CITY OF ALAMEDA

SPECIFICATIONS AND PLANS

FOR

CITY OF ALAMEDA SIGNAL INSTALLATION AT HARBOR BAY PARKWAY/NORTH AND SOUTH LOOP ROAD

and

HARBOR BAY PARKWAY/PENUMBRA PLACE AND SOUTH LOOP ROAD

P.W. No. 04-19-23

MANDATORY PREBID MEETINGS:	Thursday, May 23, 2019
LOCATION:	City Hall West 950 W. Mall Square, Room 156 Alameda, CA 94501
TIME:	10:00 a.m.
BID DUE DATE:	Wednesday, June 5, 2019
LOCATION:	Public Works Department 950 W. Mall Square, Room 110 Alameda, CA 94501
TIME:	2:00 p.m.

REGISTERED PROFESSIONAL ENGINEER
JOY BHATTACHARYA
No. C68920
Exp. 9-30-19
CIVIL
STATE OF CALIFORNIA

Joy Bhattacharya, PE, PTOE
Advanced Mobility Group (AMG)

Scott Wikstrom
City Engineer

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CITY OF ALAMEDA, CALIFORNIA

SPECIFICATIONS, SPECIAL PROVISIONS AND PLANS
FOR
PUBLIC WORK

SECTION I. PROPOSAL AND CONTRACT REQUIREMENTS

A. GENERAL INFORMATION. The City of Alameda will receive sealed bid at the time and place specified in the advertisement calling for bids for:

CITY OF ALAMEDA SIGNAL INSTALLATION AT HARBOR BAY PARKWAY/NORTH AND SOUTH LOOP ROAD

and

HARBOR BAY PARKWAY/PENUMBRA PLACE AND SOUTH LOOP ROAD
P.W. No. 04-19-23

Electronic specifications and bidders forms for bidding this project can only be obtained at the City of Alameda website, https://www.alamedaca.gov/BUSINESS/Bid-on-City-Contracts or by calling (510) 747-7900. There is no cost for the specifications.

B. EXAMINATION OF PLANS, SPECIFICATIONS, SPECIAL PROVISIONS AND SITE OF WORK. The bidder is required to examine carefully the site and the proposal, plans, specifications and contract forms for the work contemplated, and it will be assumed that the bidder has investigated and is satisfied as to the conditions to be encountered, as to the character, quality and quantities of work to be performed and materials to be furnished, and as to the requirements of the specifications, the special provisions and the contract.

C. DESIGNATIONS. As used herein "City" shall mean the City of Alameda; "Council" or "City Council" shall mean the Council of the City; "City Manager" shall mean the City Manager of the City; "Engineer" or "City Engineer" shall mean the City Engineer or City Engineer's designee of the City; "Director" shall mean the Public Works Director of the City; and "Contractor" shall mean the bidder who is awarded the contract for the work.

D. PROPOSAL FORM. All bids must be made upon blank forms which are included in these specifications.

All bids must give the prices proposed, **both in writing and in figures.** Bids must be signed by the Bidder. If the proposal is signed by an individual, that individual's name and business address must be shown. If made by a firm or partnership, the name and the post office address of each member of the firm or partnership must be shown. If made by a corporation, the proposal must show the name of the state under the laws of which the corporation was chartered and the names, titles, and business addresses of the president, secretary and treasurer.

E. PRESENTING AND MARKING OF BIDS. Bids must be presented to the Public Works Department, 950 W. Mall Square, Room 110, Alameda, California, under sealed cover, plainly marked on the outside, **"City of Alameda Signal Installation at Harbor Bay Parkway/North and South Loop Road and Harbor Bay Parkway/Penumbra Place and South Loop Road, P.W. No. 04-19-23"**, not later than **2:00 p.m.** on the date set forth in the following paragraph.

A Mandatory prebid meeting will be held at City Hall West, 950 W. Mall Square, Room 156, Alameda, California, 94501, on Thursday, May 23, 2019, at 10:00 a.m. **The Mandatory prebid meeting** must be attended. The City reserves the right to hold additional prebid meetings as necessary.

Bids will be opened in the Public Works Department, 950 W. Mall Square, Room 110, Alameda, California**, at 2:01 p.m. on Wednesday, June 5, 2019**.

General Work Description: The work shall generally consist of furnishing all the labor, materials, tools, and equipment necessary to construct and complete in an efficient, operative, and workman like manner the traffic signal installations at Harbor Bay Parkway & N Loop Road/S Loop Road and Harbor Bay Parkway & Penumbra Place/S Loop Road. The project includes, but is not limited to, installation of traffic signal cabinet and controller, service, signal poles, accessible pedestrian signal, video detection systems, battery backup system, and emergency vehicle preemption.

Bides are required for the entire work described herein.

The contractor shall possess a Class A license at the time this contract is awarded.

F. BIDDER'S GUARANTY. All bids shall be accompanied by one of the following forms of bidder's guaranty: cash, a cashier's check, a certified check, or a bidder's bond executed by an admitted surety insurer, made payable to the City of Alameda. The security shall be in an amount equal to at least ten percent (10%) of the amount bid. A bid shall not be considered unless one of the forms of bidder's security is enclosed with it. If, in lieu of depositing cash, a cashier's check, or a certified check, the bidder submits a bidder's bond, the said bond shall, in form, be satisfactory to the City Attorney of the City of Alameda. A Bid Bond form is provided in Exhibit F.

Said bidder's guaranty which is submitted according to the above paragraph shall, in the event of the failure, for any reason, of the successful bidder or bidders to execute the contract as awarded, be deemed to be liquidated damages to be retained in full by the City of Alameda, but shall not be construed as a penalty for failure to execute said contract. The full amount of the said bidder's guaranty shall also be retained in full by the City of Alameda as consideration payable to the City of Alameda for engineering, accounting and clerical services in formulating specifications for such bid or bids, for advertising costs to the City of Alameda in connection with such bid or bids, and further, as consideration for the award of such contract to such bidder or bidders.

Any bid bond submitted under this Section shall incorporate therein by reference, or otherwise, all of the provisions of Section I, Item F, of these specifications.

G. RETURN OF BIDDER'S GUARANTIES. Within ten (10) days after the award of the contract, the Public Works staff will return the proposal guaranties accompanying the bids which are not to be considered in making the award. All other proposal guaranties will be held until the contract has been finally executed, after which they will be returned to the respective bidders whose bids they accompanied.

H. TAXES. Bids must include all state and federal taxes applicable to the transaction.

I. SUBCONTRACTORS. All contractors shall comply with the State Subletting and Subcontracting Fair Practices Act, located in Sections 4100 through 4112 of the California Public Contract Code. A copy of said Act is available in the office of the City Engineer. Said Act is hereby made a part of the specifications on the above-mentioned job and all contractors submitting bids shall accompany the bid with information regarding subcontractors as therein provided. All Subcontractors shall have a current City of Alameda business license.

J. REJECTION OR RETURN OF BIDS. Bids may be rejected if they show any alterations of form, additions not called for, conditional or alternative bids, incomplete bids, erasures or irregularities of any kind. The right is reserved to reject any and all bids. The City reserves the right to return bids unopened.

K. BID PROTEST. Any bid protest must be submitted in writing to the Public Works Director, City of Alameda Public Works Department, City Hall West, 950 West Mall Square, Room 110, Alameda, CA 94501 before 5:00 p.m. of the 10th business day following bid opening.

1. The initial protest document shall contain a complete statement of the basis for the protest.

2. The protest shall refer to the specific portion of the document which forms the basis for the protest.

3. The protest shall include the name, address, and telephone number of the person representing the protesting party.

4. The party filing the protest shall concurrently transmit a copy of the initial protest document and any attached documentation to all other parties with a direct financial interest which may be adversely affected by the outcome of the protest. Such parties shall include all other Bidders or proposers who appear to have a reasonable prospect of receiving an award depending upon the outcome of the protest.

5. The Public Works Director will issue a decision on the protest. If the Public Works Director determines that a protest is frivolous, the party originating the protest may be determined to be irresponsible and that party may be determined to be ineligible for future contract awards.

6. The procedure and time limits set forth in this paragraph are mandatory and are the Bidder's sole and exclusive remedy in the event of Bid protest and failure to comply with these procedures shall constitute a waiver of any right to further pursue the bid protest, including filing a Government Code Claim or legal proceedings.

L. AWARD OF CONTRACT. The award of contract, if it be awarded, will be to the responsible bidder who submits the lowest and best bid and whose proposal complies with all requirements described herein. The award, if made, will be made within ninety (90) days after the opening of the bids. All bids will be compared on the basis of the Engineer's estimate of quantities of work to be done. In the event of a delay the City reserves the right to hold the Bidder to its bid for 90 days from the date the contract is awarded.

Bid protests, contracts, bonds, insurance, and other documents identified in these specifications and these special provisions are to be delivered to the following City address: City of Alameda, City Hall West, Public Works Department, 950 West Mall Square, Room 110, Alameda, CA 94501.

M. EXECUTION OF CONTRACT. The contract, in form and content satisfactory to the City, will be awarded at a regular City Council meeting (first and third Tuesdays of each month, except August). At least five (5) business days prior to the anticipated award date, the Contractor will be notified of apparent award status and requested to provide the documents necessary to complete the contract process. Required documentation shall include two (2) copies of the contract executed by the Contractor, proof of insurance and Payment and Performance bonds. The Contractor will be given five (5) business days from the date the City Council awards the contract to obtain the relevant bonds and insurance along with any other documents required for submission.

No proposal shall be considered binding upon the City until the execution of the contract. Failure to execute a contract and file acceptable bonds and insurance as provided herein within the time frame outlined above shall be just cause for the annulment of the award and the forfeiture of the bidder's guaranty.

N. CONTRACT BONDS. The Contractor shall furnish two good and sufficient bonds. One of the bonds shall be executed in a sum equal to at least one hundred percent (100%) of the contract price, which shall be furnished as required by the Terms of Section 3247 to 3252 of the Civil Code of the State of California (see Exhibit E). The other bond shall guaranty faithful performance of the said contract by the Contractor and shall be executed in a sum equal to at least one hundred percent (100%) of the contract price (see Exhibit D). Bonds shall be furnished by a surety company satisfactory to the City of Alameda.

Whenever any surety or sureties on any such bonds, or any bonds required by law for the protection of the claims of laborers and materials, become insufficient or the City Engineer has cause to believe that such surety or sureties have become insufficient, a demand in writing may be made of the Contractor for further bond or bonds or additional surety not exceeding that originally required, as is considered necessary, taking into account the extent of the work remaining to be done. Thereafter no payment shall be made upon such contract to the Contractor,

or any assignee of the Contractor, until such further bond or bonds or additional surety has been furnished. Faithful performance bonds, whether by individual or corporate surety, shall in addition to other terms and conditions, contain the conditions that (1) death of the named principal shall not operate as a release of the obligation hereunder of the surety, and (2) extensions of time, if any, granted by the City to Contractor for performance of the work covered by said bond shall extend for a like time the period of limitations during which surety shall remain bound by the said undertaking.

SECTION II. LEGAL RELATIONS AND RESPONSIBILITIES

A. LAWS TO BE OBSERVED. The Contractor shall keep himself fully informed of all existing and future state and federal laws and all municipal ordinances and regulations of the City of Alameda which in any manner affect those engaged or employed in the work, or the materials used in the work, or which in any way affect the conduct of the work, and of all such orders and decrees of bodies or tribunals having any jurisdiction or authority over the same.

B. DEPARTMENT OF INDUSTRIAL RELATIONS COMPLIANCE AND PREVAILING WAGE REQUIREMENTS ON PUBLIC WORKS PROJECTS.

1. Effective January 1, 2015, no Contractor or Subcontractor may be listed on a bid proposal for a public works project (submitted after March 1, 2015) unless registered with the Department of Industrial Relations pursuant to Labor Code Section 1725.5 (with the limited exceptions from this requirement for bid purposed only under Labor code Section 1771.1(a)). Register at https://efiling.dir.ca.gov/PWCR

2. No Contractor or Subcontractor may be awarded a contract for public work on a public works project (awarded on or after April 1, 2015) unless registered with the Department of Industrial Relations pursuant to Labor Code Section 1725.5.

3. This project is subject to compliance monitoring and enforcement by the Department of Industrial Relations.

4. The Prime Contractor is required to post job site notices prescribed by regulations. See 8 Calif. Code Regulation §16451(d).

5. Effective April 1, 2015, All Contractors and Subcontractors must furnish electronic certified payroll records directly to the Labor Commissioner at: https://apps.dir.ca.gov/ecpr/das/altlogin

C. PREVAILING WAGES:

1. The Contractor is aware of the requirements of California Labor Code sections 1720 et seq. and 1770 et seq., as well as California Code of Regulations, Title 8, section 16000 et seq. ("Prevailing Wage Laws"), which require the payment of prevailing wage rates and the performance of other requirements on certain "public works" projects. Since this Project involves a "public work" project, as defined by the Prevailing Wage Laws, Contractor shall fully comply with such Prevailing Wage Laws. Contractor's failure to comply with the Prevailing Wage Law may constitute a default under the contract for performance of the work which would entitle the City to rescind the contract or exercise other remedies as provided by law or the contract.

2. The Contractor shall obtain a copy of the prevailing rates of per diem wages at the commencement of this contract from the website of the Division of Labor Statistics and Research of the Department of Industrial Relations located at www.dir.ca.gov/dlsr/. In the alternative, the

Contractor may view a copy of the prevailing rates of per diem wages at the City's Public Works Department, Building 1, 950 W. Mall Square, Room 110, Alameda. The Contractor shall make copies of the prevailing rates of per diem wages for each craft, classification or type of worker needed to perform work on the Project available to interested parties upon request, and shall post copies at the Contractor's principal place of business and at the Project site. The Contractor shall defend, indemnify, and hold the City, its elected officials, officers, employees, volunteers, and agents free and harmless from any claims, liabilities, costs, penalties or interest arising out of any failure or allege failure to comply with the Prevailing Wage Laws and/or the City's Labor Compliance Program (hereinafter referred to as "LCP"), if any.

3. If this project is funded in whole or in part with Federal monies and subject to the provisions of the Davis-Bacon Act, the successful bidder shall pay not less than the wage rates determined by the Secretary of Labor. The Federal wage rates shall apply unless the State wage rates are higher. The Federal Wage Rates applicable to the contract are those current within ten (10) days of the bid due date.

4. The Contractor and all subcontractors shall pay and shall cause to be paid each worker engaged in work on the Project not less than the general prevailing rate of *per diem* wages determined by the Director, regardless of any contractual relationship which may be alleged to exist between the Contractor or any Subcontractor and such workers.

5. The Contractor and all subcontractors shall pay and shall cause to be paid to each worker needed to execute the work on the Project travel and subsistence payments, as such travel and subsistence payments are defined in the applicable collective bargaining Contracts filed with the Department of Industrial Relations in accordance with Labor Code § 1773.8.

6. If during the period any bid for work on this Project remains open, the Director of Industrial Relations determines that there has been a change in any prevailing rate of *per diem* wages in the locality in which this public work is to be performed, such change shall not alter the wage rates in the Notice calling for Bids or the contract subsequently awarded.

7. Pursuant to Labor Code §1775, the Contractor shall as a penalty to the City, forfeit Fifty Dollars ($50.00) for each calendar day, or portion thereof, for each worker paid less than the prevailing rate of *per diem* wages, determined by the Director, for such craft or classification in which such worker is employed for any public work done under the Contract by the Contractor or by any Subcontractor under it. The amount of the penalty shall be determined by the Labor Commission. In addition, the difference between such prevailing rate of *per diem* wage and the amount paid to each worker for each calendar day or portion thereof for which each worker was paid less than the prevailing rate of *per diem* wage shall be paid to each work by the Contractor.

8. Any worker employed to perform work on the Project, which work is not covered by any craft or classification listed in the general prevailing rate of *per diem* wages determined by the Director, shall be paid not less than the minimum rate of wages specified therein for the craft or classification which most nearly corresponds to the work on the Project to be performed by them, and such minimum wage rate shall be retroactive to time of initial employment of such person in such craft or classification.

9. For those crafts or job classifications requiring special prevailing wage determinations, please contact the Division of Labor Statistics and Research, Prevailing Wage Unit, P.O. Box 420603, San Francisco, CA 94142-0603, (415) 703-4774 or check out the web site at www.dir.ca.gov.

D. HOURS OF LABOR.

1. As provided in Article 3 (commencing at §1810), Chapter 1, Part 7, Division 2 of the Labor Code, eight (8) hours of labor shall constitute a legal day's work. The time of service of any worker employed at any time by the Contractor or by any Subcontractor on any subcontract under this Contract, upon the work or upon any part of the work contemplated by this Contract, is limited and restricted to eight (8) hours during any one calendar day and forty (40) hours during any one calendar week, except as hereinafter provided. Notwithstanding the provision hereinabove set forth, work performed by employees of Contractor in excess of eight (8) hours per day and forty (40) hours during any one week shall be permitted upon this public work provided that the employees' compensation for all hours worked in excess of eight (8) hours per day at not less than one and one-half (1-1/2) times the basic rate of pay.

2. The Contractor shall pay to the City a penalty of Twenty-five Dollars ($25.00) for each worker employed in the execution of this Contract by the Contractor, or by any Subcontractor, for each calendar day during which such worker is required or permitted to work more than eight (8) hours in any calendar day and forty (40) hours in any one (1) calendar week, in violation of the provisions of Article 3 (commencing at §1810), Chapter 1, Part 7, Division 2 of the Labor Code, unless compensation for the workers so employed by Contractor is not less than one and one-half (1-1/2) times the basic rate of pay for all hours worked in excess of eight (8) hours per day.

3. Holiday and overtime work, when permitted by law, shall be paid for at a rate of at least one and one-half (1½) times the above specified rate of *per diem* wages, unless otherwise specified. Holidays shall be defined in the Collective Bargaining Contract applicable to each particular craft, classification, or type of worker employed.

E. CERTIFIED PAYROLL.

1. Contractor's attention is directed to California Labor Code Section 1776, which requires Contractor and any subcontractors to keep an accurate payroll record and which imposes inspection requirements and penalties for non-compliance. Contractor is responsible for the submission of copies of payrolls by all subcontractors. Each payroll submitted shall be accompanied by a "Statement of Compliance", signed by the Contractor or subcontractor or his/her agent who pays or supervises the payment of the persons employed under the contract, and shall certify the following:

a. That the payroll for each payroll period contains the name, social security number, and address of each employee, his or her correct classification, including applicable area and group code, hourly rates of wages paid, daily and weekly number of hours worked, deductions made and actual wages paid, and that such information is correct and complete;

b. That such laborer or mechanic (including each helper, apprentice and trainee) employed on the contract during the payroll period has been paid the full weekly wages earned, without rebate, either directly or indirectly, and that no deductions have been made either directly or indirectly from the full wages earned, other than permissible deductions; and

c. That each laborer or mechanic has been paid not less than the applicable wage rates and fringe benefits or cash equivalents for the classification of work performed, as specified in the applicable wage determination incorporated into the contract.

2. If the Contractor or a subcontractor does not work during the payroll period, a Statement of Non-Working Days must be submitted for each day not worked.

3. In the event of noncompliance with the requirements of such section after 10 Days written notice specifying in what respects compliance is required, the CONTRACTOR shall forfeit as a penalty to the CITY, $25.00 for each calendar Day, or portion thereof, for each worker, until strict compliance is effectuated. Upon the request of the Division of Apprenticeship Standards or the Division of Labor Standards Enforcement, such penalties shall be withheld from progress payments then due.

F. APPRENTICES.

1. Attention is directed to the provisions in sections 1777.5 and 1777.6 of the Labor Code concerning the employment of apprentices by the Contractor or any subcontractor under him on contracts greater than $30,000 or 20 working days. The Contractor and any subcontractor under him shall comply with the requirements of Sections 1777.5 and 1777.6 in the employment of apprentices.

2. Section 1777.5 requires the Contractor or subcontractor employing workers in any apprenticeable occupation to apply to the joint apprenticeship committee nearest the site of the public works project, and which administers the apprenticeship program in that trade, for a certificate of approval, if they have not previously applied and are covered by the local apprenticeship standards.

3. The Contractor is required to make contributions to funds established for the administration of apprenticeship programs if: (1) the Contractor employs registered apprentices or journeymen in any apprenticeable trade on such contracts and if other contractors on the public works site are making such contributions; or (2) if the Contractor is not a signatory to an apprenticeship fund and if the funds administrator is unable to accept Contractor' required contribution. The Contractor or subcontractor shall pay a like amount to the California Apprenticeship Council.

4. Information relative to apprenticeship standards, wage schedules, and other requirements may be obtained from the Director of Industrial Relations, ex-officio the Administrator of Apprenticeship, San Francisco, California, or from the Division of Apprenticeship Standards and its branch offices.

G. LABOR DISCRIMINATION. No discrimination shall be made in the employment of persons upon public works because of the race, color, sex, religion, age, national origin, sexual orientation, or physical disability of such persons and every Contractor for public works violating this section is subject to all the penalties imposed for a violation of the provisions of the Labor Code, and, in particular, Section 1735.

H. REGISTRATION OF CONTRACTORS. Before submitting bids, contractors shall be licensed in accordance with the provisions of Chapter 9, Division 3, of the Business and Professional Code of the State of California. All Contractors must have an "A" license or a "C" license that allows them to complete the work specified herein, in a professional manner consistent with these specifications.

I. PERMITS AND LICENSES. The Contractor shall procure all permits and licenses, including City of Alameda business licenses, pay all charges and fees, and give all notices necessary and incidental to the due and lawful prosecution of the work. However, the contractor will be reimbursed for construction permit fees. The estimated cost shown as an allowance in the bid proposal is only for bidding purposes. Payment shall be made for the actual cost of the permit. The cost for a City of Alameda business license is not reimbursable. Each Subcontractor shall have a current City of Alameda business license.

The following permit(s) and/or license(s) are required for this project:

1. **A City of Alameda Business License** from the City of Alameda, 2263 Santa Clara Avenue, Finance Department, Room 220, Alameda.
2. **Excavation Permit** from City Hall, 2263 Santa Clara Avenue, Planning and Building Services, Room 190, Alameda. (Refundable)
3. **Electrical Permit** for Installation of Accessible Pedestrian Signal from the City of Alameda, 2263 Santa Clara Avenue, Planning and Building Department, Room 190, Alameda. (Refundable)
4. **Concrete Permit** from City Hall, 2263 Santa Clara Avenue, Building Division, Room 190, Alameda. (Refundable)
5. **Encroachment Permit** from Caltrans, for traffic control signs and barricades posted at various locations along State Route 61. (Refundable)

J. PATENTS. The Contractor shall assume all costs arising from the use of patented materials, equipment, devices or processes used on or incorporated in the work, and agrees to indemnify and hold harmless the City of Alameda, its officers, employees and agents from all suits at law or actions of any nature, damages, royalties and costs on account of the use of any patented materials, equipment, devices or processes.

K. RESPONSIBILITY FOR DAMAGES. The City of Alameda, its officers, employees and agents shall not be answerable or accountable in any manner for any loss or damage to the work or any part thereof, nor to any material or equipment used in performing the work, nor for injury or damage to any person or persons, either workers or the public, nor for damage to adjoining property from any cause whatsoever during the progress of the work nor at any time before final acceptance.

L. CONTRACTOR'S RESPONSIBILITY FOR THE WORK. Except as provided above, until formal acceptance of the work by the City, the Contractor shall have the charge and care thereof and shall bear the risk of injury or damage to any part thereof by the action of the elements or from any other cause, whether arising from the execution or from the non-execution of the work. The Contractor shall rebuild, repair, restore and make good all injuries or damages to any portion of the work occasioned by any of the above causes before final acceptance and shall bear the expense thereof, except such injuries or damages occasioned by acts of the Federal Government or the public enemy. The Contractor will not be responsible for the cost of repairing or restoring damage to the work, which damage is determined to have been proximately caused by an act of God, in excess of 5% of the contracted amount.

M. SAFETY PROVISIONS. The Contractor shall conform to the rules and regulations pertaining to safety established by the California Division of Occupational Safety and Health of the Industrial Relations Department (CAL-OSHA).

N. NO PERSONAL LIABILITY. Neither the City Council, City Manager, the City Engineer, nor any other City officer, authorized assistant or agent shall be personally responsible for any liability arising under this contract.

O. RESPONSIBILITY OF CITY. The City of Alameda shall not be held responsible for the care or protection of any material or parts of the work prior to final acceptance, except as expressly provided in these specifications.

P. PUBLIC CONVENIENCE AND SAFETY. The Contractor shall so conduct operations as to cause the least possible obstruction and inconvenience to public traffic. The Contractor shall furnish, erect and maintain such fences, barriers, lights and signs as are necessary or as required by the Engineer to give adequate warning to the public at all times that the work is in progress and of any dangerous conditions to be encountered as a result of the work or of the presence of the Contractor's equipment or machinery.

The use of Flex-o-Lite Model No. 501, or approved equal, will be permitted only in specifically approved locations and only to the extent of 50 percent of the total amount of necessary lighting. Other models of lesser candle power may be permitted in some approved locations at a lesser percentage.

If the work involves the construction of a street or highway, the following additional provisions shall apply:

All traffic shall be permitted to pass through the work, unless other existing streets are stipulated as detours in the special provisions. Residents and businesses along the affected street or highway shall be provided passage as far as practicable; convenient access to driveways, houses and public buildings along the street or highway shall be maintained and temporary crossings shall be provided and maintained in good condition. No more than one cross or intersecting street or highway shall be closed at any time without the approval of the Engineer.

Contractor shall submit to the Engineer at the pre-construction meeting a Traffic Control Plan for any work that will impact vehicular traffic in the area. The Contractor must have an approved plan prior to commencing of work. All Traffic Control Plans must be in conformance with Caltrans regulations and guidelines.

The Contractor shall furnish, install and maintain such facilities as barricades, traffic signs, and flagmen, as may be necessary to advise the public of construction hazards and to control traffic.

The Traffic Control Plan shall cover, at minimum, all phases of work scheduled to occur in the first twenty (20) working days that will impact vehicular, pedestrian and bicycle traffic in the area. The Traffic Control Plan shall allow residents on the streets impacted ample “on street” parking within one (1) block of their homes. The Contractor shall have an approved Traffic Control Plan prior to commencing of work in the field. Contractor shall submit subsequent additions to the Traffic Control Plan in a timely manner to allow for the Engineer’s review and shall be in conformance with Caltrans regulations and guidelines.

At least 72 hours (3 working days) prior to beginning work on a section of street, curb or sidewalk that will affect use of the parking lane, the Contractor shall notify, by approved "No Parking - Tow Away" signs on barricades, all affected property owners, residents, businesses and agencies adjacent to that section of street. The “No-Parking” signs shall state the days, dates, and hours of parking lane closure, and shall be placed along the street on each side at no more than 50 feet spacing. The Contractor shall notify the Engineer at least one (1) working day in advance of the intent to post No-Parking signs, so that the timely posting can be verified by the Inspector. The Contractor is permitted to list up to one (1) working day before and one (1) working day after the scheduled days of work, as shown in the latest approved schedule on signs, in order to bracket the approved scheduled date of work. The Contractor shall remove the “No Parking” signs as soon as the parking lane is re-opened to parking.

If the Contractor is unable to meet the scheduled and noticed time for the work, the Contractor shall immediately notify the Engineer and remove the posted "No-Parking" signs. The Contractor shall submit a new scheduling request in writing to the Engineer. Upon written approval of the Engineer, the Contractor shall post signs at least 72 hours (3 working days) prior to beginning work per the revised schedule.

Work hours are limited between 8:00 A.M. and 5:00 P.M., except for vicinity of schools where the work hours are limited between 9:00 A.M. and 2:00 P.M.

Contractors must coordinate with Coastline Christian School located on North Loop Road.

Q. NOTICES TO CONTRACTOR. Any notice required to be given to the Contractor by the City of Alameda or by the City Engineer or by any officer of said City may be given to said Contractor at the address shown in the Contractor’s proposal. Such notice may be given by mailing a copy of said notice to the Contractor to such address by United States certified mail. Evidence of such mailing shall be deemed the equivalent of personal services of said notice.

R. UTILITIES. The location of railroad tracks, utility facilities and other structures shall be the responsibility of the Contractor. The Contractor shall contact the owners of those tracks, facilities and structures for any information that may be required. The Contractor shall contact Underground Services Alert (USA) at 800-642-2444 forty-eight (48) hours (2 working days) prior to commencement of work.

Where existing sewers and storm drains cross or interfere in any way with construction under this contract, they shall be left in place and the Contractor shall work around them, or where feasible and practical, the Contractor may, with the permission of the City Engineer, remove and replace them at his/her own expense. Precautions shall be exercised to provide bearing under existing sewer lines so encountered to preclude settlement during or after the term of the contract. In the event that some of these sewers are abandoned, they may, with the permission of the City Engineer, be removed and not replaced. The Contractor shall provide submittals for the Engineer's review and approval for supporting utilities.

The owners of pipes, wires, conduits, vaults and other utilities (other than sewers) located in the City streets which could conflict with the proposed work will be notified by the City Engineer to remove or adjust the same, without cost to the Contractor, to such extent as will allow the prosecution of the work described herein according to the necessities thereof and in accordance with these specifications. Wherever and whenever the Contractor anticipates working in an area from which utilities must be removed at the expense of others, he/she shall notify the City Engineer sufficiently in advance (a minimum of ten (10) working days) to permit the owners thereof to rearrange or abandon such utilities, and he/she shall cooperate with the owners thereof in the performance of the work under this contract.

The work will be so prosecuted that a minimum of damage will result to utility services. In the event that utility services are damaged or interrupted, the Contractor shall immediately, at his/her own expense, restore such services in a manner satisfactory to the City Engineer. In the event that an interruption of utility services is sustained for a period of longer than one-half hour, it shall be the responsibility of the Contractor to notify the occupants of the premises to which said services are connected, so that no damage will accrue on or to said premises.

The Contractor shall perform all work in such manner as to prevent damage to utilities lying outside of or below a required excavation of trench area.

S. SOUND CONTROL REQUIREMENTS. Sound control shall conform to Section 4-10 of the Alameda Municipal Code, which prohibits weekday construction activities between 7:00 pm and 7:00 am.

T. CONSTRUCTION SITE CONTROLS. Within five (5) business days of the date the work is to commence pursuant to the NTP the Contractor shall submit an Erosion/Stormwater Pollution Prevention Plan (SWPPP) to the City Engineer for review. The SWPPP shall include appropriate erosion and sediment control measures to effectively prevent the entry of soil, dirt, debris and other pollutants to storm water runoff, the storm drain system, lagoons and the bay/estuary during construction. No work in the field under this Contract may begin until the City Engineer has approved the Contractor's SWPPP.

Erosion and sediment control plans/sheets shall indicate the specifications and maintenance schedules for the installation and upkeep of the erosion control mechanisms. Specifications shall be provided for the erosion control practices, perimeter protection(s), any silt fencing and fiber rolls to be used, storm drain inlet protections, stabilized construction entrance(s) and exits, site and excavation dewatering activities, vehicle tire wash area(s), vehicle and equipment servicing area(s), and the materials handling and storage area(s). These specifications should meet the same level of erosion and sediment control effectiveness established by practices identified in the San Francisco Bay Regional Water Quality Control Board's Erosion and Sediment Control Field Manual (510-622-2465), the Association of Bay Area Government's Manual of Standards for Erosion and Sediment Control (510-464-7900) and/or the California Stormwater Quality Association's Stormwater Best Management Practice Handbook – Construction (2003) (www.cabmphandbooks.com). Contact City Public Works Department Clean Water Program Specialist Jim Barse (510-747-7930) for additional assistance in obtaining copies of these reference documents.

