

Project Name/No.: **Traffic Engineering Services for YL Blvd.  
/Weir Canyon RTSSP Project (TC231003)**

Contract No.: \_\_\_\_\_

Dept./Contract Rep: **PW-Traffic/ T.Wang**

Approved: **5/16/2023**

**PROFESSIONAL SERVICES AGREEMENT  
FOR  
TRAFFIC ENGINEERING SERVICES FOR YORBA LINDA  
BOULEVARD/WEIR CANYON ROAD CORRIDOR REGIONAL TRAFFIC SIGNAL  
SYNCHRONIZATION PROJECT (RTSSP)**

THIS AGREEMENT FOR CONTRACT SERVICES ("Agreement") is made and entered into as of **May 16<sup>th</sup>, 2023**, by and between the CITY OF YORBA LINDA, a municipal organization organized under the laws of the State of California ("City"), and **ITERIS, INC.**, a ("*California corporation*") ("Consultant").

**NOW THEREFORE**, the parties hereto agree as follows:

**SECTION ONE: SERVICES OF CONSULTANT**

1.1 Scope of Services. In compliance with all terms and conditions of this Agreement, Consultant shall provide those services related to **Traffic Engineering Services For Yorba Linda Boulevard/Weir Canyon Road Corridor Regional Traffic Signal Synchronization Project (RTSSP)**, as specified in the "Scope of Services" attached hereto as Exhibit "A" and incorporated herein by this reference (the "services" or "work"). Consultant warrants that all services will be performed in a competent, professional and satisfactory manner in accordance with the standards prevalent in the industry for such services.

1.2 Changes and Additions to Scope of Services. City shall have the right at any time during the performance of the services, without invalidating this Agreement, to order extra work beyond that specified in the Scope of Services or make changes by altering, adding to, or deducting from said work. No such work shall be undertaken unless a written order is first given by City to Consultant, incorporating therein any adjustment in (i) the Schedule of Compensation, and/or (ii) the Schedule of Performance, which adjustments are subject to the written approval of the Consultant. It is expressly understood by Consultant that the provisions of this Section 1.2 shall not apply to services specifically set forth in the Scope of Services or reasonably contemplated therein. Consultant hereby acknowledges that it accepts the risk that the services to be provided pursuant to the Scope of Services may be more costly or time consuming than Consultant anticipates, and that Consultant shall not be entitled to additional compensation therefor.

1.3 Familiarity with Work. By executing this Agreement, Consultant warrants that (a) it has thoroughly investigated and considered the work to be performed, (b) it has investigated the nature and factual context of the work and fully acquainted itself with the conditions pertaining to it, (c) it has carefully considered how the work should be performed, and (d) it fully understands the facilities, difficulties and restrictions attending performance of the work under this Agreement. Should Consultant discover any latent or unknown conditions materially differing from those inherent in the work or as represented by City, and such latent or unknown condition affects Consultant's ability to perform the Work for the Contract Sum (as defined in Section 2.1 below) Consultant shall immediately inform City of such fact and shall not

proceed except at Consultant's risk until written instructions are received from the Contract Officer (as defined in Section 4.2 hereof).

1.4 Standard of Performance. Consultant agrees that all services shall be performed in a competent, professional, and satisfactory manner in accordance with the standards prevalent in the industry, and that all goods, materials, equipment, or personal property included within the services herein shall be of good quality, fit for the purpose intended.

1.5 Performance to Satisfaction of City. Consultant shall perform all work and tasks comprising the Services to the satisfaction of City within the time specified. If City reasonably determines that any portion of the services is not satisfactory, City shall have the right to take appropriate action, including but not limited to: (a) meeting with Consultant to review the quality of the work and resolve matters of concern; (b) requiring Consultant to repeat unsatisfactory work at no additional charge until they are satisfactory; (c) suspending the delivery of work to Consultant for an indefinite time; (d) withholding payment; and (e) terminating this Agreement as hereinafter set forth.

1.6 Prohibition Against Subcontracting or Assignment. Consultant shall not contract with any entity to perform in whole or in part the work and services required of Consultant herein without the prior express written approval of the City. Neither this Agreement nor any interest herein may be assigned or transferred, voluntarily or by operation of law, without the prior written approval of the City. Any such prohibited assignment or transfer shall be void.

## **SECTION TWO:        COMPENSATION**

2.1 Contract Sum. For the services rendered pursuant to this Agreement, Consultant shall be compensated in accordance with Exhibit "B" (the "Schedule of Compensation") in a total amount not to exceed **One Million Two Hundred Seventeen Thousand Nine Hundred Fifty-One and 98/100 Dollars (\$1,217,951.98)** (the "Contract Sum"), except as provided in Section 1.2. The method of compensation set forth in the Schedule of Compensation may include a lump sum payment upon completion, payment in accordance with the percentage of completion of the services, payment for time and materials based upon Consultant's rate schedule, but not exceeding the Contract Sum, or such other methods as may be specified in the Schedule of Compensation. Compensation may include reimbursement at Consultant's actual cost, without additional overhead or services charge, for actual and necessary expenditures for reproduction costs, transportation expense, telephone expense, and similar costs and expenses when and if specified in the Schedule of Compensation.

2.2 Method of Payment. Unless otherwise provided in the Schedule of Compensation, Consultant shall submit to City no later than the tenth (10th) working day of each month, in the form approved by City, an invoice for services rendered prior to the date of the invoice. Such invoice shall (1) describe in detail the services provided, including time and materials, and (2) specify each staff member who has provided services and the number of hours assigned to each such staff member. Such invoice shall contain a certification by a principal member of Consultant specifying that the payment requested is for work performed in accordance with the terms of this Agreement. City will pay Consultant for all expenses stated

thereon which are approved by City pursuant to this Agreement no later than thirty (30) days after approved invoices are received by the City.

### **SECTION THREE: PERFORMANCE SCHEDULE**

3.1 Time of Essence. Time is of the essence in the performance of this Agreement.

3.2 Schedule of Performance. All services rendered pursuant to this Agreement shall be performed diligently and within the time period established in Exhibit “C” (the “Schedule of Performance”). Extensions to the time period specified in the Schedule of Performance may be approved in writing by the Contract Officer.

3.3 Force Majeure. The time period specified in the Schedule of Performance for performance of the services rendered pursuant to this Agreement shall be extended because of any delays due to unforeseeable causes beyond the control and without the fault or negligence of Consultant, including, but not restricted to, acts of God or of the public enemy, fires, earthquakes, floods, epidemic, quarantine restrictions, riots, strikes, freight embargoes, acts of any governmental agency other than City, and unusually severe weather, if Consultant shall within ten (10) days of the commencement of such delay notify the Contract Officer in writing of the causes of the delay. The Contract Officer shall ascertain the facts and the extent of delay, and extend the time for performing the services for the period of the forced delay when and if in his or her judgment such delay is justified, and the Contract Officer's determination shall be final and conclusive upon the parties to this Agreement.

3.4 Term. The term of this agreement shall commence upon execution of this agreement on **May 16<sup>th</sup>, 2023** and terminate upon completion of the project. This agreement may be extended upon mutual agreement by both parties (extended term). Unless earlier terminated in accordance with Sections 8.11 or 8.12 of this Agreement, this Agreement shall continue in full force and effect until completion of the services, except as otherwise provided in the Schedule of Performance.

### **SECTION FOUR: COORDINATION OF WORK**

4.1 Representative of Consultant. **Braulio Ramirez, P.E., Associate Vice President** is hereby designated as the principal representative of the Consultant, authorized to act in its behalf with respect to the work and services specified herein and to make all decisions in connection therewith. A substitution of the designated representative must be approved in advance by the City.

4.2 Contract Officer. The Contract Officer shall be **Tony Wang, P.E., Traffic Engineering Manager** or such other person as may be designated by the City Manager of City. It shall be Consultant's responsibility to assure that the Contract Officer is kept informed of the progress of the performance of the services and Consultant shall refer any decisions, which must be made by City to the Contract Officer. Unless otherwise specified herein, any approval of City required hereunder shall mean the approval of the Contract Officer.

## **SECTION FIVE:            INSURANCE AND INDEMNIFICATION**

5.1     Without limiting Consultant's indemnification obligations, Consultant shall not undertake the services contemplated hereunder until Consultant has obtained all of the insurance required herein from a company or companies acceptable to City, and Consultant shall maintain all such insurance in full force and effect at all times during the term of this License and any extension or renewal thereof. Insurance shall be placed with insurers having a current A.M. Best rating of no less than A-: VII or equivalent or as otherwise approved by City.

5.2     Consultant shall take out and maintain the following insurance:

5.2.1. Workers' Compensation and Employer's Liability Insurance: Consultant shall cover or insure as required by applicable laws relating to workers' compensation insurance all of its employees performing the services contemplated hereunder, in accordance with the "Workers' Compensation and Insurance Act," Division IV of the Labor Code of the State of California and any Acts amendatory thereof. Consultant shall provide worker's compensation insurance and employer's liability insurance with limits not less than One Million Dollars (\$1,000,000) each occurrence, One Million Dollars (\$1,000,000) disease policy limit, and One Million Dollars (\$1,000,000) disease each employee. Such policy of workers compensation insurance shall contain the following separate endorsements:

(a)     "Insurer waives all rights of subrogation against the City of Yorba Linda, its officers, directors, employees, representatives and volunteers."

(b)     "This insurance policy shall not be suspended, voided, reduced in coverage or in limits, cancelled, limited, non-renewed or materially changed for any reason by the insurer until thirty (30) days after receipt by the City of Yorba Linda of a written notice of such cancellation, limitation or reduction of coverage."

5.2.2. Commercial General Liability Insurance providing coverage in the following minimum limits:

(a)     Combined single limit of One Million Dollars (\$1,000,000) per occurrence for Bodily Injury, Personal Injury or Death and Property.

(b)     Damage Coverage shall be at least as broad as Insurance Services Office (ISO) Commercial General Liability coverage (occurrence Form CG 0001).

(c)     If Commercial General Insurance or other form with a general aggregate limit is used, either the general aggregate limit shall apply separately to the project/location (with the ISO CG 2503 or ISO CG 2504, or insurer's equivalent endorsement provided to City), or the general aggregate limit shall be twice the required occurrence limit.

5.2.3. Comprehensive Automobile Liability Insurance, including owned, non-owned, leased, hired, and borrowed automobiles and similar vehicles, providing the following minimum limits:

(a) Combined single limit of One Million Dollars (\$1,000,000) per occurrence for Bodily Injury or Death and Property Damage.

(b) Coverage shall be at least as broad as Insurance Services Office (ISO) Business and Auto Coverage (Form CA 0001) covering any auto.

5.2.4. Professional Liability: Consultant shall provide coverage appropriate to the Consultant's profession covering Consultant's wrongful acts, negligent actions, errors, or omissions. The retroactive date (if any) is to be no later than the effective date of this Agreement. Consultant shall maintain such coverage continuously for a period of at least three years after the completion of the contract work. Consultant shall purchase a one-year extended reporting period i) if the retroactive date is advanced past the effective date of this Agreement; ii) if the policy is canceled or not renewed; or iii) if the policy is replaced by another claims-made policy with a retroactive date subsequent to the effective date of this Agreement. The limits shall be no less than \$1,000,000 per claim and annual aggregate.

5.3 Endorsements: The policies of liability insurance provided for in Paragraphs 5.2.2 through 5.2.4 shall specify that this specific Agreement is insured and that coverage for injury to participants resulting from Consultant's activities is not excluded, and shall be in a form satisfactory to City and contain the following separate endorsements:

(a) "The City of Yorba Linda, its officers, directors, employees, representatives and volunteers, are declared to be additional insureds on all of the above policies with respects to the operations and activities of the named insured at or from the premises of the City of Yorba Linda. The coverage shall contain no special limitations on the scope of protection afforded to the City of Yorba Linda, its officers, directors, employees, representatives and volunteers."

(b) "This insurance policy shall not be suspended, voided, reduced in coverage or in limits, canceled, limited, non-renewed, or materially changed for any reason until thirty (30) days after receipt by the City of Yorba Linda of a written notice of such cancellation, limitation or reduction of coverage."

(c) "This insurance policy is primary insurance and no insurance held or owned by the designated additional insureds shall be called upon or looked to cover a loss under said policy; the City of Yorba Linda shall not be liable for the payment of premiums or assessments on this policy."

(d) "Any failure to comply with reporting or other provisions of the policies including breaches of warranties shall not affect coverage provided to the City of Yorba Linda, its officers, directors, employees, representatives, or volunteers."

(e) "This insurance shall apply separately to each insured against whom claim is made or suit is brought, except with respect to the limits of the insurer's liability."

5.4 Evidence of Coverage: Consultant shall at the time of the execution of the Agreement present to City the original policies of insurance required by this Section 5 or a

certificate of the insurance, with separate endorsements (Insurance Services Office Form CG 2026, or equivalent), showing the issuance of such insurance and the additional insured and other provisions and endorsements required herein, and copies of all endorsements signed by the insurer's representative. All policies shall contain the Consultant's name and location of the Premises on the certificate. At least thirty (30) days prior to the expiration of any such policy, a signed complete certificate of insurance, with all endorsements provided herein, showing that such insurance coverage has been renewed or extended, shall be filed with City. Consultant's insurance shall apply separately to each insured against whom claim is made or suit is brought, except with respect to the limits of the insurer's liability.

