of the APS for the entire period of the warranty.

33-38 PAYMENT (82-2.04)

The Contractor is referred to Section 9 in the special provisions for measurement and payment.

33-39 QUALITY ASSURANCE (87-1.01D)

The Contractor will be given one "punch list" for the contract to be completed within 30 calendar days. This will include a "compliance recheck" of the punch list. If the compliance recheck is performed, and it is found that the Contractor has not completed the punch list, the contractor shall receive an additional 15 calendar days to complete the list. The cost of subsequent compliance rechecks will be deducted from any monies due, or which may become due the Contractor.

Technical Assistance and Back-Up Services:

The manufacturer’s representative shall provide the City with a California telephone number for the ordering of replacement parts that are required and for providing technical advice to City personnel.

The manufacturer shall have on hand at this number a complete file of the City's equipment, including all serial numbers pertinent to this project. The manufacturer shall have available at the telephone number a person with competence in parts, nomenclature and functional characteristics of the City's signal controller equipment. This person shall be able to provide descriptions, part numbers, prices and availability of the City's requirements. A fully qualified electronics technician with the capacity to expertly advise on all matters relating to the City's equipment shall be available immediately, or by return telephone call within 24 hours (normal work days only, holidays and weekends accepted). There shall be no charge to the City for any advice or information provided in this matter.

Workmanship:

All facilities shall be installed in a professional and workmanlike manner. Any portion of the signal system, which is not installed in a professional manner, shall be removed and reinstalled correctly to the satisfaction of the Engineer.

33-40 PAYMENT (87-1.04)

The Contractor is referred to Section 9 in the special provisions for measurement and payment.

END OF SECTION

SECTION SP-34 SIGNAGE

(SECTION 34)

34-01 GENERAL

SUMMARY

This work includes the installation of one (1) construction project signs per City of East Palo Alto University Avenue Safety Enhancements Project signage standards.

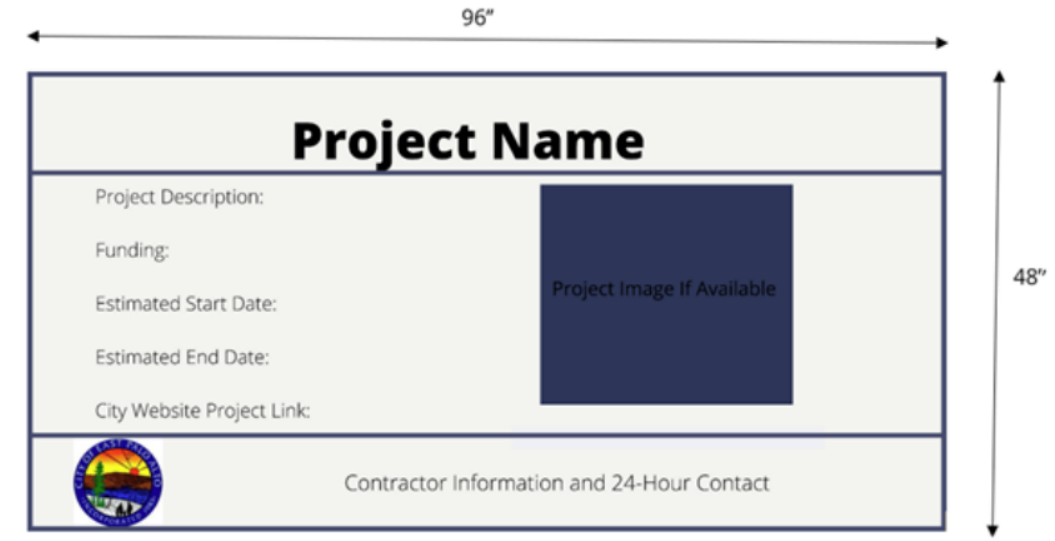
SUBMITTALS

Contractor shall submit a draft of the sign prior to production.

34-02 MATERIALS

SIGN DETAIL

Sign per detail below:



34-02 MEASUREMENT AND PAYMENT

The Contractor is referred to Section 9 in the special provisions for measurement and payment.

END OF SECTION