The Contractor is responsible for ensuring that all of his/her workers and subcontractors are aware of and implement the specific stormwater quality control measures under the approved SWPPP. The Contractor(s) shall avoid creating excess dust when breaking asphalt/concrete and during excavation and grading. If water is to be used as a measure for dust control, use as little as possible. All wash water shall be kept out of streets, gutters and storm drains. Controls shall be implemented before construction begins and maintained until the end of construction at which time they shall be removed.

Failure to comply with the following approved construction Best Management Practices ("BMPs") shall result in the issuance of correction notices, citations and/or a project stop order:

1. Gather all construction debris on a regular basis and place it in a dumpster or other container which is emptied or removed on a weekly basis. When appropriate, use tarps on the ground to collect fallen debris or splatters that could contribute to stormwater pollution. After breaking old pavement, remove all pieces to avoid contact with rainfall or runoff.

2. Remove on-site piles from the site on a regular basis. Only temporary storage is allowed. All temporary soil or other stockpiles on site shall be securely covered with a tarp, plastic sheeting or similar material.

3. Remove all dirt/mud, gravel, rubbish, refuse and green waste from the sidewalk, street pavement, and storm drain system adjoining the project site daily and prior to rain. Clean up leaks, drips and spills immediately. Avoid unnecessary driving on unpaved areas during wet weather.

4. Install and maintain stabilized construction entrances to minimize the tracking of dirt, mud, dust and debris onto the public right-of-way.

5. Broom-sweep the sidewalk and public street pavement adjoining the project site daily and prior to rain. Caked-on mud or dirt shall be scraped from these areas before sweeping. At the completion of work the street shall be washed and the wash water collected and disposed offsite.

6. Install filter materials (such as block and gravel bags, sandbags, filter fabric) at the storm drain inlets surrounding the project site. Such inlet protections shall be installed before: the start of the rainy season (October 1st), site de-watering activities, saw-cutting activities, or any other activity that may result in the discharge of material to the storm drain. Filter materials shall be maintained and/or replaced as necessary to minimize short-cutting and to remove sediment deposits and buildup. Accumulated sediment/debris shall be disposed of properly.

7. Vacuum saw-cutting slurry and remove from site. Do not allow saw-cut slurry to enter the storm water conveyance system.

8. Create a contained and covered area on the site for the storage of cement bags, paints, flammables, oils, fertilizers, pesticides, or any other materials used on the project site that have the potential for being discharged to the storm drain system by wind, exposure to rainfall or in the event of a material spill.

9. Never clean machinery, tools, brushes, etc. or rinse containers into a street, gutter, storm drain or stream. See the *Building Maintenance and Remodeling* BMP flyer and ACCWP BMP brochures for more information. Contact the Public Works Department at 747-7930 for assistance with obtaining these documents.

10. Ensure that concrete/gunite supply trucks or concrete/plaster finishing operations do not discharge wash water into street gutters or drains. Concrete trucks shall have a self-contained washout system or discharge to a dedicated, secure site washout in order to avoid the possibility of debris on city streets or discharge of wash water to the storm water conveyance system.

11. Minimize removal of natural vegetation or ground cover from the site in order to minimize the potential for erosion and sedimentation problems. Re-plant the area and stabilize all cut and fill slopes as soon as possible after grading is completed. At a minimum, 4,000 pounds/acre of straw with tackifier should be placed on all exposed soils including those within active work areas and flat lots. **No site grading shall occur between October 1 and May 31 unless approved erosion and sedimentation control measures are in place.**

12. Provide erosion "prevention" and perimeter protection measures (soil stabilization) such as fiber rolls, silt fence, and/or sediment traps or basins. Ensure control measures are adequately maintained and in operable condition. Sediment controls, including inlet protection, are necessary but should be a secondary defense behind good erosion control and site perimeter measures.

13. Design site de-watering operations to prevent the discharge of any sediment, debris or other pollutants to the municipal storm water conveyance system.

14. Maintain and if necessary, repair, all erosion prevention and sediment control measures throughout the contract term. Replacement supplies should be kept on site. Site inspections shall be conducted before and after each storm event, and every 24 hours for extended storm events, to identify areas that contribute to erosion and sediment problems or any

other pollutant discharges. If additional measures are needed, inform the City Engineer immediately and document all inspection findings and actions taken.

15. Conduct visual observations before, during, and after storm events. Any breach, malfunction, leakage, or spill observed that could result in the discharge of pollutants to surface waters that might not be visually detectable in stormwater shall trigger the collection of a sample of discharge. The following procedures shall be followed during sampling:

Sampling Procedures:

- For all construction activity, identify a sampling and analysis strategy and sampling schedule for potential discharges discovered through visual monitoring.
- Any breach, malfunction, leakage, or spill observed during visual monitoring which could result in the discharge of pollutants to surface waters that would not be visually detectable in stormwater shall trigger the collection of a sample of discharge.
- Samples shall be collected at all discharge locations which drain the areas identified by the visual observations and which can be safely accessed.
- Personnel trained in water quality sampling procedures shall collect stormwater samples.
- An uncontaminated sample shall be collected for comparison with the discharge sample.
- Sampling shall be conducted during the first two hours of discharge from rain events that occur during daylight hours and which generate runoff.
- The uncontaminated sample shall be compared to the samples of discharge using field analysis or through laboratory analysis. Analyses may include, but are not limited to indicator parameters such as: pH, specific conductance, dissolved oxygen, conductivity, salinity, and TDS
- All field and/or analytical data shall be kept in the SWPPP document, which is to remain at the construction site at all times.

16. Contact the City of Alameda Public Works Department at 510-747-7930 in the event of any slope failure, sediment pond overflow, or any other malfunction resulting in sediment-laden runoff. The City shall, in turn, report such incidents to the Regional Water Quality Control Board.

17. Clearly mark with the words, “No Dumping! Drains to Bay” or the equivalent, using methods approved by the City of Alameda, onto the on-site storm drain inlets. All on-site storm drains must be inspected and, if necessary, cleaned, at least once a year immediately prior to the rainy season. Additional cleaning may be required by the City of Alameda.

18. Require all concrete trucks used in the performance of the work to have a self-contained washout system, rather than do washout on the site. The idea is to avoid:

a. An undesirable pile of concrete on the jobsite, and
b. The possibility of debris on city streets.

The objective of these Standard Conditions is to ensure that the City’s municipal storm water Permit, the National Pollutant Discharge Elimination System (NPDES) Permit provisions and additional Regional Water Quality Control Board requirements are adequately enforced.

These recommendations are intended to be used in conjunction with the State's Best Management Practices Municipal and Construction Handbooks, local program guidance materials from municipalities, Section 7.1.01, of the Standard Specifications and any other appropriate documents on storm water quality controls for construction. If you need assistance in checking these documents, contact Clean Water Program Specialist at 510-747-7930.

Failure to comply with the above program will result in issuance of noncompliance notices, citations, project stop orders or fines. The fine for noncompliance of the above program is two hundred and fifty dollars ($250.00) per occurrence per day. The State under the Federal Clean Water Act can also impose a fine on the Contractor.

U. RECYCLING OF CONSTRUCTION AND DEMOLITION DEBRIS REQUIRED. The Contractor shall prepare and submit to alameda.wastetracking.com a Waste Management Plan to recycle at least 65% of construction and/or demolition debris to an approved materials recycling location that has proven and verified recycling rates. Source separation of inerts (concrete, rock, brick, asphalt, etc.) is encouraged where possible. The 65% recycling rate shall be determined by total weight of materials.

The Contractor shall also submit to alameda.wastetracking.com a Summary Report, containing proof of actual recycling results of construction and/or demolition debris hauled from the project (ex. processing facility tonnage receipts verifying at least 65% recycling rate). Proof of an approved Waste Management Plan must be provided to the City Engineer before construction starts and proof of an approved Summary Report must be provided before project acceptance. The Contractor shall submit a request, along with proof in writing, to the City Engineer of the Contractor's inability to comply with this requirement.

V. CLEAN AIR ACT OF 1970, ET SEQ. AND FEDERAL WATER POLLUTION CONTROL ACT AS AMENDED BY THE CLEAN WATER ACT OF 1977. The Contractor agrees to comply with federal clean air and water standards during the performance of this contract and specifically agrees to the following:

- The term "facility" means any building, plant, installation, structure, mine, vessel or other floating craft, location or site of operations owned, leased, or supervised by the Contractor and the subcontractors for the construction, supply and service contracts entered into by the Contractor;

- Any facility to be utilized in the accomplishment of this contract is not listed on the Environmental Protection Agency's List of Violating Facilities pursuant to 40 CFR, Part 15.20;

- In the event a facility utilized in the accomplishment of this contract becomes listed on the EPA list, this contract may be canceled, terminated, or suspended in whole or in part;

- It will comply with all the requirements of Section 114 of the Clean Air Act and Section 308 of the Water Pollution Control Act relating to inspection, monitoring, entry, reports, and information, as well as all other requirements specified in Section 114 and Section 308, respectively, and all regulations and guidelines issued thereunder;

- It will promptly notify the Government of the receipt of any notice from the Director, Office of Federal Activities, Environmental Protection Agency, indicating that any facility utilized or to be utilized in the accomplishment of this contract is under consideration for listing on the EPA List of Violating Facilities;

- It will include the provisions of Paragraph a. through g. in every subcontract or purchase order entered into for the purpose of accomplishing this contract, unless otherwise exempted pursuant to the EPA regulations implementing the Air or Water Acts above (40 CFR, Part 15.5), so that such provisions will be binding on each subcontractor or vendor;

In the event that the Contractor or the subcontractor for the construction, supply and service contracts entered into for the purpose of accomplishing this contract were exempted from complying with the above requirements under the provisions of 40 CFR, Part 15.5 (a), the exemption shall be nullified should the facility give rise to a criminal conviction (see 40 CFR 15.20) during the accomplishment of this contract. Furthermore, with the nullification of the exemption, the above requirements shall be effective. The Contractor shall notify the Government, as soon as the Contractor's or the subcontractors' facility is listed for having given rise to a criminal conviction noted in 40 CFR, Part 15.20.

X. SUBMITTALS AND REQUEST FOR INFORMATION (RFI'S). The Contractor shall submit an RFI within five (5) business days of an event or question of fact arising under the Contract. The Engineer in charge of the project shall have ten (10) business days to respond to an RFI or any Submittal required to be made under the Contract.

Y. COMPLIANCE WITH THE CITY'S INTEGRATED PEST MANAGEMENT POLICY. The Contractor shall follow the requirements of the City's Integrated Pest Management (IPM) Policy to ensure the City is in compliance with its Municipal Regional Stormwater NPDES Permit, Order No. R2-2009-0074, issued by the California Regional Water Quality Control Board. Contractor shall follow the City's IPM Policy and utilize generally accepted IPM Best Management Practices (BMPs) to the maximum extent practicable for the control or management of pests in and around City buildings and facilities, parks and golf courses, urban landscape areas, rights-of-way, and other City properties.

Contractor will ensure that applicators will use the most current IPM technologies available to ensure the long-term prevention or suppression of pest problems and to minimize negative impacts on the environment, non-target organisms, and human health. Contractor will consider the options or alternatives listed below in the following order, before recommending the use of or applying any pesticide on City property:

1. No controls (e.g., tolerating the pest infestation, use of resistant plant varieties or allowing normal life cycle of weeds)
2. Physical or mechanical controls (e.g., hand labor, mowing, exclusion)
3. Cultural controls (e.g., mulching, disking, alternative vegetation), good housekeeping (e.g. cleaning desk area)
4. Biological controls (e.g., natural enemies or predators)
5. Reduced-risk chemical controls (e.g., soaps or oils)
6. Other chemical controls

Contractor shall ensure that only appropriate licensed applicators who are authorized and trained in pesticide application and who shall implement the City department's IPM standard operating procedures may apply pesticides to or within City property.

Restricted Chemicals

The term pesticide applies to herbicides, insecticides, fungicides, rodenticides and other substances used to control pests. Antimicrobial agents are not included in this definition of pesticides.

Contractor shall avoid the use of pesticides that threaten water quality, human health and the environment. Thus, the Contractor shall not use or promote the use of the following chemicals:

1. Acute Toxicity Category I chemicals as identified by the Environmental Protection Agency (EPA),
2. Organophosphate pesticides (e.g., those containing Diazinon, chlorpyrifos or malathion)
3. Pyrethroids (bifenthrin, cyfluthrin, beta-cyfluthrin, cypermethrin, deltamethrin, esfenvalerate, lambda-cyhalothrin, permethrin, and tralomethrin),
4. Carbamates (e.g., carbaryl),
5. Fipronil,
6. Copper-based pesticides unless:
    a) Their use is judicious,
    b) Other approaches and techniques have been considered, and;
    c) Threat of impact to water-quality is prevented.

General Pesticide Usage Practices

Contractor shall ensure implementation of the following practices:

1. All pesticide applications shall be performed according to the manufacturer's instructions as detailed on the product label, and in accordance with all applicable state and local laws and regulations set forth to protect the environment, the public, and the applicator; and properly dispose of unused pesticides and their containers.

2. Pesticides that are not approved for aquatic use will not be applied to areas immediately adjacent to water bodies where through drift, drainage, or erosion, there is a reasonable possibility of a pesticide being transported into surface water.

3. Applicators will always avoid applications of pesticides that directly contact water, unless the pesticide is registered under Federal and California law for aquatic use.

4. Obtain coverage under the Statewide General NPDES Permit prior to discharging pollutants from the use of aquatic pesticides directly to the waters of the United States, or

onto aquatic plants growing in waters of the United States (as required by the State Water Quality Resources Control Board).

Posting of Warning Notices Prior to Pesticide Application

1. If a pesticide with a "Warning" or "Danger" label indicator must be applied, the Contractor shall post sufficient copies of warning notices (Notice of Scheduled Chemical Application for Pest Management) and MSDS to effectively alert the public (i.e., at all entrances to a building) no less than 48 hours (2 working days) in advance of the pesticide application. The warning notice must be completely filled out, including name of the pesticide (both chemical and brand name), time and date of application, and with a fully legible re-entry time.

Annual Pesticide Use Summary Report

Contractor shall track pesticide use on City properties and provide an annual pesticide use summary report of pesticide application on City properties. The annual pesticide use summary report shall be submitted to the City's Public Works Department Clean Water Program staff by a date to be determined in the scope of work and shall include the following information:

1. Product name and manufacturer
2. Active ingredient
3. The total quantity of each pesticide used during the prior fiscal year (from July 1 to June 30)
4. Target pest(s) for pesticide application(s).
5. Reasons for increases in use of pesticides that threaten water quality, specifically organophosphorous pesticides, pyrethroids, carbamatesl, fipronil, and copper-based pesticides.

Best Management Practices (BMPs)

To protect water quality, the Contractor shall implement the BMPs and control measures described below:

1. Follow all federal, state, and local laws and regulations governing the use, storage, and disposal of pesticides and training of pest control advisors and applicators.

2. Use the most effective, least toxic pesticides that will do the job, provided there is a choice. The agency will take into consideration the LD50, overall risk to the applicator, and impact to the environment (chronic and acute effects).

3. Apply pesticides at the appropriate time to maximize their effectiveness and minimize the likelihood of discharging pesticides in stormwater runoff. Avoid application of pesticides if rain is expected (this does not apply to the use of pre- emergent herbicide applications when required by the label for optimal results.)
4. Employ techniques to minimize off-target application (i.e. spray drift) of pesticides, including consideration of alternative application techniques. For example, when

spraying is required, increase drop size, lower application pressure, use surfactants and adjuvants, use wick application, etc.

5. Apply pesticides only when wind speeds are low.

6. Mix and apply only as much material as is necessary for treatment. Calibrate application equipment prior to and during use to ensure desired application rate.

7. Do not mix or load pesticides in application equipment adjacent to a storm drain inlet, culvert, or watercourse.

8. Properly inspect applicator equipment to prevent accidental pesticide leaks, spills and hazards to applicators and the environment.

9. Meet local fire department and Alameda County Agricultural Commissioner storage requirements for pesticide products. Provide secondary containment for liquids if required.

10. Prepare spill kits, store the kits near pesticides, and train employees to use them.

11. Store pesticides and other chemicals indoors in a locked and posted storage unit, as per California Code of Regulations.

12. Store pesticides in labeled containers, as per California Code of Regulations.

13. Rinse empty pesticide/herbicide containers, and empty in the spray, as per California Code of Regulations.

14. Dispose of triple-rinsed empty pesticide containers according to recommendations of the Alameda County Agricultural Commissioner and the manufacturer.

15. Try to find a qualified user for any unwanted pesticides, or return to the manufacturer if unopened. If disposal is required, contact Alameda County's Household Hazard Waste Collection Program at (510) 670-6460 between 8:30 AM and 5:00 PM., Monday through Friday, to make appropriate disposal arrangements, or to recycle the material.

16. If changing pesticides or cleaning spray tanks, use tank rinse water as the product, over a targeted area within the application site.

17. Irrigate slowly to prevent runoff, and do not over-water.

SECTION III. SCOPE OF WORK

A. WORK TO BE DONE. The work shall generally consist of furnishing all the labor, materials, tools, and equipment necessary to construct and complete in an efficient, operative, and workman like manner the traffic signal installation at Harbor Bay Parkway & North Loop Road/South Loop Road and Harbor Bay Parkway & Penumbra Place/South Loop Road. The project includes, but is not limited to, installation of traffic signal cabinet and controller, service, signal poles, accessible pedestrian signal, video detection systems, battery backup system, and emergency vehicle preemption.

The Notice to Proceed (NTP) for this project is tentatively scheduled to be issued August 2019.

The Initial Project Submittal Package shall address the entire project and shall include the Traffic Control Plan (first 20 working days at minimum), SWPPP, Waste Management Plan, and the full project schedule. Contractor shall not commence work in the field until Engineer has approved the Initial Project Submittal Package.

The Contractor shall have one hundred (100) consecutive working days from the date the work is to commence pursuant to the Notice to Proceed to complete the work.

Contractor is advised to remove all equipment from the streets identified as route, detour, and/or staging areas for the 4th of July Parade, during the period of Monday, July 1, 2 p.m. through 8 a.m. Friday, July 5. No removal of concrete, asphalt or pavement markings shall be allowed on these streets unless they are restored in full at least 24 hours prior to July 1. No crack sealing or slurry seal shall be applied on July 1 on these streets.

Contractor shall not work during City holidays; 2019 and 2020 holidays include:

Christmas Day	Wednesday, December 25, 2019
New Year's Day	Wednesday, January 1, 2020
Martin Luther King, JR.	Monday, January 20, 2020
Presidents Day	Monday, February 17, 2020
Memorial Day	Monday, May 25, 2020
Independence Day	Friday, July 4, 2020
Labor Day	Monday, September 7, 2020
Veteran's Day	Wednesday, November 11, 2020
Thanksgiving Day	Thursday, November 26, 2020
Day after Thanksgiving Day	Friday, November 27, 2020
Christmas Day	Friday, December 25, 2020

The following City events are planned for Calendar Year 2019:

Event	**Date**
Spring Festival (Park Street)	May 11 and 12, 2019
July 4th Parade	July 4, 2019
Art and Wine Faire (Park Street)	July 27 - 28, 2019
Island Jam (Webster Street)	June 15 – 16, 2019
Classic Car Show (Park Street)	October 12, 2019
Halloween Treats (Park Street)	October 31, 2019 (from 3-6 p.m.)
Halloween Treats (Webster Street)	October 31, 2019 (from 1-4 p.m.)
Concerts at the Cove	2nd Friday in June, July and August 2019

Farmer's Market (Webster Street at Haight Avenue) - Every Tuesday and Saturday (year-round) from 9 a.m. to 1 p.m.

B. ALTERATIONS. The City of Alameda reserves the right to increase or decrease the quantity of any item or portion of work, or to omit portions of the work as may be deemed necessary or expedient by the Engineer; also to make such alterations or deviations, increases or decreases, additions or omissions in the plans and specifications, as may be determined during the progress of the work to be necessary and advisable.

C. EXTRA AND FORCE ACCOUNT WORK. New and unforeseen work will be classed as extra work when such work cannot be covered by any of the various items or combination of items for which there is a bid price.

The Contractor shall do no extra work except upon written order from the Engineer. Extra work as herein before defined under Section 5-1.02, Extra Work, when ordered and accepted, shall be paid for under a written work order in accordance with the terms therein provided. Payment for extra work will be made as agreed upon in writing pursuant to an extra work order signed by both parties, or by force account.

Work performed on force account shall be paid on a time and materials basis plus ten percent (10%). For work done by a subcontractor, an additional five percent (5%) markup is allowed to reimburse the contractor for additional administration cost and no other additional payment will be made; provided, however, that the City reserves the right to furnish such materials required as it deems expedient, and the Contractor shall have no claim for profit on the cost of such materials. Payment for work performed on force account pursuant to this subsection shall include full compensation to the Contractor for contributions made to the State as required by the provisions of the Unemployment Reserve Act, Chapter 352, Statutes of 1935, as amended; for taxes paid to the Federal Government as required by the Social Securities Act, approved August 14, 1935, as amended; for premiums paid on any other insurance of any nature which the Contractor may be required to carry or which he may elect to carry, and for additional premiums paid on faithful performance and labor and materials bonds required by reason of increase in the amount of work to be performed over and above that called for in the original contract. The price paid for labor shall include any compensation insurance paid by the Contractor.

All force account work shall be recorded and tracked daily upon Time and Material Tentative Extra Work Order report sheets furnished by the Contractor to the Engineer and signed by both parties, which daily reports shall thereafter be considered the true record of force account work done. Verification of time and materials shall be made on a daily basis by the Inspector or by his/her designee.

D. REMOVAL OF OBSTRUCTIONS. The Contractor shall remove and dispose of all structures, debris, or other obstruction of any character to the construction of the project if and as required by the Engineer.

E. CLEAN UP. Contractor shall leave the work site in an acceptable clean manner at the end of each work day. Upon completion and before making application for acceptance of the work, the Contractor shall clean the street or road, borrow pits, and all ground occupied by the Contractor in connection with the work, of all rubbish, excess materials, temporary structures, and equipment; and all parts of the work shall be left in a neat and presentable condition.

SECTION IV. CONTROL

A. AUTHORITY OF THE ENGINEER. The Engineer shall decide all questions which may arise as to the quality or acceptability of materials furnished and work performed; the manner of performance and rate of progress of the work; the interpretation of the plans and specifications; the acceptable fulfillment of the contract on the part of Contractor; and all questions as to claims and compensation.

The Engineer's decision shall be final and he/she shall have executive authority to enforce and make effective such decisions and orders that the Contractor fails to carry out promptly.

B. PLANS. All authorized alterations affecting the requirements and information given on the approved plans shall be in writing. No changes shall be made to any plans or drawings after the same have been approved by the Engineer, except by direction of the Engineer.

Working drawings of plans for any structure not included in the plans furnished by the Engineer shall be approved by the Engineer before any work involving these plans shall be performed, unless approval is waived in writing by the Engineer.

Notwithstanding the foregoing, the Contractor agrees that approval by the Engineer of the Contractor's working plans does not relieve the Contractor of any responsibility for the accuracy of the dimensions and details thereof, and that the Contractor shall be responsible for agreement and conformity of his/her working plans with the approved plans and specifications.

The Contractor shall provide as-built drawings at the completion of the work. As-built drawings shall be prepared by a licensed engineer or surveyor and approved by the City Engineer.

As-built drawings must be in digital format. Any difficulty in providing the digital as-built drawings must be documented and presented to the City Engineer, who may permit manual as-built drawings on 24"x30" vellum. Release of retention is subject to the approval of the as-built drawings by the Engineer.

Full compensation for furnishing all working drawings and digital **as-built drawings** shall be considered as included in the prices paid for the various contract items of work, and no additional allowance will be made therefor.

C. CONFORMITY WITH PLANS AND ALLOWABLE DEVIATION. Finish surfaces in all cases shall conform with the lines, grades, cross sections, and dimensions shown on the approved plans. Deviations from the approved plans, as may be required by the exigencies of construction will be determined in all cases by the Engineer and authorized in writing.

D. COORDINATION OF PLANS, SPECIFICATIONS, AND SPECIAL PROVISIONS. These specifications, the plans, special provisions and all supplementary documents are essential parts of the contract, and a requirement occurring in one is as binding as though occurring in all. They are intended to be cooperative, to describe, and to provide for a complete work. Plans shall govern over specifications; special provisions shall govern over both specifications and plans.

E INTERPRETATION OF PLANS AND SPECIFICATIONS AND ADDENDA THERETO. Should it appear that the work to be done, or any matter relative thereto, is not sufficiently detailed or explained in these specifications, plans, and the special provisions, the Contractor shall apply to the Engineer for such further explanation as may be necessary to carry out the work. Upon such application by the Contractor or prospective bidder, or in the event that it appears expedient to the Engineer to further explain, clarify, or amend these specifications, special provisions and plans, the Engineer shall issue addenda thereto and such addenda shall constitute a part hereof, and shall be binding on the Contractor. It is up to the Contractor to check before the bid date that Contractor has all paperwork to complete the bid.

Addenda will be uploaded to the City of Alameda website, https://www.alamedaca.gov/BUSINESS/Bid-on-City-Contracts. If the addendum is issued after a pre-bid meeting is held, the addendum will also be forwarded by fax or email, followed by mail, to all attendees who have furnished contact information. All prospective bidders are responsible for inquiring at the Public Works Department (510-747-7930) within four (4) working days prior to the bid opening, to determine if any addenda have been issued. Do not rely upon third party providers of the original plans and specs to issue all addenda. Contractor shall acknowledge receipt of all addenda on the Bid and those Bids that do not have acknowledgment of all addenda will be considered non-responsive.

In the event of any discrepancy between any drawing and the figures written thereon, the figures shall be taken as correct.

F SUPERINTENDENCE. Whenever the Contractor is not present on any part of the work where it may be desired to give directions, orders will be given by the Engineer in writing and shall be received and obeyed by the superintendent or foreman in charge of the particular work in reference to which orders are given.

G. CONSTRUCTION STAKING & LAYOUT. Construction staking and layout shall be at the contractor's expense and performed by the contractor's surveyor or engineer qualified to do surveying work.

The Contractor shall preserve all stakes and points set for lines, grades, or measurements of the work in their proper places until authorized to remove them by the Engineer. All expenses incurred in replacing stakes that have been removed without proper authority shall be paid by the Contractor.

AND/OR

H. LINES AND GRADES. All distances and measurements are given and will be made in a horizontal plane. Grades are given from the top of stakes or nails, unless otherwise noted on the plans.

Three consecutive points shown on the same rate of slope must be used in common, in order to detect any variation from a straight grade, and in case any discrepancy exists, it must be reported to the Engineer. If such discrepancy is not reported to the Engineer, the Contractor shall be responsible for any error in the finished work.

The Contractor shall preserve all stakes and points set for lines, grades, or measurements of the work in their proper places until authorized to remove them by the Engineer. All expenses incurred in replacing stakes that have been removed without proper authority shall be paid by the Contractor.

I. INSPECTION. The Engineer shall, at all times, have access to the work during construction and shall be furnished with every reasonable facility for ascertaining full knowledge respecting the progress, workmanship, and character of materials used and employed in the work.

The Contractor shall give at least 48 hours (2 working days) notice in writing when he will require inspection on subgrade, formwork, concrete paving, etc. Inspection will routinely be carried out at pre-scheduled time established at the pre-construction meeting. Inspection will only be carried out for substantial quantities of work ready for inspection.

The Contractor shall contact the City's representative by 11:00 a.m. the day prior to any special inspections so the City can schedule the inspections. If the contractor does not perform work that requires the special inspection as previously communicated to City's representative then the contractor will be responsible for all costs associated with special inspection regardless of the fact that the special inspector did not perform any services.

Whenever the Contractor varies the period during which work is carried on each day, he shall give due notice to the Engineer, so that proper inspection may be provided. Any work done in the absence of the Engineer is subject to rejection.

The inspection of the work shall not relieve the Contractor of any of his/her obligations to fulfill the contract as prescribed. Defective work shall be made good and unsuitable materials may be rejected, notwithstanding the fact that such defective work and unsuitable materials have been previously overlooked by the Engineer and accepted or estimated for payment.

Working hours in the field are restricted to 8 AM through 5 PM, Monday through Friday, excluding City Holidays, and shall constitute “normal working hours.” The Public Works Department Inspectors work on Friday’s and can be reached at 510-747-7900. In some locations, as noted on the Plans, normal working hours may be further restricted to avoid traffic and/or school-related conflicts. Any work in the field performed outside of these hours, including but not limited to construction, clean up, placement of traffic control devices, and mobilization/demobilization, shall be subject to removal and the Contractor fined $5,000 per incident, unless such work has been previously authorized by the Engineer in writing.

Inspection hours for construction shall be from 8 AM through 5 PM, Monday through Friday, excluding City Holidays, and shall constitute “normal inspection hours.” The Public Works Department Inspectors work on Friday’s and can be reached at 510-747-7900.Unless prior written authorization has been received from the Engineer, the Contractor shall not perform any work outside of these hours except for general clean up, demobilization, and placement of no-parking signs. The Contractor shall pay the salary and benefits, including overtime, of the City employee(s) for inspection of any work performed outside of the normal inspection hours.

Projects financed in whole or in part with state funds shall be subject to inspection at all times by the Director of Public Works of the State of California, or his agents.

J. REMOVAL OF DEFECTIVE AND UNAUTHORIZED WORK. All work which is defective in its construction or deficient in any of the requirements of these specifications shall be remedied or removed and replaced by the Contractor in an acceptable manner and no compensation will be allowed for such correction.

Any work done beyond the lines and grades shown on the plans or established by the Engineer, or any extra work done without written authority, shall be considered as unauthorized and will not be paid for.

Upon failure on the part of the Contractor to comply forthwith with any order of the Engineer made under the provisions of this article, the Engineer shall have the authority to cause defective work to be remedied, or removed and replaced, and unauthorized work to be removed, and to deduct the cost thereof from any monies due or to become due the Contractor.

The fact that the work and materials have been inspected from time to time, and payments on account have been made, does not relieve the Contractor from the responsibility of replacing and making good any defective work or materials that may be discovered within one year from the date of the completion of the work by the Contractor and its acceptance by the City.

K. FINAL INSPECTION. Whenever the work provided and contemplated by the contract shall have been satisfactorily completed, the Engineer will make the final inspection.

L. FINAL GUARANTEE. It is understood that the Contractor is skilled in the trade or calling necessary to perform the work set forth within the plans and specifications, and that the City of Alameda, not being skilled in such matters, relies upon the Contractor to do and perform all work, acts, and things necessary to carry out the contract in the most skilled and desirable manner, and the Contractor guarantees the workmanship and materials to be the best of their kind. The acceptance of any part or of the whole of the work by the City does not operate to release the Contractor or the Contractor's surety from said guarantee.

The Contractor shall be held responsible for and must make good any defects through faulty, improper or inferior workmanship or materials arising from or discovered in any part of the contract work within one year of the completion and acceptance of the same. The bond for faithful performance, furnished by the Contractor, shall cover such defects and protect the City of Alameda against any and all such defects.

Nothing in this section supersedes contractor obligations for repair and replacement of work pursuant to the Public Contract Code.

SECTION V. CONTROL OF MATERIAL

A. SAMPLES AND TESTS. At the option of the Engineer, the source of supply of each of the materials shall be approved by the Engineer before delivery is started and before such material is used in the work. Representative preliminary samples of the character and quality prescribed shall be submitted by the Contractor or producer of all materials to be used in the work for testing or examination as desired by the Engineer.

All tests of materials furnished by the Contractor shall be made in accordance with commonly recognized standards of national organizations and such special methods and tests as are prescribed in these specifications.

The Contractor shall furnish such samples of materials as are requested by the Engineer without charge. No material shall be used until it has been approved by the Engineer. Samples will be secured and tested whenever necessary to determine the quality of material.