5.5 Review of Coverage: City shall have the right at any time to review the coverage, form, and limits of insurance required under this Agreement. If, in the sole and absolute discretion of City, the insurance provisions in this Agreement do not provide adequate protection for City, City shall have the right to require Consultant to obtain insurance sufficient in coverage, form and limits to provide adequate protection and Consultant shall promptly comply with any such requirement. City's requirements shall not be unreasonable but shall be adequate in the sole opinion of City to protect against the kind and extent of risks which may exist at the time a change of insurance is required, or thereafter.

5.6 Deductibles: Any and all deductibles must be declared and approved by City prior to execution of this Agreement.

5.7 Agreement Contingent Upon Coverage: Notwithstanding any other provision of this Agreement, this Agreement shall be null and void at all times when the above-referenced original policies of insurance or Certificate of Insurance or Renewal Certificates or Endorsements are not on file with City.

5.8 Workers' Compensation Insurance. By his/her signature hereunder, Consultant certifies that he/she is aware of the provisions of Section 3700 of the California Labor Code which requires every employer to be insured against liability for workers' compensation or to undertake self-insurance in accordance with the provisions of that code, and he/she will comply with such provisions before commencing the performance of the work of this Agreement. To the extent required by law, Consultants and subcontractors will keep Workers' Compensation Insurance for their employees in effect during all work covered by this Agreement. In the event Consultant has no employees requiring Consultant to provide Workers' Compensation Insurance, Consultant shall so certify to the City in writing prior to the City's execution of this Agreement. The City shall not be responsible for any claims in law or equity occasioned by failure of the Consultant to comply with this section or with the provisions of law relating to Worker's Compensation.

5.9 Indemnification. Consultant shall indemnify, defend, and hold City and City's agents, officers, and employees ("City Personnel") harmless from and against any and all actions, suits, claims, demands, judgments, attorney's fees, costs, damages to persons or property, losses, penalties, obligations, expenses or liabilities (herein "claims" or "liabilities") that may be asserted or claimed by any person or entity arising out of the negligence, recklessness, or willful misconduct of Consultant, its employees, agents, representatives or subcontractors in the performance of any tasks or services for or on behalf of City, whether or

not there is concurrent active or passive negligence on the part of City and/or City Personnel, but excluding such claims or liabilities arising from the sole active negligence or willful misconduct of City or City Personnel. In connection therewith:

5.9.1. Consultant shall defend any action or actions filed in connection with any such claims or liabilities, and shall pay all costs and expenses, including attorney's fees incurred in connection therewith, to the maximum extent allowed under California law including but not limited to Civil Code section 2782.8.

5.9.2. Consultant shall promptly pay any judgment rendered against City or any City Personnel for any such claims or liabilities, to the maximum extent allowed under California law including but not limited to Civil Code section 2782.8..

5.9.3. In the event City and/or any City Personnel is made a party to any action or proceeding filed or prosecuted for any such damages or other claims arising out of or in connection with the negligence, recklessness, or willful misconduct of Consultant, Consultant shall pay to City any and all costs and expenses incurred by City or City Personnel in such action or proceeding, together with reasonable attorney's fees and expert witness fees, to the maximum extent allowed under California law including but not limited to Civil Code section 2782.8..

## **SECTION SIX: RECORDS, REPORTS, AND INTELLECTUAL PROPERTY.**

6.1 Reports. Consultant shall periodically prepare and submit to the Contract Officer such reports concerning Consultant's performance of the services required by this Agreement as the Contract Officer shall require.

6.2 Records. Consultant shall keep such books and records as shall be necessary to perform the services required by this Agreement and enable the Contract Officer to evaluate the cost and the performance of such services. Books and records pertaining to costs shall be kept and prepared in accordance with generally accepted accounting principles. The Contract Officer shall have full and free access to such books and records at all reasonable times, including the right to inspect, copy, audit, and make records and transcripts from such records.

6.3 Ownership of Documents and Data. All original drawings, specifications, reports, records, data, documents and other materials, whether in hard copy or electronic form, which are prepared by Consultant, its employees, subcontractors and agents in the performance of this Agreement, shall be the property of City and shall be delivered to City upon termination of this Agreement or upon the earlier request of the Contract Officer, and Consultant shall have no claim for further employment or additional compensation as a result of the exercise by City of its full rights of ownership of the documents and materials hereunder. Consultant shall cause all subcontractors to assign to City any documents or materials prepared by them, and in the event Consultant fails to secure such assignment, Consultant shall indemnify City for all damages suffered thereby.

6.4 In the event City or any person, firm or corporation authorized by City reuses said documents and materials without written verification or adaptation by Consultant for the specific purpose intended and causes to be made or makes any changes or alterations in said documents and materials, City hereby releases, discharges, and exonerates Consultant from liability

resulting from said change. The provisions of this clause shall survive the completion of this Contract and shall thereafter remain in full force and effect.

## 6.5 Intellectual Property and Proprietary Information.

6.5.1. Proprietary Information. All proprietary information developed specifically for City by Consultant in connection with, or resulting from, this Agreement, including but not limited to inventions, discoveries, improvements, copyrights, patents, maps, reports, textual material, or software programs, but not including Consultant's underlying materials, software, or know-how, shall be the sole and exclusive property of City, and are confidential and shall not be made available to any person or entity without the prior written approval of City. Consultant agrees that the compensation to be paid pursuant to this Agreement includes adequate and sufficient compensation for any proprietary information developed in connection with or resulting from the performance of Consultant's services under this Agreement. Consultant further understands and agrees that full disclosure of all proprietary information developed in connection with, or resulting from, the performance of Services by Consultant under this Agreement shall be made to City, and that Consultant shall do all things necessary and proper to perfect and maintain ownership of such proprietary information by City.

6.5.2. Reproduction Rights. Any and all patents and copyrights that arise from the services or the creation of work in carrying out this Agreement shall be vested in City, and Consultant hereby agrees to relinquish all claims to such copyrights in favor of City.

6.5.3. Use of Patented Materials. Consultant shall assume all costs arising from the use of patented or copyrighted materials, including but not limited to equipment, devices, processes, and software programs, used, or incorporated in the Services performed by Consultant under this Agreement. Consultant shall indemnify, defend, and save City harmless from any and all suits, actions, or proceedings of every nature for or on account of the use of any patented or copyrighted materials.

## SECTION SEVEN: RELEASE OF INFORMATION/CONFLICTS OF INTEREST.

7.1 Confidentiality. All information gained by Consultant in performance of this Agreement shall be considered confidential and shall not be released by Consultant without City's prior written authorization. Consultant, its officers, employees, agents, or subcontractors, shall not without written authorization from the City Manager or unless requested by the City Attorney, voluntarily provide declarations, letters of support, testimony at depositions, response to interrogatories, or other information concerning the work performed under this Agreement or relating to any project or property located within the City. Response to a subpoena or court order shall not be considered "voluntary" provided Consultant gives City notice of such court order or subpoena.

7.2 Release of Confidential Information. Consultant shall promptly notify City should Consultant, its officers, employees, agents, or subcontractors be served with any summons, complaint, subpoena, notice of deposition, request for documents, interrogatories, request for admissions, or other discovery request, court order, or subpoena from any person or party regarding this Agreement and the work performed hereunder or with respect to any project



or property located within the City. City retains the right, but has no obligation, to represent Consultant and/or be present at any deposition, hearing, or similar proceeding. Consultant agrees to cooperate fully with City and to provide the opportunity to review any response to discovery requests provided by Consultant. However, City's right to review any such response does not imply or mean the right by City to control, direct, or rewrite said response.

7.3 Conflicts of Interest Prohibited. Consultant covenants that neither he/she nor any officer or principal of their firm have any interest in, or shall acquire any interest, directly or indirectly, which will conflict in any manner or degree with the performance of their services hereunder. Consultant further covenants that in the performance of this Agreement, no person having such interest shall be employed by them as an officer, employee, agent, or subcontractor. Consultant further covenants that Consultant has not contracted with nor is performing any services, directly or indirectly, with any developer(s) and/or property owner(s) and/or firm(s) and/or partnership(s) owning property in the City or the study area and further covenants and agrees that Consultant and/or its subcontractors shall provide no service or enter into any agreement or agreements with a/any developer(s) and/or property owner(s) and/or firm(s) and/or partnership(s) owning property in the City or the study area prior to the completion of the work under this Agreement.

7.4 Covenant Against Contingent Fee. Consultant covenants that neither it nor any of its officers, employees, agents, or representatives employed or retained any company or person, other than a bona fide employee working for Consultant, to solicit or secure this Agreement. Consultant further covenants that neither it nor any of its officers, employees, agents, or representatives has paid or agreed to pay any company or person, other than a bona fide employee of Consultant, any fee, commission, percentage, brokerage fee, gift, or any other consideration contingent upon, or resulting from, the award or making of this Agreement. For breach or violation of this provision, City shall have the right to annul this agreement without liability, or, at its discretion, to deduct from the Agreement price or consideration, or otherwise recover, the full amount of such fee, commission, percentage, brokerage fees, gift, or contingent fee.

## **SECTION EIGHT: LEGAL RELATIONS AND RESPONSIBILITIES.**

8.1 Compliance with Law. Consultant shall keep itself fully informed of all existing and future state and federal laws and all county and city ordinances and regulations which in any manner affect those employed by it or in any way affect the performance of services pursuant to this Agreement. Consultant shall at all times observe and comply with all such laws, ordinances, and regulations and shall be responsible for the compliance of all work and services performed by or on behalf of Consultant.

8.2 Licenses, Permits, Fees and Assessments. Except as otherwise specified herein, Consultant shall obtain at its sole cost and expense such licenses, permits and approvals as may be required by law for the performance of the services required by this Agreement. Consultant shall have the sole obligation to pay for any fees, assessments and taxes, plus applicable penalties, and interest, which may be imposed by law and arise from or are necessary for the performance of the services required by this Agreement.

8.3 Covenant Against Discrimination. The Consultant covenants that, by and for itself, its heirs, executors, assigns and all persons claiming under or through them, that there shall be no discrimination against, or segregation of, any person or group of persons on account of race, color, creed, religion, sex, marital status, national origin, or ancestry in the performance of this Agreement.

8.4 Independent Contractor. Consultant shall perform all services required herein as an independent contractor of City and shall remain at all times as to City a wholly independent contractor. City shall not in any way or for any purpose become or be deemed to be a partner of Consultant in its business or otherwise, or a joint venturer, or a member of any joint enterprise with Consultant. Consultant shall not at any time or in any manner represent that it or any of its agents or employees are agents or employees of City. Neither Consultant nor any of Consultant's employees shall, at any time, or in any way, be entitled to any sick leave, vacation, retirement, or other fringe benefits from City; and neither Consultant nor any of its employees shall be paid by City time and one-half for working in excess of forty (40) hours in any one week. City is under no obligation to withhold State and Federal tax deductions from Consultant's compensation. Neither Consultant nor any of Consultant's employees shall have any property right to any position, or any of the rights an employee may have in the event of termination of this Agreement.

8.5 Non-liability of City Officers and Employees. No officer or employee of the City shall be personally liable to the Consultant, or any successor in interest, in the event of any default or breach by the City or for any amount that may become due to the Consultant or to its successor, or for breach of any obligation of the terms of this Agreement.

8.6 California Law. This Agreement shall be construed and interpreted both as to validity and to performance of the parties in accordance with the laws of the State of California. Legal actions concerning any dispute, claim or matter arising out of or in relation to this Agreement shall be instituted in the Superior Court of the County of Orange, State of California, or any other appropriate court in such county, and Consultant covenants and agrees to submit to the personal jurisdiction of such court in the event of such action.

8.7 Disputes. In the event of any dispute arising under this Agreement, the injured party shall notify the injuring party in writing of its contentions by submitting a claim therefor. The injured party shall continue performing its obligations hereunder so long as the injuring party commences to cure such default within ten (10) days of service of such notice and completes the cure of such default within forty-five (45) days after service of the notice, or such longer period as may be permitted by the Contract Officer; provided that if the default is an immediate danger to the health, safety and general welfare, City may take such immediate action as City deems warranted. Compliance with the provisions of this section shall be a condition precedent to termination of this Agreement for cause and to any legal action, and such compliance shall not be a waiver of any party's right to take legal action in the event that the dispute is not cured, provided that nothing herein shall limit City's right to terminate this Agreement without cause pursuant to Section 8.11.

8.8 Retention of Funds. City may withhold from any monies payable to Consultant sufficient funds to compensate City for any losses, costs, liabilities, or damages it reasonably

believes were suffered by City due to the default of Consultant in the performance of the services required by this Agreement.

8.9 Waiver. No delay or omission in the exercise of any right or remedy of a non defaulting party on any default shall impair such right or remedy or be construed as a waiver. City's consent or approval of any act by Consultant requiring City's consent or approval shall not be deemed to waive or render unnecessary City's consent to or approval of any subsequent act of Consultant. Any waiver by either party of any default must be in writing and shall not be a waiver of any other default concerning the same or any other provision of this Agreement.

8.10 Rights and Remedies are Cumulative. Except with respect to rights and remedies expressly declared to be exclusive in this Agreement, the rights and remedies of the parties are cumulative and the exercise by either party of one or more of such rights or remedies shall not preclude the exercise by it, at the same or different times, of any other rights or remedies for the same default or any other default by the other party.