G. DEFECTIVE MATERIALS. All materials not conforming to the requirements of these specifications shall be considered as defective, and all such materials, whether in place or not, shall be rejected. They shall be removed immediately from the site of the work unless otherwise permitted by the Engineer.

Upon failure on the part of the Contractor to comply with any order of the Engineer made under the provisions of this article, the Engineer shall have the authority to remove and replace defective material and to deduct the cost of removal and replacement from any monies due or to become due the Contractor.

SECTION VI. PROSECUTION AND PROGRESS

A. PROGRESS OF THE WORK AND TIME FOR COMPLETION. The Contractor shall submit the Initial Project Submittal Package to the City Engineer for review. The Initial Project Submittal Package shall address the entire project and shall include the Traffic Control Plan (first 20 working days at minimum), SWPPP, Waste Management Plan, and the full project schedule. Contractor shall not commence work in the field until Engineer has approved the Initial Project Submittal Package.

The Contractor shall have one hundred (100) consecutive working days from the date the work is to commence pursuant to the NTP to complete all work, including punch list items. The Contractor shall not commence construction on any section of the work until such time that he/she shall have on the ground, or can furnish definite assurance to the Engineer that there will be available when required, all the materials necessary to complete the section of the work upon which construction is to begin (excluding those furnished by the City).

The Contractor shall submit a three week look-ahead work schedule every Monday and upon the issuance of any change order that alters the contract's schedule. Engineer shall have ten (10) working days to respond to the updated work schedule, and Contractor shall abide by most recently approved schedule until a new one has been approved in writing by the Engineer.

The Contractor shall submit additions to the Traffic Control Plan ten (10) working days in advance of any work that was not covered by the Traffic Control Plan submitted in the Initial Project Submittal Package.

In order to minimize disturbances to residents and public the Contractor shall:

1. Backfill and resurface failed area locations the same working day as the start of break out.

2. Resurface planed AC areas within two (2) working days from the day the areas were planed. The streets shall be swept, repeatedly if necessary, to minimize loose material.

3. Schedule removal and reconstruction of curb, gutter, and culverts so that only one side of the street is under construction on any one day, and parking and unimpeded pedestrian passage remains available on the opposite side of the street.

4. Not apply the slurry seal on streets the same day that trash and recycling pickup is scheduled.

B. SUBLETTING AND ASSIGNMENT. The Contractor shall give his/her personal attention to the fulfillment of the contract and shall keep the work under his/her control.

Subcontractors will not be recognized as such, and all persons engaged in the work of construction will be considered as employees of the Contractor, and their work shall be subject to the provisions of the contract and specifications.

Where a portion of the work sublet by the Contractor is not being prosecuted in a manner satisfactory to the Public Works Director, the subcontractor shall be removed immediately on the requisition of the Engineer and shall not again be employed on the work.

This contract may be assigned only on written consent of the City Council.

C. CHARACTER OF WORKER. If any subcontractor or person employed by the Contractor shall fail or refuse to carry out the directions of the Engineer or shall appear to the Engineer to be incompetent or to act in a disorderly manner, said worker shall be discharged immediately on the requisition of the Engineer and such person shall not again be employed on the work.

D. TEMPORARY SUSPENSION OF WORK. The Engineer shall have the authority to suspend the work wholly or in part for such period as he/she may deem necessary, due to unsuitable weather, or to such other conditions as are considered unfavorable for the suitable prosecution of the work, or for such time as he/she may deem necessary, due to the failure on the part of the Contractor to carry out orders given or to perform any of the provisions of the work. The Contractor shall immediately obey such orders of the Engineer and shall not resume suspended work until ordered in writing by the Engineer.

E. TIME OF COMPLETION AND LIQUIDATED DAMAGES. It is agreed by the parties to the contract that in case all the work called for under the contract is not completed before or upon the expiration of the contract's term as set forth in these specifications, damage will be sustained by the City of Alameda, and that it is and will be impracticable to determine the actual damage which the City will sustain in the event of and by reason of such delay; and it is therefore agreed that the Contractor will pay to the City of Alameda the sum of per day for each and every day's delay beyond the time prescribed to complete the work; and the Contractor agrees to pay such liquidated damages as herein provided, and in case the same are not paid, agrees that the City of Alameda may deduct the amount thereof from any money due or that may become due the Contractor under the contract.

It is further agreed that in case the work called for under the contract is not finished and completed in all parts and requirements within the time specified, the City Council shall have the right to extend the time for completion or not, as may seem best to serve the interest of the City; and if it decides to extend the time limit for the completion of the contract, it shall further have the right to charge the Contractor, his heirs, assigns, or sureties, and to deduct from the final payment for the work, all or any part, as it may deem proper, of the actual cost of engineering, inspection, superintendence, and other overhead expenses which are directly chargeable to the contract, and which accrue during the period of such extensions, except that the cost of final surveys and preparation of final estimate shall not be included in such charges.

The Contractor shall not be assessed with liquidated damages nor the cost of engineering and inspection during any delay in the completion of the work caused by acts of God or of the public enemy, acts of the City, fire, floods, epidemics, quarantine restrictions, strikes, freight embargoes, and unusually severe weather or delays of subcontractors due to such causes; provided that the Contractor shall within ten (10) days from the beginning of such delay notify the Engineer in writing of the causes of delay. The Engineer shall ascertain the facts and the extent of the delay and his findings of the facts thereon shall be final and conclusive.

F. SUSPENSION OF CONTRACT. If, at any time, in the opinion of the City Council, the Contractor has failed to supply an adequate working force, or material of proper quality, or has failed in any other respect to prosecute the work with the diligence and force specified and intended in and by the terms of the contract, notice thereof in writing will be served upon him; and shall he neglect or refuse to provide means for a satisfactory compliance with the contract, as directed by the Engineer, within the time specified in such notice, the City Council in any such case shall have the power to suspend the operation of the contract. Upon receiving notice of such suspension, the Contractor shall discontinue said work, or such parts of it as the City Council may designate. Upon such suspension, the Contractor's control shall terminate, and thereupon the City Council or its duly authorized representative may take possession of all or any part of the Contractor's materials, tools, equipment and appliances upon the premises, and use the same for the purpose of completing said contract, and hire such force and buy or rent such additional machinery, tools, appliances, and equipment, and buy such additional materials and supplies at the Contractor's expense as may be necessary for the proper conduct of the work and for the completion thereof; or may employ other parties to substitute other machinery or materials, and purchase the materials contracted for, in such manner as the City Council may deem proper; or the City Council may annul and cancel the contract and re-let the work or any part thereof. Any excess of cost arising therefrom over and above the contract price will be charged against the Contractor and his sureties, who will be liable therefor. In the event of such suspension, all monies due the Contractor or retained under the terms of this contract shall be forfeited to the City; but such forfeiture shall not release the Contractor or his sureties from liability for failure to fulfill the contract. The Contractor and his sureties will be credited with the amount of money so forfeited toward any excess of cost over and above the contract price, arising from the suspension of the operations of the contract and the completion of the work by the City as above provided; the Contractor will be so credited with any surplus remaining after all just claims for such completion have been paid.

In the determination of the question whether there has been any such noncompliance with the contract as to warrant the suspension or annulment thereof, the decision of the City Council shall be binding on all parties to the contract.

If two or more sections within this Specification are in conflict or are inconsistent with one another regarding terminations, suspensions, the requirement to hold bid prices, or payment due in a termination or suspension situation, this Section shall control.

G. RIGHT-OF-WAY. The right-of-way sufficient for the work to be constructed will be provided by the City. The Contractor shall make his own arrangements and pay all expenses for additional area required by him outside of the limits of right-of-way, unless otherwise provided in the special provisions. Contractor’s staging area must be approved by the Engineer.

SECTION VII. MEASUREMENTS AND PAYMENT

A. MEASUREMENTS AND PAYMENT. Payment for work done under the contract shall be made on the basis of the sums as calculated from the finally measured quantities of work done and the agreed unit and lump sum prices. Payment shall be full compensation for furnishing all labor, materials, tools and equipment and doing all the work necessary to construct the items for which payment is being made, complete in place as shown on the plans and described in the specifications.

B. EXTRA AND FORCE ACCOUNT WORK. Extra work as hereinbefore defined (Section III, Paragraph C) when ordered and accepted, shall be paid for under a written work order in accordance with the terms therein provided. Payment for extra work will be made as agreed upon in writing pursuant to an extra work order signed by both parties, or by force account.

Work performed on force account shall be paid on a time and materials basis plus ten percent (10%). For work done by a subcontractor, an additional five percent (5%) markup is allowed to reimburse the contractor for additional administration cost and no other additional payment will be made; provided, however, that the City reserves the right to furnish such materials required as it deems expedient, and the Contractor shall have no claim for profit on the cost of such materials. Such payment shall include full compensation to the Contractor for contributions made to the State as required by the provisions of the Unemployment Reserve Act, Chapter 352, Statutes of 1935, as amended; for taxes paid to the Federal Government as required by the Social Securities Act, approved August 14, 1935, as amended; for premiums paid on any other insurance of any nature which the Contractor may be required to carry or which he may elect to carry, and for additional premiums paid on faithful performance and labor and materials bonds required by reason of increase in the amount of work to be performed over and above that called for in the original contract. The price paid for labor shall include any compensation insurance paid by the Contractor.

C. PROGRESS PAYMENTS. The City shall, once each month, cause an estimate in writing to be made by the City Engineer of the total amount of work done and the acceptable materials furnished and delivered by the Contractor on the ground and not used at the time of such estimate, and the value thereof. The City of Alameda shall retain five percent (5%) of such estimated value of the work done and fifty percent (50%) of the value of the materials so estimated to have been furnished and delivered and unused, as aforesaid, as part security for the fulfillment of the contract by the Contractor, and shall monthly pay to the Contractor, while carrying on the work, the balance not retained, as aforesaid, after deducting therefrom all previous payments and all sums to be kept or retained under the provisions of the contract. No such estimate or payment shall be required to be made, when, in the judgment of the City Engineer, the work is not proceeding in accordance with the provisions of the contract, or when in his judgment, the total value of the work done since the last estimate amounts to less than Three Hundred Dollars ($300.00). No such estimate or payment shall be construed to be an acceptance of any defective work or improper materials.

Partial Payments

Progress payments shall be in accordance with Section 9-1.06 of the Standard Specifications "Partial Payments", as currently amended, and these special provisions. The City, once in each month, shall cause an estimate in writing to be made by the Engineer. The estimate shall include the total amount of work done and acceptable materials furnished, provided the acceptable materials are listed as eligible for partial payment as materials in the special provisions and are furnished and delivered by the Contractor on the ground and not used or are furnished and stored for use on the Contract, if the storage is within the City and the Contractor furnishes evidence satisfactory to the Engineer that the materials are stored subject to or under the control of the City, to the time of the estimate, and the value thereof. The estimate shall also include any amounts payable for mobilization.

The amount of any material to be considered in making an estimate will in no case exceed the amount thereof which has been reported by the Contractor to the Engineer. Only materials to be incorporated in the work will be considered. The estimated value of the material established by the Engineer will in no case exceed the Contract price for the item of work for which the material is furnished.

Contractor warrants that upon signature of pay estimate, all work has been performed in strict compliance with the Contract Documents, and all work for which progress payments have been previously issued and payment has been received from City, shall be free and clear of all third-party claims, stop notices, security interests, and encumbrances.

Payment of all, or any part, of an estimate in writing may be withheld on account of any of the following:

1. Defective work not remedied;
2. Third-party claims against Contractor or City arising from the acts or omissions of Contractor or subcontractors;
3. Stop Notices;
4. Failure of Contractor to make timely payments due to subcontractors for material or labor;
5. Damage to the City or others for which Contractor is responsible;
6. Failure of Contractor to maintain, update, and submit record documents;
7. Failure of Contractor to submit schedules or their updates as required by the Contract Documents;
8. Performance of the work by Contractor without properly processed shop drawings;
9. Liquidated damages assessed;
10. Any other failure of Contractor to perform its obligations under the Contract Documents.

F. SUBSTITUTION OF SECURITIES FOR WITHHELD ACCOUNTS. Pursuant to Chapter 13 (commending with Section 4590), Division 5, Title 1 of the Government Code of the State of California, securities may be substituted for any monies withheld by a public agency to ensure performance under a contract. At the request and expense of the Contractor, securities

equivalent to the amount withheld shall be deposited with the public agency, or with a state or federally chartered bank as the escrow agent, who shall pay such monies to the Contractor upon satisfactory completion of the contract.

Securities eligible for substitution under this section shall include those listed in Section 22300 of the Public Contract Code of the State of California or bank or savings and loan certificates of deposit.

Contractor shall be the beneficial owner of any securities substituted for monies withheld and shall receive any interest thereon.

Any escrow agreement entered into pursuant to this section shall contain, as a minimum, the following provisions:

1. The amount of securities to be deposited.
2. The terms and conditions of conversion to cash in case of the default of the Contractor.
3. The termination of the escrow upon completion of the contract.

D. NOTICE OF COMPLETION. Whenever the work provided and contemplated by the contract shall have been satisfactorily completed, the Engineer will make the final inspection.

When such final inspection shows that the work has been completed in conformance with the plans, specifications and special provisions, the Engineer will recommend the formal acceptance of the work by the City Council; and upon such acceptance, Notice of Completion will be recorded. The said work shall not be deemed completed until the same is accepted by the City.

E. PAYMENT OF THE RETENTION. The City Engineer shall, after the completion of the contract, total all amounts retained under the provisions of the contract. Final payment of retention shall be in conformance with Public Contract Code Section 7107.

It is mutually agreed between the parties to the contract that no certificate given or payments made under the contract, except the final certificate of final payment, shall be conclusive evidence of the performance of the contract, either wholly or in part, against any claim of the Contractor; and no payment shall be construed to be an acceptance of any defective work or improper materials.

The Contractor further agrees that the payment of the final amount due under the contract, and the adjustment and payment for any work done in accordance with any alterations of the same, shall release the City of Alameda, its officers, employees and agents from any and all claims or liability on account of work performed under the contract or any alteration thereof.

SECTION VIII. SPECIAL PROVISIONS

A. STANDARD SPECIFICATIONS ADOPTION. The work embraced herein shall be done in accordance with the appropriate provisions of construction detail of the specifications entitled "State of California, Department of Transportation, Standard Specifications", latest revision, insofar as the same apply, which specifications are hereinafter referred to as the Standard Specifications, and in accordance with the following Special Provisions.

Whenever in the Standard Specifications the following terms are used, they shall be understood to mean and refer to the following:

Department of Public Works or Department of Transportation	To the Engineering Division
Director of Public Works	To the Public Works Director
Engineer	To the City Engineer, acting either directly or through properly authorized agents, such agents acting within the scope of the particular duties entrusted to them.
Laboratory	To the designated Laboratory authorized by the City of Alameda to test materials and Work involved in the contract.
State	To the City of Alameda

Other terms appearing in the Standard Specifications, and these specifications, shall have the intent and meaning specified in Section I, Definition of Terms, of the Standard Specifications.

In case of conflict between the Standard Specifications and these Special Provisions, the special provisions shall take precedence over and be used in lieu of such conflicting portions.

SECTION IX. QUANTITIES

The following preliminary estimate of the quantities of work to be done and materials to be furnished is approximate only, and the City of Alameda does not expressly or by implication agree that the actual amount of work will correspond therewith, but reserves the right to increase or decrease the amount of any class or portion of the work or to omit portions of the work that may be deemed necessary or expedient to the Engineer.

Quantities shall be determined by the Contractor from plans and specifications, and /or pre-construction meeting and walk - through. Any discrepancy or conflict shall be reported to the Project Manager. Contractor shall be held responsible for any discrepancies or conflicts not reported to the Project Manager seventy-two (72) hours prior to the bid opening.

The basis of award of contract shall be by the City of Alameda for the lowest and best bid that will best serve the City's need.

The City reserves the right to reject any, any portion, or all bids.

TABULATION OF PRELIMINARY ESTIMATE OF QUANTITIES

Item No.	Description	Quantity	Unit
1.	Mobilization	1	Lump sum
2.	Water Pollution Control	1	Lump sum
3.	Traffic Control	1	Lump sum
4.	Traffic Signal at Harbor Bay Parkway & Penumbra Place/South Loop Road	1	Lump sum
5.	Traffic Signal at Harbor Bay Parkway & North Loop Road/South Loop Road	1	Lump sum
6.	Signing and Striping at Harbor Bay Parkwwy & Penumbra Place/South Loop Road	1	Lump sum
7.	Signing and Striping at Harbor Bay Parkway & North Loop Road/South Loop Road	1	Lump sum
8.	Permits	1	Allowance

SECTION X. MATERIALS

The Contractor shall furnish for use under these special provisions all materials required to complete the contract, except as described under Section VII of the specifications.

SECTION XI. DESCRIPTION AND LOCATION OF WORK

A. DESCRIPTION OF WORK. The work shall generally consist of furnishing all the labor, materials, tools, and equipment necessary to construct and complete in an efficient, operative, and workman like manner the traffic signal installation at Harbor Bay Parkway & North Loop Road/South Loop Road and Harbor Bay Parkway & Penumbra Place/South Loop Road. The project includes, but is not limited to, installation of traffic signal cabinet and controller, service, signal poles, accessible pedestrian signal, video detection systems, battery backup system, and emergency vehicle preemption.

Plans of the street improvements are available for review at the Public Works Department, 950 West Mall Square, Room 110, Alameda, CA 94501.

Amendments to the Standard Specifications set forth in these special provisions shall be considered as part of the Standard Specifications for the purposes set forth in Section 5, "Control of Work", of the Standard Specifications. Whenever either the term "Standard Specifications is amended" or the term "Standard Specifications are amended" is used in the special provisions, the indented text or table following the term shall be considered an amendment to the Standard Specifications. In case of conflict between such amendments and the Standard Specifications, the amendments shall take precedence over and be used in lieu of the conflicting portions.

Examination of plans, specifications, special provisions and site of work. The bidder is required to examine carefully the site and the proposal, plans, specifications and contract forms for the work contemplated, and it will be assumed that the bidder has investigated and is satisfied as to the conditions to be encountered, as to the character, quality and quantities of work to be performed and materials to be furnished, and as to the requirements of the specifications, the special provisions and the contract.

Each bidder, subcontractor, and supplier is responsible for ascertaining, prior to submitting its Bid, that it has reviewed all issued Addenda. If, during the course of the bidder's examination of the Bid Documents and the Site, a bidder finds facts or conditions which appear to be in conflict with the letter or spirit of the bidding documents, the bidder shall apply for additional information and explanation before submitting the bid. The bidder shall be responsible for not clarifying conflicting information or for assuming less costly approaches that could have been resolved by asking questions in writing prior to submitting the bid. The City will issue Addenda if required to response to bidder's questions and other items prior to the bid. **The last day for bidder questions will be 5:00 p.m. on May 29, 2019. Questions must be submitted by electronic mail at: tnguyen@alamedaca.gov.**

All work is to be in conformance with the plans and specifications as required by the Engineer. The contract shall include all work necessary to make the job complete as herein specified or as shown on the plans. The contract may be awarded with Base Bid only or Base Bid with a sequential addition of Add Alternates at the discretion of the City or depending on available funding.

B. PLANS. The following drawings are incorporated into these specifications. Drawing numbers refer to City Engineer's files:

Plans

TITLE: Signal Installations at:
1. Harbor Bay Parkway & North Loop Road/South Loop Road
2. Harbor Bay Parkway & Penumbra Place/South Loop Road

DRAWING NO. 9422

The material furnished for "Electrical Systems" of the 2015 edition of the California Department of Transportation (Caltrans) Standard Specifications and shall include but not be limited to the State Standard Drawings below:

TITLE	DRAWING NO.
Electrical Systems (Legend, Notes and Abbreviations)	RSP ES-1A
Electrical Systems (Legend, Notes and Abbreviations)	RSP ES-1B
Electrical Systems (Legend, Notes and Abbreviations)	RSP ES-1C
Electrical Systems (Service Equipment Enclosure, Type III-A Series)	RSP ES-2D
Electrical Systems (Controller Cabinet Details),	ES-3A
Electrical Systems (Controller Cabinet Adapter, Foundations, Pad Detail)	RSP ES-3B
Electrical Systems (Pedestrian Signal and Ramp Metering)	ES-4B
Electrical Systems (Signal Faces and Emergency Veh. Det. Mountings)	ES-4E
Electrical Systems (Detectors, Pedestrian Push Button and Signs)	ES-5C
Electrical Systems (Push Button Assembly Post)	RSP ES-7A
Electrical Systems (Internally Illuminated Street Name Sign)	ES-7P
Electrical Systems (Traffic Rates Pull Box)	RSP ES-8B
Electrical Systems (Foundation Installations)	ES-11

The following illustration by the State of California, Department of Transportation, 'California Manual on Uniform Traffic Control Devises for Streets and Highways: Part 6 – Temporary Traffic Control', are incorporated into these Specifications:

Right-Hand Lane Closure on Far Side of Intersection	6H-22
Left-Hand Lane Closure on Far Side of Intersection	6H-23
Closure at Side of Intersection	6H-27
Sidewalk Detour or Diversion	6H-28
Crosswalk Closure and Pedestrian Detours	6H-29

SECTION XII. CONSTRUCTION DETAILS

The construction details covered under this Section XII shall be Special Provisions as set forth in Section VIII.

A. MAINTAINING TRAFFIC. Attention is directed to Section 7-1.08, "Public Convenience", 7-1.09, "Public Safety", of the State of California Standard Specifications, and to Section II, Article Q of these specifications.

The Contractor shall furnish, install and maintain such facilities as barricades, traffic signs, and flagmen, as may be necessary to advise the public of construction hazards and to control traffic.

The Contractor will not be permitted to detour traffic from the work area at any time. The Contractor will be required to maintain two-way traffic at all times. Any lane closure shall be subject to the prior approval of the City Engineer.

The full width of the traveled way shall be open for use by public traffic when construction operations are not actively in progress on working days.

Prior to commencement of work, the Contractor shall provide the Engineer with sketches for approval, indicating the method of signing and necessary delineators for proposed lane closures.

The Contractor shall cooperate with local authorities relative to handling traffic through the area and shall make his own arrangement relative to keeping the work area clear of parked vehicles.

The provisions of Section 7-1.08 of the Standard Specifications, regarding State-furnished signs, are hereby revised to provide that all signs and other warning devices shall be provided by the Contractor and shall become his/her property after the completion of the contract. The Contractor shall refer to the current "Manual of Warning Signs, Lights and Devices for Use in the Performance of Work Upon Highways" and the "Uniform Sign Chart" issued by the Department of Transportation, Division of Operations.

Flagmen, if necessary, shall be properly equipped and trained in accordance with "Instructions to Flagmen", published by the California Department of Transportation. Section 12-2.02 is revised to provide that all flagmen shall be furnished by the Contractor at his/her expense.

The provisions in this section may be modified or altered if, in the opinion of the Engineer, public traffic will be better served and work expedited. Said modifications or alterations shall not be adopted until approved in writing by the Engineer.

No additional compensation will be allowed the Contractor for providing for the free passage of traffic through the work. Construction work hours are restricted between 9:00 AM to 5:00 PM, Monday through Friday.

Whenever vehicle or equipment is parked on the shoulder within 6 feet of a traffic lane, the shoulder area shall be closed with florescent traffic cones or portable delineators placed on a taper in advance of the parked vehicle or equipment and along the edge of the pavement at 25-foot intervals to a point no less than 25 feet past the last vehicle or piece of equipment. A minimum of nine (9) cones or portable delineators shall be used for the taper. A C23 (Road Work Ahead) or C24 (Shoulder Work Ahead) sign shall be mounted on a telescoping flag tree with flags. The flag tree shall be placed where directed by the Engineer.

Contractor shall be responsible for posting "No Parking-Tow Away" Signs for the seventy-two (72) hours prior to construction. Contractor must obtain these signs at his/her own expense from the City's Planning and Building Office or at the Department of Public Works. No parking signs shall be posted only when work is being performed by the Contractor at the posted locations. No Parking signs shall display a date range no longer than 2 weeks at any given time. A revision in date range requires re-posting.

All vehicular, bicycle, and pedestrian traffic shall be permitted to pass through the work, unless other existing streets stipulated in the special provisions**. Contractor must comply with ADA requirements, by providing pedestrian access on the sidewalk and crosswalk during construction.**

The Contractor shall furnish, install and maintain such facilities as barricades, traffic signs, and flagmen, as may be necessary to advise the public of construction hazards and to control traffic. A traffic control plan identifying the size and location of such facilities shall be submitted to the Engineer for approval a minimum of two weeks prior to beginning construction. Any work being performed without proper signing in place shall be stopped until the unsatisfactorily condition is corrected. **Contractor shall submit to the Engineer a traffic control plan signed and stamped by a Traffic Engineer registered in the state of California for any work that will impact vehicular, bicycle, and pedestrian traffic in the area and shall be developed to show the actual field conditions and not a typical plan. The contractor must have an approved plan prior to commencing of work. All Traffic Control Plans must be in conformance with Manual on Uniform Traffic Control Devices-CA (MUTCD-CA) regulations and guidelines. Contractor shall submit Traffic Control Plan for approval to the Engineer at the pre-construction. Any work being performed without proper signing in place shall be stopped until the unsatisfactory condition is corrected.**

The Contractor shall place barriers at each end of all excavations and at such places along excavations as may be necessary to warn all pedestrian and vehicular traffic of excavations. Lights shall also be placed along excavations (from sunset each day to sunrise of the next day) until excavation is entirely restored. Material for backfill or for protection of excavation in public roads from surface drainage shall be neatly placed and stored in containers so as to cause the least possible interference with public travel. Free access must be maintained to all fire hydrants, water valves and meters, and private driveways.

Storage of construction material and equipment on City streets will not be permitted.

No trench or excavation shall be left open at the end of any day's work. Daily traffic control measures shall continue until cleanup activities have been satisfactorily completed and all of the Contractor's equipment has been removed from the traveled way area.

The provision of this section will not relieve the Contractor from his/her responsibility to provide such additional devices or take such measures as may be necessary to comply with the provision in Section 7-1.09, "Public Safety," of the Standard Specifications.

Contractor shall not work on multiple streets at a time unless approved by the engineer.

See Section II-P. for traffic control guidelines. This section also outlines times construction is allowed on certain streets in the City. (Night work, if requested by the Contractor, must be approved by the City Engineer.)

B. ORDER OF WORK. Order of work shall conform to provisions of Section 5-1.05, "Order of Work", of the Standard Specifications and these Special Provisions.

The Contractor shall coordinate his work with all other contractors or utility companies working in the construction area.

At least three (3) working days prior to the placement of any new traffic striping and pavement markings, the Contractor shall layout cat-tracks for the traffic striping and pavement marking and contact the City inspector for inspection and approval of the cat-tracking. The City shall review, modify as necessary, and approve the cat-tracking prior to the Contractor proceeding with the striping/marking. The Contractor may not proceed with the striping/marking work until the cat-tracks have been approved by the Engineer or approved designee. The Contractor shall post temporary "No Parking" signs in accordance with the provisions of the Section II-P, "PUBLIC CONVENIENCE AND SAFETY" of these Specifications.

Any work done without proper inspection and approval will be subject to rejection. In the case of rejection, the Contractor shall remove the rejected work, and the striping/marking work shall be reinstalled in accordance with these requirements and based on the direction of the Engineer. The City will not compensate the Contractor for any work associated with replacing striping/marking to the satisfaction of the Engineer, including but not limited to: the full removal of the rejected traffic striping and pavement marking work; the installation of new striping/marking, including blacking out any of the removed and rejected striping/marking; and the re-posting of temporary "No Parking" signs in accordance with the provisions of the Section II-P, "PUBLIC CONVENIENCE AND SAFETY" of these Specifications. All of these costs shall be borne by the Contractor.

C. PORTLAND CEMENT CONCRETE. All concrete shall be Class "A" unless otherwise specified and shall meet the requirements of the Standard Specifications, Section 90. If it is found necessary to increase the slump of concrete at the site of the work it shall be done only by the addition of 16 pounds of cement (1/6 sack) per gallon of water. Such addition shall be made only at the direction of the Engineer and in his presence.

All edges of concrete shall be edged with a cement edger of the size 2-3/4" in width with a 3/16" radius. All joints or grooves that are indicated on the plans or required by the Engineer shall be marked with cement grooves or jointers 4" in width and having a groove 3/8" wide at the top and a depth of l/4" to l/2".

A power driven pavement saw shall be used to cut existing Portland cement concrete sidewalk, curb and gutter where it is necessary to remove the concrete. The depth of the cut shall be a minimum of 1-1/2" and straight; and, if two cuts are made, they shall be parallel. The cut shall be deep enough to permit complete breakage of the concrete without ragged edges. Sawcut debris is not permitted to enter the storm drain system and shall be vacuumed up by the contractor.

All concrete with exposed surfaces, such as sidewalk, curb, gutter, local depressions, driveway and catch basins tops shall be colored by adding to the mix a proportionate amount of the best quality lampblack, such proportion to be 1 ½ Lbs. Lampblack per each cubic yard.

All new or previously existing concrete surfaces shall be left neat, clean and free from concrete droppings. The Contractor shall be responsible for preventing vandals or others from disfiguring or defacing the finished surfaces. Any new concrete surfaces disfigured due to pouring late in the day, or due to the failure on the part of the Contractor to provide adequate protection or covering to the new surfaces, shall be replaced at the Contractor's expense. The work shall conform to Section II-U "Construction Site Control" and Section III-E "Clean Up".

The name of the Contractor and the year the work is performed shall be stamped upon both ends of each single piece of any concrete work, as called for by Section No. 22-5.3 of the Municipal Code. Contractor shall obtain a load slip from each delivery and give one copy of said slip to the Engineer at the point of deliver of the material.

All exposed surfaces shall be cured by the impervious membrane method to the satisfaction of the Engineer.

D. EQUAL AND/OR APPROVED EQUAL

Wherever the term "or equal" and/or "approved equal" are used following a trade name or the mention of any patented product in the specifications, they shall be deemed to read "or their equals in quality and utility" where two or more such trade names or patented products are mentioned. If any trade name or patented product or process is mentioned in these specifications and is not followed by any such term as "or equal", such trade name or patented product or process shall be deemed to be followed by the words "or its equal in quality and utility " or "or their equals in quality and utility" if more than one is mentioned. Trade names, proprietary products and methods are used merely as standards of quality and utility and to designate the

type of material and processes desired. Materials and processes of equal quality and utility may be furnished or used so long as such substitution causes no delay to product delivery and/or installation and the Contractor has received written approval therefor by the Engineer. The Contractor shall allow 30 days for the Engineer's review of the proposed substitution.

E. DISPOSAL OF EXCAVATED MATERIALS. See Section II-V.

F. EXISTING IMPROVEMENTS. Existing fence, lawn, or other improvements within the area of the work shall be carefully removed without damage and replaced in their present location and condition upon completion of the work, in a manner satisfactory to the Engineer and the owner.

Existing lawn shall be removed only where necessary and shall be replaced if considered by the Engineer to be in good condition. Otherwise, the Contractor shall furnish four inches (4") of new loam and plant new lawn, all as approved by the Engineer. All ground surface and replaced lawn shall be left smoothly graded to the original grade.

All existing irrigation system including electric wire, pipelines, sprinkler heads, damaged as a direct or indirect result of construction activity, shall be replaced by the Contractor at his/her expense at appropriate locations in a manner satisfactory to the Engineer and the owner. Any existing improvements that are damaged or disturbed due to carelessness by the Contractor shall be replaced or adjusted to the satisfaction of the Engineer.

Existing fence or other improvements within the area of the work shall be carefully removed without damage and replaced in their present location and condition upon completion of the work, in a manner satisfactory to the Engineer and the owner.

The Contractor shall not disturb or destroy any permanent survey points and/or monuments without the written consent of the City of Alameda. Any permanent survey points and/or monuments disturbed or destroyed, as a direct or indirect result of construction activity shall be replaced to the satisfaction of the Engineer by a licensed surveyor at the Contractor’s expense.

All decorative landscaping (shrubs, plants, trees, lawn, etc.) and/or hardscaped ground surfaces (exposed aggregate, bricks and mortar, painted concrete, etc.) that are removed, damaged, or destroyed as a direct or indirect result of any work done for this project shall be replaced by the contractor at his expense and in the manner that is satisfactory to the engineer and the owner.

Unless specified separately by bid items, payment for existing improvements should be included in various bid items and no additional payment will be made.

G. TREE ROOTS. Where tree roots conflict with the grade for the placement or replacement of concrete work, the Contractor shall inform the City Maintenance Division immediately. When directed by the City Maintenance Division, the Contractor shall perform the necessary root removal and trimming to a minimum depth of ten inches (10") below the proposed concrete, to

prepare the site for the concrete work. All cut roots shall be properly painted with an approved root-sealing compound. The Contractor shall then proceed with the work to completion. The cost of the Contractor cutting the tree roots involved shall be included in the cost of the work.

Prior to any lateral extension excavation, the area must be reviewed by the Engineer or his representative, and if required, the City Arborist shall supervise the excavation and any root cutting or shaving where tree conflicts exist.

If root trimming is not allowed by the City Maintenance Division, all trees that could be damaged from equipment will require protection from physical injury. Tree trunks are to be wrapped with orange plastic construction fencing from the base up to the first branch. The plastic fencing must be wrapped to a minimum thickness of 2 inches to protect from possible injury. Additional protection from larger equipment can be provided by strapping 2x4 boards over the orange fencing on the side of the tree where there is a potential for injury. When trenching is undertaken, the size of the equipment may require that upper scaffold stems are also wrapped and protected. Hand digging is the only acceptable method for excavating the soil within five feet of the base of trees.

H. UTILITY RELOCATION. The known existing utilities and pipelines except building connections (laterals) are shown on the Drawings in their approximate location. The Contractor shall exercise care in avoiding damage to all utilities, as he/she will be held responsible for their repair if damaged. There is no guarantee that all utilities or obstructions are shown, or that locations indicated are accurate. Utilities are piping, conduits, wire, cable, poles, ducts, manholes, pull boxes and the like, located at the project site.

The Contractor shall be responsible for locating, protecting and supporting all utilities, which are to remain whether shown or not shown on the plans. Full compensation for this work shall be considered as included in the prices paid for the various contract items of work, and no additional allowance will be made.

The Contractor shall contact all affected utility owners and request them to locate their respective utilities prior to the start of "potholing" procedures. The utility owner shall be given seven days written notice prior to commencing potholing. If a utility owner is not equipped to locate its utility, the Contractor shall locate it.

The location of all affected utility underground pipes; conduits and other utilities shall be clearly marked on the pavement or with suitable markers if not on pavement. In addition to the location of metallic pipes and conduits, non-metallic pipe, ducts and conduits shall also be similarly located using surface indicators and shall then be similarly marked.

After the utility survey is completed, potholing shall commence to determine the actual location of the utilities. Prior to excavating for any new pipelines or structures, the Contractor shall locate and uncover all existing utilities to a point one foot below the utility. Pothole for all utilities where crossings, interferences, or connections to the new pipelines are shown on the Drawings, marked by the utility companies, or indicated by surface signs. The Contractor shall submit a report identifying each underground utility and its depth and station. Any variation in the actual elevations and the indicated elevations shall be brought to the Engineer's attention.

Any necessary relocations of utilities, whether shown on the Drawings or not, shall be coordinated with the affected utility. The Contractor shall perform the relocation only if instructed to do so in writing from the utility and the Engineer. Payment for work not shown on the Drawings shall be in accordance with Section VII, Article B, of these specifications or for a price previously agreed upon in writing, by the Contractor and the Engineer. If the Contractor does not expose all required utilities, he shall not be entitled to additional compensation for work necessary to avoid interferences, nor for repair to damaged utilities.

Excavations around underground electrical ducts and conduits shall be performed using extreme caution to prevent injury to workmen or damage to electrical ducts or conduits. Similar precautions shall be exercised around gas lines, telephone and television cables.

Backfill and pave with one inch of cutback after completing potholing.

If interferences occur at locations other than shown on the Drawings, the Contractor shall notify the Engineer, and a method for correcting said interferences shall be supplied by the Engineer. Payment for interferences that are not shown on the plans, nor for which there are surface indications, shall be in accordance with the provisions of the General Conditions.

Planned utility service shutdowns shall be accomplished during periods of minimum use. In some cases this may require night or weekend work, at no additional cost to the City. The Contractor shall program his work so that service will be restored in the minimum possible time, and shall cooperate with the utility companies in reducing shutdowns of utility systems to a minimum.

No utility shall be disconnected without prior written approval from the utility owner. When it is necessary to disconnect a utility, the Contractor shall give the utility owner not less than 72 hours (3 working days) notice when requesting written approval. The Contractor shall program his work so that service will be restored in the minimum possible time.

There are existing overhead electric and telephone transmission lines along the pipeline routes. These overhead utilities are not shown on the Drawings. Extreme caution shall be used when working in the vicinity of overhead utilities so as to prevent injury to workmen or damage to the utilities. The Contractor shall be required to comply with the applicable provisions of the California Construction Safety Orders when working anywhere on this project.

Existing gas, water, sewer and telephone house laterals are not specifically shown on the Drawings but do exist along the pipeline routes. Protect all service laterals from damage due to construction operations. If any laterals are damaged, notify the Engineer and the affected utility immediately. The cost of repair shall be borne by the Contractor.

I. EXCAVATION AND BACKFILL Method of excavation, trench shoring and dewatering, if applicable, shall be the responsibility of the Contractor, subject to the approval of the Engineer. It should be presumed that the presence of high groundwater will require dewatering operations.

The Contractor shall conform to the rules and regulations pertaining to safety established by the California Division of Occupational Safety and Health of the Industrial Relations Department.

Any excavation shall be supported so that it will be safe and the ground alongside the excavation will not slide or settle, and all existing improvements, either on public or private property, will be fully protected from damage.

Any damage or collapse of pavement or improvements beyond the trench shoring or excavation limits, due to sliding, caving, or settling of ground during excavation, construction, or backfilling, or from construction equipment, shall be repaired to the satisfaction of the Engineer at the Contractor's expense. All supports shall be removed after construction is completed, unless otherwise directed by the Engineer, and shall be withdrawn in a manner that will prevent the caving of the sides of the excavation. All openings caused by the removal of supports shall be filled with suitable material properly compacted.

Approved local or imported material shall be used for backfill. When the material from the excavation is unsuitable for backfill; it shall be disposed of and a suitable material (free from large stones) and approved by the Engineer, shall be furnished by the Contractor for the backfill. Backfilling shall be accomplished by tapping or ramming with proper tools for the full depth to sub-grade elevation in six inch (6") layers or less. Relative compaction shall be ninety-five percent (95%) or more as determined by the Impact or Field Method Compaction Test. Flooding or jetting of backfill shall not be allowed.

Backfilling of trenches in pipe areas shall be accomplished by backfilling on both sides of the pipe simultaneously so that injurious side pressures do not occur. Backfilling around the pipe by bulldozer or other mechanical equipment will not be allowed.

Guidelines for site preparation, suitable backfill material, material requirements, fill placement and compaction are outlined in the Geotechnical Report.

Payment for excavation and backfill shall be included in the various bid items of these specifications. The contractor shall provide the engineer daily load tags for backfill material used.

J. SEWAGE PUMPING. The Contractor shall furnish, install, and operate pumps, conduits, and other equipment to divert the flow of sewage during the project construction.

The pumping system shall be of sufficient capacity to handle existing flow plus additional flow that may occur during a rainstorm. If pumping is required on a 24-hour basis, engines shall be equipped in a manner to keep noise to a minimum. Standby pumps shall be provided as required. Pumping shall be done by the Contractor in such a manner that it will not damage public or private property or create a nuisance or health menace. The pumped sewage shall be in an enclosed hose or pipe and shall be reinserted into the sanitary sewer system. Sewage shall not be allowed to free flow in gutters, streets, or over sidewalks, etc. Nor shall any sewage be allowed to flow into the storm inlets, the lagoon or conduits. Pumping and all related work shall be included in various items and shall not be considered for additional payment.

Contractor shall submit a pump set up diagram showing the intake point and outfall point, including the pump size, pipe size for the sewage conveyance from the existing system.

Payment for sewage pumping whether on public right-of-way and private property shall be included in the various contract items of work.

K. CONTROL OF WATER All excavations shall be kept free from water and all construction shall be in the dry. The presence of high groundwater will require dewatering operations. The contractor shall furnish, install, maintain and operate all necessary pumping and other equipment for dewatering all excavations. The contractor shall at all times have on the project sufficient pumping equipment for immediate use, including standby pumps for use in case other pumps become inoperable. A sufficient number of pumps shall be provided as to hold the groundwater level at an elevation not less than two feet below the lowest elevation of the concrete or other material to be placed. Water shall be disposed of in such a manner as to cause no injury or nuisance to public or private property, or be menace to the public health.

The dewatering operation shall be continuous, so that the excavated areas shall be kept free from water during construction, while concrete is setting and achieves full strength, and until backfill has been placed to a sufficient height to anchor the work against possible floatation.

Dewatering shall be continued during, backfilling operations such that the groundwater is at least one foot below the level of the compaction effort at all times. No compaction of saturated clay materials shall be allowed.

Dewatering devices must be adequately filtered to prevent the removal of fines from the soil.

The Contactor shall be responsible for any damage to foundations or any other parts of existing structures or the new work caused by failure of any part of the Contractor's protective works. After temporary protective works are no longer needed for dewatering purposes, they shall be removed by the Contractor.

If pumping is required on a 24- hour basis, requiring engine drives, then engines shall be equipped in a manner to keep noise to a minimum. Refer to Section II, Article T, of these specifications for noise control requirements.

The contractor shall be responsible for furnishing temporary drainage facilities to convey and dispose of surface water falling or passing over site.

No sediment shall be pumped from the excavation. Refer to Section II, Article S, of these specifications for construction site controls.

Payment for dewatering whether on public right-of-way and private property shall be included in the various contract items of work**.**

L. EXTENT OF CONTRACT. The Contractor shall furnish all labor, material has herein specified, tools and equipment necessary and shall do all the work necessary to construct and put in complete order for use the construction project contemplated by these specifications, the various items, and in the approximate quantities tabulated in the Proposal, Section XIV.

1. MOBILIZATION (BID ITEM #1). Mobilization shall consist of preparatory work and operations, including but not limited to those necessary for the movement of personnel, equipment, supplies and incidentals to the project site; for the establishment of all offices and facilities necessary for the work on the project; and for all other work and operations which must be performed or cost incurred prior to beginning work on the various contract items on the project site.

Contractor shall be responsible for providing water and electricity and toilet facilities for construction purposes to the site.

Mobilization shall be in accordance with Section 11 of the State Standard Specifications. A field office for the Engineer is not required as part of the project costs.

The Contractor shall notify the appropriate regional notification center for operators of subsurface installations at least 2 working days, but not more than 14 calendar days, prior to commencing excavation for construction area sign posts. The regional notification centers include, but are not limited to, the following:

Notification Center Telephone Number	(800) 642 2444
Underground Service Alert Northern California (USA)	(800) 227 2600

Excavations required to install construction identification sign shall be performed by hand methods without the use of power equipment, except that power equipment may be used if it is determined there are no utility facilities in the area of the proposed post holes. The post hole diameter, if backfilled with Portland cement concrete, shall be at least 4 inches greater than the longer dimension of the post cross section.

Construction identification sign shall be placed where directed by the Engineer.

Payment

The contract lump sum price paid for Mobilization shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals and for doing all the work involved in preparing, obtaining approval of, and amending the Mobilization as specified in Section 9 of Standard Specifications and these special provisions, and as directed by the Engineer.

2. WATER POLLUTION CONTROL (BID ITEM #2)

CONSTRUCTION SITE MANAGEMENT. Construction site management shall consist of controlling potential sources of water pollution before they come in contact with storm water systems or watercourses. The Contractor shall control material pollution and manage waste and

non-storm water existing at the construction site by implementing effective handling, storage, use, and disposal practices.

Attention is directed to "Water Pollution Control" of these special provisions regarding the Contractor's appointment of a water pollution control manager (WPCM) for the project.

The Contractor shall train all employees and subcontractors regarding:

A. Material pollution prevention and control;
B. Waste management;
C. Non-storm water management;
D. Identifying and handling hazardous substances; and
E. Potential dangers to humans and the environment from spills and leaks or exposure to toxic or hazardous substances.

Training shall take place before starting work on this project. New employees shall receive the complete training before starting work on this project. The Contractor shall have regular meetings to discuss and reinforce spill prevention and control; material delivery, storage, use, and disposal; waste management; and non-storm water management procedures.

Instructions for material and waste handling, storage, and spill reporting and cleanup shall be posted at all times in an open, conspicuous, and accessible location at the construction site.

Nonhazardous construction site waste and excess material shall be recycled when practical or disposed of in accordance with the provisions in Section 7-1.13, "Disposal of Material Outside the Highway Right of Way," of the Standard Specifications, unless otherwise specified.

Vehicles and equipment at the construction site shall be inspected by the WPCM on a frequent, predetermined schedule, and by the operator each day of use. Leaks shall be repaired immediately, or the vehicle or equipment shall be removed from the construction site.

Spill Prevention and Control

The Contractor shall implement spill and leak prevention procedures when chemicals or hazardous substances are stored. Spills of petroleum products; substances listed under CFR Title 40, Parts 110, 117, and 302; and sanitary and septic waste shall be contained and cleaned up as soon as is safe.

Minor spills involve small quantities of oil, gasoline, paint, or other material that can be controlled by the first responder upon discovery of the spill. Cleanup of minor spills includes:

A. Containing the spread of the spill,
B. Recovering the spilled material using absorption,
C. Cleaning the contaminated area, and
D. Disposing of contaminated material promptly and properly.

Semi-significant spills are those that can be controlled by the first responder with the help of other personnel. Cleanup of semi-significant spills shall be immediate. Cleanup of semi-significant spills includes:

A. Containing the spread of the spill;
B. Recovering the spilled material using absorption if the spill occurs on paved or an impermeable surface;
C. Containing the spill with an earthen dike and digging up contaminated soil for disposal if the spill occurs on dirt;
D. Covering the spill with plastic or other material to prevent contaminating runoff if the spill occurs during precipitation; and
E. Disposing of contaminated material promptly and properly.

Significant or hazardous spills are those that cannot be controlled by construction personnel. Notifications of these spills shall be immediate. The following steps shall be taken:

A. Construction personnel shall not attempt to cleanup the spill until qualified staff have arrived;
B. Notify the Engineer and follow up with a written report;
C. Obtain the services of a spills contractor or hazardous material team immediately;
D. Notify the local emergency response team by dialing 911 and county officials at the emergency phone numbers kept on the construction site;
E. Notify the Governor's Office of Emergency Services Warning Center at (805) 852 7550;
F. Notify the National Response Center at (800) 424 8802 regarding spills of Federal reportable quantities in conformance with CFR Title 40, Parts 110, 119, and 302;
G. Notify other agencies as appropriate, including:
    a. Fire Department,
    b. Public Works Department,
    c. Coast Guard,
    d. Highway Patrol,
    e. City Police or County Sheriff Department,
    f. Department of Toxic Substances,
    g. California Division of Oil and Gas,
    h. Cal OSHA, or
    i. Regional Water Resources Control Board.

The WPCM shall oversee and enforce proper spill prevention and control measures. Minor, semi-significant, and significant spills shall be reported to the Contractor's WPCM who shall notify the Engineer immediately.

The Contractor shall prevent spills from entering storm water runoff before and during cleanup. Spills shall not be buried or washed with water.

The Contractor shall keep material or waste storage areas clean, well organized, and equipped with enough cleanup supplies for the material being stored. Plastic shall be placed under paving equipment when not in use to catch drips.

Material Management

Material shall be delivered, used, and stored for this contract in a manner that minimizes or eliminates discharge of material into the air, storm drain systems, or watercourses.

The Contractor shall implement the practices described in this section when taking delivery of, using, or storing the following materials:

A. Hazardous chemicals including:
    a. Acids,
    b. Lime,
    c. Glues,
    d. Adhesives,
    e. Paints,
    f. Solvents, and
    g. Curing compounds;
B. Soil stabilizers and binders;
C. Fertilizers;
D. Detergents;
E. Plaster;
F. Petroleum products including:
    a. Fuel,
    b. Oil, and
    c. Grease;
G. Asphalt components and concrete components; and
H. Pesticides and herbicides.

The Contractor shall supply the Material Safety Data Sheet to the Engineer for material used or stored. The Contractor shall keep an accurate inventory of material delivered and stored at the construction site.

Employees trained in emergency spill cleanup procedures shall be present when hazardous materials or chemicals are unloaded.

The Contractor shall use recycled or less hazardous products when practical.

Material Storage

The Contractor shall store liquids, petroleum products, and substances listed in CFR Title 40, Parts 110, 117, and 302 in containers or drums approved by the United States Environmental Protection Agency, and place them in secondary containment facilities.

Secondary containment facilities shall be impervious to the materials stored there for a minimum contact time of 72 hours.

Throughout the rainy season secondary containment facilities shall be covered during non-working days and when precipitation is predicted. Secondary containment facilities shall be adequately ventilated.

The Contractor shall keep the secondary containment facility free of accumulated rainwater or spills. After precipitation, or in the event of spills or leaks, accumulated liquid shall be collected and placed into drums within 24 hours. These liquids shall be handled as hazardous waste in accordance with the provisions in "Hazardous Waste" of these special provisions, unless testing determines them to be nonhazardous.

Incompatible materials, such as chlorine and ammonia, shall not be stored in the same secondary containment facility.

Materials shall be stored in the original containers with the original product labels maintained in legible condition. Damaged or illegible labels shall be replaced immediately.

The secondary containment facility shall have the capacity to contain precipitation from a 24-hour-long, 25-year storm; and 10 percent of the aggregate volume of all containers, or all of the volume of the largest container within the facility, whichever is greater.

The Contractor shall store bagged or boxed material on pallets. Throughout the rainy season, bagged or boxed material shall be protected from wind and rain during non-working days and when precipitation is predicted.

The Contractor shall provide sufficient separation between stored containers to allow for spill cleanup or emergency response access. Storage areas shall be kept clean, well organized, and equipped with cleanup supplies appropriate for the materials being stored.

The Contractor shall repair or replace perimeter controls, containment structures, covers, and liners as needed. Storage areas shall be inspected before and after precipitation, and at least weekly during other times.

Stockpile Management

The Contractor shall reduce or eliminate potential air and water pollution from stockpiled material including soil, paving material, or pressure treated wood. Stockpiles shall be located out of floodplains when possible, and at least 50 feet from concentrated flows of storm water, drainage courses, or inlets unless written approval is obtained from the Engineer.

The Contractor may discontinue adding or removing material for up to 21 days and a stockpile will still be considered active.

The Contractor shall protect active stockpiles with plastic or geotextile cover, soil stabilization measures, or with linear sediment barrier when precipitation is predicted. Active stockpiles of cold mix asphalt concrete shall be placed on an impervious surface and covered with plastic when precipitation is predicted.

The Contractor shall protect inactive soil stockpiles with a plastic or geotextile cover, or with soil stabilization measures at all times during the rainy season. A linear sediment barrier around the perimeter of the stockpile shall also be used. During the non-rainy season soil stockpiles shall be covered and protected with a linear sediment barrier when precipitation is predicted. The Contractor shall control wind erosion during dry weather as provided in Section 10, "Dust Control," of the Standard Specifications.

Stockpiles of Portland cement concrete rubble, asphalt concrete (AC), hot mix asphalt (HMA), AC and HMA rubble, aggregate base, or aggregate subbase shall be covered with plastic or geotextile, or protected with a linear sediment barrier at all times during the rainy season, and when precipitation is predicted during the non-rainy season.

Stockpiles of cold mix asphalt concrete shall be placed on and covered with impermeable material at all times during the rainy season, and when precipitation is predicted during the non-rainy season.

Stockpiles of pressure treated wood shall be covered with impermeable material and placed on pallets at all times during the rainy season, and when precipitation is predicted during the non-rainy season.

The Contractor shall repair or replace linear sediment barriers and covers as needed or as directed by the Engineer to keep them functioning properly. Sediment shall be removed when it accumulates to 1/3 of the linear sediment barrier height.

Waste Management

Solid Waste

The Contractor shall not allow litter or debris to accumulate anywhere on the construction site, including storm drain grates, trash racks, and ditch lines. The Contractor shall pick up and remove trash and debris from the construction site at least once a week. The WPCM shall monitor solid waste storage and disposal procedures on the construction site. The Contractor shall provide enough dumpsters of sufficient size to contain the solid waste generated by the project. Dumpsters shall be emptied when refuse reaches the fill line. Dumpsters shall be watertight. The Contractor shall not wash out dumpsters on the construction site. The Contractor shall provide additional containers and more frequent pickup during the demolition phase of construction.

Solid waste includes:

A. Brick,
B. Mortar,
C. Timber,
D. Metal scraps,
E. Sawdust,
F. Pipe,

G. Electrical cuttings,
H. Non-hazardous equipment parts,
I. Styrofoam and other packaging materials,
J. Vegetative material and plant containers from highway planting, and
K. Litter and smoking material, including litter generated randomly by the public.

Trash receptacles shall be provided and used in the Contractor's yard, field trailers, and locations where workers gather for lunch and breaks.

Hazardous Waste

The Contractor shall implement hazardous waste management practices when waste is generated on the construction site from the following substances:

A. Petroleum products,
B. Asphalt products,
C. Concrete curing compound,
D. Pesticides,
E. Acids,
F. Paints,
G. Stains,
H. Solvents,
I. Wood preservatives,
J. Roofing tar, and
K. Materials classified as hazardous by California Code of Regulations, Title 22, Division 4.5; or listed in CFR Title 40, Parts 110, 117, 261, or 302.

Nothing in these special provisions shall relieve the Contractor of the responsibility for compliance with Federal, State, and local laws regarding storage, handling, transportation, and disposal of hazardous wastes.

The WPCM shall oversee and enforce hazardous waste management practices. Production of hazardous materials and hazardous waste on the construction site shall be kept to a minimum. Perimeter controls, containment structures, covers, and liners shall be repaired or replaced when damaged.

The Contractor shall have a laboratory certified by the Department of Health Services (DHS) sample and test waste when hazardous material levels are unknown to determine safe methods for storage and disposal.

The Contractor shall segregate potentially hazardous waste from nonhazardous waste at the construction site. Hazardous waste shall be handled, stored, and disposed of as required in California Code of Regulations, Title 22, Division 4.5, Section 66262.34; and in CFR Title 49, Parts 261, 262, and 263.

The Contractor shall store hazardous waste in sealed containers constructed and labeled with the contents and date accumulated as required in California Code of Regulations, Title 22, Division 4.5; and in CFR Title 49, Parts 172, 173, 178, and 179. Hazardous waste containers shall be kept in temporary containment facilities conforming to the provisions in "Material Storage" of these special provisions.

There shall be adequate storage volume and containers shall be conveniently located for hazardous waste collection. Containers of hazardous waste shall not be overfilled and hazardous wastes shall not be mixed. Containers of dry waste that are not watertight shall be stored on pallets. The Contractor shall not allow potentially hazardous waste to accumulate on the ground. Hazardous waste shall be stored away from storm drains, watercourses, moving vehicles, and equipment.

The Contractor shall clean water based or oil based paint from brushes or equipment within a contained area and shall not contaminate soil, watercourses, or storm drain systems. Paints, thinners, solvents, residues, and sludges that cannot be recycled or reused shall be disposed of as hazardous waste. When thoroughly dry, latex paint and paint cans, used brushes, rags, absorbent materials, and drop cloths shall be disposed of as solid waste.

The Contractor shall dispose of hazardous waste within 90 days of being generated. Hazardous waste shall be disposed of by a licensed hazardous waste transporter using uniform hazardous waste manifest forms and taken to a Class I Disposal Site. A copy of the manifest shall be provided to the Engineer.

Contaminated Soil

The Contractor shall identify contaminated soil from spills or leaks by noticing discoloration, odors, or differences in soil properties. Soil with evidence of contamination shall be sampled and tested by a laboratory certified by DHS. If levels of contamination are found to be hazardous, the soil shall be handled and disposed of as hazardous waste.

The Contractor shall prevent the flow of water, including ground water, from mixing with contaminated soil by using one or a combination of the following measures:

A. Berms,
B. Cofferdams,
C. Grout curtains,
D. Freeze walls, or
E. Concrete seal course.

If water mixes with contaminated soil and becomes contaminated, the water shall be sampled and tested by a laboratory certified by the DHS. If levels of contamination are found to be hazardous, the water shall be handled and disposed of as hazardous waste.

Concrete Waste

The Contractor shall implement practices to prevent the discharge of portland cement concrete, AC, or HMA waste into storm drain systems or watercourses.

Portland cement concrete, AC, or HMA waste shall be collected at the following locations and disposed of:

A. Where concrete material, including grout, is used;
B. Where concrete dust and debris result from demolition;
C. Where sawcutting, coring, grinding, grooving, or hydro-concrete demolition of portland cement concrete, AC, or HMA creates a residue or slurry; or
D. Where concrete trucks or other concrete-coated equipment is cleaned at the construction site.

Liquid Waste

The Contractor shall not allow construction site liquid waste, including the following, to enter storm drain systems or watercourses:

A. Drilling slurries or fluids,
B. Grease-free or oil-free wastewater or rinse water,
C. Dredgings,
D. Liquid waste running off a surface including wash or rinse water, or
E. Other non-storm water liquids not covered by separate permits.

The Contractor shall hold liquid waste in structurally sound, leak proof containers such as:

A. Sediment traps,
B. Roll-off bins, or
C. Portable tanks.

Liquid waste containers shall be of sufficient quantity and volume to prevent spills and leaks. The containers shall be stored at least 50 feet from storm drains, watercourses, moving vehicles, and equipment.

The Contractor shall remove and dispose of deposited solids from sediment traps as provided in "Solid Waste" of these special provisions, unless determined infeasible by the Engineer.

Liquid waste may require testing to determine hazardous material content before disposal.

Drilling fluids and residue shall be disposed of outside the highway right of way. If the Engineer determines that an appropriate location is available, fluids and residue exempt under

California Code of Regulations, Title 23, Section 2511(g) may be dried by infiltration and evaporation in a leak proof container. The remaining solid waste may be disposed of as provided in "Solid Waste" of these special provisions.

Non-Storm Water Management

Water Control and Conservation

The Contractor shall prevent erosion or the discharge of pollutants into storm drain systems or watercourses by managing the water used for construction operations. The Contractor shall obtain the Engineer's approval before washing anything on the construction site with water that could discharge into a storm drain system or watercourse. Discharges shall be reported to the Engineer immediately.

The Contractor shall implement water conservation practices when water is used on the construction site. Irrigation areas shall be inspected and watering schedules shall be adjusted to prevent erosion, excess watering, or runoff. The Contractor shall shut off the water source to broken lines, sprinklers, or valves, and they shall be repaired as soon as possible. When possible, water from waterline flushing shall be reused for landscape irrigation. Paved areas shall be swept and vacuumed, not washed with water.

Construction water runoff, including water from water line repair, shall be directed to areas to infiltrate into the ground and shall not be allowed to enter storm drain systems or watercourses. Spilled water shall not be allowed to escape water truck filling areas. When possible, the Contractor shall direct water from off-site sources around the construction site, or shall minimize contact with the construction site.

Illegal Connection and Discharge Detection and Reporting

The Contractor shall inspect the construction site and the site perimeter before beginning work for evidence of illegal connections, discharges, or dumping. Subsequently, the construction site and perimeter shall be inspected on a frequent, predetermined schedule.

The Contractor shall immediately notify the Engineer when illegal connections, discharges, or dumping are discovered. The Contractor shall take no further action unless directed by the Engineer. Unlabeled or unidentifiable material shall be assumed to be hazardous.

The Contractor shall look for the following evidence of illegal connections, discharges, or dumping:

A. Debris or trash piles,
B. Staining or discoloration on pavement or soils,
C. Pungent odors coming from drainage systems,
D. Discoloration or oily sheen on water,
E. Stains or residue in ditches, channels or drain boxes,
F. Abnormal water flow during dry weather

G. Excessive sediment deposits,
H. Nonstandard drainage junction structures, or
I. Broken concrete or other disturbances near junction structures.

Vehicle and Equipment Cleaning

The Contractor shall limit vehicle and equipment cleaning or washing on the construction site to that necessary to control vehicle tracking or hazardous waste. Vehicles and equipment shall not be cleaned on the construction site with soap, solvents, or steam until the Engineer has been notified. The resulting waste shall be contained and recycled, or disposed of as provided in "Liquid Waste" or "Hazardous Waste" of these special provisions, whichever is applicable. The Contractor shall not use diesel to clean vehicles or equipment, and shall minimize the use of solvents.

The Contractor shall clean or wash vehicles and equipment in a structure equipped with disposal facilities. If using a structure is not possible, vehicles and equipment shall be cleaned or washed in an outside area with the following characteristics:

A. Located at least 50 feet from storm drainage systems or watercourses,
B. Paved with AC, HMA, or portland cement concrete,
C. Surrounded by a containment berm, and
D. Equipped with a sump to collect and dispose of wash water.

When washing vehicles or equipment with water, the Contractor shall use as little water as possible. Hoses shall be equipped with a positive shutoff valve.

Wash racks shall discharge to a recycle system or to another system approved by the Engineer. Sumps shall be inspected regularly, and liquids and sediments shall be removed as needed.

Vehicle and Equipment Fueling and Maintenance

The Contractor shall fuel or perform maintenance on vehicles and equipment off the construction site whenever practical. When fueling or maintenance must be done at the construction site, the Contractor shall designate a site, or sites, and obtain approval from the Engineer before using. The fueling or maintenance site shall be protected from storm water, shall be on level ground, and shall be located at least 50 feet from drainage inlets or watercourses. The WPCM shall inspect the fueling or maintenance site regularly. Mobile fueling or maintenance shall be kept to a minimum.

The Contractor shall use containment berms or dikes around the fueling and maintenance area. Adequate amounts of absorbent spill cleanup material and spill kits shall be kept in the fueling and maintenance area and on fueling trucks. Spill cleanup material and kits shall be disposed of immediately after use. Drip pans or absorbent pads shall be used during fueling or maintenance unless performed over an impermeable surface.

Fueling or maintenance operations shall not be left unattended. Fueling nozzles shall be equipped with an automatic shutoff control. Vapor recovery fueling nozzles shall be used where required by the Air Quality Management District. Nozzles shall be secured upright when not in use. Fuel tanks shall not be topped-off.

The Contractor shall recycle or properly dispose of used batteries and tires.

Material and Equipment Used Over Water

Drip pans and absorbent pads shall be placed under vehicles or equipment used over water, and an adequate supply of spill cleanup material shall be kept with the vehicle or equipment. Drip pans or plastic sheeting shall be placed under vehicles or equipment on docks, barges, or other surfaces over water when the vehicle or equipment will be idle for more than one hour.

The Contractor shall provide watertight curbs or toe boards on barges, platforms, docks, or other surfaces over water to contain material, debris, and tools. Material shall be secured to prevent spills or discharge into water due to wind.

Structure Removal Over or Adjacent to Water

The Contractor shall not allow demolished material to enter storm water systems or watercourses. The Contractor shall use covers and platforms approved by the Engineer to collect debris. Attachments shall be used on equipment to catch debris on small demolition operations. Debris catching devices shall be emptied regularly and debris shall be handled as provided in "Waste Management" of these special provisions.