8.11 Termination Prior To Expiration of Term. This section shall govern any termination of this Agreement, except as specifically provided in the following Section 8.12 for termination for cause. City reserves the right to terminate this Agreement at any time, with or without cause, upon ten (10) days' written notice to Consultant. Upon receipt of any notice of termination, Consultant shall immediately cease all services hereunder except such as may be specifically approved by the Contract Officer. Consultant shall be entitled to compensation for all services rendered prior to receipt of the notice of termination and for any services authorized by the Contract Officer thereafter in accordance with the Schedule of Compensation or such as may be approved by the Contract Officer, except as provided in Section 8.8.

8.12 Termination for Default of Consultant. If termination is due to the failure of Consultant to fulfill its obligations under this Agreement, City may, after compliance with the provisions of Section 8.7, take over work and prosecute the same to completion by contract or otherwise, and Consultant shall be liable to the extent that the total cost for completion of the services required hereunder exceeds the compensation herein stipulated (provided that City shall use reasonable efforts to mitigate such damages), and City may withhold any payments to Consultant for the purpose of setoff or partial payment of the amounts owed City as previously stated in Section 8.8.

8.13 Attorney's Fees. If either party to this Agreement is required to initiate or defend or made a party to any action or proceeding in any way connected with this Agreement, the prevailing party in such action or proceeding, in addition to any other relief which may be granted, whether legal or equitable, shall be entitled to reasonable attorney's fees, whether or not the matter proceeds to judgment.

8.14 Safety. The Consultant shall execute and maintain his/her work so as to avoid injury or damage to any person or property. The Consultant shall comply with the requirements of the specifications relating to safety measures applicable in particular operations or kinds of work. In carrying out his/her work, the Consultant shall at all times exercise all necessary precautions for the safety of employees appropriate to the nature of the work and the conditions under which the work is to be performed, and be in compliance with all applicable federal, state,

and local statutory and regulatory requirements including California Department of Industrial Relations (Cal/OSHA) regulations; and the U.S. Department of Transportation Omnibus Transportation Employee Testing Act.

8.15 Compliance with California Unemployment Insurance Code Section 1088.8. If Consultant is a sole proprietor, then prior to signing the Agreement, Consultant shall provide to City a completed and signed Form W-9, Request for Taxpayer Identification Number and Certification. Consultant understands that pursuant to California Unemployment Insurance Code section 1088.8, City will report the information from Form W-9 to the State of California Employment Development Department, and that the information may be used for the purposes of establishing, modifying, or enforcing child support obligations, including collections, or reported to the Franchise Tax Board for tax enforcement purposes.

8.16 Prevailing Wages. Consultant is aware of the requirements of California Labor Code Section 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 “public works” and “maintenance” projects. If the services are being performed as part of an applicable “public works” or “maintenance” project, as defined by the Prevailing Wage Laws, and if the total compensation is \$1,000 or more, Consultant agrees to fully comply with such Prevailing Wage Laws. Consultant shall defend, indemnify and hold the City, its elected officials, officers, employees and agents free and harmless from any claim or liability arising out of any failure or alleged failure to comply with the Prevailing Wage Laws.

8.17 Unauthorized Use of City's Name. Except as required by law or with the prior written consent of City (which consent may be withheld in city's sole and absolute discretion), Consultant shall not use City's name, seal or logo in any marketing materials, magazine, trade paper, newspaper, television or radio production or other similar medium, nor shall Consultant state, imply or in any way represent to any third party that City has endorsed or approved Consultant or any of its services or products.

## **SECTION NINE: MISCELLANEOUS**

9.1 Notices. Any notice, demand, request, consent, approval, communication either party desires or is required to give the other party or any other person shall be in writing and either served personally or sent by prepaid, first-class mail to the address set forth below. Either party may change its address by notifying the other party of the change of address in writing. Notices personally delivered or delivered by a document delivery service shall be effective upon receipt. Notices delivered by mail shall be effective at 5:00 p.m. on the second calendar day following dispatch.

To City: CITY OF YORBA LINDA  
Attention: **Tony Wang, P.E.**  
**Traffic Engineering Manager**  
4845 Casa Loma Avenue  
Yorba Linda, CA 92886

To Consultant: ITERIS, INC.  
Attention: **Braulio Ramirez, P.E.**  
**Associate Vice President**  
1700 Carnegie Avenue, Suite 100  
Santa Ana, CA 92705

9.2 Interpretation. The terms of this Agreement shall be construed in accordance with the meaning of the language used and shall not be construed for or against either party by reason of the authorship of this Agreement.

9.3 Integration; Amendment. This Agreement contains the entire understanding of the parties herein and supersedes any and all other written or oral understandings as to those matters contained herein, and no prior oral or written understanding shall be of any force or effect with respect to those matters covered thereby. No amendment, change or modification of this Agreement shall be valid unless in writing, stating that it amends, changes or modifies this Agreement, and signed by all the parties hereto.

9.4 Severability. In the event that part of this Agreement shall be declared invalid or unenforceable by a valid judgment or decree of a court of competent jurisdiction, such invalidity or inability to enforce shall not affect any of the remaining portions of this Agreement which are hereby declared as severable and shall be interpreted to carry out the intent of the parties hereunder unless the invalid provision is so material that its invalidity deprives either party of the basic benefit of their bargain or renders this Agreement meaningless.

9.5 Authority. The persons executing this Agreement on behalf of the parties hereto warrant that they are duly authorized to execute this Agreement on behalf of said parties.

9.6 Statutory References. All references in this Agreement to particular statutes, regulations, ordinances, or resolutions of the United States, the State of California, or the County of Orange shall be deemed to include the same statute, regulation, ordinance or resolution as hereafter amended or renumbered, or if repealed, to such other provisions as may thereafter govern the same subject.

9.7 Special Provisions. Any additional or supplementary provisions or modifications or alterations of this Agreement, if any, shall be set forth in an additional Exhibit "D" ("Special Provisions") if any such Special Provisions exist. In the event of any discrepancy between the provisions of this Agreement and the Special Provisions, Special Provisions shall take precedence and prevail.

9.8 Contract Documents. The Agreement between the Parties shall consist of the following: (1) this Agreement, (2) the Consultant's signed, original Proposal ("Consultant's Proposal"), and (3) the City's Request for Proposals, ("City's RFP), which shall all be referred to collectively hereinafter as the "Contract Documents". The Consultant's Proposal and the City's RFP, which are both hereby incorporated by reference, and are made a part of this Agreement. All provisions of this Agreement, the Consultant's Proposal, and the City's RFP shall be binding on the Parties. Should any conflict or inconsistency exist in the Contract Documents, the conflict or inconsistency shall be resolved by applying the provisions in the highest priority document, which shall be determined in the following order of priority, (1<sup>st</sup>) the terms and conditions of this Agreement, (2<sup>nd</sup>) the provisions of the City's RFP, and (3<sup>rd</sup>) the provisions of the Consultant's Proposal(s).

[SIGNATURES BEGIN ON NEXT PAGE]

IN WITNESS WHEREOF, the parties have entered into this Agreement as of the date first written above.

**CITY:**

**CITY OF YORBA LINDA**

**CONSULTANT:**

**ITERIS, INC.**

By: \_\_\_\_\_

MARK A. PULONE  
CITY MANAGER

Dated: \_\_\_\_\_

By: \_\_\_\_\_

Signature: \_\_\_\_\_

Title: \_\_\_\_\_

Address: \_\_\_\_\_

\_\_\_\_\_

By: \_\_\_\_\_

Dianna Honeywell, Finance Director

By: \_\_\_\_\_

Signature: \_\_\_\_\_

Title: \_\_\_\_\_

Address: \_\_\_\_\_

\_\_\_\_\_

ATTEST:

By: \_\_\_\_\_

Marcia Brown, City Clerk

APPROVED AS TO FORM  
RUTAN & TUCKER, LLP

By: \_\_\_\_\_

City Attorney, City of Yorba Linda

SCOPE OF SERVICES

## Scope of Services

The following sections describe the tasks that Iteris will execute to successfully complete this project to achieve cross-jurisdictional signal synchronization that the City of Yorba Linda can leverage in traffic operation moving forward, as well as satisfies commitments to OCTA, the stakeholders and Caltrans.

### TASK 1: PROJECT MANAGEMENT

Excellent project management is crucial to the success of this project. A successful project is when the Cities of Yorba Linda, Anaheim, Placentia, and Fullerton are completely satisfied with the outcome and all goals and objectives are met. This is not only true during the implementation phase but also for the O&M phase of the project when any degradation of corridor performance is measured, and changes are needed. Thus, at the initiation of the project, Mr. Braulio Ramirez will lead a project kick-off meeting with the City of Yorba Linda. As part of this meeting, communication channels and protocols will be established, the scope of work, schedule, and budget will be discussed, necessary information will be gathered, and a thorough understanding of the goals of the project will be obtained. Additionally, a second kick-off meeting will be followed with the partner agencies to identify specific goals and develop effective strategy to complete the project.

Iteris takes great pride in its proactive methods for staying in contact with project clients. Iteris understands that city staff have other jobs to perform outside of this project and want to be as efficient and effective as possible with their time. Thus, project management techniques will be modified to meet the city's needs as well as catered towards the requirements of OCTA, which Iteris is familiar with as they are currently working with the City of Yorba Linda as part of the Tustin Avenue/Rose Drive RTSSP project. Iteris also strives to ensure that meeting notes are developed after every meeting, which capture the items covered and decisions made.

Project Management and Contract Administration will be ongoing throughout the duration of the project, including the two-year period allocated for monitoring and maintaining the system after construction of improvements and implementation of optimized timing plans. **Iteris will also guarantee that all administrative items that the city is responsible for to update OCTA as it relates to funding as well as project progress, will be created and maintained by Iteris throughout the entire project and for project closeout.**

#### Deliverables:

- Organize and lead Project Kick-off Meetings and prepare agendas and meeting materials.
- Draft and Final Detailed budget and schedule.
- Monthly progress reports, including detailed status

of the work effort, outlook, issues/ solutions, and updated schedule shall be e-mailed to the City and Partner Agencies.

- Attend all coordination meetings and prepare meeting materials, including agenda, action items, graphics, presentation aides, and notes/minutes.
- Attend OCTA Traffic Forum meetings (as requested) and prepare meeting materials, graphics, presentation aides, and notes.
- Retain and provide electronic versions of all data files as directed by the City.
- Prepare graphics and presentation aides required for all meetings.
- All documents provided in electronic form should be those currently used by the City: Microsoft Office and PDF files.
- All electronic data produced for the Project shall be provided on a flash drive.
- Monthly invoices in a format acceptable to the City, shall include all third-party invoices and other supporting documentation as requested by the City.
- All reporting and close-out documentations in compliance with OCTA requirements and any applicable regulatory agency.

### TASK 2: DATA COLLECTION

The data collection task includes the gathering of all information needed to deliver the traffic signal improvements for the project and the optimized signal timing and synchronization for the corridor. Iteris has a unique approach to collecting data for both signal timing and PS&E tasks. Prior to conducting traffic counts, Iteris will use ClearGuide as we showed earlier in **Figure 2**, in the Project Understanding section to identify and compare if traffic patterns have returned to the “new” normal condition. Once confirmed and with agencies' concurrence, Iteris' subconsultant, AimTD will conduct 7-day 24-hour ADT machine counts at critical locations (at least every 1-mile segment) to identify the peaking characteristics of the corridor and to identify proposed peak periods for the collection of turning movement counts as well as signal synchronization periods. All ADT locations will also include vehicle classification counts to determine heavy vehicle percentage.

AimTD will also conduct weekday and weekend peak period “true demand” turning movement counts at all study intersections along the corridor, including offset signals using video cameras mounted on signal poles. These recordings can be conducted during the same week(s) as the ADT counts with the appropriate set-up to capture queues. Therefore, once the ADT data is analyzed, the turning movement count videos can be processed immediately without having to schedule another field visit and will also ensure turning movement counts will be representative of the ADT data and provide another layer



of quality control. The choice to record the intersection turning movement counts during the same week as the ADT counts will be discussed and approved by the stakeholders prior to collecting.

Another important data collection task that we will start immediately is the utility coordination for new conduit segments and service pedestals, which will be ongoing and consist of the following:

- Submit utility information requests to all utility companies
- Obtain utility plans showing location and size of all utility lines and appurtenances within the project area to be shown on our design plans
- Prepare a Utility Notification Log to track utility company contacts and responses including contact information and dates of all outgoing and incoming correspondence.

#### Deliverables:

- Prepare a report summarizing the findings of the data collection completed in Task 2. This report is to be incorporated in the Primary Implementation Project Report (Task 8).
- Electronic versions of all data files, organized and compiled in a logical manner.

## TASK 3: FIELD REVIEW AND PLANS, SPECIFICATION AND ESTIMATES

### SUB-TASK 3.1: FIELD REVIEW

Iteris will conduct detailed field review of the project area. Our field reviews will note any intersection (including cabinet equipment) and corridor issues. Each study intersection and controller cabinet will be visited and inventoried. In addition, we will open the existing pull boxes to verify conduit sizes and evaluate conduit capacity; document existing utilities or markings that can be captured through visual investigation as needed for new conduit segments. To facilitate the field review process, Iteris will use FastField, a web- and mobile-based application, during our field review. This application will enable us to input data into mobile devices while in the field and produce high-quality customized reports (shown below). The reports will depict lane geometry, existing equipment (controllers, communication cables, IP devices, etc.), phase diagram, and pictures of inside and outside of the cabinet.