The WPCM shall inspect demolition sites within 50 feet of storm water systems or watercourses every day.

Paving, Sealing, Sawcutting, and Grinding Operations

The Contractor shall prevent the following material from entering storm drain systems or water courses:

A. Cementitious material,
B. Asphaltic material,
C. Aggregate or screenings,
D. Grinding or sawcutting residue,
E. Pavement chunks, or
F. Shoulder backing.

The Contractor shall cover drainage inlets and use linear sediment barriers to protect downhill watercourses until paving, sealing, sawcutting, or grinding operations are completed and excess material has been removed. Drainage inlets and manholes shall be covered during the application of seal coat, tack coat, slurry seal, or fog seal.

During the rainy season or when precipitation is predicted, paving, sawcutting, and grinding operations shall be limited to places where runoff can be captured. Seal coat, tack coat, slurry seal, or fog seal operations shall not begin if precipitation is predicted for the application or the curing period. The Contractor shall not excavate material from existing roadways during precipitation.

The Contractor shall vacuum up slurry from sawcutting operations immediately after the slurry is produced. Slurry shall not be allowed to run onto lanes open to public traffic or off the pavement.

The Contractor shall collect residue from Portland Cement Concrete grinding operations with a vacuum attachment on the grinding machine. The residue shall not be left on the pavement or allowed to flow across the pavement.

Material excavated from existing roadways may be stockpiled as provided in "Stockpile Management" of these special provisions if approved by the Engineer. AC or HMA chunks used in embankment shall be placed above the water table and covered by at least one foot of material.

Substances used to coat asphalt trucks and equipment shall not contain soap, foaming agents, or toxic chemicals.

Thermoplastic Striping and Pavement Markers

Thermoplastic striping and preheating equipment shutoff valves shall work properly at all times when on the construction site. The Contractor shall not preheat, transfer, or load thermoplastic within 50 feet of drainage inlets or watercourses. The Contractor shall not fill the preheating container to more than 6 inches from the top. Truck beds shall be cleaned daily of scraps or melted thermoplastic.

The Contractor shall not unload, transfer, or load bituminous material for pavement markers within 50 feet of drainage inlets or watercourses. All pressure shall be released from melting tanks before removing the lid to fill or service. Melting tanks shall not be filled to more than 6 inches from the top.

The Contractor shall collect bituminous material from the roadway after marker removal.

Concrete Curing

The Contractor shall not overspray chemical curing compound. Drift shall be minimized by spraying as close to the concrete as possible. Drainage inlets shall be covered before applying curing compound.

The Contractor shall minimize the use and discharge of water by using wet blankets or similar methods to maintain moisture when curing concrete.

Concrete Finishing

The Contractor shall collect and dispose of water and solid waste from high-pressure water blasting. Drainage inlets within 50 feet shall be covered before sandblasting. The nozzle shall be kept as close to the surface of the concrete as possible to minimize drift of dust and blast material. Blast residue may contain hazardous material.

Containment structures for concrete finishing operations shall be inspected for damage before each day of use and before predicted precipitation. Liquid and solid waste shall be removed from the containment structure after each work shift.

Dewatering

Dewatering shall consist of discharging accumulated storm water, ground water, or surface water from excavations or temporary containment facilities. The Contractor shall discharge water within the limits of the project.

Dewatering discharge shall not cause erosion, scour, or sedimentary deposits that impact natural bedding materials.

The Contractor shall conduct dewatering activities in accordance with the Field Guide for Construction Dewatering available at:

http://www.dot.ca.gov/hq/construc/stormwater/manuals.htm

Before dewatering the Contractor shall submit a Dewatering and Discharge Plan to the Engineer in conformance with the provisions in Section 5-1.02, "Plans and Working Drawings," of the Standard Specifications and "Water Pollution Control," of these special provisions. At a minimum, the Dewatering and Discharge Plan shall include the following:

A. A title sheet and table of contents;
B. A description of the dewatering and discharge operations detailing the locations, quantity of water, equipment, and discharge point;
C. The estimated schedule for dewatering and discharge (begin and end dates, intermittent or continuous);
D. Discharge alternatives such as dust control or percolation; and
E. Visual monitoring procedures with inspection log.

The Contractor shall not discharge storm water or non-storm water that has an odor, discoloration other than sediment, an oily sheen, or foam on the surface and shall notify the Engineer immediately upon discovery.

If water cannot be discharged within the project limits due to site constraints it shall be disposed of in the same manner specified for material in Section 7-1.13, "Disposal of Material Outside the Highway Right of Way," of the Standard Specifications.

Payment

The contract paid for construction site management shall be included in various items of work and shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals and for doing all the work involved in spill prevention and control, material management, waste management, non-storm water management, and dewatering and identifying, sampling, testing, handling, and disposing of hazardous waste, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer.

Water pollution control work shall conform to the provisions in Section II-T, "Construction Site Controls" of the Standard Specifications.

The Contractor shall perform water pollution control work in conformance with the requirements in the "Storm Water Pollution Prevention Plan (SWPPP) and Water Pollution Control Program (WPCP) Preparation Manual" and its addenda in effect on the day the Notice to Bidders is dated. This manual is referred to as the "Preparation Manual." Copies of the Preparation Manual may be obtained from:

State of California
Department of Transportation
Publication Distribution Unit
1900 Royal Oaks Drive
Sacramento, CA 95815
Telephone: (916) 445 3520

OR

http://www.dot.ca.gov/hq/construc/stormwater/stormwater1.htm

Before the start of job site activities, the Contractor shall provide training for project managers, supervisory personnel, and employees involved with water pollution control work. The training shall include:

A. Rules and regulations
B. Implementation and maintenance for:
    a. Temporary Soil Stabilization
        i. Temporary Sediment Control
        ii. Tracking Control
    b. Wind Erosion Control

The Contractor shall designate in writing a Water Pollution Control Manager (WPCM). The Contractor shall submit a statement of qualifications describing the training, work history, and expertise of the proposed WPCM. The qualifications shall include either:

A. A minimum of 24 hours of Department approved storm water management training described at Department's Construction Storm Water and Water Pollution Control web site.
B. Certification as a Certified Professional in Erosion and Sediment Control (CPESC).

The WPCM shall be:

A. Responsible for water pollution control work.
B. The primary contact for water pollution control work.
C. Have authority to mobilize crews to make immediate repairs to water pollution control practices.

The Contractor may designate one manager to prepare the WPCP and a different manager to implement the plan. The WPCP preparer shall meet the training requirements for the WPCM.

Water Pollution Control Program

The Contractor shall submit a Water Pollution Control Program (WPCP) to the Engineer for approval. The WPCP shall conform to the requirements in the Preparation Manual and these special provisions.

The WPCP shall include water pollution control practices:

A. For storm water and non-storm water from areas outside of the job site related to construction activities for this contract such as:
    a. Staging areas.
    b. Storage yards.
    c. Access roads.
B. Appropriate for each season as described in "Implementation Requirements" of these special provisions.

The WPCP shall include a schedule that:

A. Describes when work activities that could cause water pollution will be performed.
B. Identifies soil stabilization and sediment control practices for disturbed soil area.
C. Includes dates when these practices will be 25, 50, and 100 percent complete.
D. Shows 100 percent completion of these practices before the rainy season.

The WPCP shall include the following temporary water pollution control practices and their associated contract items of work as shown on the plans or specified in these special provisions:

A. Temporary Soil Stabilization
B. Temporary Sediment Control
C. Tracking Control
D. Wind Erosion Control
E. Non-Storm Water Management
F. Waste Management and Materials Pollution Control

Within five (5) business days of the date the work is to commence pursuant to the NTP, the Contractor shall submit the SWPPP/WPCP as part of its Initial Project Submittal Package for the City Engineer's review.

The Contractor may proceed with construction activities if the Engineer conditionally approves the WPCP while minor revisions are being completed. If the Engineer fails to complete the review within the time allowed and if, in the opinion of the Engineer, completion of the work is delayed or interfered with by reason of the Engineer's delay, the Contractor will be compensated for resulting losses, and an extension of time will be granted, as provided for in Section 8-1.09, "Right of Way Delays," of the Standard Specifications.

If there is a change in construction schedule or activities, the Contractor shall prepare an amendment to the WPCP to identify additional or revised water pollution control practices. The Contractor shall submit the amendment to the Engineer for review within a time agreed to by the Engineer not to exceed the number of days specified for the initial submittal of the WPCP. The Engineer will review the amendment within the same time allotted for the review of the initial submittal of the WPCP.

If directed by the Engineer or requested in writing by the Contractor and approved by the Engineer, changes to the water pollution control work specified in these special provisions will be allowed. Changes may include addition of new water pollution control practices. The Contractor shall incorporate these changes in the WPCP. Additional water pollution control work will be paid for as extra work in accordance with Section 4-1.03D, "Extra Work," of the Standard Specifications.

The Contractor shall keep a copy of the approved WPCP at the job site. The WPCP shall be made available when requested by a representative of the Regional Water Quality Control Board, State Water Resources Control Board, United States Environmental Protection Agency, or the local storm water management agency. Requests from the public shall be directed to the Engineer.

Implementation Requirements

The Contractor's responsibility for WPCP implementation shall continue throughout any temporary suspension of work ordered in conformance with the provisions in Section 8-1.05, "Temporary Suspension of Work," of the Standard Specifications.

If the Contractor or the Engineer identifies a deficiency in the implementation of the approved WPCP, the deficiency shall be corrected immediately, unless an agreed date for correction is approved in writing by the Engineer. The deficiency shall be corrected before the onset of precipitation. If the Contractor fails to correct the deficiency by the agreed date or before the onset of precipitation, the City may correct the deficiency and deduct the cost of correcting deficiencies from payments.

The Contractor shall construct permanent water pollution control items identified in the WPCP as specified in "Order of Work" of these special provisions. The Contractor shall

maintain the permanent water pollution control items in the locations and condition shown on the plans throughout the duration of the project.

Year Round

The Contractor shall monitor the National Weather Service weather forecast on a daily basis during the contract. The Contractor may use an alternative weather forecasting service if approved by the Engineer. Appropriate water pollution control practices shall be in place before precipitation.

The Contractor may discontinue earthwork operations for a disturbed area for up to 21 days and the disturbed soil area will still be considered active. When earthwork operations in the disturbed area have been completed, the Contractor shall implement appropriate water pollution control practices within 15 days or before predicted precipitation, whichever occurs first.

Soil stabilization and sediment control practices conforming to these special provisions shall be in place during the rainy season between October 15th and May 1st.

The Contractor shall implement soil stabilization and sediment control practices a minimum of 10 days before the start of the rainy season.

Inspection and Maintenance

The WPCM shall inspect the water pollution control practices identified in the WPCP as follows:

A. Before a forecasted storm,
B. After precipitation that causes site runoff,
C. At 24 hour intervals during extended precipitation,
D. On a predetermined schedule, a minimum of once every 2 weeks outside of the defined rainy season, and
E. On a predetermined schedule, a minimum of once a week during the defined rainy season.

The WPCM shall oversee the maintenance of the water pollution control practices.

The WPCM shall use the Storm Water Quality Construction Site Inspection Checklist provided in the Preparation Manual or an alternative inspection checklist provided by the Engineer. A copy of the completed site inspection checklist shall be submitted to the Engineer within 24 hours of finishing the inspection.

The Contractor may suspend inspections of water pollution control practices during plant establishment work upon written approval from the Engineer.

Reporting Requirements

If the Contractor identifies discharges into surface waters or drainage systems causing or potentially causing pollution or if the project receives a written notice or order from a regulatory agency, the Contractor shall immediately inform the Engineer. The Contractor shall submit a written report to the Engineer within 7 days of the discharge, notice, or order. The report shall include the following information:

A. The date, time, location, and nature of the operation, type of discharge and quantity, and the cause of the notice or order.
B. The water pollution control practices used before the discharge, or before receiving the notice or order.
C. The date of placement and type of additional or altered water pollution control practices placed after the discharge or after receiving the notice or order.
D. A maintenance schedule for affected water pollution control practices.

Payment

During each estimate period the Contractor fails to conform to the provisions in this section, "Water Pollution Control," or fails to implement the water pollution control practices shown on the plans or specified elsewhere in these special provisions as items of work, the City will withhold 25 percent of the progress payment.

Withholds for failure to perform water pollution control work will be in addition to all other withholds provided for in the contract. The City will return performance-failure withholds in the progress payment following the correction for noncompliance.

The contract lump sum price paid for prepare water pollution control program shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals and for doing all the work involved in preparing, obtaining approval of, and amending the WPCP and inspecting water pollution control practices as specified in the Standard Specifications and these special provisions, and as directed by the Engineer.

Payments for prepare water pollution control program will be made as follows:

A. After the WPCP has been approved by the Engineer, up to 75 percent of the contract item price for prepare water pollution control program will be included in the monthly progress estimate.
B. After acceptance of the contract in conformance with the provisions in Section 7-1.17, "Acceptance of Contract," of the Standard Specifications, payment for the remaining percentage of the contract item price for prepare water pollution control program will be made in conformance with the provisions in Section 9-1.07A, "Payment Prior to Proposed Final Estimate."

Implementation of water pollution control practices in areas outside the street right of way not specifically provided for in the WPCP or in these special provisions will not be paid for.

Water pollution control practices for which there are separate contract items of work will be measured and paid for as those contract items of work.

3. TRAFFIC CONTROL (BID ITEM #3). Attention is directed to Part 6 of the California MUTCD, Sections 7-1.03, "Public Convenience", 7-1.04, "Public Safety", Section 12-4 “Maintaining Traffic”, of the Caltrans Specifications, and Section XII-B, "Order of Work", of these Special Provisions. Nothing in these Special Provisions shall be construed as relieving the Contractor from the responsibilities specified in these sections.

The Contractor shall furnish, and maintain in good working order, all barricades and flashers, and provide flaggers as necessary to protect pedestrians, bicyclists, and vehicular traffic. The Contractor shall furnish and maintain all barricades, flashers, and any detour signs twenty-four (24) hours a day, including covering or removing signs during non-construction hours.

The Contractor shall provide adequate and continuous ingress and egress for all adjacent properties; except for the limited period of time it is necessary to perform work at a specific property. The Contractor shall diligently prosecute all work directly impacting businesses to completion. The Contractor shall coordinate limited closures with tenants or owners, as required by these Special Provisions, and as directed by the Engineer. The Contractor shall cover signal heads with traffic jackets, signs and other traffic control devices that may conflict with any detours.

The Contractor shall submit to the City Engineer a detailed "Traffic Control Plan" for review and approval. The "Traffic Control Plan" shall be submitted no later than ten (10) working days following the Notice to Proceed date and at least 3 working days prior to commencing any work which requires implementation of any component of the "Traffic Control Plan". The plan shall be approved by the Engineer prior to its implementation by the Contractor.

The "Traffic Control Plan" shall conform to the typical traffic control details included in the Caltrans Standard Plans, Part 6 of the California MUTCD. The Traffic Control Plan shall include, but not be limited to, detailed requirements for the following:

- Traffic control devices, including signs and markings.
- Construction routes, phasing and/or staging of both the roadway and sidewalk areas.
- Employee, Customer, and Business/Delivery access to adjacent property.
- Emergency vehicles access.
- Bus, refuse collection, and mail delivery access.
- Any parking zones to be removed on a temporary basis.
- Pedestrian and bicyclist access.

The Traffic Control Plan shall consider the impacts of changes in traffic volumes and capacities related to the construction activities, and their impact on vehicular and bicycle traffic and pedestrian operations, on roadway pavements, including provisions to restore construction-damaged pavements.

Payment

The contract lump sum price paid for "Traffic Control" under Bid Item #3 shall include full compensation for furnishing all labor, materials, including signs, tools, equipment, mobilization, and incidentals, and for doing all the work involved in providing Traffic Control Plans, preparing Pedestrian Safety Plans, hosting Contractor Safety Meetings, placing, removing, storing, maintaining, moving to new locations, replacing and disposing of the components of the traffic control system, including supervision, as shown on the plans, as required by these Special Provisions, and as directed by the City Engineer.

Full compensation for flagging costs shall be considered as included in the contract lump sum price paid for Traffic Control and no additional compensation will be allowed therefore, the shared cost for providing flagging as specified in 12-1.04 "Payment", of the Standard Specifications, shall not apply to the item of traffic control.

4. TRAFFIC SIGNAL AT HARBOR BAY PARKWAY & PENUMBRA PLACE/SOUTH LOOP ROAD (BID ITEM #4). Installation of a traffic signal system shall conform with the provisions of Section 87, "Electrical Systems," of the State Specifications, Standard Plans, and these Special Provisions.

Traffic Signal Systems

The material furnished for Traffic Signal System shall conform to the provisions of Section 87, "Electrical Systems" of the 2015 edition of the California Department of Transportation (Caltrans) Standard Specifications and shall include but not be limited to the State Standard Drawings below:

Electrical Systems (Legend, Notes and Abbreviations)	RSP ES-1A
Electrical Systems (Legend, Notes and Abbreviations)	RSP ES-1B
Electrical Systems (Legend, Notes and Abbreviations)	RSP ES-1C
Electrical Systems (Service Equipment Enclosure, Type III-A Series)	RSP ES-2D
Electrical Systems (Controller Cabinet Details),	ES-3A
Electrical Systems (Controller Cabinet Adapter, Foundations, Pad Detail)	RSP ES-3B
Electrical Systems (Pedestrian Signal and Ramp Metering)	ES-4B
Electrical Systems (Signal Faces and Emergency Veh. Det. Mountings)	ES-4E
Electrical Systems (Detectors, Pedestrian Push Button and Signs)	ES-5C
Electrical Systems (Push Button Assembly Post)	RSP ES-7A
Electrical Systems (Traffic Rates Pull Box)	RSP ES-8B
Electrical Systems (Foundation Installations)	ES-11

Schedule shall conform to the provisions in Section 86-1.01C, "Submittals," of the Standard Specifications and these special provisions.

The Engineer shall be furnished a schedule of values for each contract lump sum item of work described in this Section.

The schedule of values shall be submitted to the Engineer for approval within 15 days after the contract has been approved. The schedule of values shall be approved, in writing, by the Engineer before any partial payment for the items of electrical work will be made.

Maintaining Existing and Temporary Electrical Systems

Traffic signal system shutdowns shall be limited to periods between the hours of 9:00 a.m. and 3:00 p.m. Turn on of traffic signals are only allowed after all the detectors are functionally tested and operational, signal flashed out, communications functional, striping and signing modified or installed matching the signal intended phasing operation. The detector shall not be placed on detector recall to simulate fixed timing. The signal shall only be turned on or switched over Monday through Friday on a non-holiday work week between the hours of 9:00 a.m. and noon allowing ample time for any issues to arise.

Use when lane closures are specified under "Maintaining Traffic."

Traffic signal system shutdowns shall be limited to periods allowed for lane closures listed or specified in "Maintaining Traffic" of these special provisions.

Cast-In-Drilled-Hole Concrete Foundations

General

This work includes constructing cast-in-drilled-hole concrete pile foundations for traffic signal and lighting standards. Comply with Section 86-2.03, “Foundations,” of the Standard Specifications.

Materials

Concrete must contain not less than 590 pounds of cementitious material per cubic yard.

Construction

For standards located in sidewalk areas, the pile foundation must be:

1. Placed to final sidewalk grade before the sidewalk is placed
2. Square for the top 4 inches

Standards, Steel Pedestals, and Posts (Use City Standard Plans)

Standards, steel pedestals, and posts for traffic signal and lighting standards shall conform to the provisions in Section 86-2.04, "Standards, Steel Pedestals and Posts," of the Standard Specifications, "Steel Structures" of these special provisions, and the following requirements.

Steel bolts not designated on the plans as high strength (HS) or stainless steel shall be for general applications and shall conform to the requirements in ASTM Designation: A 307.

Where the plans refer to the side tenon detail at the end of the signal mast arm, the applicable tip tenon detail may be substituted.

The sign mounting hardware shall be installed at the locations shown on the plans. See Caltrans Standard Plan ES-70 for sign mounting details.

Pedestrian Push Button post shall be modified 4-foot1-B post with removable raintight cap at the top to accommodate Audible Pedestrian Signal. See plans for details.

All standards, steel pedestals, and posts shall be galvanized.

Conduit

Conduit shall conform to the provisions in Section 86-2.05, "Conduit," of the Standard Specifications and these Special Provisions.

Conduit installation shall be performed by trenching across traveled ways.

Repaired roadway to conform to existing asphalt concrete material.

The grade of asphalt binder mixed with aggregate for HMA shall be PG 64-10.

All aggregate for HMA shall comply with the 1/2 - inch grading.

Non-metallic type, Schedule 40 conduit shall be used unless otherwise noted.

After pull boxes have been installed, the ends of conduits terminating in pull boxes shall be sealed with an approved type of sealing compound.

Underground conduit without conductors to be incorporated into a new system shall be cleaned with a mandrel or cylindrical wire brush and blown out with compressed air prior to pulling string.

Deviations from these specifications shall be requested from the City Engineer in writing.

Conduit shall be laid to a depth of not less than 18" below grade in concrete sidewalk areas and curbed paved median areas, and 30" below finished grade in all other areas.

Street Patching: Existing pavement that is removed by the Contractor during construction shall be replaced by compacting the subgrade and constructing a four-inch (4") asphaltic concrete pavement surface course on an 18" minimum thickness aggregate base(Class II) in all trenches in the street area. The work shall conform to the Engineer's Drawing No. 2930, Case 22, and the following requirements:

1. Asphaltic concrete surfacing shall be Type A, one-half inch(1/2") maximum aggregate size asphalt concrete and shall conform to the applicable requirements of Section 39 and 92 of the Standard Specifications. Paving asphalt of the performance grade PG64-10 shall be used unless otherwise permitted by the Engineer. A tack coat of SS-1 emulsified asphalt shall be applied to the existing ground surface, asphalt and concrete areas prior to replacement of asphalt concrete.
2. Portland cement concrete pavement base shall be Class "II" concrete and shall conform to the applicable requirements of Sections 40 and 90 of the Standard Specifications.

Temporary Patch: It shall be mandatory for the Contractor to maintain a good temporary patch upon all trenches from the time they are backfilled until they are satisfactorily completed. The Engineer will determine whether the temporary patch is satisfactory. In general, the patch shall not be lower than the surrounding pavement and shall be topped with cutback.

Trenching and Backfilling: Trenching and backfilling shall conform to the provisions in Section 86-2.01, "Excavation and Backfilling" of the Standard Specifications, and these Special Provisions. Underground conduit, where subject to vehicular traffic, shall have a minimum depth of thirty inches (30") and shall be constructed according to the City Standard Drawing 2930, Case 22.

All trenches shall be shored where required for safety or to eliminate interference with other work being performed. All trenches shall be excavated with straight walls. Conduits shall be installed with three inches (3") radial clearance. This shall include right-angle crossings as well as parallel installations. Trenches shall not be excavated wider than necessary for the proper installation of the electrical appurtenances and foundations.

Approved local or imported material shall be used for backfill. When material from the excavation is unsuitable for backfill, it shall be disposed of as directed in Section XII, Paragraph C, of these specifications, and suitable material, free from rocks or abrasive materials, and approved by the Engineer, shall be furnished by the Contractor for the backfill. Backfill material shall be placed in horizontal, uniform layers not exceeding six inches (6") in thickness, before compaction, and shall be brought up uniformly on all sides of the structure or facility. Relative compaction shall be ninety-five percent (95%) or more as determined by the impact or field method compaction test.

A continuous plastic marker tape shall be installed above all conduits to show the location of the conduit to prevent damage that might be caused by future excavations in the vicinity of the conduit.

The tape shall be laid in a horizontal plane above the conduit. Under paved areas and sidewalks the tape shall be laid directly on top of the compacted earth subgrade before installation of standard street patch. In unpaved areas the tape shall be laid during the backfilling operation on smooth, compacted backfill eight inches (8") below finished grade surface.

Marker tape shall be polyethylene film, six inches (6”) wide, four (4) mils thick, color red, marked with black lettering, which is an integral part of the plastic, with the following words repeated continuously along the tape, “CAUTION” and “BURIED ELECTRICAL LINE BELOW.”

Pull Boxes

Pull boxes shall conform to the provisions in Section 86-2.06, “Pull Boxes,” of the Standard Specifications, Plan Number ES-8 of the Standard Plans contained within these Specifications, and to these Special Provisions.

Pull boxes and extensions shall be plastic of the size shown on the plan. Covers shall be plastic labeled “Traffic Signals”

No pull boxes shall be labeled “Caltrans.”

Pull boxes and covers located in streets or subject to traffic shall be approved for H-20 traffic loading. Steel or cast iron covers shall be used. Covers shall be inscribed as specified above.

Pull boxes shall not have locking type covers and pull box covers shall not have bolt holes unless noted otherwise. All pull boxes shall have extensions.

Grounding shall be required in all pull boxes.

Recesses for suspension of ballast will not be required.

All pull boxes shall have concrete bottoms.

Where pull boxes are located in unpaved areas, the tops shall be set level approximately two inches (2”) above finished grade. Pull boxes located in paved areas shall be set flush with surrounding paved surface. Pull boxes located in wheelchair ramp areas shall be set flush and inclined at a slope in conformance to the existing ramp.

Final exact pull box locations will be determined in the field. The Engineer shall have the right to relocate boxes up to a radius of thirty feet (30’) from the position shown on the plans without additional charge.

Conductors, Cables, and Wiring

Conductors and wiring shall conform to the provisions in Section 86-2.08, “Conductors,” and 86-2.09, “Wiring,” of the State Standard Specifications and these Special Provisions.

Splices shall be insulated by "Method B" as illustrated in Caltrans Standard Detail ES-13A.

Conductors shall be wrapped around projecting end of conduit in pull boxes, as shown on the plans. Cables shall be secured to the projecting end of conduit in pull boxes to prevent pulling of cables without removing the securing device.

The minimum insulation thickness, at any point, for Type USE, RHH or RHW wire shall be 39 mils for conductor sizes No. 14 to No. 10, inclusive, and 51 mils for No. 8 to No. 2, inclusive. The minimum insulation thickness, at any point, for Type THW and TW wires shall be 27 mils for conductor sizes No. 14 to No. 10, inclusive, 40 mils for No. 8, and 54 mils for No. 6 to No. 2, inclusive.

All newly installed conductors shall be labeled, identifications shall be by direct labeling, tags, or bands fastened to the conductors in such a manner that they will be permanent and not move along the conductors. Labeling shall be by mechanical methods. Identification bands shall be constructed from nylon cable tie with 3/8 inch by ¾ inch label flag. The indelible marking pen shall be one recommended by the manufacturer of the cable tie or it shall be indelible marking pen compatible with the writing on the nylon material approved by the engineer. No other method of labeling will be acceptable. All phase conductors and detector cables shall be labeled by phase designations in the pull box nearest their termination, and in the controller cabinet. Detector cables shall be labeled with phase and loop number. Lighting conductors shall be labeled. Spare conductors do not require any labeling. All conductors shall be neatly coiled, secured, and tie wrapped to the edges or corner of the cabinet. Conductors shall not be draped from one end of the cabinet to the other.

Testing

The Contractor shall perform a high voltage series lighting test consisting of the open circuit voltage of the connected constant current transformer between conductors and ground.

The high voltage test shall not be performed on existing circuits or equipment. Non testing of existing circuits and equipment shall not relieve the Contractor from the responsibility for malfunctioning of existing lighting circuits due to the Contractor making splices in or connecting to the circuits and such malfunctions shall be corrected at the Contractor's expense.

Light Emitting Diode Signal Module

Traffic signal faces with 12 inch sections or arrow sections shall use light emitting diode (LED) signal modules as the light source in conformance with these special provisions. Incandescent lamps in existing traffic signal faces shall be replaced with LED signal modules as shown on the plans and in conformance with these special provisions.

Traffic signal module and housing shall be Econolite series 12 inch section LED traffic signal head or approved equal. The signal module Construction shall be:

1. HOUSING: Dark Green
2. BACKPLATE: Metal, Louvered
3. SECTION HEAD ASSEMBLY: Polycarbonate
4. TUNNEL VISORS: Aluminum, Open bottom half

General

Type 1 LED signal modules shall be installed in the doorframes of standard traffic signal housings. Lamp sockets, reflectors, reflector holders and lenses used with incandescent lamps shall not be used when Type 1 LED signal modules are installed.

Type 2 LED signal modules shall be mounted in standard lamp sockets normally used with incandescent lamps. When Type 2 LED signal modules are used, standard traffic signal lenses in the door frames shall be used, or at the option of the Contractor, the standard lenses may be replaced with translucent or clear lenses to seal the signal sections from weather. The installation of Type 2 LED signal modules shall not require any modification to standard lamp sockets or reflectors.

LED signal modules, including green, yellow, red, circular balls and arrow indications shall be from the same manufacturer, and each size shall be the same model.

Type 1 LED signal modules shall be sealed units with two color coded conductors for power connection, a printed circuit board, a power supply, a lens and a gasket. LED signal modules shall be weatherproof after installation and connection. Circuit boards and power supplies shall be contained inside Type 1 LED signal modules. Circuit boards shall conform to the requirements in Chapter 1, Section 6 of the "Transportation Electrical Equipment Specifications," (TEES) published by the Department.

Conductors for Type 1 LED signal modules shall be 3 feet in length with quick disconnect terminals attached and shall conform to the provisions in Section 86-4.01C, "Electrical Components," of the Standard Specifications.

Lenses of Type 1 LED signal modules shall be integral to the units, shall be convex with a smooth outer surface and shall be made of ultraviolet (UV) stabilized plastic or glass. The lenses shall be capable of withstanding ultraviolet exposure from direct sunlight for a minimum period of 36 months without exhibiting evidence of deterioration.

Type 1 LED signal modules shall be sealed in doorframes with one piece ethylene propylene rubber (EPDM) gaskets.

Type 2 LED signal modules shall be sealed units containing all components for operation except, at the Contractor's option, lenses mounted in doorframes will be allowed.

Lenses used with Type 2 signal modules shall be sealed in doorframes with one piece ethylene propylene rubber (EPDM) gaskets.

Type 2 LED signal modules shall not require a specific mounting orientation and shall not vary in light output, pattern or visibility for any mounting orientation.

LEDs used in signal modules shall be of Aluminum Indium Gallium Phosphide (AlInGaP) technology for red and yellow indications and of Gallium Nitride (GaN) technology

for green indications. LEDs shall be the ultra bright type rated for 100,000 hours of continuous operation from 40˚C to +74˚C.

Individual LEDs shall be wired so that a total failure of one LED will result in the loss of not more than 5 percent of the signal module light output. Failure of an individual LED in a string shall not result in the loss of the entire string or any other indication.

Maximum power consumption requirements for LED signal modules shall be as follows:

LED Signal Module	Power Consumption in Watts					
	Red		Yellow		Green	
	25°C	74°C	25°C	74°C	25°C	74°C
12-inch circular	11	17	22	25	12	12
8-inch circular	8	13	13	16	10	10
12-inch arrow	9	12	10	12	13	13

Physical and Mechanical Requirements

For existing traffic signals, LED signal modules shall be designed as retrofit replacements for existing optical units of standard traffic signal sections and shall not require special tools for installation. LED signal modules shall fit into existing traffic signal section housings built in conformance with the requirements in the Institute of Transportation Engineers (ITE) without any modification to the housing.

Installation of LED signal modules shall only require the removal of the optical unit components such as the lens, lamp module, gaskets and reflector. LED signal modules shall be weather tight, fit securely to the housing and connect directly to electrical wiring.

Arrow modules shall conform to the requirements in Section 9.01 of the Institute of Transportation Engineers (ITE) Publication: Equipment and Materials Standards, "Vehicle Traffic Control Signal Heads" for arrow indications. LEDs shall be spread evenly across the illuminated portion of the arrow area.