Our field review will document the existing detection settings and identify any modification that will be required for deployments of SPM system or signal responsive/adaptive operations. We will identify critical intersections (those with high pedestrian or bicyclist volumes, over-saturated and/or closely spaced intersections), uneven lane distribution, high volume heavy vehicle intersections, and high volume un-signalized intersections along the study corridor to gauge their impact on signal progression. As mentioned in the Project Approach, we have performed preliminary field investigations within all cities and have prepared 30% plans as part of a different project within the City of Yorba Linda for the communication upgrades. This effort has given us a clearer understanding of the necessary upgrades and alternate solutions we can provide the cities.

Information collected as part of this task will be summarized in a report that will detail the findings of the field review, identify planned and programmed improvements, identify equipment and develop costs for work to be performed, identify deficiencies and include, if applicable, simple low-cost solutions. The report will also include a review of the existing signal timing parameters in comparison to the appropriate governing standard timing parameters. Having performed numerous RTSS projects for OCTA and the local agencies, we have a set format for collection and presentation of the Field Review information collected as part of this subtask, used successfully on several projects.

### SUB-TASK 3.2: PLANS, SPECIFICATION AND ESTIMATE

Iteris will develop plans, specifications and estimates (PS&E) bid packages and support the city during bidding and construction. Based on city-provided data (e.g. signal plans, street improvement plans, existing signal timing plans etc.) and a thorough field review of the project corridor, design plans, specifications, cost estimates, and bid and contract documents will be prepared for the installation of new and/or upgraded traffic signal control, communication hardware, and software as required.

Iteris will work with the Cities of Yorba Linda, Anaheim, Placentia, Fullerton, Caltrans agency at the outset of the project to discuss our approach to provide plans that are both biddable and detailed enough to achieve the agency's objectives. More importantly, Iteris focuses the effort on the overall city's goals while considering upgrades for future projects. For example, communication upgrades can serve not only for the communication needs of the current project signals, but citywide communication needs. Iteris has worked with agencies to leverage fiber communication systems for the Fire Department, Citywide IT needs, Utility SCADA systems and many more. Thus, Iteris ensures citywide information is documented and we develop optimum solutions that serve these goals. Therefore, we focus on detailed field work for communication upgrades after meeting with the agencies to ensure the investment made in this project can serve a citywide robust and redundant infrastructure for the current project needs and future citywide goals.

After Iteris has verified design requirements with field review and record documentation, Iteris will provide the cities with a strategy for final plan production. It is expected that traffic signal modification plans will be required for all locations that have installation/upgrades of signal controller/cabinet, smart video detection, signal head upgrades, and fiber installation. These plans will detail the removal and installation of cables in existing conduit as appropriate. For new detection locations, the plans will identify appropriate detection zones and channels in addition to all equipment needs at the traffic signal cabinet.

In addition to these details, the traffic signal modification plans will include all existing equipment including location of all traffic signal elements, conductor schedule, phase diagram, cabinet equipment, and fiber optic cable schematic. For locations where only the controller is being installed, it is anticipated that a full traffic signal modification plan is not necessary. At a minimum, a plan will be provided detailing the work needed to update the controller and the location of the cabinet.

Once the details of the project elements have been identified and agreed upon by the cities, Iteris will begin the detailed design phase, led by Mr. Paul Frislie, PE, IMSA for the 60%, 90%, and Final submittals. All design drawings prepared will be

completed using AutoCAD. Plans will be prepared in standard measure units and based on the level of detail required; design drawings will be developed at 1"=20' for traffic signal modification plans and 1"=40' scale for interconnect plans. Communication schematics will also be provided, which will identify the appropriate splicing details to achieve the desired and intended operation.

Iteris is familiar with coordinating with Southern California Edison (SCE) for design of new or upgraded services and is aware that their services can be delayed. SCE design and installation fees shall be paid by Iteris and reimbursed by the City of Yorba Linda with proper documentation. Because the fees vary by location and design efforts from SCE, a dollar amount is unknown at this time. Therefore, we will not include the permit fees in our cost proposal since the city will reimburse Iteris after invoice from SCE is received.

#### Sub-Task 3.1 Deliverables:

- Prepare a report summarizing the findings and recommendations of the field review. This report is to be incorporated in the Primary Implementation Project Report (Task 8).
- Electronic versions of all data files, organized and compiled in a logical manner.

#### Sub-Task 3.2 Deliverables:

- Utility coordination documents and records, including all letters of requests, responses, as-built drawings, utility logs, Preliminary and Final Notices.
- All permit application submittals and final issued permits.
- Plans, specifications and estimates for 60% and 90% level design, in both hard copy and electronic copy format. Copies of each level of design shall be provided to each Partner Agency.
- SCE approved final plans for new or upgraded services and relevant invoices.
- Review Comment and Resolution tracking log, in Excel format.
- Original files of the PS&E for each level of design (60%, 90% and Final), including AutoCAD or MicroStation files, Word and Excel files.
- Any design and quantity calculations.
- Final PS&E package, signed and stamped by a California Licensed Professional Engineer. Final PS&E package shall be in both electronic and hard copy. Electronic file shall be in PDF format. Hard copy shall include one full size (36"x24") set of plans, on mylar for City records. Hard copy specifications shall be GBC bound. Copies of Final design shall be provided to each Partner Agency.

## TASK 4: SYNCHRONIZATION SYSTEM CONSTRUCTION

### SUB-TASK 4.1: BID SUPPORT

After the design has been successfully completed, the Iteris team will help during the bidding phase. Once the construction project has been awarded to a contractor, Mr. Braulio Ramirez, PE., will lead the construction management support services for the traffic signal modifications and communication improvements. Iteris will not only oversee the construction details of the intersection improvements but will also provide updates and reports to inform the cities of the construction progress. Fulfilling this task will help ensure that the construction of this project will be completed on time and minimize interruptions to the traffic flow.

### SUB-TASK 4.2: CONSTRUCTION ENGINEERING AND MANAGEMENT

Iteris will provide construction management support to each city. Iteris will help review request for information (RFI). This will assist in avoiding defects and deficiencies in the work of the contractor. In support of this task, Iteris will conduct the following activities:

- Arrange pre-construction meeting
- Review shop drawings submitted by contractor
- Cost management – assist cities in monitoring the project with respect to the contract amount by keeping track of change orders if any, claims, control of quantities, and other factors affecting project cost
- Quality management – assist cities in monitoring the contractor's progress with respect to the quality of work specified in the plans and specs
- Schedule adherence – assist cities in review duration of activities, milestones, submittal lead times

### TMC and Field Equipment Integration Support

The Iteris team led by **Mr. Omid Modaghegh, MCSE, IMSA, and Felipe Ortega** will provide overall system integration which includes which includes connections to each city's TMC. The Iteris team will provide technical oversight and integration support for individual improvement with expertise to realize the overall goal of the project. We will work hand-in-hand with the contractor and system vendor in configuring IP devices and TMC integration. We will test and verify the connectivity from a TMC to field equipment for proper bandwidth and latency requirements for the ITS network. This is essential for a robust and reliable network to meet the needs of integration of future integration of projects.

Our team of experts will expand on existing or generate new Virtual Local Area Networks (VLANs) for the communications network, and configure switches, controllers, Internet Protocol (IP) cameras, VDS, etc. for deployment. Iteris networking experts

evaluate the communication topology and network schema such that the designs are optimal for not only the current project, but also ideal citywide operation for future projects.

### Construction Documentation

It is imperative to document the condition of all equipment that is accessed or modified through this project prior to construction starting so that the condition of all equipment is documented, and the post construction condition does not negatively impact the existing traffic equipment.

In case equipment stops working or accidentally gets damaged, taking pictures (as shown in task 2) will assist to identify existing conditions of equipment prior to construction. **Equally important is to document the existing condition of all system and communication components prior to shutting down the existing systems, so the status and expectations of the new system is documented, and all operational elements of the new system must be operational when the new system is activated.**

### SUB-TASK 4.3: AS-BUILT RECORDS

Once the contractor has completed construction, the project will move into the post construction phase. In support of this task, Iteris will conduct the following activities:

- **Punch list** – Iteris will assist City inspectors in the final walk-through ensuring compliance with construction requirements and providing a thorough “punch-list” of items that must be corrected and/or completed to satisfy the project requirements.
- **As-builts** – Iteris and the Cities will verify that the contractor maintains an accurate record of all changes in the plans which include change orders, RFIs, any addendums, and additional details. Iteris will compile and re-submit final as-built to both Cities.

### Deliverables:

- Response to RFIs, Addenda and Bid Analyses as a result of Bid Support.
- Construction engineering and management records and files, including, but not limited to:
  - » Pre-Construction meeting agenda and notes
  - » Construction progress meeting minutes and notes
  - » Submitted shop drawings and materials submittals and subsequent reviews and responses
  - » Contractor correspondence
  - » Contract change order requests, calculations, estimates and documentation
  - » Compilation of all relevant inspection reports and photos
  - » Tracking of quantities of work completed and progress payments records and calculations

- » Guarantees, certifications, affidavits, leases, easement deeds, operating & maintenance manuals, warranties and other documents as stipulated in contract documents
- » Electronic versions of all files, organized and compiled in a logical manner.
- Final As-Built record drawings in both hard copy and electronic format; provided to each Partner Agency.

### TASK 5: CORRIDOR “BEFORE” STUDY

Iteris will conduct a travel time and delay ‘before’ study along the project corridor using the floating car method and Tru-Traffic Version 10.0 Software. This study will serve the following purposes:

- Serve as a base point of comparison to quantify the improvements of the Measure of Effectiveness (MOE) and Corridor Synchronization Performance Index (CSPI) with the deployment of the new signal timing plans
- Supplement volume and timing analysis in determining congested corridor segments
- Identify operational deficiencies and queuing conditions (in conjunction with field review)

A minimum of five (5) runs will be conducted in each direction to obtain a statistically valid estimation. Prior to performing travel time runs, we will review the existing time-based coordination schedule and ADT counts to determine appropriate study hours to cover the true peak hour for each peak period. ‘Before’ studies will be conducted just before new timings are implemented, as preferred by the city.

Iteris has been using our ClearGuide system to supplement data collected from travel time runs. The limitation of travel time data is it is too small a dataset to reflect the true operation over the entire corridor for the entire peak period for multiple days. Iteris will utilize ClearGuide to supplement the data collected during the travel runs and develop a true performance benefit for all the vehicles on the corridor and not only a single vehicle driving and collecting data that could experience some performance skew.

The ‘before’ data collection task as well as the resulting graphical outputs will provide an easy way to initially identify bottlenecks along the corridor. One draft and one final version of the technical memorandum presenting the MOE results, as well as the results of the CSPI quantification for the ‘before’ conditions will be submitted. In addition to the floating car data, the report will address optimization strategies for improved signal synchronization including, but not limited to, the flow of traffic along the corridor, coordinated subsystems, and zones and segments. The report will be organized in such a manner as to clearly provide a picture of traffic patterns on the corridor during all identified coordination periods.

### Deliverables:

- “Before” Study report.
- Electronic versions of all data files, organized and compiled in a logical manner.

## TASK 6: SIGNAL TIMING OPTIMIZATION AND IMPLEMENTATION

Clearly identifying the existing operational issues and signal system improvements is especially important. For this proposal purpose, we identified some existing critical locations. Preliminary field observations and review of data available in ClearGuide reveal consistent slowdowns and/or stops at Associated Way, SR57, Kraemer Boulevard, Rose Drive, Imperial Highway, and Santa Ana Canyon Road.

We will present optimization concept in the kick-off meeting to collect comments from the Cities of Yorba Linda, Anaheim, Placentia, Fullerton and Caltrans agency. Our team is aware that this corridor’s complexities are unique but not overly difficult. We also understand that agencies often have a strong preference regarding using signal timing and synchronization strategies. Our team will strive to meet each agency’s preferences, while providing information on the benefits of signal synchronization along the corridor.

### SUB-TASK 6.1: PROPOSED NETWORK MODELING

The intersection features and traffic data collected in Tasks 2 and 3 will be used to prepare and calibrate a traffic model that encompasses Yorba Linda Blvd/Weir Canyon Road RTSSP project limits and all the signalized intersections on major crossing arterials that are near the project corridor. The congestion hotspot data and field observations will be used to calibrate and verify the Synchro models, which will serve as the baseline condition for the evaluation and selection of optimization alternatives. The traffic models will be developed and submitted using Synchro version 11 and Tru-Traffic 10 using a GIS shapefile as the background to develop the base roadway configuration. The development of the models will be consistent with the city’s intersection numbering guideline, or the OCTA Countywide Synchro Network as administered by the GIS/ROADS database. Any modification, additions or removal of intersections will be approved by participating cities.