LED Signal Module Lens

The LED signal module shall be capable of replacing the optical unit. The lens may be tinted or may use transparent film or materials with similar characteristics to enhance "ON/OFF" contrasts. The use of tinting or other materials to enhance "ON/OFF" contrast shall not affect chromaticity and shall be uniform across the face of the lens.

If a polymeric lens is used, a surface coating or chemical surface treatment shall be used to provide front surface abrasion resistance.

Environmental Requirements

LED signal modules shall be rated for use in the operating temperature range of 40˚C to +74˚C.

LED signal modules shall be protected against dust and moisture intrusion in conformance with the requirements in NEMA Standard 250 for Type 4 enclosures to protect internal components.

Construction

LED signal modules shall be single, self contained devices, not requiring on site assembly for installation into existing traffic signal housings. The power supply for LED signal modules shall be integral to the module.

Assembly and manufacturing processes for LED signal modules shall be designed to assure all internal components will be adequately supported to withstand mechanical shock and vibration from high winds and other sources.

Materials

Materials used for lenses and LED signal modules shall conform to the requirements in ASTM Specifications for the materials.

Enclosures containing the power supply or electronic components of LED signal modules shall be made of UL94VO flame retardant materials. Lenses of LED signal modules are excluded from this requirement.

Module Identification

LED signal modules shall have the manufacturer's name, trademark, model number, serial number, lot number, month and year of manufacture, and required operating characteristics permanently marked on the back of the module. Required operating characteristics shall include rated voltage, power consumption and volt ampere (VA).

Type 1 LED signal modules shall have prominent and permanent vertical markings for correct indexing and orientation within the signal housings. Markings shall consist of an up arrow or the word "UP" or "TOP."

Photometric Requirements

Initial luminous intensity values for LED signal modules, operating at 25˚C, shall meet or exceed the following minimum values:

Circular Indications (in cd)

	8-inch			12-inch		
Angle (v,h)	Red	Yellow	Green	Red	Yellow	Green
2.5, ±2.5	157	314	314	399	798	798
2.5, ±7.5	114	228	228	295	589	589
2.5, ±12.5	67	133	133	166	333	333
2.5, ±17.5	29	57	57	90	181	181
7.5, ±2.5	119	238	238	266	532	532
7.5, ±7.5	105	209	209	238	475	475
7.5, ±12.5	76	152	152	171	342	342
7.5, ±17.5	48	95	95	105	209	209
7.5, ±22.5	21	43	43	45	90	90
7.5, ±27.5	12	24	24	19	38	38
12.5, ±2.5	43	86	86	59	119	119
12.5, ±7.5	38	76	76	57	114	114
12.5, ±12.5	33	67	67	52	105	105
12.5, ±17.5	24	48	48	40	81	81
12.5, ±22.5	14	29	29	26	52	52
12.5, ±27.5	10	19	19	19	38	38
17.5, ±2.5	19	38	38	26	52	52
17.5, ±7.5	17	33	33	26	52	52
17.5, ±12.5	12	24	24	26	52	52
17.5, ±17.5	10	19	19	26	52	52
17.5, ±22.5	7	14	14	24	48	48
17.5, ±27.5	5	10	10	19	38	38

Arrow Indications (foot-lamberts)

	Red	Yellow	Green
Arrow Indication	1,600	3,200	3,200

LED signal modules shall meet or exceed the following minimum illumination values for a minimum period of 36 months, based on normal use in traffic signal operation over an operating temperature range of 40˚C to +74˚C. In addition, yellow LED signal modules shall meet or exceed the following minimum illumination values for a minimum period of 36 months, based on normal use in traffic signal operation at 25˚C:

Circular Indications (in cd)

	8-inch			12-inch		
Angle (v,h)	Red	Yellow	Green	Red	Yellow	Green
2.5, ±2.5	133	267	267	339	678	678
2.5, ±7.5	97	194	194	251	501	501
2.5, ±12.5	57	113	113	141	283	283
2.5, ±17.5	25	48	48	77	154	154
7.5, ±2.5	101	202	202	226	452	452

7.5, ±7.5	89	178	178	202	404	404
7.5, ±12.5	65	129	129	145	291	291
7.5, ±17.5	41	81	81	89	178	178
7.5, ±22.5	18	37	37	38	77	77
7.5, ±27.5	10	20	20	16	32	32
12.5, ±2.5	37	73	73	50	101	101
12.5, ±7.5	32	65	65	48	97	97
12.5, ±12.5	28	57	57	44	89	89
12.5, ±17.5	20	41	41	34	69	69
12.5, ±22.5	12	25	25	22	44	44
12.5, ±27.5	9	16	16	16	32	32
17.5, ±2.5	16	32	32	22	44	44
17.5, ±7.5	14	28	28	22	44	44
17.5, ±12.5	10	20	20	22	44	44
17.5, ±17.5	9	16	16	22	44	44
17.5, ±22.5	6	12	12	20	41	41
17.5, ±27.5	4	9	9	16	32	32

Arrow Indications (foot-lamberts)

	Red	Yellow	Green
Arrow Indication	1,600	3,200	3,200

Measured chromaticity coordinates of LED signal modules shall conform to the chromaticity requirements of the following table, for a minimum period of 36 months, over an operating temperature range of 40˚C to +74˚C.

Chromaticity Standards

Red	Y: not greater than 0.308, or less than 0.998 -x
Yellow	Y: not less than 0.411, nor less than 0.995 - x, nor less than 0.452
Green	Y: not less than 0.506 - 0.519x, nor less than 0.150 + 1.068x, nor more than 0.730 - x

LED signal modules tested or submitted for testing shall be representative of typical production units. Circular LED modules shall be tested in conformance with California Test 604. Optical testing shall be performed with LED signal modules mounted in standard traffic signal sections without visors or hoods attached to the signal sections.

LEDs for arrow indications shall be spread evenly across the illuminated portion of the arrow area. Arrow LED signal modules shall be tested in conformance with California Test 3001.

Optical testing shall be performed with LED signal modules mounted in standard traffic signal sections without visors or hoods attached to the signal sections. LED arrow signal section indication shall provide minimum initial luminous intensity as listed herein. Measurements shall be performed at the rated operating voltage of 120 V (ac).

Electrical

Maximum power consumption requirements for LED signal modules shall not exceed those listed in "General." LED signal modules shall operate at a frequency of 60 Hz ±3 Hz over a voltage range from 95 V (ac) to 135 V (ac) without perceptible flicker. Fluctuations of line voltage shall have no visible effect on luminous intensity of the indications. Rated voltage for all measurements shall be 120 V (ac).

Wiring and terminal blocks shall conform to the requirements of Section 13.02 of the ITE Publication: Equipment and Material Standards, (Vehicle Traffic Control Signal Heads). Two secured, color coded, 3 feet long, 600 V, 20 AWG minimum, jacketed wires, conforming to the National Electronic Code, rated for service at +105˚C, shall be provided for electrical connection for each Type 1 LED signal module.

LED signal module on board circuitry shall include voltage surge protection to withstand high repetition noise transients in conformance with the requirements in Section 2.1.6 of NEMA Standard TS2.

LED signal modules shall be operationally compatible with currently used controller assemblies including solid state load switches, flashers and conflict monitors. When a current of 20 milliamperes (ac) or less is applied to the unit, the voltage read across the two leads shall be 15 V (ac) or less.

LED signal modules and associated on board circuitry shall conform to the requirements in Federal Communications Commission (FCC) Title 47, SubPart B, Section 15 regulations concerning the emission of electronic noise.

LED signal modules shall provide a power factor of 0.90 or greater.

Total harmonic distortion from current and voltage induced into an alternating current power line by LED signal modules shall not exceed 20 percent at an operating temperature of 25˚C.

Quality Control Program

LED signal modules shall be manufactured in conformance with a vendor quality control (QC) program. The QC program shall include two types of testing: (1) design qualification and (2) production quality. Production quality testing shall include statistically controlled routine tests to ensure minimum performance levels of LED signal modules built to meet these specifications.

Documentation of the QC process and test results shall be kept on file for a minimum period of seven years.

LED signal module designs not satisfying design qualification testing and the production quality testing performance requirements specified herein shall not be labeled, advertised or sold as conforming to these specifications.

Identification of components and subassemblies of LED signal modules, which may affect reliability and performance, shall be traceable to the original manufacturers.

Design Qualification Testing

Design qualification testing (DQT) shall be performed by the manufacturer or an independent testing lab hired by the manufacturer on new LED signal module designs, and on existing designs when a major design change has been implemented. Failure to conform to the requirements of any design qualification test shall be cause for rejection.

A major design change is defined as a design change, electrical or physical, which changes any of the performance characteristics of the LED signal module, results in a different circuit configuration for the power supply, or changes the layout of the individual LEDs in the signal module.

Two LED modules for each design shall be used for DQT. The two LED signal modules shall be selected at random. These signal modules shall be submitted to the Transportation Laboratory after the DQT is complete. Testing data shall be submitted with the modules to the Transportation Laboratory for verification of DQT data.

LED signal modules shall be energized for a minimum of 24 hours, at 100 percent on time duty cycle, at a temperature of 74˚C before performing any DQT.

After burn in, LED signal modules shall be tested for rated initial luminous intensity in conformance with the provisions in "Photometric Requirements." Before measurement, LED signal modules shall be energized at rated voltage, with 100 percent on time duty cycle, for a time period of 30 minutes. Photometrics, luminous intensity and color measurements for yellow LED signal modules shall be taken immediately after the modules are energized. The ambient temperature for these measurements shall be 25˚C. Test results for this testing shall record the current, voltage, total harmonic distortion (THD) and power factor (PF) associated with each measurement.

LED signal modules shall be tested by measuring for chromaticity (color) in conformance with the provisions in "Photometric Requirements." A spectra radiometer shall be used for this measurement. The ambient temperature for this measurement shall be 25˚C.

LED signal modules shall be tested by measuring the current flow in amperes. The measured current values shall be used for quality comparison of production quality assurance on production modules.

LED signal modules shall be tested by measuring the power factor. A commercially available power factor meter may be used to perform this measurement.

LED signal modules shall be tested by measuring the total harmonic distortion. A commercially available total harmonic distortion meter may be used to perform this measurement.

LED signal modules shall be tested in conformance with the provisions in "Electrical," with reference to Class A emission limits referenced in Federal Communications Commission (FCC) Title 47, SubPart B, Section 15.

LED signal modules shall be tested for compatibility with the controller unit, conflict monitor and load switch. Each signal module shall be connected to the output of a standard load switch connected to an alternating current voltage supply between the values of 95 V (ac) and 135 V (ac) with the input to the load switch in the "OFF" position. The alternating current voltage developed across each LED signal module so connected shall not exceed 15 V rms as the input alternating current voltage is varied from 95 V (ac) rms to 135 V (ac) rms.

LED signal modules shall be tested for transient immunity in conformance with the provisions in "Electrical," and conforming to the procedure described in NEMA Standard TS2.

Mechanical vibration testing shall be performed on LED signal modules in conformance with the requirements in MIL STD 883, Test Method 2007, using three 4 minute cycles along each x, y, and z axis, at a force of 2.5 Gs, with a frequency sweep from 2 Hz to 120 Hz. The loosening of the lens, internal components, or other physical damage shall be cause for rejection.

Temperature cycling shall be performed on LED signal modules in conformance with the requirements of MIL STD 883, Test Method 1010. The temperature range shall conform to the provisions in "Environmental Requirements." A minimum of 20 cycles shall be performed with a 30 minute transfer time between temperature extremes and a 30 minute dwell time at each temperature. LED signal module under test shall be non operating. Failure of LED signal modules to function properly or evidence of cracking of LED signal module lenses or housings after temperature cycling shall be cause for rejection.

Moisture resistance testing shall be performed on LED signal modules in conformance with the requirements in NEMA Standard 250 for Type 4 enclosures. Evidence of internal moisture after testing shall be cause for rejection.

Production Quality Testing

Production quality testing shall be performed on each LED signal module prior to shipment. Failure to conform to the requirements of any production quality test shall be cause for rejection. The manufacturer shall retain test results for seven years for warranty purposes.

LED signal modules shall be tested for rated initial intensity after burn in. The burn in period shall consist of signal modules being energized at rated voltage for a 30 minute stabilization period before the measurements are made. A single point measurement with a correlation to the minimum initial luminous intensity requirements of "Photometric Requirements" for circular modules may be used. The ambient temperature for this measurement shall be +25°C.

LED signal modules shall be tested for luminous intensity requirements in "Photometric Requirements."

LED signal modules shall be tested for required power factor after burn in.

LED signal modules shall be tested by measuring current flow in amperes after burn in. The measured current values shall be compared against current values resulting from design qualification measurements under "Design Qualification Testing." The current flow shall not exceed the rated value. The measured ampere values with rated voltage shall be recorded as volt ampere (VA) on the product labels.

LED signal modules shall be visually inspected for any exterior physical damage or assembly anomalies. The surface of the lens shall be free of scratches, abrasions, cracks, chips, discoloration, or other defects. Any such defects shall be cause for rejection.

Certificate of Compliance

The Contractor shall provide the Engineer a Certificate of Compliance from the manufacturer, in conformance with the provisions of Section 6-1.07, "Certificates of Compliance," of the Standard Specifications. The certificate shall certify that the LED signal modules comply with the requirements of these specifications. The certificate shall also include a copy of all applicable test reports on the LED signal modules.

Quality Assurance Testing (Random Sample Testing)

The State may perform random sample testing on all shipments. Random sample testing will be completed within 30 days after delivery to the Transportation Laboratory. Circular LED signal modules shall be tested in conformance with California Test 604 and these special provisions. Arrow signal modules shall be tested in conformance with California Test 3001 and these special provisions. Optical testing shall be performed with the module mounted in a standard traffic signal section, but without a visor or hood attached to the section or housing. The number of modules tested shall be determined by the quantity of each model in the shipment. The sample size shall conform to ANSI/ASQC Z1.4. The Transportation Laboratory shall determine the sampling parameters to be used for the random sample testing. All parameters of the specification may be tested on the modules. Acceptance or rejection of the shipment shall conform to ANSI/ASQC Z1.4 for random sampled shipments.

Warranty

The manufacturer must provide a written warranty against defects in materials and workmanship for LED signal modules for a period of 48 months after installation of LED signal modules. Replacement LED signal modules shall be provided within 15 days after receipt of failed LED signal modules at no cost to the State, except the cost of shipping the failed modules. All warranty documentation shall be given to the Engineer prior to installation.

Light Emitting Diode Pedestrian Signal Face Modules

Light emitting diode (LED) pedestrian signal face (PSF) modules shall be installed in standard Type A pedestrian signal housing, "UPRAISED HAND" and "WALKING PERSON,"

and shall use light emitting diodes as the light source as shown on the plans and in conformance with these special provisions.

LED pedestrian signal module and housing shall be Econolite series LED pedestrian signal or approved equal.

General

PSF modules shall be designed to mount in standard Type A housings. PSF modules shall be designed to mount behind or replace face plates of standard Type A housings in conformance with the requirements of the Institute of Transportation Engineers (ITE) Standards: "Pedestrian Traffic Control Signal Indications," "Manual on Uniform Traffic Control Devices" (MUTCD), and "2014 California MUTCD". Where existing Type A pedestrian signal faces contain both incandescent and LED light sources, both light sources shall be removed and replaced by a new LED pedestrian signal face module in conformance with these special provisions.

PSF modules used on this project shall be from a single manufacturer.

Circuit boards and power supplies shall be contained inside the LED modules. Circuit boards shall conform to the requirements in Chapter 1, Section 6 of the "Transportation Electrical Equipment Specifications," (TEES) published by the Department.

PSF modules shall fit into existing Type A housings and shall not require a specific mounting orientation and shall not vary in light output, pattern or visibility for any mounting orientation.

LEDs for "UPRAISED HAND" symbols shall utilize Aluminum Indium Gallium Phosphide (AlInGaP) technology and shall be the ultra bright type rated for 100,000 hours of continuous operation from 40°C to +74°C.

Individual LEDs shall be wired so that a total failure of one LED will result in the loss of not more than 5 percent of the PSF module light output. Failure of an individual LED in a string shall not result in the loss of the entire string or any other indication.

PSF modules tested and those submitted for testing shall be representative of typical production units. PSF modules shall be tested in conformance with California Test 610 and as specified herein.

Luminance Requirements

Luminance of the "UPRAISED HAND" symbol shall be 1,100-foot lamberts minimum. Color of "UPRAISED HAND" shall be Portland orange conforming to the requirements of the ITE Standards: "Pedestrian Traffic Control Signal Indications," "Manual on Uniform Traffic Control Devices," and "MUTCD California Supplement."

Luminance of the "WALKING PERSON" symbol shall be 1,550 foot lamberts minimum. Color of "WALKING PERSON" shall be white (Luminous Tubing) conforming to the

requirements of the ITE Standards: "Pedestrian Traffic Control Signal Indications," "Manual on Uniform Traffic Control Devices," and "MUTCD California Supplement."

Height and width of each symbol shall not be less than 10 inches and 6 1/2 inches respectively. Uniformity ratio of illuminated symbols shall not exceed 4 to 1 between the highest luminance area and the lowest luminance area.

PSF modules shall be rated for a minimum useful life of 36 months and shall maintain at least 85 percent of 1,100 foot lamberts for "UPRAISED HAND" symbols and 85 percent of 1,550 foot lamberts for "WALKING PERSON" symbols after 36 months of continuous use in traffic signal operation over a temperature range of 40°C to +74°C.

Physical and Mechanical Requirements

PSF modules shall be designed as retrofit replacement for existing optical units of signal lamps, or existing pedestrian signal faces with both LED and incandescent light sources, and shall not require special tools for installation. PSF modules shall fit into pedestrian signal section housings built in conformance with the ITE Publication: Equipment and Materials Standards, Chapter 2 "Vehicle Traffic Control Signal Heads" (VTCSH) without modification to the housing.

Installation of PSF modules into pedestrian signal faces shall require only removal of lenses, reflectors, lamps and existing LED modules as indicated on the plans.

Environmental Requirements

PSF modules shall be rated for use in the operating temperature range of 40°C to +74°C.
Construction

PSF modules shall be single, self-contained devices, not requiring on site assembly for installation into standard Type A housings. Power supplies for PSF modules shall be integral to the modules.

Assembly and manufacturing processes for PSF modules shall be designed to assure all internal components will be adequately supported to withstand mechanical shock and vibration from high winds and other sources.

Materials

Material used for PSF modules shall conform to the requirements in ASTM specifications for the materials.

Enclosures containing either the power supply or electronic components of the PSF module shall be made of UL94VO flame retardant materials.

Module Identification

PSF modules shall have the manufacturer's name, trademark, model number, serial number, lot number, month and year of manufacture, and required operating characteristics permanently marked on the back of the module. Required operating characteristics shall include rated voltage, power consumption and volt ampere (VA).

Type A pedestrian signal face, combination "UPRAISED HAND"/"WALKING PERSON" section, housings without the reflectors shall be used for PSF modules.

Photometric Requirements

PSF modules shall maintain at least 85 percent of the following luminous intensity values over 36 months of continuous use in signal operation over the temperature range of 40°C to +74°C. In addition, PSF modules shall meet or exceed the following luminous intensity values upon initial testing at 25°C.

PSF module	Luminous Intensity
UPRAISED HAND	1,100-foot lamberts
WALKING PERSON	1,550-foot lamberts

The measured chromaticity coordinates of PSF modules shall conform to the requirements for chromaticity in Section 5.3.2.1 and Figure C of the VTCSH standards.

Electrical

PSF module power consumption shall not exceed the following maximum values:

PSF module	Power Consumption @ 25°C	Power Consumption @ 74°C
UPRAISED HAND	10.0 W	12.0 W
WALKING PERSON	12.0 W	15.0 W

Service

Service shall conform to the provisions in Sections 86-1.02P, 87-1.03L, and 87-1.03P of the Caltrans Specifications and these Special Provisions. Each service shall be suitable for the short circuit current available at its supply terminal.

If service equipment cabinet design deviates in any way from the details shown on the, details of such deviation shall be submitted to the Engineer for review before fabrication of the contract cabinets. If deemed necessary by the Engineer, one complete prototype cabinet shall be delivered to the Engineer for review at least 30 days before fabrication of the contract fixtures. The prototype cabinet will be returned to the Contractor and if permitted by the Engineer, the cabinet may be installed in the work.

The Contractor shall furnish and install Type III AF single meter service equipment. Cabinets (See State of California Standard Plan ES 2C and ES-2D) conforming to City of Alameda Specifications shall be constructed with anodized aluminum and per the Caltrans Specifications Sections 86-1.02Q, 86-1.02P, and 87-1.03Q, and painted in SEA FOAM GREEN or City-approved color. A 40 amp, 120 volt, metered circuit shall be furnished to the controller cabinet for traffic signal operation. The Contractor shall confirm and provide all service requirements with Alameda Municipal Power, and the City of Alameda. Note: 120/240 volt service houses a 4 jaw meter socket, 120/208 volt service houses a 5 jaw meter socket.

Service Cabinet Fabrication:

- Maximum width 12", Maximum height 63" with a minimum of 60" maximum depth 9". Minimum opening to control section 8.25" x 39.25".
- Cabinet shall be fabricated with anodized aluminum.
- Internal part shall be fabricated for 14-gauge cold steel.
- Cabinet shall be welded construction with welding materials specifically designed for material used.
- All fasteners, hinges, latches, and hardware shall be of stainless steel and hinges shall be continuous piano style.
- There shall be no exposed nuts, bolts, screws, rivets, or other fasteners on the exterior.
- Cabinet shall have enclosed swept pull section with removable step.
- Cabinet shall have fully framed ride hinged outer door with swaged close tolerance sides for flush fit with top drip lip and closed cell neoprene flange compressed gaskets.
- Cabinet door shall have 2,000 LB stress rated stainless hasp, welded to cabinet door.
- Base mounting detail shall be identical to existing cabinets for emergency Dead-front Safety Door.
- Distribution and control panel shall have separate hinged dead-front panels with 1/4 turn latch and knotted knobs.
- Breaker compartment shall be safety barriered from the control compartment.
- Dead front shall be hinged on the same side as the front door and shall open a minimum of 120 degrees.
- Removable back-pan shall be mounted on 4 welded 1/4" studs.

Power Distribution Panel:

- Main breakers shall be available as 1 pole, 2 pole, 3 pole, or 4 pole.
- Provide separate metered main, lighting main and disconnects as required.
- All circuit breakers shall be installed in a vertical position, handle up for "On," handle down for "Off".
- Circuit breaker shall be industrial grade, Westinghouse Quicklag C or equal to match existing.
- There shall be no plug-in circuit breakers.
- All bushing shall be UL approved copper THHN cable bussing, fully rated 125 Amps.

Control Compartment:

- There shall be a minimum 25" from base to circuit breakers.
- All components shall match existing components in use for maintenance of spare parts and known reliability.
- Contactors shall be Westinghouse Class A202 or other to match existing.
- The cabinet shall be wired to include a spare contactor for street lighting (See the wiring diagram detail).
- The cabinet shall be completely pre-wired in the factory.
- Wiring will be to NEMA IIB standards showing external connections and external equipment.
- All control wiring shall be 19 strand #14 AWG THHN.
- All control wires shall be permanently labeled with matching engraved clip-sleeve nylon markers.
- All terminals shall be permanently labeled.

Nameplates and Drawings:

- The function of all circuit breakers, switches and other components as required shall be identified by laminated engraved plastic nameplates with minimum 1/4 " letters fastened with minimum of two 1/4", #4-40 machine screws.
- Wiring schematics shall be Computer Aided Drafted and include all external equipment and connections per NEMA IIB.
- As built factory drawings shall be enclosed in clear plastic and held inside the outer door by weld hooks.

Certification:

- Manufacturers will be required to furnish independent laboratory certification of material preparation and finish and to confirm that the overall product meets these specifications. If this agency wishes to witness this testing, all costs to be paid by the Contractor.

Photoelectric Control:

- Photoelectric control shall be NEMA Type V, three-prong, twist-lock, and housed inside the service cabinet. Photoelectric control shall have an instant on/delay (5 second) off incorporated as per State Standards, to prevent cycling if struck by vehicle headlights. The photoelectric cell shall be solid-state unit and the photocell sensitivity shall be in compliance with PG&E LS rate requirements. Photocell socket must be made of metal and not plastic.
- A secondary photoelectric control system shall be wired from the mast arm street light to the service cabinet. After testing the secondary, the wire will be disconnected, coiled, and secured in the service cabinet until needed at a future date. The mast arm PEU shall have a north orientation. The photoelectric unit shall be a multi-voltage, instant on/ delay (5 sec) off, and three-prong twist-locking type unit. The photocells sensitivity shall be in compliance with PG&E LS rate requirements.

Transit Signal Priority Configuration

A. The traffic signal controller firmware shall enable the traffic signal controllers to recognize TSP calls received from AC Transit buses as Class I vehicles through the Low Priority system.
B. The Contractor shall program local traffic signal controllers at the project intersections for TSP and operations as indicated on the project plans. Controller programming shall include, but not be limited to the following items as appropriate:

    a. Assignment of low-priority calls to appropriate TSP channel.
    b. 10-minute headway lock-out time for TSP calls
    c. Lock-out of TSP vehicles
    d. Timing parameters

C. The system shall provide the following functionalities:

    a. The TSP shall work with existing or new Low Priority System installed on traffic signal standards.
    b. The TSP shall grant priority based on a user defined headway based system, The system shall grant a priority if the bus is behind a user defined headway to provide priority for the designated buses, independent of vehicle direction. The headway parameter shall be user settable, by day of week and time of day. A time of day and day of week look up table shall be provided.
    c. The TSP shall grant priority based on a user defined schedule based system. The schedule parameters shall be user settable, by day of week and time of day. A time of day and day of week look up table shall be provided.
    d. The TSP shall provide an early green or extension of green based on traffic signal timing parameters provided by the Engineer. The phase duration for all subsequent phases, after the early-green or extension of green, shall be reduced equally after the priority call. There shall be no back-to-back TSP activations.
    e. The TSP shall be non-locking, i.e. if a bus has departed the intersection, the priority request will be dropped.
    f. The TSP shall not truncate pedestrian walk or don't walk durations if activated. If the intersection is equipped with countdown timers, the countdown timers shall be blank in the absence of a pedestrian call.
    g. The system shall meet all applicable MUTCD requirements.
    h. The system shall be capable of maintaining a log of all TSP requests and activations, including the fields listed below, to allow AC Transit to monitor the performance of TSP operations. This information shall include the following fields (at a minimum) and be stored at each controller for a minimum of two weeks. At a minimum, this information will include the following fields:
        i. Controller ID
        ii. Event Start Date-Time (i.e., when bus detected)
        iii. Event End Date-Time (i.e., when bus call has dropped off)

iv. Location of bus at Event End Date-Time
v. Bus ID emitter Code
vi. Bus Travel Direction
vii. Priority Response (e.g., Priority Granted, Priority Denied)
viii. Cycle Length
ix. Red Duration
x. Early Green Duration
xi. Extended Green Duration

i. The Contractor shall calibrate the detectors to allow recognition of the transit priority call within 400 feet (minimum) of the stop bar or as directed by City (near- side stops will be case by case). The TSP recognition shall end 50' prior to the stop bar or as directed by the Engineer.

D. All Agency-furnished controllers shall have firmware with TSP functionality.

Transit Signal Priority Testing

Prior to conditional acceptance, Contractor shall perform pre-approved tests on the TSP, to demonstrate the end-to-end functionality of the system—from detecting bus to granting TSP, log of TSP events at controller, and receipt of emailed report to an AC Transit email account. This testing shall be done in addition to specific tests for individual pieces of equipment. Prior to beginning of testing, the Contractor shall submit an acceptance test plan for review and approval. The test plan shall document the test procedures, including the operation and functional requirements to be verified by the tests.

Vendor representation shall be provided for all system equipment testing.

The Engineer, or other Engineer approved representative, shall be present for all field tests.

1. Intersection Installation Field Test. TSP operations shall tested at each project intersection. Intersection test shall consist of properly detecting buses 400 feet minimum from intersection or at a distance equivalent to 10 seconds from intersection (unless otherwise specified by Engineer for locations with near- side bus stops) and granting TSP response subject to pre-defined parameters (vehicle privileges and time since last TSP activation). The Engineer shall be present at testing to review performance of signal timing parameters. Contractor shall implement signal timing changes as needed.

The Contractor shall review 'as constructed' drawings and provide all that is necessary to operate and maintain the TSP and its components for the period during construction and for 12 months thereafter.

The Contractor shall adhere to the testing requirements for this project and shall allow for 30 days between substantial completion and entrance into the 12-month operational support period which exceeds and includes the warranties provided.

Wire Accessible Pedestrian Signal (APS)

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

1. The System shall consist of a Central Control Unit (CCU) and Pedestrian Push Button Stations (PBS), as described below, and an iOS device w/ the iOS client application or Windows PC with BLE dongle and Windows client application, for programming the system settings.
2. The System shall be manufactured by an ISO 9001:2008 (minimum) registered company.

Design Compliance

1. The System shall meet the functionality requirements of MUTCD 2009 – 4E and CAMUTCD 2011 – 4E.
2. The System shall meet NEMA TS 2 Section 2.1 Temperature & Humidity requirements, or TS4 equivalent.
3. The System shall meet NEMA TS 2 Section 2.1 Transient Voltage Protection requirements, or TS4 equivalent.
4. The System shall meet NEMA TS 2 Section 2.1 Mechanical Shock and Vibration requirements, or TS4 equivalent.
5. The System shall meet IEC 61000-4-4, IEC 61000-4-5 Transient Suppression requirements.
6. The System shall meet FCC Title 47, Part 15, Class A Electronic Noise requirements.
7. The Push Button Station (PBS) Enclosure shall meet NEMA 250 – Type 4X requirements.
8. The Central Control Unit (CCU) Enclosure shall meet NEMA 250 – Type 1 requirements.

Functional Requirements

1. 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.

2. 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.
3. 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.
4. 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.
5. 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.
6. 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.
7. The System shall have standard “Travel Direction” options that can be selected at the time of installation.
8. 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.
9. 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.
10. The System shall provide 2 language capabilities, selectable by user (as a field selectable feature).
11. The System shall provide an Emergency preemption message in conjunction with a preemption system (selectable feature).
12. 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.
13. All sounds for all PBS’s shall be synchronized.
14. The system shall have a non-visible, ambient sensing microphone located in the pedestrian station in an environmentally protected housing.
15. 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.
16. 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.
17. The system shall utilize high quality digital audio technology, with a minimum 16-bit sample at a 48 kHz sample rate.

18. 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.
19. The System shall have the option to mute sounds on all crosswalks except activated crosswalk (selectable feature).
20. 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.
21. 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.
22. 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.
23. The entire System shall be configurable from any PBS over Bluetooth.
24. The entire System shall be configurable from the CCU over Wi-Fi or Ethernet.
25. 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 is the control unit that provides data for the Push Button Stations. The CCU shall be either a shelf mount (CCU-S) or rack mount (CCU-C) assembly.

1. The CCU-S shall be installed inside the Traffic Cabinet and powered by the AC supply mains (115 VAC).
2. 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).
3. The CCU-S shall provide internal power to operate up to 16 PBS's.
4. A 24 volt power brick shall power up to 16 PBS's in a CCU-C configuration.
5. The CCU shall control at least 16 PBS's.
6. The CCU shall be logically configurable to assign any PBS to one of 16 traffic phases.
7. 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.
8. The CCU-C shall receive pedestrian phase Walk, Don't Walk and Clearance inputs from a Transport Electrical Equipment Specification (TEES) C4S connector.
9. 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.
10. The CCU-S shall provide optically isolated general purpose inputs.
11. The CCU-S shall be used with a 4-cable interface harness assembly.
12. The CCU shall have internal storage to log several hundred events with a date-time stamp for each event.
13. The CCU shall have an internal real-time clock capable of being set in the field and propagating the time to each connected PBS.
14. 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.