### SUB-TASK 6.2: NEW TIMING IMPLEMENTATION

#### Basic Timing Review

Prior to conducting signal coordination optimization, Iteris will perform phase and pedestrian timing analysis for all project intersections identified in the scope. The methodology of basic timing calculation will be consistent with the latest version of California Manual of Uniform Traffic Control Devices (CA MUTCD), industry best practices, and agencies’ timing preference. The parameters will be a function of field measurements and speed data collected through City Speed

survey's or observed posted speed limits. Iteris will coordinate with agencies' staff for special considerations at turning movement in association with the Institute of Transportation Engineers (ITE) latest Guidelines for Determining Traffic Signal Change and Clearance Intervals. We believe the optimum timing settings require not only familiarity with timing guidelines but also a thorough understanding of controller firmware and operational features of the existing central systems. The timing parameters to be reviewed include the following, at a minimum, which are critical to safety for vehicle, pedestrian, and bicyclist:

- Minimum Green
- Bicycle Minimum Green
- Yellow Change Interval
- All Red Interval
- Pedestrian Walk Time
- Pedestrian Flashing Don't Walk Time

The Iteris basic timing calculation spreadsheet tool has been used in numerous TSS projects and well adopted to expedite agencies' review. We will also evaluate the controller parameters and capabilities (density features, dynamic maximums, time of day functions, traffic responsive/adaptive, etc.) to provide participating agencies with additional recommendations for optimum performance during coordinated and free operation.

#### Optimization of Signal Coordination Plans

Our methodology to optimize a study corridor or grid network

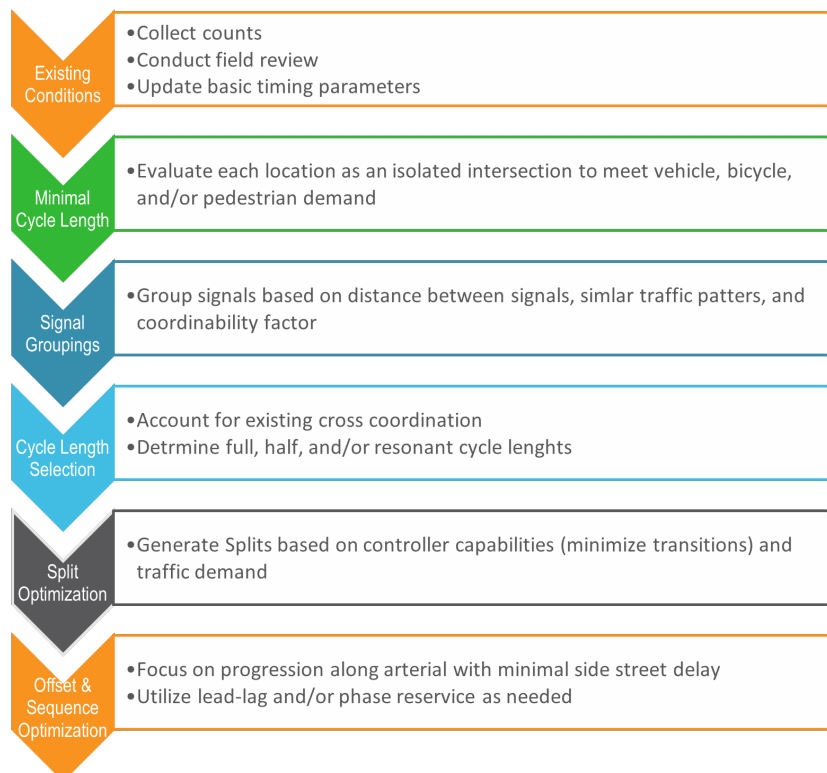
is shown in **Figure 6**. Cycle length selection is a critical step in developing signal coordination plans. A longer cycle length may provide better progression along the corridors but could increase side street delay and queuing. Alternatively, decreasing the cycle length to reduce the side street delay may increase the overall delay and number of total stops.

We developed a unique iterative methodology to determine ideal cycle lengths for each study intersection. Extensive project studies show this capacity-based method provides more accurate results than purely delay-based methodologies adopted by the Highway Capacity Manual and Synchro software. In selecting each intersection's critical cycle lengths, the following factors and conditions were taken into consideration:

- Intersection "true demand" of turning movement counts.
- Each intersection's unique lane geometry and operation.
- Realistic minimum splits for vehicular turning movements.
- Amount of pedestrian and bicyclist activities at each intersection

During the determination of critical cycle lengths, Iteris will treat each intersection as an isolated signal and evaluate the cycle lengths for the following conditions:

**Figure 6 – Signal Timing Methodology**





- Cycle lengths required to accommodate vehicle turning movement volumes and all pedestrian clearance times – “With All Ped”.
- Cycle lengths required to accommodate vehicle turning movement volumes only – “With Veh Only”
- Cycle lengths required to accommodate vehicle turning movement volumes and pedestrian crossing demand for the coordinated phases only (i.e., split time was calculated to meet vehicular demand only, which may be lower than the pedestrian clearance times for the side street) – “With Coord Ped”.

We will use the calculated critical cycle lengths to develop four TSS plans (Weekday AM, Midday, PM; and Weekend periods). The Synchro network models will be derived from the base model developed under subtask 6.1. The SimTraffic simulation will then be carefully observed to identify segments of the corridor needing special operational analysis. We will develop time-space diagrams using Tru-Traffic Version 10.0 to augment the Synchro models. Locations noted to have existing cross coordination will be analyzed for split and sequence optimization unless otherwise approved by the respective Agency to evaluate whether a different cycle length is recommended.

Our vast experience in Orange County and working relationships with nearly all the cities allows us to provide value-added services and additional solutions to assigned project corridors. These include the development of school/summer timing plans and traffic operations reviews by in-house traffic responsive/adaptive experts to ensure the optimized plans are completed to serve the project goals and objectives for the project corridor. Experience has shown that multi-jurisdictional projects require continued communication and coordination with the participating agencies and OCTA. **Our relationship and trust with all the local agencies and Caltrans will allow for that communication.**

### SUB-TASK 6.3: OPTIMIZE SIGNAL TIMING

We consider implementation to be the most critical phase of a signal synchronization project and understand each agency has its own requirements for implementation and fine-tuning. Through the existing and completed RTSSP projects, both led by OCTA and the local agencies, Iteris has developed numerous implementation ready timings in agency preferred format (Synchro printouts, marked-up timing sheets in PDF, new Excel files, etc.). Iteris has completed new timing implementation through central systems, and at controllers. We separate the act of implementing new signal timing plans from fine-tuning signal patterns/plans to ensure each intersection is operating as planned prior to any fine-tuning efforts. The implementation team is staffed with qualified specialists fully trained in signal retiming projects.

Immediately after implementation, we will conduct fine-tuning in the field to monitor signal cycling at each intersection as well as actual progression along the corridor. The fine-tuning usually takes at least three weeks, which gives the field team plenty of time to observe the new timing plans under varying traffic conditions and make changes as appropriate. Timing fine-tuning will be completed using the Tru-Traffic and Synchro software to provide the participating agencies with historical data during the travel runs and to identify reasoning for any modifications conducted during the fine-tuning task. Iteris also recently adopted TranSync software in the finetuning of an on-going Main Street RTSSP project.

Iteris will also continue to find opportunities for SPM implementations with the City of Yorba Linda and will utilize the measures provided but such tools when available. SPM coordination, termination and wait time charts will be used to provide a better understanding of intersection performance throughout the implementation and fine-tuning period, especially for periods when we are not able to physically observe conditions. Any adjustments to controller settings will also be made as necessary and documented in an Iteris implementation log. Upon completion of the field implementation and fine-tuning, the Synchro models will be updated to match the field conditions.

#### Sub-Task 6.1 Deliverables:

- Proposed Synchro files for the existing and optimized conditions
- Proposed Tru-Traffic files for the existing and optimized conditions
- Draft and final network modeling technical memorandum

#### Sub-Task 6.2 Deliverables:

- Basic timing review and existing condition analysis technical memorandum
- Coordination optimization technical memorandum
- Implementation-ready timing sheets

#### Sub-Task 6.3 Deliverables:

- Memorandum documenting the signal timing implementation and finetuning.
- Field implementation of optimized traffic signal timing plans, including all required fine-tuning.
- Electronic versions of files from all Traffic Signal Modeling Software programs used.

### TASK 7: CORRIDOR “AFTER” STUDY

Similar to the ‘before’ travel time study, five floating car runs will be conducted four weeks after the fine-tuning and approval of implementation of new timing plans. The ‘after’ travel time study will be done on the same days of the week, and at the

same time of day as the ‘before’ travel time study. The same MOE and CSPI will be collected to evaluate the improvements of the synchronization plans and implementation.

In addition, as a value-add service, Iteris will load fine-tuned timing plans into TranSync-M mobile app and verify them in the field during travel time after study. TranSync files including recorded videos of traffic progression and trajectory of travel time runs will be provided for City’s review and presentation purposes.

Upon completion of the ‘after’ travel time study, Iteris will submit a memorandum specifying the results of the ‘before’ and ‘after’ travel time studies with reference to the MOE

elements. **Table 7** summarizes the benefits of recently completed RTSSP projects we have performed for OCTA and the local agencies, by listing the Benefit/Cost (B/C) ratios over a three-year period. **All our projects have resulted in significant improvements in travel times, with B/C ratio as high as 33:1.**

#### Deliverables:

- “After” Study report.
- Electronic versions of all data files, organized and compiled in a logical manner.
- Two (2) synchronized videos showing “Before” and “After” runs for AM and PM peaks.
- All Trip Logs gathered during the “After Runs” shall be plotted accurately on the final time-space-diagrams.

**Table 7 – Signal Timing Improvements on Recently Completed Projects in Orange County**

| TSS PROJECT     | CITIES/AGENCIES   | # SIGNALS | B/C RATIO |
|-----------------|---|-----------|-----------|
| Bristol St      | Santa Ana, Costa Mesa and Newport Beach, and Caltrans   | 45        | 12:1      |
| Harbor Blvd     | Santa Ana, Garden Grove, Fountain Valley, Costa Mesa, Caltrans                                | 46        | 17:1      |
| Coast Hwy       | Newport Beach and Caltrans  | 27        | 17:1      |
| Marguerite Pkwy | Mission Viejo   | 30        | 18:1      |
| Von Karman Ave  | Tustin, Irvine, and Newport Beach   | 30        | 20:1      |
| Main Street     | Orange, Santa Ana, Irvine, and Caltrans   | 67        | 33:1      |
| Katella Avenue  | Los Alamitos, Cypress, Stanton, Anaheim, County of Orange, Garden Grove, Orange, and Caltrans | 73        | 31:1      |

## TASK 8: PRIMARY IMPLEMENTATION PROJECT REPORT

Upon completion of the fine-tuning and ‘after’ studies, a draft timings and evaluation technical report will be developed and provided to the participating agencies. The report will include all the elements identified in the RFP. A separate binder will be provided showing the new traffic signal plan sequences, signal timing plans, and pedestrian timings.

In addition to documenting the processes and results of the timing study, recommendations for future improvements including cost and benefit estimates to further alleviate traffic congestion will be provided. These recommendations may include changes in intersection geometry, infrastructure, and traffic management plans. Time-Space Diagrams showing all pertinent data will be generated from Tru-Traffic or Synchro. When comments are received from stakeholders, the final version of the Project Report will be delivered. An executive summary will identify complete documentation of the project and improvements gained.

### Deliverables:

- Draft and Final Project Report

## TASK 9: ONGOING MONITORING AND MAINTENANCE PROJECT MANAGEMENT

Prior to starting the O&M phase, Iteris will request acceptance of completion from each agency for the PI phase to ensure all stakeholders are satisfied and requirements/goals are met.

As mentioned earlier in this document, Iteris will be involved throughout the PI and O&M phases of this project. Successful completion does not only mean finishing the project, but also completing the project to each stakeholder’s satisfaction within budget and on schedule. Iteris will continue monthly status reports and overall administration of the project and will provide project close-out documentation for completion of the project.

### Deliverables:

- Project close-out documentation

## TASK 10: ONGOING MONITORING AND MAINTENANCE (OMM)

Iteris understands the importance of monitoring and maintaining the corridor performance after the primary implementation phase. Therefore, Iteris will continue to provide ongoing support for the Yorba Linda Boulevard/Weir Canyon Road corridor for a period of 24 months during the O&M phase, with a goal not only to maintain but also to further enhance the corridor performance. There are two primary tasks for the two-year O&M phase:

### SUB-TASK 10.1: MONITORING AND IMPROVING OPTIMIZED SIGNAL TIMING

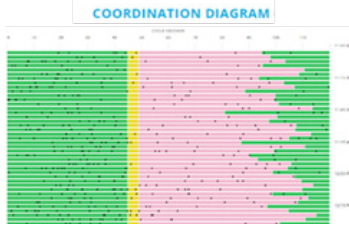
Corridor synchronization monitoring will be achieved by performing monthly travel time floating car surveys during weekday AM, Midday, PM peaks and weekend peak periods. As an optional task, Iteris can utilize two valuable analytics tools: Agencies’ SPM system and Iteris’ ClearGuide, a performance measurement software to provide more continuous monitoring of the traffic system which will result in an improved corridor performance throughout the O&M period as any degradations will be identified and remedied right away instead of on the monthly interval when the corridor is driven. Both SPM and ClearGuide provide 24 hours/day, 365 days/year actionable information. Utilizing this continuous stream of data will provide the best maintenance of the traffic system and result in any issues being resolved likely before the city staff receives any complaints. This will relieve city staff of the phone calls that typically arise when timing along a corridor is changed and negatively affected by faulty traffic equipment.

Implementing SPM can be challenging and require proper detector configuration. Iteris staff members are experts in configuring and implementing SPM for agencies. For this project, not only will Iteris configure the system, but will also proactively monitor all the project intersections using SPM to receive alerts and take proper actions to ensure the signal operations are optimal. Iteris will also use ClearGuide, as a value-added service, to monitor and identify any deficiencies (e.g. excessive delays) along any segments of the corridor and conduct further fine-tuning of the signal coordination.