15. The CCU shall monitor PED interval conflicts and signal affected PBS's to an off state when a conflict occurs.
16. The CCU-S shall meet NEMA 250 – Type 1 enclosures requirements.
17. 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 allows the pedestrian to place calls to the traffic controller and provides vibro-tactile feedback during the Walk cycle. This equipment is typically mounted on a pole, near the start of the crossing.

1. The PBS shall be Polara iNavigator (iN2) series or approved equal.
2. The PBS shall be mounted to a pole by banding or bolting.
3. 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.
4. The PBS Speaker shall be 8 Ohms, 6 Watt, and weather-proof.
5. 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.
6. The PBS Arrow Button Actuation shall use Hall Effect Sensor technology rated to greater than 20 million operations.
7. The PBS Arrow Button Push Force shall have three adjustable pressure settings between approximately 1 and 3lbs to activate a button push.
8. The PBS Arrow Button shall pulse and vibrate at approximately 20 Hz with displacement factor based on pounds of force used to actuate.
9. The PBS shall have a rear facing speaker projecting sound from front and back, providing 360º omnidirectional sound performance.
10. 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.
11. 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.
12. The system shall operate with the vendor's client application to record and upload cumulative ped count & call data.
13. The PBS shall meet or exceed NEMA 250 type 4X enclosure requirements.
14. The PBS Construction shall be:
    a. FRAME: Cast Aluminum, Powder Coated.
    b. HOUSING: Reinforced, UL-listed Thermoplastic.
    c. MESSAGE SIGN: Aluminum, Powder Coated, Ink Markings, or Reflective Vinyl Sheeting
    d. PUSH BUTTON: Aluminum, Powder Coated.
15. 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.

16. 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.

Field Programming

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

1. The iOS and PC applications shall be upgradable.
2. The iOS and PC applications shall notify the user when a newer version of the client application is available.
3. The iOS and PC applications shall notify the user when newer PBS and CCU firmware is available.
4. The iOS and PC applications shall provide the mechanism to download the latest PBS and CCU firmware.
5. The iOS and PC applications shall be capable of setting all volumes and features of the APS system specific to the PBS's.
6. 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).
7. The iOS and PC applications shall be capable of storing, modifying, loading, and emailing PBS configuration settings.

Payment

Payment for the traffic signal installation shall be on a lump sum for Traffic Signal at Harbor Bay Parkway & Penumbra Place/South Loop Road (Bid Item #4) as shown on the Bidder's Proposal, and shall include full compensation for furnishing all labor, tools, material and equipment, and doing all the work necessary for removing existing equipment as needed and furnishing and installing new equipment, service pedestal, foundation, concrete pad, conduits, pull box, utility trench crossing, including but not limited to mobilization, demobilization, disposal of material, traffic and pedestrian control, street patch. It shall include the work necessary for installing City Furnished equipment including traffic signal cabinet, traffic signal controller, video detection, GPS radio unit and emergency vehicle preemption and associated cost for installation.

Full compensation for all additional materials and labor not shown on the plans or specified, which are necessary to complete the installation of traffic signal, shall be considered as included in the unit price bid and no additional compensation will be allowed therefor.

5. TRAFFIC SIGNAL AT HARBOR BAY PARKWAY & NORTH LOOP ROAD/SOUTH LOOP ROAD (BID ITEM #5). Installation of a traffic signal system shall conform with the provisions of Section 87, "Electrical Systems," of the State Specifications, Standard Plans, these Special Provisions.

Traffic Signal Systems

The material furnished for Traffic Signal System shall conform to the provisions of Section 87, "Electrical Systems" of the 2015 edition of the California Department of Transportation (Caltrans) Standard Specifications and shall include but not be limited to the State Standard Drawings below:

Electrical Systems (Legend, Notes and Abbreviations)	RSP ES-1A
Electrical Systems (Legend, Notes and Abbreviations)	RSP ES-1B
Electrical Systems (Legend, Notes and Abbreviations)	RSP ES-1C
Electrical Systems (Service Equipment Enclosure, Type III-A Series)	RSP ES-2D
Electrical Systems (Controller Cabinet Details),	ES-3A
Electrical Systems (Controller Cabinet Adapter, Foundations, Pad Detail)	RSP ES-3B
Electrical Systems (Pedestrian Signal and Ramp Metering)	ES-4B
Electrical Systems (Signal Faces and Emergency Veh. Det. Mountings)	ES-4E
Electrical Systems (Detectors, Pedestrian Push Button and Signs)	ES-5C
Electrical Systems (Push Button Assembly Post)	RSP ES-7A
Electrical Systems (Traffic Rates Pull Box)	RSP ES-8B
Electrical Systems (Foundation Installations)	ES-11

Schedule shall conform to the provisions in Section 86-1.01C, "Submittals," of the Standard Specifications and these special provisions.

The Engineer shall be furnished a schedule of values for each contract lump sum item of work described in this Section.

District to determine number of days required for cost break down submittal. Use 15 days unless otherwise specified.

The schedule of values shall be submitted to the Engineer for approval within 15 days after the contract has been approved. The schedule of values shall be approved, in writing, by the Engineer before any partial payment for the items of electrical work will be made.

Maintaining Existing and Temporary Electrical Systems

Traffic signal system shutdowns shall be limited to periods between the hours of 9:00 a.m. and 4:00 p.m. Turn on of traffic signals are only allowed after all the detectors are functionally tested and operational, signal flashed out, communications functional, striping and signing modified or installed matching the signal intended phasing operation. The detector shall not be placed on detector recall to simulate fixed timing. The signal shall only be turned on or switched over Monday through Friday on a non-holiday work week between the hours of 9:00 a.m. and noon allowing ample time for any issues to arise.

Use when lane closures are specified under "Maintaining Traffic."

Traffic signal system shutdowns shall be limited to periods allowed for lane closures listed or specified in "Maintaining Traffic" of these special provisions.

Cast-In-Drilled-Hole Concrete Foundations

General

This work includes constructing cast-in-drilled-hole concrete pile foundations for traffic signal and lighting standards. Comply with Section 86-2.03, “Foundations,” of the Standard Specifications.

Materials

Concrete must contain not less than 590 pounds of cementitious material per cubic yard.

Construction

For standards located in sidewalk areas, the pile foundation must be:

1. Placed to final sidewalk grade before the sidewalk is placed
2. Square for the top 4 inches

Standards, Steel Pedestals, and Posts (Use City Standard Plans)

Standards, steel pedestals, and posts for traffic signal and lighting standards shall conform to the provisions in Section 86-2.04, "Standards, Steel Pedestals and Posts," of the Standard Specifications, "Steel Structures" of these special provisions, and the following requirements.

Steel bolts not designated on the plans as high strength (HS) or stainless steel shall be for general applications and shall conform to the requirements in ASTM Designation: A 307.

Where the plans refer to the side tenon detail at the end of the signal mast arm, the applicable tip tenon detail may be substituted.

The sign mounting hardware shall be installed at the locations shown on the plans. See Caltrans Standard Plan ES-70 for sign mounting details.

Pedestrian Push Button post shall be modified 4-foot1-B post with removable raintight cap at the top to accommodate Audible Pedestrian Signal. See plans for details.

All standards, steel pedestals, and posts shall be galvanized.

Conduit

Conduit shall conform to the provisions in Section 86-2.05, "Conduit," of the Standard Specifications and these Special Provisions.

Conduit installation shall be performed by trenching across traveled ways.

Repaired roadway to conform to existing asphalt concrete material.

The grade of asphalt binder mixed with aggregate for HMA shall be PG 64-16.

All aggregate for HMA shall comply with the 1/2 - inch grading.

Non-metallic type, Schedule 40 conduit shall be used unless otherwise noted.

After pull boxes have been installed, the ends of conduits terminating in pull boxes shall be sealed with an approved type of sealing compound.

Underground conduit without conductors to be incorporated into a new system shall be cleaned with a mandrel or cylindrical wire brush and blown out with compressed air prior to pulling string.

Deviations from these specifications shall be requested from the City Engineer in writing.

Conduit shall be laid to a depth of not less than 18" below grade in concrete sidewalk areas and curbed paved median areas, and 30" below finished grade in all other areas.

Street Patching: Existing pavement that is removed by the Contractor during construction shall be replaced by compacting the subgrade and constructing a four-inch (4") asphaltic concrete pavement surface course on an 18" minimum thickness aggregate base(Class II) in all trenches in the street area. The work shall conform to the Engineer's Drawing No. 2930, Case 22, and the following requirements:

1. Asphaltic concrete surfacing shall be Type A, one-half inch(1/2") maximum aggregate size asphalt concrete and shall conform to the applicable requirements of Section 39 and 92 of the Standard Specifications. Paving asphalt of the performance grade PG64-10 shall be used unless otherwise permitted by the Engineer. A tack coat of SS-1 emulsified asphalt shall be applied to the existing ground surface, asphalt and concrete areas prior to replacement of asphalt concrete.
2. Portland cement concrete pavement base shall be Class "II" concrete and shall conform to the applicable requirements of Sections 40 and 90 of the Standard Specifications.

Temporary Patch: It shall be mandatory for the Contractor to maintain a good temporary patch upon all trenches from the time they are backfilled until they are satisfactorily completed. The Engineer will determine whether the temporary patch is satisfactory. In general, the patch shall not be lower than the surrounding pavement and shall be topped with cutback.

Trenching and Backfilling: Trenching and backfilling shall conform to the provisions in Section 86-2.01, "Excavation and Backfilling" of the Standard Specifications, and these Special Provisions. Underground conduit, where subject to vehicular traffic, shall have a minimum depth of thirty inches (30") and shall be constructed according to the City Standard Drawing 2930, Case 22.

All trenches shall be shored where required for safety or to eliminate interference with other work being performed. All trenches shall be excavated with straight walls. Conduits shall be installed with three inches (3") radial clearance. This shall include right-angle crossings as well as parallel installations. Trenches shall not be excavated wider than necessary for the proper installation of the electrical appurtenances and foundations.

Approved local or imported material shall be used for backfill. When material from the excavation is unsuitable for backfill, it shall be disposed of as directed in Section XII, Paragraph C, of these specifications, and suitable material, free from rocks or abrasive materials, and approved by the Engineer, shall be furnished by the Contractor for the backfill. Backfill material shall be placed in horizontal, uniform layers not exceeding six inches (6") in thickness, before compaction, and shall be brought up uniformly on all sides of the structure or facility. Relative compaction shall be ninety-five percent (95%) or more as determined by the impact or field method compaction test.

A continuous plastic marker tape shall be installed above all conduits to show the location of the conduit to prevent damage that might be caused by future excavations in the vicinity of the conduit.

The tape shall be laid in a horizontal plane above the conduit. Under paved areas and sidewalks the tape shall be laid directly on top of the compacted earth subgrade before installation of standard street patch. In unpaved areas the tape shall be laid during the backfilling operation on smooth, compacted backfill eight inches (8") below finished grade surface.

Marker tape shall be polyethylene film, six inches (6") wide, four (4) mils thick, color red, marked with black lettering, which is an integral part of the plastic, with the following words repeated continuously along the tape, "CAUTION" and "BURIED ELECTRICAL LINE BELOW."

Pull Boxes

Pull boxes shall conform to the provisions in Section 86-2.06, "Pull Boxes," of the Standard Specifications, Plan Number ES-8 of the Standard Plans contained within these Specifications, and to these Special Provisions.

Pull boxes and extensions shall be plastic of the size shown on the plan. Covers shall be plastic labeled "Traffic Signals"

No pull boxes shall be labeled "Caltrans."

Pull boxes and covers located in streets or subject to traffic shall be approved for H-20 traffic loading. Steel or cast iron covers shall be used. Covers shall be inscribed as specified above.

Pull boxes shall not have locking type covers and pull box covers shall not have bolt holes unless noted otherwise. All pull boxes shall have extensions.

Grounding shall be required in all pull boxes.

Recesses for suspension of ballast will not be required.

All pull boxes shall have concrete bottoms.

Where pull boxes are located in unpaved areas, the tops shall be set level approximately two inches (2") above finished grade. Pull boxes located in paved areas shall be set flush with surrounding paved surface. Pull boxes located in wheelchair ramp areas shall be set flush and inclined at a slope in conformance to the existing ramp.

Final exact pull box locations will be determined in the field. The Engineer shall have the right to relocate boxes up to a radius of thirty feet (30') from the position shown on the plans without additional charge.

Conductors, Cables, and Wiring

Conductors and wiring shall conform to the provisions in Section 86-2.08, "Conductors," and 86-2.09, "Wiring," of the State Standard Specifications and these Special Provisions.

Splices shall be insulated by "Method B" as illustrated in Caltrans Standard Detail ES-13A.

Conductors shall be wrapped around projecting end of conduit in pull boxes, as shown on the plans. Cables shall be secured to the projecting end of conduit in pull boxes to prevent pulling of cables without removing the securing device.

The minimum insulation thickness, at any point, for Type USE, RHH or RHW wire shall be 39 mils for conductor sizes No. 14 to No. 10, inclusive, and 51 mils for No. 8 to No. 2, inclusive. The minimum insulation thickness, at any point, for Type THW and TW wires shall be 27 mils for conductor sizes No. 14 to No. 10, inclusive, 40 mils for No. 8, and 54 mils for No. 6 to No. 2, inclusive.

All newly installed conductors shall be labeled, identifications shall be by direct labeling, tags, or bands fastened to the conductors in such a manner that they will be permanent and not move along the conductors. Labeling shall be by mechanical methods. Identification bands shall be constructed from nylon cable tie with 3/8 inch by ¾ inch label flag. The indelible marking pen shall be one recommended by the manufacturer of the cable tie or it shall be indelible marking pen compatible with the writing on the nylon material approved by the engineer. No other

method of labeling will be acceptable. All phase conductors and detector cables shall be labeled by phase designations in the pull box nearest their termination, and in the controller cabinet. Detector cables shall be labeled with phase and loop number. Lighting conductors shall be labeled. Spare conductors do not require any labeling. All conductors shall be neatly coiled, secured, and tie wrapped to the edges or corner of the cabinet. Conductors shall not be draped from one end of the cabinet to the other.

Testing

The Contractor shall perform a high voltage series lighting test consisting of the open circuit voltage of the connected constant current transformer between conductors and ground.

The high voltage test shall not be performed on existing circuits or equipment. Non testing of existing circuits and equipment shall not relieve the Contractor from the responsibility for malfunctioning of existing lighting circuits due to the Contractor making splices in or connecting to the circuits and such malfunctions shall be corrected at the Contractor's expense.

Light Emitting Diode Signal Module

Traffic signal faces with 12 inch sections or arrow sections shall use light emitting diode (LED) signal modules as the light source in conformance with these special provisions. Incandescent lamps in existing traffic signal faces shall be replaced with LED signal modules as shown on the plans and in conformance with these special provisions.

Traffic signal module and housing shall be Econolite series 12 inch section LED traffic signal head or approved equal. The signal module Construction shall be:

1. HOUSING: Dark Green
2. BACKPLATE: Metal, Louvered
3. SECTION HEAD ASSEMBLY: Polycarbonate
4. TUNNEL VISORS: Aluminum, Open bottom half

General

Type 1 LED signal modules shall be installed in the doorframes of standard traffic signal housings. Lamp sockets, reflectors, reflector holders and lenses used with incandescent lamps shall not be used when Type 1 LED signal modules are installed.

Type 2 LED signal modules shall be mounted in standard lamp sockets normally used with incandescent lamps. When Type 2 LED signal modules are used, standard traffic signal lenses in the door frames shall be used, or at the option of the Contractor, the standard lenses may be replaced with translucent or clear lenses to seal the signal sections from weather. The installation of Type 2 LED signal modules shall not require any modification to standard lamp sockets or reflectors.

LED signal modules, including green, yellow, red, circular balls and arrow indications shall be from the same manufacturer, and each size shall be the same model.

Type 1 LED signal modules shall be sealed units with two color coded conductors for power connection, a printed circuit board, a power supply, a lens and a gasket. LED signal modules shall be weatherproof after installation and connection. Circuit boards and power supplies shall be contained inside Type 1 LED signal modules. Circuit boards shall conform to the requirements in Chapter 1, Section 6 of the "Transportation Electrical Equipment Specifications," (TEES) published by the Department.

Conductors for Type 1 LED signal modules shall be 3 feet in length with quick disconnect terminals attached and shall conform to the provisions in Section 86-4.01C, "Electrical Components," of the Standard Specifications.

Lenses of Type 1 LED signal modules shall be integral to the units, shall be convex with a smooth outer surface and shall be made of ultraviolet (UV) stabilized plastic or glass. The lenses shall be capable of withstanding ultraviolet exposure from direct sunlight for a minimum period of 36 months without exhibiting evidence of deterioration.

Type 1 LED signal modules shall be sealed in doorframes with one piece ethylene propylene rubber (EPDM) gaskets.

Type 2 LED signal modules shall be sealed units containing all components for operation except, at the Contractor's option, lenses mounted in doorframes will be allowed.

Lenses used with Type 2 signal modules shall be sealed in doorframes with one piece ethylene propylene rubber (EPDM) gaskets.

Type 2 LED signal modules shall not require a specific mounting orientation and shall not vary in light output, pattern or visibility for any mounting orientation.

LEDs used in signal modules shall be of Aluminum Indium Gallium Phosphide (AlInGaP) technology for red and yellow indications and of Gallium Nitride (GaN) technology for green indications. LEDs shall be the ultra bright type rated for 100,000 hours of continuous operation from 40˚C to +74˚C.

Individual LEDs shall be wired so that a total failure of one LED will result in the loss of not more than 5 percent of the signal module light output. Failure of an individual LED in a string shall not result in the loss of the entire string or any other indication.

Maximum power consumption requirements for LED signal modules shall be as follows:

LED Signal Module	Power Consumption in Watts					
	Red		Yellow		Green	
	25°C	74°C	25°C	74°C	25°C	74°C
12-inch circular	11	17	22	25	12	12

8-inch circular	8	13	13	16	10	10
12-inch arrow	9	12	10	12	13	13

Physical and Mechanical Requirements

For existing traffic signals, LED signal modules shall be designed as retrofit replacements for existing optical units of standard traffic signal sections and shall not require special tools for installation. LED signal modules shall fit into existing traffic signal section housings built in conformance with the requirements in the Institute of Transportation Engineers (ITE) without any modification to the housing.

Installation of LED signal modules shall only require the removal of the optical unit components such as the lens, lamp module, gaskets and reflector. LED signal modules shall be weather tight, fit securely to the housing and connect directly to electrical wiring.

Arrow modules shall conform to the requirements in Section 9.01 of the Institute of Transportation Engineers (ITE) Publication: Equipment and Materials Standards, "Vehicle Traffic Control Signal Heads" for arrow indications. LEDs shall be spread evenly across the illuminated portion of the arrow area.

LED Signal Module Lens

The LED signal module shall be capable of replacing the optical unit. The lens may be tinted or may use transparent film or materials with similar characteristics to enhance "ON/OFF" contrasts. The use of tinting or other materials to enhance "ON/OFF" contrast shall not affect chromaticity and shall be uniform across the face of the lens.

If a polymeric lens is used, a surface coating or chemical surface treatment shall be used to provide front surface abrasion resistance.

Environmental Requirements

LED signal modules shall be rated for use in the operating temperature range of 40˚C to +74˚C.

LED signal modules shall be protected against dust and moisture intrusion in conformance with the requirements in NEMA Standard 250 for Type 4 enclosures to protect internal components.

Construction

LED signal modules shall be single, self contained devices, not requiring on site assembly for installation into existing traffic signal housings. The power supply for LED signal modules shall be integral to the module.

Assembly and manufacturing processes for LED signal modules shall be designed to assure all internal components will be adequately supported to withstand mechanical shock and vibration from high winds and other sources.

Materials

Materials used for lenses and LED signal modules shall conform to the requirements in ASTM Specifications for the materials.

Enclosures containing the power supply or electronic components of LED signal modules shall be made of UL94VO flame retardant materials. Lenses of LED signal modules are excluded from this requirement.

Module Identification

LED signal modules shall have the manufacturer's name, trademark, model number, serial number, lot number, month and year of manufacture, and required operating characteristics permanently marked on the back of the module. Required operating characteristics shall include rated voltage, power consumption and volt ampere (VA).

Type 1 LED signal modules shall have prominent and permanent vertical markings for correct indexing and orientation within the signal housings. Markings shall consist of an up arrow or the word "UP" or "TOP."

Photometric Requirements

Initial luminous intensity values for LED signal modules, operating at 25˚C, shall meet or exceed the following minimum values:

Circular Indications (in cd)

	8-inch			12-inch		
Angle (v,h)	Red	Yellow	Green	Red	Yellow	Green
2.5, ±2.5	157	314	314	399	798	798
2.5, ±7.5	114	228	228	295	589	589
2.5, ±12.5	67	133	133	166	333	333
2.5, ±17.5	29	57	57	90	181	181
7.5, ±2.5	119	238	238	266	532	532
7.5, ±7.5	105	209	209	238	475	475
7.5, ±12.5	76	152	152	171	342	342
7.5, ±17.5	48	95	95	105	209	209
7.5, ±22.5	21	43	43	45	90	90
7.5, ±27.5	12	24	24	19	38	38
12.5, ±2.5	43	86	86	59	119	119
12.5, ±7.5	38	76	76	57	114	114
12.5, ±12.5	33	67	67	52	105	105

12.5, ±17.5	24	48	48	40	81	81
12.5, ±22.5	14	29	29	26	52	52
12.5, ±27.5	10	19	19	19	38	38
17.5, ±2.5	19	38	38	26	52	52
17.5, ±7.5	17	33	33	26	52	52
17.5, ±12.5	12	24	24	26	52	52
17.5, ±17.5	10	19	19	26	52	52
17.5, ±22.5	7	14	14	24	48	48
17.5, ±27.5	5	10	10	19	38	38

Arrow Indications (foot-lamberts)

	Red	Yellow	Green
Arrow Indication	1,600	3,200	3,200

LED signal modules shall meet or exceed the following minimum illumination values for a minimum period of 36 months, based on normal use in traffic signal operation over an operating temperature range of 40˚C to +74˚C. In addition, yellow LED signal modules shall meet or exceed the following minimum illumination values for a minimum period of 36 months, based on normal use in traffic signal operation at 25˚C:

Circular Indications (in cd)

	8-inch			12-inch		
Angle (v,h)	Red	Yellow	Green	Red	Yellow	Green
2.5, ±2.5	133	267	267	339	678	678
2.5, ±7.5	97	194	194	251	501	501
2.5, ±12.5	57	113	113	141	283	283
2.5, ±17.5	25	48	48	77	154	154
7.5, ±2.5	101	202	202	226	452	452
7.5, ±7.5	89	178	178	202	404	404
7.5, ±12.5	65	129	129	145	291	291
7.5, ±17.5	41	81	81	89	178	178
7.5, ±22.5	18	37	37	38	77	77
7.5, ±27.5	10	20	20	16	32	32
12.5, ±2.5	37	73	73	50	101	101
12.5, ±7.5	32	65	65	48	97	97
12.5, ±12.5	28	57	57	44	89	89
12.5, ±17.5	20	41	41	34	69	69
12.5, ±22.5	12	25	25	22	44	44
12.5, ±27.5	9	16	16	16	32	32
17.5, ±2.5	16	32	32	22	44	44
17.5, ±7.5	14	28	28	22	44	44
17.5, ±12.5	10	20	20	22	44	44
17.5, ±17.5	9	16	16	22	44	44
17.5, ±22.5	6	12	12	20	41	41
17.5, ±27.5	4	9	9	16	32	32

Arrow Indications (foot-lamberts)

	Red	Yellow	Green
Arrow Indication	1,600	3,200	3,200

Measured chromaticity coordinates of LED signal modules shall conform to the chromaticity requirements of the following table, for a minimum period of 36 months, over an operating temperature range of 40˚C to +74˚C.

Chromaticity Standards

Red	Y: not greater than 0.308, or less than 0.998 -x
Yellow	Y: not less than 0.411, nor less than 0.995 - x, nor less than 0.452
Green	Y: not less than 0.506 - 0.519x, nor less than 0.150 + 1.068x, nor more than 0.730 - x

LED signal modules tested or submitted for testing shall be representative of typical production units. Circular LED modules shall be tested in conformance with California Test 604. Optical testing shall be performed with LED signal modules mounted in standard traffic signal sections without visors or hoods attached to the signal sections.

LEDs for arrow indications shall be spread evenly across the illuminated portion of the arrow area. Arrow LED signal modules shall be tested in conformance with California Test 3001.

Optical testing shall be performed with LED signal modules mounted in standard traffic signal sections without visors or hoods attached to the signal sections. LED arrow signal section indication shall provide minimum initial luminous intensity as listed herein. Measurements shall be performed at the rated operating voltage of 120 V (ac).

Electrical

Maximum power consumption requirements for LED signal modules shall not exceed those listed in "General." LED signal modules shall operate at a frequency of 60 Hz ±3 Hz over a voltage range from 95 V (ac) to 135 V (ac) without perceptible flicker. Fluctuations of line voltage shall have no visible effect on luminous intensity of the indications. Rated voltage for all measurements shall be 120 V (ac).

Wiring and terminal blocks shall conform to the requirements of Section 13.02 of the ITE Publication: Equipment and Material Standards, (Vehicle Traffic Control Signal Heads). Two secured, color coded, 3 feet long, 600 V, 20 AWG minimum, jacketed wires, conforming to the National Electronic Code, rated for service at +105˚C, shall be provided for electrical connection for each Type 1 LED signal module.

LED signal module on board circuitry shall include voltage surge protection to withstand high repetition noise transients in conformance with the requirements in Section 2.1.6 of NEMA Standard TS2.

LED signal modules shall be operationally compatible with currently used controller assemblies including solid state load switches, flashers and conflict monitors. When a current of 20 milliamperes (ac) or less is applied to the unit, the voltage read across the two leads shall be 15 V (ac) or less.

LED signal modules and associated on board circuitry shall conform to the requirements in Federal Communications Commission (FCC) Title 47, SubPart B, Section 15 regulations concerning the emission of electronic noise.

LED signal modules shall provide a power factor of 0.90 or greater.

Total harmonic distortion from current and voltage induced into an alternating current power line by LED signal modules shall not exceed 20 percent at an operating temperature of 25˚C.

Quality Control Program

LED signal modules shall be manufactured in conformance with a vendor quality control (QC) program. The QC program shall include two types of testing: (1) design qualification and (2) production quality. Production quality testing shall include statistically controlled routine tests to ensure minimum performance levels of LED signal modules built to meet these specifications.

Documentation of the QC process and test results shall be kept on file for a minimum period of seven years.

LED signal module designs not satisfying design qualification testing and the production quality testing performance requirements specified herein shall not be labeled, advertised or sold as conforming to these specifications.

Identification of components and subassemblies of LED signal modules, which may affect reliability and performance, shall be traceable to the original manufacturers.

Design Qualification Testing

Design qualification testing (DQT) shall be performed by the manufacturer or an independent testing lab hired by the manufacturer on new LED signal module designs, and on existing designs when a major design change has been implemented. Failure to conform to the requirements of any design qualification test shall be cause for rejection.

A major design change is defined as a design change, electrical or physical, which changes any of the performance characteristics of the LED signal module, results in a different circuit configuration for the power supply, or changes the layout of the individual LEDs in the signal module.

Two LED modules for each design shall be used for DQT. The two LED signal modules shall be selected at random. These signal modules shall be submitted to the Transportation Laboratory after the DQT is complete. Testing data shall be submitted with the modules to the Transportation Laboratory for verification of DQT data.

LED signal modules shall be energized for a minimum of 24 hours, at 100 percent on time duty cycle, at a temperature of 74˚C before performing any DQT.

After burn in, LED signal modules shall be tested for rated initial luminous intensity in conformance with the provisions in "Photometric Requirements." Before measurement, LED signal modules shall be energized at rated voltage, with 100 percent on time duty cycle, for a time period of 30 minutes. Photometrics, luminous intensity and color measurements for yellow LED signal modules shall be taken immediately after the modules are energized. The ambient temperature for these measurements shall be 25˚C. Test results for this testing shall record the current, voltage, total harmonic distortion (THD) and power factor (PF) associated with each measurement.

LED signal modules shall be tested by measuring for chromaticity (color) in conformance with the provisions in "Photometric Requirements." A spectra radiometer shall be used for this measurement. The ambient temperature for this measurement shall be 25˚C.

LED signal modules shall be tested by measuring the current flow in amperes. The measured current values shall be used for quality comparison of production quality assurance on production modules.

LED signal modules shall be tested by measuring the power factor. A commercially available power factor meter may be used to perform this measurement.

LED signal modules shall be tested by measuring the total harmonic distortion. A commercially available total harmonic distortion meter may be used to perform this measurement.

LED signal modules shall be tested in conformance with the provisions in "Electrical," with reference to Class A emission limits referenced in Federal Communications Commission (FCC) Title 47, SubPart B, Section 15.

LED signal modules shall be tested for compatibility with the controller unit, conflict monitor and load switch. Each signal module shall be connected to the output of a standard load switch connected to an alternating current voltage supply between the values of 95 V (ac) and 135 V (ac) with the input to the load switch in the "OFF" position. The alternating current voltage developed across each LED signal module so connected shall not exceed 15 V rms as the input alternating current voltage is varied from 95 V (ac) rms to 135 V (ac) rms.

LED signal modules shall be tested for transient immunity in conformance with the provisions in "Electrical," and conforming to the procedure described in NEMA Standard TS2.

Mechanical vibration testing shall be performed on LED signal modules in conformance with the requirements in MIL STD 883, Test Method 2007, using three 4 minute cycles along each x, y, and z axis, at a force of 2.5 Gs, with a frequency sweep from 2 Hz to 120 Hz. The loosening of the lens, internal components, or other physical damage shall be cause for rejection.

Temperature cycling shall be performed on LED signal modules in conformance with the requirements of MIL STD 883, Test Method 1010. The temperature range shall conform to the provisions in "Environmental Requirements." A minimum of 20 cycles shall be performed with a 30 minute transfer time between temperature extremes and a 30 minute dwell time at each temperature. LED signal module under test shall be non operating. Failure of LED signal modules to function properly or evidence of cracking of LED signal module lenses or housings after temperature cycling shall be cause for rejection.

Moisture resistance testing shall be performed on LED signal modules in conformance with the requirements in NEMA Standard 250 for Type 4 enclosures. Evidence of internal moisture after testing shall be cause for rejection.

Production Quality Testing

Production quality testing shall be performed on each LED signal module prior to shipment. Failure to conform to the requirements of any production quality test shall be cause for rejection. The manufacturer shall retain test results for seven years for warranty purposes.

LED signal modules shall be tested for rated initial intensity after burn in. The burn in period shall consist of signal modules being energized at rated voltage for a 30 minute stabilization period before the measurements are made. A single point measurement with a correlation to the minimum initial luminous intensity requirements of "Photometric Requirements" for circular modules may be used. The ambient temperature for this measurement shall be +25°C.

LED signal modules shall be tested for luminous intensity requirements in "Photometric Requirements."

LED signal modules shall be tested for required power factor after burn in.

LED signal modules shall be tested by measuring current flow in amperes after burn in. The measured current values shall be compared against current values resulting from design qualification measurements under "Design Qualification Testing." The current flow shall not exceed the rated value. The measured ampere values with rated voltage shall be recorded as volt ampere (VA) on the product labels.

LED signal modules shall be visually inspected for any exterior physical damage or assembly anomalies. The surface of the lens shall be free of scratches, abrasions, cracks, chips, discoloration, or other defects. Any such defects shall be cause for rejection.