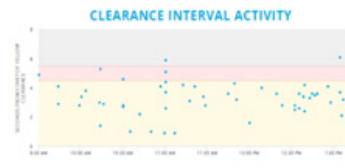
During the O&M phase, Iteris will conduct regular travel time floating car surveys during AM, MD, PM and weekend peak periods monthly using Tru-Traffic software and a GPS unit. The data collected will then be compared to the data gathered from the “after” study to ensure corridor performance is maintained. During our field travel time runs, we will also ensure all side streets and left turns do not experience excessive queues or delays. If any roadway segments are observed to be consistently under-performing after a few months of floating car surveys, and validated by SPM and ClearGuide, Iteris will provide recommendations to the involved agencies to improve the performance and progressions.

Here lists the SPM charts that we routinely use for TSSP O&M to keep track of corridor operational performance and evaluate how well project signals are performing:





**Coordination Diagram** provides insights to how good the coordination of the system is performing. The goal of a good coordination plan is to ensure that vehicle platoons are arriving at the intersection during the green. Using the Coordination Diagram, it can be determined if an offset change will allow more vehicles to arrive during green.



Vehicles entering the intersection during and after the yellow and red clearance intervals are shown per phase on the **Clearance Interval Activity** Chart. This feature requires video detection detecting vehicles that have entered the intersection. As such, Clearance interval activity may be considered based on future improvements to traffic signal detection along project corridor.



**Phase Termination Detail** chart plots the duration and type of termination for every cycle, every phase. The data points distinguish whether the approach was cleared during the phase or if vehicles were left at the stop bar at termination. This chart helps traffic engineers identify phases where the vehicle queue is not being adequately served, and appropriate split adjustments can be made.



**Wait Time** chart in Iteris SPM was developed to help traffic engineers understand how much time the first vehicle to arrive at a red light waited for the green because this is a frequent citizen call that traffic engineers receive. This chart also shows how much of this time that no vehicles were travelling through the intersection.



**Preempt/Transition** chart shows how much of time the controller spends in preemption or transition in relation to being in step during a coordinated plan. This chart shows the frequency of pedestrian and preemption calls.

## SUB-TASK 10.2: COMMUNICATION AND DETECTION SUPPORT

Communication and detection maintenance support can be initiated either by project agencies (e.g., check intersection operation, troubleshoot equipment, etc.), or proactively by Iteris to ensure intersection operations are well maintained. Under this task, Iteris will provide “on-call” support for any issues that may arise due to hardware (e.g. detector or communication) as reported by agencies. Iteris will deploy our staff within 48 hours of notification to conduct a field visit for troubleshooting. Upon completion, Iteris will report our findings and any repair work done to the agencies for your records. Iteris prides ourselves in providing this responsive service on all the TSSP projects in a timely manner.

## SUB-TASK 10.3: ONGOING MONITORING AND MAINTENANCE MEMO

Iteris will submit the final report for O&M phase to document the data collected in comparison to the initial ‘after’ study. The report will also include a summary of all the modifications made during the two-year period and any additional recommendations for additional signal system upgrades or low-cost infrastructure improvement along the study corridor. Iteris will also provide the City with the necessary documentation and information and assist City by any means expeditiously in order to close-out the project as per the CTFP guidelines.

### Deliverables:

- Summary of drives completed and ATSPM data collected in Sub-Task 10.1 and resulting findings and adjustments on a monthly basis. A copy, limited to jurisdictional boundaries, shall also be sent to each Partner Agency.
- Draft and final OMM memorandum.
- Electronic versions of all files, organized and compiled in a logical manner.

## Miscellaneous

Iteris will coordinate with Caltrans for the execution of cooperative agreements with the Cities of Anaheim and Fullerton for implementation of project improvements and signal synchronization at Caltrans operated intersections. Iteris will refine scope and responsibility and coordinate project efforts in the Caltrans operated intersections. Caltrans cooperative agreement fees will be paid by the city within their respective jurisdiction.

Insurance and Indemnification Insurance found to be acceptable.

# RFP Scope of Services Copied In

The following is the entire Scope of Services (Section IV from the RFP) copied in per the RFP's instruction.

## A. PRIMARY IMPLEMENTATION SERVICES

### TASK 1: PROJECT MANAGEMENT

Project management will be ongoing throughout the duration of the Project in both the Primary Implementation Phase (Task 1) and Ongoing Monitoring and Maintenance Phase (Task 9). This task includes day-to-day Project management, such as meetings, progress reports, tracking of schedules, invoicing and overall administration of the Project. The Project management team will be comprised of City personnel, Partner Agency representatives and the selected Proposer.

Project management costs shall be split between the two Project phases. Project management for the Primary Implementation Phase is Task 1 and for Ongoing Monitoring and Maintenance Phase is Task 9.

The following lists a minimum of what is required of Project management:

1. The selected Consultant for the Project shall prepare a detailed budget, schedule and estimates for all tasks, providing specific Project milestones for review and approval by the City. These items shall be detailed and include expected meetings, activities (by work task, whether performed by Consultant team or by others), start dates, activity durations, product submittal dates, relationships among work tasks (including critical path items), and a detailed Gantt chart for the Project tasks, and float time.
2. Consultant shall lead two Project Kick-Off Meetings with all applicable parties.
  - a. The first meeting will be to kick-off the Project with the City: establish communication channels and protocols, discuss the scope of work, schedule, and budget, gather available information, and obtain a thorough understanding of the goals for the Project. Specific topics to discuss include data collection needs, Traffic Signal Timing Optimization software programs, and construction considerations and required/optional procurement methodologies, intent of the original application and allowances or variants in design engineering, and Project schedule. Administrative items to be discussed will include contact persons and secondary contacts for different functions of the Project. Invoicing and reporting with explanations on how to provide monthly information on prime, sub-consultant, and vendor expenses on the invoice submittal will be discussed.
  - b. The second meeting will be with the Consultant, City, and Partner Agencies that have signalized intersections along the Project. The focus of this meeting shall be to identify specific goals and develop effective strategy to accomplish them. Consultant shall prepare an agenda to discuss critical tasks and schedule of work and a memorandum to document the Project goals and strategy. Data collection needs and requirements shall be outlined to the Partner Agencies. Consultant shall notify each agency of the type of work, and when the work is to be performed within that agency. Consultant shall notify each Partner Agency of any and all documents that need to be produced pertaining to the construction of the facilities and the coordination, including but not limited to: as-built drawings, new Plans, Specifications and Estimates (PS&E) for new construction related to this Project, intersection timing charts, existing Synchro models, aerial photos, Average Daily Traffic (ADT) and Turning Movement Counts (TMC) data, etc.
3. Consultant shall organize and lead Project meetings as directed by City to include Consultant staff, City, Partner Agencies and other Project-related participants. The purpose of these meetings will be to ensure that proper input is being received and included in the work effort by Consultant and City.
  - a. Consultant shall prepare agendas, provide status updates, discuss the progress and direction of the work, and provide notes of these meetings as directed by City to all relevant parties. These meetings will also serve to provide regarding specific issues of the effort, including facilitating the development of measures of effectiveness, and constructability reviews.
  - b. At a minimum, one meeting per month for the Primary Implementation Phase (Task 1) should be scheduled and budgeted. Consultant shall evaluate Project needs and propose the appropriate discussion sessions to properly facilitate the Project. During the Ongoing Monitoring and Maintenance Phase (Task 9), meetings shall be on an as-needed basis. Consultant shall anticipate at least one kick-off meeting for the Ongoing Monitoring and Maintenance phase to discuss scope and schedule.

- c. Consultant will be responsible for documentation of all Project meetings with the City. Meeting minutes with action items shall be distributed within five (5) working days to all attendees.
- 4. Consultant shall attend and be an active presenter, as requested, at the OCTA-led OCTA Traffic Forum, updating the group on the effort, and its status. The Traffic Forum is a semi-annual forum envisioned to further communication and information exchange between OCTA and the local agencies regarding traffic signal synchronization and intelligent traffic system.
- 5. Consultant may be requested to prepare and present the Project at two public forum meetings for the City of Yorba Linda: City Council and/or Traffic Commission.
- 6. Consultant shall create and maintain a file-sharing portal that shall be used for all Project correspondence, file transfer, and schedule management. Platform shall be approved by the City prior to implementation. All email correspondence shall include the City as a recipient.
- 7. Consultant shall keep a running record of Project cost broken down by task and sub-task. Project costs attributed to each Partner Agency shall be identified, tracked and included in this cost record. This information may be requested by the City at any time. The Project cost record shall be actively maintained on the file-sharing portal for Project files.
- 8. Consultant shall also keep a running record of all scope changes and/or any deviations from awarded contract. This information will be used by the City to request for Scope Changes at the Semi-Annual Review (SAR). This information may be requested by the City at any time. The record of Project changes shall be actively maintained on the file-sharing portal for Project files.
- 9. Consultant shall submit monthly invoices in an acceptable format. Each invoice shall include a detailed progress report for the reporting month, all third-party invoices, schedule, and other backup documentation as requested by the City. Each invoice shall clearly identify the tasks worked on and percent complete. All costs accrued shall be broken down by task. All supporting documents for costs accrued shall be submitted as back-up. When applicable, the task, associated progress and costs shall be broken out and tracked by Partner Agency.
- 10. Consultant shall be familiar with all relevant OCTA Project delivery and documentation requirements, including, but not limited to Comprehensive Transportation Funding Programs (CTFP) Guidelines, Project P, and Measure M2. Consultant shall develop Project schedule to ensure satisfying Project delivery timelines; and advise City of all applicable OCTA requirements. Consultant shall prepare, coordinate, and submit all necessary reporting and close-out documentations in compliance with OCTA requirements on behalf of the City. The Consultant shall manage the Project to ensure the CTFP Guidelines and funding deadlines are met.
- 11. Consultant shall perform required coordination among Project team, lead agency, participating agencies, Caltrans and OCTA.
- 12. Consultant shall coordinate with Caltrans for execution of cooperative agreements with Partner Agencies for implementation of Project improvements and signal synchronization at Caltrans operated intersections. Consultant shall refine scope and responsibility and coordinate Project efforts in the Caltrans operated intersections. Caltrans cooperative agreement fees will be paid by the City with proper documentation.
- 13. Consultant shall coordinate with City and Partner Agencies to verify all software preferences being used in the various tasks and deliverables, including software versions and compatibility for each agency.

#### Task 1 Deliverables:

- 1. Organize and lead Project Kick-off Meetings and prepare agendas and meeting materials.
- 2. Draft and Final Detailed budget and schedule.
- 3. Monthly progress reports, including detailed status of the work effort, outlook, issues/ solutions, and updated schedule shall be e-mailed to the City and Partner Agencies.
- 4. Attend all coordination meetings and prepare meeting materials, including agenda, action items, graphics, presentation aides, and notes/minutes.
- 5. Attend OCTA Traffic Forum meetings (as requested) and prepare meeting materials, graphics, presentation aides, and notes.
- 6. Retain and provide electronic versions of all data files as directed by the City.
- 7. Prepare graphics and presentation aides required for all meetings.
- 8. All documents provided in electronic form should be those currently used by the City: Microsoft Office and PDF files.
- 9. All electronic data produced for the Project shall be provided on a flash drive.
- 10. Monthly invoices in a format acceptable to the City, shall include all third-party invoices and other supporting documentation as requested by the City.
- 11. All reporting and close-out documentations in compliance with OCTA requirements and any applicable regulatory agency.

## TASK 2: DATA COLLECTION

Consultant will collect data necessary to thoroughly understand existing traffic conditions in the study area, develop a concept of operations and develop optimal time-of-day traffic signal coordination plans for specific zones and traffic generators as applicable. At a minimum, Consultant shall collect the following data:

1. Consultant shall collect any existing timing charts/sheets, existing coordination plans, as-built/record drawings, aerial photos, maps, traffic collision data, and collision diagrams for the study intersections, if available. Consultant shall be responsible for any and all documentation reproduction, as necessary.
2. Consultant shall consult with the City and Partner Agencies on signal timing and signal priority preferences, including, but not limited to, those related to pedestrian, equestrian and bicycle timing, phase sequence modifications and preferences, and special operations such as change in clearance intervals, coordination preferred phase re-service, and ring-barrier logic, as well as the timing optimization software preferences.
3. Consultant shall conduct seven-day 24-hour Average Daily Traffic (ADT) counts with vehicle and bike classification counts to determine heavy vehicle (Buses and Trucks) percentage information. The vehicle classification categories shall correspond to the latest Federal Highway Administration (FHWA) vehicle class categories. Include proposed peak period and durations for AM peak, mid-day peak, PM peak, and weekend peak. All count locations and day will be approved by the City and Partner Agencies prior to collection.
4. Consultant shall conduct weekday and weekend peak period intersection turning movement (ITM) counts at each and every one of the Project signalized intersections, including pedestrian and bicycle counts. ITM counts shall be conducted, with approval of City and Partner Agencies for weekday and weekend peak periods. Peak periods can be estimated to last for two hours of each weekday peak period (AM, mid-day, and PM ) and a single four-hour Saturday mid-day peak period. Consultant shall consult with Project team to determine if additional ITMs are necessary to account for special events and/or special generators. The proposed day/time for ITM counts shall be approved by the City and Partner Agencies prior to collection.
5. All counts shall be summarized in Microsoft Excel format. All data shall adhere to the CTFP Guidelines for data compatibility. Counts shall also be summarized in a Comma Separated Values (CSV) file in the Universal Traffic Data Format (UTDF) for direct volume import into Synchro (latest version) by peak period. Copies of the raw data count sheets shall also be provided.
6. Consultant shall field measure all advanced loops to the stop bar and compare to the latest California Manual of Uniform Traffic Control Devices (MUTCD) guidelines to calculate appropriate extension time. Submit all measurements and calculations in Microsoft Excel format to the City and Partner Agencies for review.
7. Consultant shall use the latest California MUTCD guidelines to field measure all crosswalks for all intersections. Submit all measurements and calculations in Microsoft Excel format to the City and Partner Agencies for review.
8. Consultant shall use the latest California MUTCD guidelines to measure and calculate bicycle timing for all movements. Submit all measurements in AutoCAD format and calculations in Microsoft Excel format to the City and Partner Agencies for review.
9. Consultant shall coordinate with Partner Agencies and include an identification of all planned and programmed improvements (widening projects, intersection improvements, etc.) as well as planned developments on the Project corridor or on intersecting corridors or streets that might affect the Project. The identification of these projects should be at minimum a list summarizing all improvements.
10. Consultant shall also investigate factors that are expected to affect signal progression including, but not limited to: intersections with high pedestrian or bicyclist volumes; over-saturated intersections; uneven lane distribution; high volumes of trucks and buses; schools; high-volume un-signalized intersections, including interchanges; parking maneuvers; presence and location of bus stops; differing signal timing patterns; etc.

### Task 2 Deliverables:

1. Prepare a report summarizing the findings of the data collection completed in Task 2. This report is to be incorporated in the Primary Implementation Project Report (Task 8).
2. Electronic versions of all data files, organized and compiled in a logical manner.

## TASK 3: FIELD REVIEW AND PLANS, SPECIFICATION AND ESTIMATES

Consultant shall identify and attribute Task 3 costs to each Partner Agency. For duration of Task 3, all costs shall be tracked accordingly. Cost and work scope for Task 3 in the City of Anaheim are not part of this RFP. See cost proposal instructions in Section 9 for more information.

### SUB-TASK 3.1: FIELD REVIEW

Consultant will review any and all relevant information related to traffic signal operations and equipment, including the geometric layout, existing traffic signal equipment, and signal synchronization related infrastructure to identify any deficiencies for each intersection and along the Project corridor. The review shall include an assessment of the existing intersection geometry, traffic conditions, traffic signal control equipment, and telemetry/interconnect facilities along the corridor and of each intersection using observation, available as-built plans, consultation with the local agencies, and supplied aerial photos. Based on the initial assessment by the Partner Agencies and with their respective permission, Consultant shall inspect the interior of each traffic control cabinet, inspect the telemetry and ethernet systems to determine their respective condition and make recommendations for equipment upgrades. Key components of the Project corridor review shall include, at a minimum, the following:

1. Corridor lane configurations;
2. Existing street and lane geometries, curbs, bus turnouts, and medians;
3. Existing signal operation characteristics – signal phasing, cycle lengths, phase sequence alteration, protective-permissive, etc.;
4. Crossing arterial coordination operations;
5. Crossing arterial or street with adjacent intersections;
6. All traffic control devices related to traffic signal operations at all Project intersections, approaches to cross streets, and along the Project corridor;
7. Traffic signal control device information, such as type of device, brand and make, and condition of equipment. Open each controller cabinet and take digital photos of all existing equipment. Intersection photographic documentation log of existing equipment condition shall be required;
8. Necessary configuration and parameters, such as advanced loop distances and detector channel assignments, for Automated Traffic Signal Performance Measures (ATSPM);
9. Existing controller and telemetry/ethernet interconnect equipment, if any. Note if to be reused;
10. Existing time-referencing setup, if any;
11. Existing Central Master Equipment;
12. Existing Field Master equipment or peer-to-peer operation, if any. Note if to be reused and modified, salvaged and/or new;
13. Note any deficiencies of traffic control equipment at each intersection; and
14. Note the maintenance condition or existence of the traffic signal equipment, controllers and synchronization related infrastructure.

With the view of enhancing, and improving the traffic operations along this corridor, Consultant shall identify any deficiencies of the existing traffic signal control and telemetry infrastructure and geometric layout, and provide recommendations towards solutions that may be implemented to correct such deficiencies.

#### Sub-Task 3.1 Deliverables:

1. Prepare a report summarizing the findings and recommendations of the field review. This report is to be incorporated in the Primary Implementation Project Report (Task 8).
2. Electronic versions of all data files, organized and compiled in a logical manner.

### SUB-TASK 3.2: PLANS, SPECIFICATION AND ESTIMATE

Consultant shall prepare a set of plans, specification and estimate (PS&E) for the implementation of Project improvements to be accomplished through a competitive bid process. The specific improvements required as a part of this Project are outlined in the Project application to OCTA (Appendix 4). The improvements include but are not limited to: traffic signal controllers, controller cabinets, traffic signal improvements, communication equipment, Traffic Management Center (TMC) upgrades, Closed Circuit Television Cameras (CCTV) and Intelligent Transportation System (ITS) equipment and elements.

Consultant shall prepare one PS&E package, containing improvements for all Partner Agencies. The bid package shall be organized such that each agency's requirements, standards and specifications are incorporated. The bid package will be advertised by the City for construction. Consultant will ensure timely coordination and preparation of PS&E package to ensure City and Partner Agency review.



As described in Task 4, Synchronization System Construction, Consultant shall provide Bid Support and Construction Engineering and Management services for the Project. Consultant shall produce final As-Built record drawings.

At a minimum, Consultant shall:

- Conduct all required utility research and coordination for Project, including ownership, information requests, preliminary notices and final notices. Consultant shall identify any required relocations.
- Survey existing conditions to locate existing improvements. Survey data collection should extend outside Project limits sufficiently to plot joins to existing improvements, verification of unimpeded intersection sight distance triangles, and others. All survey data shall be located in the California state plane horizontal coordinate system, North American Datum 1983 and North American Vertical Datum 1988 and their latest adjustments/epochs. • Existing right-of-way limits and easements shall be identified and shown. Any required temporary construction easements shall be identified.
- Prepare and submit permit applications to each regulatory agency required for plan approvals. Permit application fees will be paid by the City with proper documentation. Anticipated permits:
  - » Encroachment permit from Caltrans
  - » No-fee encroachment permits for work within each Partner Agency's right-of-way.
- Coordinate with Southern California Edison (SCE) for design of new or upgraded services. SCE design and installation fees shall be paid by the Consultant and reimbursed by the City with proper documentation. Consultant shall coordinate to ensure any required fees have been paid in time for relevant construction activities to begin.
- Prepare PS&E package for 60%, 90% and Final level of design.
- Plans shall be prepared using owning Agency CAD standards and in the latest version of AutoCAD or Microstation software.
- Coordinate review of PS&E with each Partner Agency, within jurisdiction, at each level of design. All comments shall be tracked and addressed at each subsequent level of design.
- Comply with all laws, rules and regulations concerning environmental permitting.

### Sub-Task 3.2 Deliverables

1. Utility coordination documents and records, including all letters of requests, responses, as-built drawings, utility logs, Preliminary and Final Notices.
2. All permit application submittals and final issued permits.
3. Plans, specifications and estimates for 60% and 90% level design, in both hard copy and electronic copy format. Copies of each level of design shall be provided to each Partner Agency.
4. SCE approved final plans for new or upgraded services and relevant invoices.
5. Review Comment and Resolution tracking log, in Excel format.
6. Original files of the PS&E for each level of design (60%, 90% and Final), including AutoCAD or Microstation files, Word and Excel files.
7. Any design and quantity calculations.
8. Final PS&E package, signed and stamped by a California Licensed Professional Engineer. Final PS&E package shall be in both electronic and hard copy. Electronic file shall be in PDF format. Hard copy shall include one full size (36"x24") set of plans, on mylar for City records. Hard copy specifications shall be GBC bound. Copies of Final design shall be provided to each Partner Agency.

## TASK 4: SYNCHRONIZATION SYSTEM CONSTRUCTION

The timeline for Project construction is outlined in the following section, Tentative Project Schedule. Consultant is expected to provide bidding and construction management services. Such services include, but are not limited to, responding to Contractor questions and requests for information, redesign of Project plans due to unforeseen conditions, traffic control plans that may be required, and system integration support services. Task 7 costs shall be attributed to each Partner Agency and tracked accordingly. Cost and work scope for Task 4 in the City of Anaheim are not part of this RFP. See cost proposal instructions in Section 9 for more information.

### SUB-TASK 4.1: BID SUPPORT

The Consultant shall provide assistance during the bidding phase, including, but not limited to, pre-proposal meetings, responding to requests for information (RFIs), issuing addenda, and bid analyses.

### SUB-TASK 4.2: CONSTRUCTION ENGINEERING AND MANAGEMENT

Consultant shall provide professional construction management services, including inspection coordination, quality control, Critical Path Method (CPM) schedule management, utility coordination, and administration services during construction. Work shall be performed in accordance with City of Yorba Linda standards of practice.

Consultant shall respond to all requests for information (RFIs), review shop drawing and material submittals, plans, and any other Project related documents. Consultant shall assist the City with reviewing and negotiating proposed Construction Change Orders.

Consultant is expected to support the Project Construction Contractor with system integration (including, but not limited to installing/implementing and integrating all hardware and software) during the construction phase of the Project. Consultant is expected to coordinate with the Construction Contractor, for installing and/or integrating new traffic signal controllers and cabinets, communication hardware, communication equipment, ITS equipment, etc.

During construction, each Partner Agency will provide construction inspection services for those components subject to that agency's inspection. Construction management services, at a minimum, include the following:

#### **Construction Phase:**

1. Arrange and conduct Pre-Construction meeting, inviting the Project Manager, Inspector, public utilities, private entities, general contractor and other Project stakeholders. Prepare minutes of Pre-Construction meeting for distribution to all attendees.
2. Provide and maintain sufficient field personnel to administer and manage construction contract.
3. Review construction schedule, including activity sequences and duration, schedule of submittals and delivery schedule of long lead materials and equipment. Review contractor's update and revisions as may be required to reflect actual progress of work.
4. Schedule and conduct progress meetings to discuss contract issues, procedures, progress, problems, change orders, submittals, request for information (RFIs), deficiencies and schedules. Prepare minutes of progress meetings for distribution to all attendees.
5. Coordinate construction inspection.
6. Investigate field problems affecting property owners and contractors.
7. Process, review and coordinate with City and Partner Agencies to approve contractor's submittals
8. Process, review and track RFIs, submittals, shop drawings, proposed change orders and revisions.
9. Review and evaluate proposed change orders. Review estimates for reasonableness and cost effectiveness and render recommendations to City. Conduct negotiations with contractors and resolve problems.
10. Maintain cost accounting records on authorized work performed under contract unit costs and additional work performed based on actual costs of time (labor) and materials (T&M).
11. Review contractor submittals for extra or unforeseen work. Review potential Construction Change Orders (CCO) for accuracy and provide recommendation(s) to City staff for proper course of action and processing of CCOs.
12. Develop a reasonable cost control system, including regular monitoring of actual costs for activities in progress and estimates for uncompleted tasks and proposed changes.
13. Assist City in coordinating services of other consultants that may be hired or selected for the Project.
14. Respond to contractor's requests for interpretation or clarification of meaning and intent of Project plans and specifications.
15. Establish and implement job safety procedures in compliance with CAL-OSHA requirements. Monitor contractor's compliance with established safety program, respond to deficiencies and hazards, and investigate and report on accidents.
16. Track quantities of work completed for progress payments. Develop and implement procedures for review and processing of progress payment applications. Assist City with review and certification for payment.
17. Establish procedures and monitor contractor compliance with state prevailing wage regulations and requirements.
18. Assist City in preparing and processing reimbursements.
19. Maintain a complete Project filing system, including records of all changes and field notes. Filing system shall be in accordance with City procedures.

#### **Post-Construction Phase:**

1. Evaluate completion of work and recommend to City and Partner Agencies when work is ready for final inspection.
2. Conduct final inspection/walk through with agency staff.
3. Coordinate with Inspector final punch list, including schedule for punch list completion. Monitor and follow through with



contractor until completion of all punch list items.

4. Secure and transmit required guarantees, certifications, affidavits, leases, easement deeds, operating & maintenance manuals, warranties and other documents as stipulated in contract documents.
5. Secure and provide neat and orderly material sheets, inspection reports,
6. Review and process contractor's request for final payment and release of retention.

### **SUB-TASK 4.3: AS-BUILT RECORDS**

At the conclusion of construction contract, produce As-Built record drawings in both electronic and hard copy format of all improvements. The electronic copy shall include both original file format (AutoCAD) and PDF. Hard copy shall include one full size (36"x24") set of plans, on mylar for City records and one set on bond paper. A copy of both formats (electronic and hard copy) shall be provided to each Partner Agency.