Certificate of Compliance

The Contractor shall provide the Engineer a Certificate of Compliance from the manufacturer, in conformance with the provisions of Section 6-1.07, "Certificates of Compliance," of the Standard Specifications. The certificate shall certify that the LED signal modules comply with the requirements of these specifications. The certificate shall also include a copy of all applicable test reports on the LED signal modules.

Quality Assurance Testing (Random Sample Testing)

The State may perform random sample testing on all shipments. Random sample testing will be completed within 30 days after delivery to the Transportation Laboratory. Circular LED signal modules shall be tested in conformance with California Test 604 and these special provisions. Arrow signal modules shall be tested in conformance with California Test 3001 and these special provisions. Optical testing shall be performed with the module mounted in a standard traffic signal section, but without a visor or hood attached to the section or housing. The number of modules tested shall be determined by the quantity of each model in the shipment. The sample size shall conform to ANSI/ASQC Z1.4. The Transportation Laboratory shall determine the sampling parameters to be used for the random sample testing. All parameters of the specification may be tested on the modules. Acceptance or rejection of the shipment shall conform to ANSI/ASQC Z1.4 for random sampled shipments.

Warranty

The manufacturer must provide a written warranty against defects in materials and workmanship for LED signal modules for a period of 48 months after installation of LED signal modules. Replacement LED signal modules shall be provided within 15 days after receipt of failed LED signal modules at no cost to the State, except the cost of shipping the failed modules. All warranty documentation shall be given to the Engineer prior to installation.

Light Emitting Diode Pedestrian Signal Face Modules

Light emitting diode (LED) pedestrian signal face (PSF) modules shall be installed in standard Type A pedestrian signal housing, "UPRAISED HAND" and "WALKING PERSON," and shall use light emitting diodes as the light source as shown on the plans and in conformance with these special provisions.

LED pedestrian signal module and housing shall be Econolite series LED pedestrian signal or approved equal.

General

PSF modules shall be designed to mount in standard Type A housings. PSF modules shall be designed to mount behind or replace face plates of standard Type A housings in conformance with the requirements of the Institute of Transportation Engineers (ITE) Standards: "Pedestrian Traffic Control Signal Indications," "Manual on Uniform Traffic Control Devices" (MUTCD),

and "2014 California MUTCD". Where existing Type A pedestrian signal faces contain both incandescent and LED light sources, both light sources shall be removed and replaced by a new LED pedestrian signal face module in conformance with these special provisions.

PSF modules used on this project shall be from a single manufacturer.

Circuit boards and power supplies shall be contained inside the LED modules. Circuit boards shall conform to the requirements in Chapter 1, Section 6 of the "Transportation Electrical Equipment Specifications," (TEES) published by the Department.

PSF modules shall fit into existing Type A housings and shall not require a specific mounting orientation and shall not vary in light output, pattern or visibility for any mounting orientation.

LEDs for "UPRAISED HAND" symbols shall utilize Aluminum Indium Gallium Phosphide (AlInGaP) technology and shall be the ultra bright type rated for 100,000 hours of continuous operation from 40°C to +74°C.

Individual LEDs shall be wired so that a total failure of one LED will result in the loss of not more than 5 percent of the PSF module light output. Failure of an individual LED in a string shall not result in the loss of the entire string or any other indication.

PSF modules tested and those submitted for testing shall be representative of typical production units. PSF modules shall be tested in conformance with California Test 610 and as specified herein.

Luminance Requirements

Luminance of the "UPRAISED HAND" symbol shall be 1,100-foot lamberts minimum. Color of "UPRAISED HAND" shall be Portland orange conforming to the requirements of the ITE Standards: "Pedestrian Traffic Control Signal Indications," "Manual on Uniform Traffic Control Devices," and "MUTCD California Supplement."

Luminance of the "WALKING PERSON" symbol shall be 1,550 foot lamberts minimum. Color of "WALKING PERSON" shall be white (Luminous Tubing) conforming to the requirements of the ITE Standards: "Pedestrian Traffic Control Signal Indications," "Manual on Uniform Traffic Control Devices," and "MUTCD California Supplement."

Height and width of each symbol shall not be less than 10 inches and 6 1/2 inches respectively. Uniformity ratio of illuminated symbols shall not exceed 4 to 1 between the highest luminance area and the lowest luminance area.

PSF modules shall be rated for a minimum useful life of 36 months and shall maintain at least 85 percent of 1,100 foot lamberts for "UPRAISED HAND" symbols and 85 percent of 1,550 foot lamberts for "WALKING PERSON" symbols after 36 months of continuous use in traffic signal operation over a temperature range of 40°C to +74°C.

Physical and Mechanical Requirements

PSF modules shall be designed as retrofit replacement for existing optical units of signal lamps, or existing pedestrian signal faces with both LED and incandescent light sources, and shall not require special tools for installation. PSF modules shall fit into pedestrian signal section housings built in conformance with the ITE Publication: Equipment and Materials Standards, Chapter 2 "Vehicle Traffic Control Signal Heads" (VTCSH) without modification to the housing.

Installation of PSF modules into pedestrian signal faces shall require only removal of lenses, reflectors, lamps and existing LED modules as indicated on the plans.

Environmental Requirements

PSF modules shall be rated for use in the operating temperature range of 40°C to +74°C.
Construction

PSF modules shall be single, self-contained devices, not requiring on site assembly for installation into standard Type A housings. Power supplies for PSF modules shall be integral to the modules.

Assembly and manufacturing processes for PSF modules shall be designed to assure all internal components will be adequately supported to withstand mechanical shock and vibration from high winds and other sources.

Materials

Material used for PSF modules shall conform to the requirements in ASTM specifications for the materials.

Enclosures containing either the power supply or electronic components of the PSF module shall be made of UL94VO flame retardant materials.

Module Identification

PSF modules shall have the manufacturer's name, trademark, model number, serial number, lot number, month and year of manufacture, and required operating characteristics permanently marked on the back of the module. Required operating characteristics shall include rated voltage, power consumption and volt ampere (VA).

Type A pedestrian signal face, combination "UPRAISED HAND"/"WALKING PERSON" section, housings without the reflectors shall be used for PSF modules.

Photometric Requirements

PSF modules shall maintain at least 85 percent of the following luminous intensity values over 36 months of continuous use in signal operation over the temperature range of 40°C to

+74°C. In addition, PSF modules shall meet or exceed the following luminous intensity values upon initial testing at 25°C.

PSF module	Luminous Intensity
UPRAISED HAND	1,100-foot lamberts
WALKING PERSON	1,550-foot lamberts

The measured chromaticity coordinates of PSF modules shall conform to the requirements for chromaticity in Section 5.3.2.1 and Figure C of the VTCSH standards.

Electrical

PSF module power consumption shall not exceed the following maximum values:

PSF module	Power Consumption @ 25°C	Power Consumption @ 74°C
UPRAISED HAND	10.0 W	12.0 W
WALKING PERSON	12.0 W	15.0 W

Service

Service shall conform to the provisions in Sections 86-1.02P, 87-1.03L, and 87-1.03P of the Caltrans Specifications and these Special Provisions. Each service shall be suitable for the short circuit current available at its supply terminal.

If service equipment cabinet design deviates in any way from the details shown on the, details of such deviation shall be submitted to the Engineer for review before fabrication of the contract cabinets. If deemed necessary by the Engineer, one complete prototype cabinet shall be delivered to the Engineer for review at least 30 days before fabrication of the contract fixtures. The prototype cabinet will be returned to the Contractor and if permitted by the Engineer, the cabinet may be installed in the work.

The Contractor shall furnish and install Type III AF single meter service equipment. Cabinets (See State of California Standard Plan ES 2C and ES-2D) conforming to City of Alameda Specifications shall be constructed with anodized aluminum and per the Caltrans Specifications Sections 86-1.02Q, 86-1.02P, and 87-1.03Q, and painted in SEA FOAM GREEN or City-approved color. A 40 amp, 120 volt, metered circuit shall be furnished to the controller cabinet for traffic signal operation. The Contractor shall confirm and provide all service requirements with Alameda Municipal Power, and the City of Alameda. Note: 120/240 volt service houses a 4 jaw meter socket, 120/208 volt service houses a 5 jaw meter socket.

Service Cabinet Fabrication:

- Maximum width 12", Maximum height 63" with a minimum of 60" maximum depth 9". Minimum opening to control section 8.25" x 39.25".
- Cabinet shall be fabricated with anodized aluminum.
- Internal part shall be fabricated for 14-gauge cold steel.

- Cabinet shall be welded construction with welding materials specifically designed for material used.
- All fasteners, hinges, latches, and hardware shall be of stainless steel and hinges shall be continuous piano style.
- There shall be no exposed nuts, bolts, screws, rivets, or other fasteners on the exterior.
- Cabinet shall have enclosed swept pull section with removable step.
- Cabinet shall have fully framed ride hinged outer door with swaged close tolerance sides for flush fit with top drip lip and closed cell neoprene flange compressed gaskets.
- Cabinet door shall have 2,000 LB stress rated stainless hasp, welded to cabinet door.
- Base mounting detail shall be identical to existing cabinets for emergency Dead-front Safety Door.
- Distribution and control panel shall have separate hinged dead-front panels with 1/4 turn latch and knotted knobs.
- Breaker compartment shall be safety barriered from the control compartment.
- Dead front shall be hinged on the same side as the front door and shall open a minimum of 120 degrees.
- Removable back-pan shall be mounted on 4 welded 1/4" studs.

Power Distribution Panel:
- Main breakers shall be available as 1 pole, 2 pole, 3 pole, or 4 pole.
- Provide separate metered main, lighting main and disconnects as required.
- All circuit breakers shall be installed in a vertical position, handle up for "On," handle down for "Off".
- Circuit breaker shall be industrial grade, Westinghouse Quicklag C or equal to match existing.
- There shall be no plug-in circuit breakers.
- All bushing shall be UL approved copper THHN cable bussing, fully rated 125 Amps.

Control Compartment:
- There shall be a minimum 25" from base to circuit breakers.
- All components shall match existing components in use for maintenance of spare parts and known reliability.
- Contactors shall be Westinghouse Class A202 or other to match existing.
- The cabinet shall be wired to include a spare contactor for street lighting (See the wiring diagram detail).
- The cabinet shall be completely pre-wired in the factory.
- Wiring will be to NEMA IIB standards showing external connections and external equipment.
- All control wiring shall be 19 strand #14 AWG THHN.
- All control wires shall be permanently labeled with matching engraved clip-sleeve nylon markers.
- All terminals shall be permanently labeled.

Nameplates and Drawings:

- The function of all circuit breakers, switches and other components as required shall be identified by laminated engraved plastic nameplates with minimum 1/4 " letters fastened with minimum of two 1/4", #4-40 machine screws.
- Wiring schematics shall be Computer Aided Drafted and include all external equipment and connections per NEMA IIB.
- As built factory drawings shall be enclosed in clear plastic and held inside the outer door by weld hooks.

Certification:

- Manufacturers will be required to furnish independent laboratory certification of material preparation and finish and to confirm that the overall product meets these specifications. If this agency wishes to witness this testing, all costs to be paid by the Contractor.

Photoelectric Control:

- Photoelectric control shall be NEMA Type V, three-prong, twist-lock, and housed inside the service cabinet. Photoelectric control shall have an instant on/delay (5 second) off incorporated as per State Standards, to prevent cycling if struck by vehicle headlights. The photoelectric cell shall be solid-state unit and the photocell sensitivity shall be in compliance with PG&E LS rate requirements. Photocell socket must be made of metal and not plastic.
- A secondary photoelectric control system shall be wired from the mast arm street light to the service cabinet. After testing the secondary, the wire will be disconnected, coiled, and secured in the service cabinet until needed at a future date. The mast arm PEU shall have a north orientation. The photoelectric unit shall be a multi-voltage, instant on/ delay (5 sec) off, and three-prong twist-locking type unit. The photocells sensitivity shall be in compliance with PG&E LS rate requirements.

Transit Signal Priority Configuration

A. The traffic signal controller firmware shall enable the traffic signal controllers to recognize TSP calls received from AC Transit buses as Class I vehicles through the Low Priority system.
B. The Contractor shall program local traffic signal controllers at the project intersections for TSP and operations as indicated on the project plans. Controller programming shall include, but not be limited to the following items as appropriate:

    a. Assignment of low-priority calls to appropriate TSP channel.
    b. 10-minute headway lock-out time for TSP calls
    c. Lock-out of TSP vehicles
    d. Timing parameters

C. The system shall provide the following functionalities:

    a. The TSP shall work with existing or new Low Priority System installed on traffic signal standards.

b. The TSP shall grant priority based on a user defined headway based system, The system shall grant a priority if the bus is behind a user defined headway to provide priority for the designated buses, independent of vehicle direction. The headway parameter shall be user settable, by day of week and time of day. A time of day and day of week look up table shall be provided.
c. The TSP shall grant priority based on a user defined schedule based system. The schedule parameters shall be user settable, by day of week and time of day. A time of day and day of week look up table shall be provided.
d. The TSP shall provide an early green or extension of green based on traffic signal timing parameters provided by the Engineer. The phase duration for all subsequent phases, after the early-green or extension of green, shall be reduced equally after the priority call. There shall be no back-to-back TSP activations.
e. The TSP shall be non-locking, i.e. if a bus has departed the intersection, the priority request will be dropped.
f. The TSP shall not truncate pedestrian walk or don't walk durations if activated. If the intersection is equipped with countdown timers, the countdown timers shall be blank in the absence of a pedestrian call.
g. The system shall meet all applicable MUTCD requirements.
h. The system shall be capable of maintaining a log of all TSP requests and activations, including the fields listed below, to allow AC Transit to monitor the performance of TSP operations. This information shall include the following fields (at a minimum) and be stored at each controller for a minimum of two weeks. At a minimum, this information will include the following fields:
    i. Controller ID
    ii. Event Start Date-Time (i.e., when bus detected)
    iii. Event End Date-Time (i.e., when bus call has dropped off)
    iv. Location of bus at Event End Date-Time
    v. Bus ID emitter Code
    vi. Bus Travel Direction
    vii. Priority Response (e.g., Priority Granted, Priority Denied)
    viii. Cycle Length
    ix. Red Duration
    x. Early Green Duration
    xi. Extended Green Duration

i. The Contractor shall calibrate the detectors to allow recognition of the transit priority call within 400 feet (minimum) of the stop bar or as directed by City (near- side stops will be case by case). The TSP recognition shall end 50' prior to the stop bar or as directed by the Engineer.

D. All Agency-furnished controllers shall have firmware with TSP functionality.

Transit Signal Priority Testing

Prior to conditional acceptance, Contractor shall perform pre-approved tests on the TSP, to demonstrate the end-to-end functionality of the system—from detecting bus to granting TSP, log of TSP events at controller, and receipt of emailed report to an AC Transit email account. This testing shall be done in addition to specific tests for individual pieces of equipment. Prior to beginning of testing, the Contractor shall submit an acceptance test plan for review and approval. The test plan shall document the test procedures, including the operation and functional requirements to be verified by the tests.

Vendor representation shall be provided for all system equipment testing.

The Engineer, or other Engineer approved representative, shall be present for all field tests.

1. Intersection Installation Field Test. TSP operations shall tested at each project intersection. Intersection test shall consist of properly detecting buses 400 feet minimum from intersection or at a distance equivalent to 10 seconds from intersection (unless otherwise specified by Engineer for locations with near- side bus stops) and granting TSP response subject to pre-defined parameters (vehicle privileges and time since last TSP activation). The Engineer shall be present at testing to review performance of signal timing parameters. Contractor shall implement signal timing changes as needed.

The Contractor shall review 'as constructed' drawings and provide all that is necessary to operate and maintain the TSP and its components for the period during construction and for 12 months thereafter.

The Contractor shall adhere to the testing requirements for this project and shall allow for 30 days between substantial completion and entrance into the 12-month operational support period which exceeds and includes the warranties provided.

Wire Accessible Pedestrian Signal (APS)

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

1. The System shall consist of a Central Control Unit (CCU) and Pedestrian Push Button Stations (PBS), as described below, and an iOS device w/ the iOS client application or Windows PC with BLE dongle and Windows client application, for programming the system settings.
2. The System shall be manufactured by an ISO 9001:2008 (minimum) registered company.

Design Compliance

1. The System shall meet the functionality requirements of MUTCD 2009 – 4E and CAMUTCD 2011 – 4E.
2. The System shall meet NEMA TS 2 Section 2.1 Temperature & Humidity requirements, or TS4 equivalent.
3. The System shall meet NEMA TS 2 Section 2.1 Transient Voltage Protection requirements, or TS4 equivalent.
4. The System shall meet NEMA TS 2 Section 2.1 Mechanical Shock and Vibration requirements, or TS4 equivalent.
5. The System shall meet IEC 61000-4-4, IEC 61000-4-5 Transient Suppression requirements.
6. The System shall meet FCC Title 47, Part 15, Class A Electronic Noise requirements.
7. The Push Button Station (PBS) Enclosure shall meet NEMA 250 – Type 4X requirements.
8. The Central Control Unit (CCU) Enclosure shall meet NEMA 250 – Type 1 requirements.

Functional Requirements

1. 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.
2. 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.
3. 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.
4. 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.
5. 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.

6. 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.
7. The System shall have standard “Travel Direction” options that can be selected at the time of installation.
8. 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.
9. 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.
10. The System shall provide 2 language capabilities, selectable by user (as a field selectable feature).
11. The System shall provide an Emergency preemption message in conjunction with a preemption system (selectable feature).
12. 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.
13. All sounds for all PBS’s shall be synchronized.
14. The system shall have a non-visible, ambient sensing microphone located in the pedestrian station in an environmentally protected housing.
15. 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.
16. 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.
17. The system shall utilize high quality digital audio technology, with a minimum 16-bit sample at a 48 kHz sample rate.
18. 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.
19. The System shall have the option to mute sounds on all crosswalks except activated crosswalk (selectable feature).
20. 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.
21. 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.
22. 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.
23. The entire System shall be configurable from any PBS over Bluetooth.
24. The entire System shall be configurable from the CCU over Wi-Fi or Ethernet.
25. 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 is the control unit that provides data for the Push Button Stations. The CCU shall be either a shelf mount (CCU-S) or rack mount (CCU-C) assembly.

1. The CCU-S shall be installed inside the Traffic Cabinet and powered by the AC supply mains (115 VAC).
2. 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).
3. The CCU-S shall provide internal power to operate up to 16 PBS's.
4. A 24 volt power brick shall power up to 16 PBS's in a CCU-C configuration.
5. The CCU shall control at least 16 PBS's.
6. The CCU shall be logically configurable to assign any PBS to one of 16 traffic phases.
7. 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.
8. The CCU-C shall receive pedestrian phase Walk, Don't Walk and Clearance inputs from a Transport Electrical Equipment Specification (TEES) C4S connector.
9. 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.
10. The CCU-S shall provide optically isolated general purpose inputs.
11. The CCU-S shall be used with a 4-cable interface harness assembly.
12. The CCU shall have internal storage to log several hundred events with a date-time stamp for each event.
13. The CCU shall have an internal real-time clock capable of being set in the field and propagating the time to each connected PBS.
14. 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.
15. The CCU shall monitor PED interval conflicts and signal affected PBS's to an off state when a conflict occurs.
16. The CCU-S shall meet NEMA 250 – Type 1 enclosures requirements.
17. 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 allows the pedestrian to place calls to the traffic controller and provides vibro-tactile feedback during the Walk cycle. This equipment is typically mounted on a pole, near the start of the crossing.

1. The PBS shall be Polara iNavigator (iN2) series or approved equal.
2. The PBS shall be mounted to a pole by banding or bolting.
3. 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.

4. The PBS Speaker shall be 8 Ohms, 6 Watt, and weather-proof.
5. 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.
6. The PBS Arrow Button Actuation shall use Hall Effect Sensor technology rated to greater than 20 million operations.
7. The PBS Arrow Button Push Force shall have three adjustable pressure settings between approximately 1 and 3lbs to activate a button push.
8. The PBS Arrow Button shall pulse and vibrate at approximately 20 Hz with displacement factor based on pounds of force used to actuate.
9. The PBS shall have a rear facing speaker projecting sound from front and back, providing 360º omnidirectional sound performance.
10. 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.
11. 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.
12. The system shall operate with the vendor's client application to record and upload cumulative ped count & call data.
13. The PBS shall meet or exceed NEMA 250 type 4X enclosure requirements.
14. The PBS Construction shall be:
    a. FRAME: Cast Aluminum, Powder Coated.
    b. HOUSING: Reinforced, UL-listed Thermoplastic.
    c. MESSAGE SIGN: Aluminum, Powder Coated, Ink Markings, or Reflective Vinyl Sheeting
    d. PUSH BUTTON: Aluminum, Powder Coated.
15. 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.
16. 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.

Field Programming

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

1. The iOS and PC applications shall be upgradable.
2. The iOS and PC applications shall notify the user when a newer version of the client application is available.
3. The iOS and PC applications shall notify the user when newer PBS and CCU firmware is available.

4. The iOS and PC applications shall provide the mechanism to download the latest PBS and CCU firmware.
5. The iOS and PC applications shall be capable of setting all volumes and features of the APS system specific to the PBS's.
6. 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).
7. The iOS and PC applications shall be capable of storing, modifying, loading, and emailing PBS configuration settings.

Payment

Payment for the traffic signal installation shall be on a lump sum for Traffic Signal at Harbor Bay Parkway & North Loop Road/South Loop Road (Bid Item #5) as shown on the Bidder's Proposal, and shall include full compensation for furnishing all labor, tools, material and equipment, and doing all the work necessary for removing existing equipment as needed and furnishing and installing new equipment, service pedestal, foundation, concrete pad, conduits, pull box, utility trench crossing, including but not limited to mobilization, demobilization, disposal of material, traffic and pedestrian control, street patch. It shall include the work necessary for installing City Furnished equipment including traffic signal cabinet, traffic signal controller, video detection, GPS Radio Unit and emergency vehicle preemption and associated cost for installation.

Full compensation for all additional materials and labor not shown on the plans or specified, which are necessary to complete the installation of traffic signal, shall be considered as included in the unit price bid and no additional compensation will be allowed therefor.

6. SIGNING AND STRIPING AT HARBOR BAY PARKWAY & PENUMBRA PLACE/SOUTH LOOP ROAD (BID ITEM #6). Sprayable thermoplastic traffic stripes (traffic lines) shall be applied in conformance with the provisions in Section 84, "Traffic Stripes and Pavement Markings," of the Standard Specifications and these special provisions.

Sprayable thermoplastic material shall be free of lead and chromium, and shall conform to the requirements in State Specification No. PTH 02SPRAY.

Retroreflectivity of the sprayable traffic stripes shall conform to the requirements in ASTM Designation: D 6359 99. White sprayable thermoplastic traffic stripes shall have a minimum initial retroreflectivity of 250 mcd m 2lx 1. Yellow sprayable thermoplastic traffic stripes shall have a minimum initial retroreflectivity of 150 mcd m 2lx 1.

At the option of the Contractor, permanent traffic striping and pavement marking tape conforming to the provisions in "Prequalified and Tested Signing and Delineation Materials" of these special provisions may be placed instead of the sprayable thermoplastic traffic stripes. Permanent tape, if used, shall be installed in conformance with the manufacturer's specifications.

Where striping joins existing striping, as shown on the plans, the Contractor shall begin and end the transition from the existing striping pattern into or from the new striping pattern a sufficient distance to ensure continuity of the striping pattern.

Sprayable thermoplastic material shall be applied to the pavement at a temperature between 351 F and 401 F, unless a different temperature is recommended by the manufacturer.

Sprayable thermoplastic traffic stripes shall be free of runs, bubbles, craters, drag marks, stretch marks, and debris.

If permanent tape is placed instead of sprayable thermoplastic traffic stripes, the tape will be measured and paid for by the linear foot as thermoplastic traffic stripe (sprayable).

Sprayable thermoplastic traffic stripes will be measured by the linear foot along the line of the traffic stripes, without deductions for gaps in broken traffic stripes. A double traffic stripe, consisting of two 4 inch wide yellow stripes, will be measured as one traffic stripe.

Layout of traffic striping and pavement markings shall be subject to approval by the Engineer prior to placement of striping/marking, in accordance with Section XII-B “ORDER OF WORK”.

Payment

The contract price for installing striping, installing pavement markings, refreshing crosswalk striping, replacing existing striping, testing for lead compliance, removing and installing roadside signal panel and posts, installing roadside signs, and removing existing pavement markings shall be paid by lump sum under Signing & Striping for Bid Item #6 shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in applying sprayable thermoplastic traffic striping and markings (regardless of the number, widths, and patterns of individual stripes involved in each traffic stripe) including establishing alignment for stripes and tees, and layout work, complete in place, as shown on the plans, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer.

7. SIGNING AND STRIPING AT HARBOR BAY PARKWAY & NORTH LOOP ROAD/SOUTH LOOP ROAD (BID ITEM #7). Sprayable thermoplastic traffic stripes (traffic lines) shall be applied in conformance with the provisions in Section 84, "Traffic Stripes and Pavement Markings," of the Standard Specifications and these special provisions.

Sprayable thermoplastic material shall be free of lead and chromium, and shall conform to the requirements in State Specification No. PTH 02SPRAY.

Retroreflectivity of the sprayable traffic stripes shall conform to the requirements in ASTM Designation: D 6359 99. White sprayable thermoplastic traffic stripes shall have a minimum initial retroreflectivity of 250 mcd m 2lx 1. Yellow sprayable thermoplastic traffic stripes shall have a minimum initial retroreflectivity of 150 mcd m 2lx 1.

At the option of the Contractor, permanent traffic striping and pavement marking tape conforming to the provisions in "Prequalified and Tested Signing and Delineation Materials" of these special provisions may be placed instead of the sprayable thermoplastic traffic stripes. Permanent tape, if used, shall be installed in conformance with the manufacturer's specifications.

Where striping joins existing striping, as shown on the plans, the Contractor shall begin and end the transition from the existing striping pattern into or from the new striping pattern a sufficient distance to ensure continuity of the striping pattern.

Sprayable thermoplastic material shall be applied to the pavement at a temperature between 351 F and 401 F, unless a different temperature is recommended by the manufacturer.

Sprayable thermoplastic traffic stripes shall be free of runs, bubbles, craters, drag marks, stretch marks, and debris.

If permanent tape is placed instead of sprayable thermoplastic traffic stripes, the tape will be measured and paid for by the linear foot as thermoplastic traffic stripe (sprayable).

Sprayable thermoplastic traffic stripes will be measured by the linear foot along the line of the traffic stripes, without deductions for gaps in broken traffic stripes. A double traffic stripe, consisting of two 4 inch wide yellow stripes, will be measured as one traffic stripe.

Layout of traffic striping and pavement markings shall be subject to approval by the Engineer prior to placement of striping/marking, in accordance with Section XII-B “ORDER OF WORK”.

Payment

The contract price for installing striping, installing pavement markings, refreshing crosswalk striping, replacing existing striping, testing for lead compliance, removing and installing roadside signal panel and posts, installing roadside signs, and removing existing pavement markings shall be paid by lump sum under Signing & Striping for Bid Item #7 shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in applying sprayable thermoplastic traffic striping and markings (regardless of the number, widths, and patterns of individual stripes involved in each traffic stripe) including establishing alignment for stripes and tees, and layout work, complete in place, as shown on the plans, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer.

8. PERMIT ALLOWANCE (BID ITEM #8). Refer to Section II, Item H of this specification. The amount shown in the bid form is an allowance, which will change after the contract is awarded. Contractor will provide copies of receipts as proof of payment.

Payment shall be made for the actual cost of the permit.

SECTION XIII. MANDATORY PRE-CONSTRUCTION MEETING SUBMITTALS

A. REQUIRED REPORTS. Contractor shall submit the following mandatory reports to the City Engineer at the pre-construction meeting:

- Construction Schedule
- Traffic Control Plan
- Pothole Plan and Schedule

The Contractor shall not proceed with construction until these reports have been approved by the City Engineer and the Contractor has received such approval in writing (included in your Notice to Proceed letter). The potholing plan and schedule must be approved by the City Engineer at least two (2) weeks before construction may proceed.

B. PRE-CONSTRUCTION CONFERENCE/MEETINGS AND SCHEDULES. Within five (5) business days of the date the work is to commence pursuant to the NTP, the Contractor shall submit the Initial Project Submittal Package to the City engineer for review. The Initial Project Submittal Package shall address the entire project and shall include the Traffic Control Plan (first 20 working days at minimum), Erosion/Storm Water Pollution Prevention Plan, Waste Reduction and Recycling Plan, and the full project schedule.

A preconstruction conference will be held at the office of the City Engineer approximately two weeks faster [should be “after”] the date the work is to commence pursuant to the NTP for the purpose of discussing with the Contractor the scope of work, contract drawings, specifications, existing conditions, traffic detour plans, materials to be ordered, equipment to be used, proposed schedule, proposed traffic control, and all essential matters pertaining to the prosecution of and the satisfactory completion of the project as required. The Contractor's representative at this conference shall include all major superintendents for the work and major Subcontractors who will be on the jobsite on a daily basis during their phase of the work.

Weekly or bi-weekly project meetings will be held on-site or in the office of the Engineer, at 950 W. Mall Square, Room 110, to discuss issues, coordination, change orders, schedule updates or any other matters. Construction schedules shall be updated weekly and submitted prior to the weekly project meetings. In addition, a three-week look ahead schedule that ties into the master schedule shall be provided and delivered to the Engineer on a weekly basis.

C. WATER AVAILABILITY AND CONSERVATION. It is anticipated that water will be available in sufficient quantities for the prosecution of the work. However, water shortages may occur during the life of the contract. Arrangements or commitments obtained by the City are not a part of the contract. It is expressly understood and agreed that the City assumes no responsibility to the bidder or Contractor whatsoever in respect to the arrangements made with the source. The Contractor shall assume all risks in connection with the use of the source and the terms upon which the use shall be made. There is no warranty or guaranty, either expressed or

implied, to the quantity of water that can be obtained from the source.

During the progress of the work, if water becomes unavailable or unavailable in the quantities needed for prosecution of the work, the unavailability of water will be considered a "shortage of materials" in conformance with the provisions in Section 8-1.10, "Liquidated Damages," of the Standard Specifications except for compensation. The Contractor will be granted an extension of time and will not be assessed with liquidated damages for any portion of the delay in completion of the work beyond the time shown above for the completion of the work caused by the unavailability of water, provided the Contractor notifies the Engineer and furnishes proof of the "shortage of materials" as required in the third and fourth paragraphs in Section 8-1.10, "Liquidated Damages," of the Standard Specifications. If the Contractor sustains delay costs or damages which could not have been avoided by the judicious handling of forces, equipment and plant, there shall be paid to the Contractor the amount the Engineer may find to be a fair and reasonable compensation for the part of the Contractor's actual loss, as, in the opinion of the Engineer, was unavoidable, determined in the same manner as provided for right of way delays. The Contractor shall be entitled to no other compensation for such delay. The provisions in Section 4-1.02, "Changes and Extra Work", of the Standard Specifications shall not apply to the unavailability of water.

Attention is directed to the various sections of the Standard Specifications and these special provisions which require the use of water for the construction of this project. Attention is directed to Section 7, "Legal Relations and Responsibility," of the Standard Specifications with regards to the Contractor's responsibilities for public convenience, public safety, preservation of property, indemnification, and insurance.

Nothing in this section "Water Availability and Conservation" shall relieve the Contractor from furnishing an adequate supply of water required for the proper construction of this project in conformance with the provisions in the Standard Specifications or these special provisions or relieve the Contractor from the legal responsibilities defined in Section 7.

The Contractor shall, whenever possible and not in conflict with the above requirements, minimize the use of water during construction of the project. Watering equipment shall be kept in good working order; water leaks shall be repaired promptly; and washing of equipment, except when necessary for safety or for the protection of equipment, shall be discouraged.