#### **Task 4 Deliverables:**

1. Response to RFIs, Addenda and Bid Analyses as a result of Bid Support.
2. Construction engineering and management records and files, including, but not limited to:
  - a. Pre-Construction meeting agenda and notes
  - b. Construction progress meeting minutes and notes
  - c. Submitted shop drawings and materials submittals and subsequent reviews and responses
  - d. Contractor correspondence
  - e. Contract change order requests, calculations, estimates and documentation
  - f. Compilation of all relevant inspection reports and photos
  - g. Tracking of quantities of work completed and progress payments records and calculations
  - h. Guarantees, certifications, affidavits, leases, easement deeds, operating & maintenance manuals, warranties and other documents as stipulated in contract documents
  - i. Electronic versions of all files, organized and compiled in a logical manner.
3. Final As-Built record drawings in both hard copy and electronic format; provided to each Partner Agency.

### **TASK 5: CORRIDOR "BEFORE" STUDY**

Consultant shall conduct "Before" floating car travel runs prior to timing implementation. Between three (3) to five (5) runs shall be completed in each direction for each of the peak periods. For weekday timing plans, this includes AM, mid-day, and PM peak periods. For weekend timing plan, this includes Saturday mid-day peak period. The number of runs shall be consistent for both directions and time periods. Consultant shall notify and receive approval from City and Partner Agencies on number of runs to be accomplished prior to commencement of data collection.

1. Consultant will prepare a "Before" field study report representative of the peak times and days for which synchronization plans will be developed. The report shall identify Measures of Effectiveness (MOE) to evaluate the effects of the synchronization plans. MOEs shall include traffic flow, travel time, average speed, number of stops per mile, number of intersections traversed on green vs. stopped by red (Greens per Red) per the OCTA MOE, Corridor Synchronization Performance Index (CSPI). Other MOEs shall include fuel consumption reduction, pollution reduction, and other pertinent items. Consultant shall collect data or analytics from Partner Agencies with Automated Traffic Signal Performance Measures (ATSPM) as part of the "Before" study. This report is to be incorporated in the Primary Implementation Project Report (Task 8).

Consultant shall prepare two (2) synchronized videos of "Before" and "After" (Task 7) condition, one for AM peak and one for PM peak. The videos shall be synchronized to show side by side of the "Before" and "After" run. The videos are to be used by City and Partner Agencies for presentation purposes.

#### **Task 5 Deliverables:**

2. "Before" Study report.
3. Electronic versions of all data files, organized and compiled in a logical manner.

### **TASK 6: SIGNAL TIMING OPTIMIZATION AND IMPLEMENTATION**

Consultant shall develop synchronized timing for the AM peak, PM peak, mid-day peak, and weekend mid-day peak periods. Special generators such as schools and businesses along with cross street traffic, will be considered. Crossing arterial projects that have recently been timed shall be considered as part of the Project.

Please note that any offset signal that was included in the application is expected to undergo the same signal timing tasks (basic timing review, counts, model in Synchro, optimization, implementation, and O&M). Before/after study is the only tasks that would not be necessary. However, depending on the status of these offset signals, the level of effort may not be the same. It would be good to show the level of effort put into these offset signals even if it ends up being free operation due to their size and traffic

### **SUB-TASK 6.1: PROPOSED NETWORK MODELING**

Consultant shall develop signal timing based on field observation of existing conditions and the data obtained from previous tasks. Synchro will be utilized to perform timing analysis and generate the network model. Existing coordination parameters will also be checked in network modeling to provide smooth progression at crossing arterial intersections.

Consultant shall develop network modeling timing plans and time-space-diagrams for each period – AM peak period, midday peak period, PM peak period, and weekend peak period for City of Yorba Linda and Partner Agencies intersections. Time-space-diagrams shall be horizontal and to scale, labeled with cycle lengths, offset locations, phase directions and values, design speeds, and green bands. Evaluate the possibility of partitioning network into sub- systems. Provide cycle evaluation analysis for each time period and sub-system. Attempt to minimize impact to progression across sub-systems. Pedestrian and bicycle timings should be included in the optimized model. Consultant shall implement appropriate Macro/Micro search optimization steps based on the practices of each Participating Agency.

Consultant shall evaluate the signal timing and coordination parameters to optimize coordination timing using:

- Modified Phase Sequence Rotation
  - » Lead/Lead
  - » Lead/Lag
  - » Leading and lagging the same phase within a given cycle (re-servicing)
- Harmonic cycling – double or half
- Other innovative techniques upon approval of the owning agency

The submittal will include electronic version for the City's and Partner Agencies' review and approval. Submit Draft Network Model and Cycle Evaluation three weeks after turning counts are approved by the relevant Partner Agency. Cycle Evaluation should be presented in table format for each peak period and sub-system. A re-submittal will be required within two weeks of the receipt of the relevant Partner Agency comments. Each Partner Agency will provide existing phasing configuration and timing parameters. All time-space diagrams shall be optimized using Tru-Traffic .

Upon final approval of the network model, the timing plans shall be converted and organized in tables in accordance with NEMA phase and sequence. Submit two weeks after each Partner Agency approves the optimal cycle. A re-submittal with corrections will be required within two weeks of the receipt of Partner Agency's comments.

Consultant shall determine and use the versions of Synchro and Tru-Traffic that is compatible with all Partner Agencies.

#### **Sub-Task 6.1 Deliverables:**

1. Proposed Synchro with optimized timing parameters.
2. Proposed Tru-Traffic with optimized timing parameters.
3. Draft Network Modeling Technical Memorandum.
4. Final Network Modeling Technical Memorandum.
5. Implementation-ready timing sheets summarizing optimized timing parameters and plans

### **SUB-TASK 6.2: NEW TIMING IMPLEMENTATION**

Consultant shall implement signal timing plans to coordinate the traffic signals on the Project corridor.

For all Project intersections, Consultant shall coordinate with each owning agency in the development and implementation of new timing plans.

For Caltrans locations, Consultant shall coordinate with Caltrans in the implementation of optimized timing plans.

Consultant shall implement approved timing plans at each Partner Agency's Traffic Management Center or at the local controller. Timing plan development should consider optimization of delay, progression saturation flow rate and lost time.

Consultant will contact and work with other Partner Agencies affected by the Project and will coordinate efforts with concurrent cross street projects to achieve mutually acceptable results.

#### **Sub-Task 6.2 Deliverables:**

1. Implementation-ready timing sheets summarizing optimized timing parameters and plans.

#### **SUB-TASK 6.3: OPTIMIZE SIGNAL TIMING**

Consultant shall implement and fine-tune the timing plans. Consultant shall verify the implemented timing plans by performing field checks and keep City and Partner Agency staff informed in writing of the implementation progress.

Upon completion of Implementation Phase, Consultant shall incorporate all changes and re-submit Synchro files, Tru-Traffic files, timing plans and tables with final implemented data.

#### **Sub-Task 6.3 Deliverables:**

1. Final optimized Synchro files
2. Final optimized Tru-Traffic files

### **TASK 7: CORRIDOR “AFTER” STUDY**

Consultant shall conduct “After” floating car travel runs after timing implementation. Between three (3) to five (5) runs shall be completed in each direction for each of the peak periods. For weekday timing plans, this includes AM, mid-day, and PM peak periods. For weekend timing plan, this includes Saturday mid-day peak period. The number of runs shall be consistent for both directions and time periods. Consultant shall notify and receive approval from City and Partner Agencies on number of runs to be accomplished prior to commencement of data collection.

1. Consultant will conduct an “After” field study representative of the peak times and days for which synchronization plans will be developed. The “After” study must be conducted in the same manner and contain the same MOEs as the “Before” study described in Task 5 in order to evaluate the improvements of the synchronization plans. The vehicles conducting the “After” study shall not exceed the design speeds shown in the final time-space-diagrams and Task 7 deliverables below. MOEs should be compiled for the optimized corridor using the floating car method. Consultant shall collect data or analytics from Partner Agencies with Automated Traffic Signal Performance Measures to complement both the before and after studies. This report is to be incorporated in the Primary Implementation Project Report (Task 8).

Consultant shall prepare two synchronized videos of “Before” (Task 5) and “After” condition, one for AM peak and one for PM peak. The videos shall be synchronized to show side by side of the “Before” and “After” run. The videos are to be used by City and Partner agencies for presentation purposes.

#### **Task 7 Deliverables:**

1. “After” Study report.
2. Electronic versions of all data files, organized and compiled in a logical manner.
3. Two (2) synchronized videos showing “Before” and “After” runs for AM and PM peaks.
4. All Trip Logs gathered during the “After Runs” shall be plotted accurately on the final time-space-diagrams.

### **TASK 8: PRIMARY IMPLEMENTATION PROJECT REPORT**

Using the data, information and analyses gathered in the previous tasks, Consultant will develop a Primary Implementation Project Report. This report will provide an analysis of the “Before” and “After” studies for the Project identifying signal coordination benefits. The report will be completed after the Primary Implementation is completed and will include the following:

- Introduction/Project description: a summary of the Project including the purpose, background, and objectives of the Project.
- Data collection: a summary of the data collected as part of the effort including the traffic counts, phasing, lane configurations, etc.
- Traffic signal systems improvements: a summary of the implemented traffic signal systems improvements by the Project.
- Signal timing optimization: a summary of the development and implementation of updated signal timing including the models, selected cycle lengths, intersection groupings, etc.
- Results: the study will contain directional morning, mid-day, evening, and weekend peak periods using travel times, average speeds, green lights to red lights, stops per mile, and the derived Corridor Synchronization Performance Index (CSPI) metric. This information shall be collected both before and after any signal timing changes have been made. Additional details based on the Final Report Template will also be included.
- Benefits to cost analysis: Project benefits resulting from signal synchronization will be evaluated based on the “Before” and “After” study results. Savings will be calculated for travel time, fuel consumptions, vehicle maintenance, Greenhouse Gas (GHG) reduction, and a final benefit cost ratio.
- Future signal corridor improvements: recommendations for system and equipment enhancements to improve traffic flow and signal synchronization will be provided.
- Conclusion: a summary of the “Before” and “After” study and its findings.

#### Task 8 Deliverables:

1. Primary Implementation Project Report.

### ONGOING MONITORING AND MAINTENANCE SERVICES:

#### TASK 9: ONGOING MONITORING AND MAINTENANCE PROJECT MANAGEMENT

Consultant shall provide continuous Project management for the duration of the Ongoing Monitoring and Maintenance Phase. Project management during this Phase, at a minimum, includes monthly status reports, tracking of schedules, invoicing, coordination between agencies and overall administration of the Project. Consultant shall provide Project close-out documentation, as needed, for completion of the project. See Task 1 Project Management in Section IV of this RFP for additional description of Project management activities.

#### TASK 10: ONGOING MONITORING AND MAINTENANCE (OMM)

Consultant shall provide “on-call” signal timing support services for a period of 24 months following the complete closeout and all payments made for the Primary Implementation phase, to address any future adjustments that may be needed during this period. During this 24-month period, Consultant will be prepared to review any Project intersection requested within 24 hours of written notice, including observing and fine-tuning the signal timing. Consultant will also assist with resolving communications and detection issues along the corridor.

##### SUB-TASK 10.1: MONITORING AND IMPROVING OPTIMIZED SIGNAL TIMING

Consultant will drive the length of the Project arterial during all designated corridor synchronization timing plan hours of operation on a monthly basis in order to verify that the synchronization timing is working as designed, and complete any necessary adjustments.

Monthly driving times will consist of a full 12-hour weekday and a 4-hour Saturday. All drives shall be documented. Consultant shall collect data or analytics from Partner Agencies with ATSPM as part of monitoring and improving optimized signal timing.

##### SUB-TASK 10.2: COMMUNICATION AND DETECTION SUPPORT

Consultant will coordinate with respective agencies to monitor, maintain, and repair communication and detection for 24 months after signal timing is implemented along Project corridor including offset signals.

##### SUB-TASK 10.3: ONGOING MONITORING AND MAINTENANCE MEMO

Consultant will prepare an Ongoing Monitoring and Maintenance (OMM) memorandum to summarize the Ongoing Monitoring and Maintenance phase, including details on when travel runs were conducted; issues and solutions throughout the phase; and recommendations for future improvements.

### Task 10 Deliverables

1. Summary of drives completed and ATSPM data collected in Sub-Task 10.1 and resulting findings and adjustments on a monthly basis. A copy, limited to jurisdictional boundaries, shall also be sent to each Partner Agency.
2. Draft and final OMM memorandum.
3. Electronic versions of all files, organized and compiled in a logical manner.

## B. Miscellaneous

Selected Consultant shall provide insurance documents per the attached checklist prior to contract award. Consultant shall ensure insurance companies used are admitted to conduct insurance business along the lines of insurance supplied in the State of California and have a Best Guide rating of Grade A or better and Class VII or better.

The City shall coordinate, prepare and execute a cooperative agreement with Caltrans for Caltrans operated signals along the Project corridor. Consultant shall assist the City with execution of Caltrans cooperative agreement, including but not limited to coordination and scope refinement.

The City recognizes that the Consultant in their preparation of a response to this RFP may have other ideas to improve the efficiency, safety, cost effectiveness or resiliency of the project beyond what is outlined in this RFP. Based on the Project understanding and goals, the Consultant may provide optional tasks that will enhance the performance and delivery of the project in the most efficient and effective manner. Optional tasks presented by the Consultant shall be cognizant of the overall project schedule and budget. For every optional task, the Consultant shall provide an explanation of additional enhancement, efficiency or cost savings to the Project along with a detailed scope of work, timeline, estimated not-to-exceed cost for each item, and deliverables.

Additional work items are not required, and thus a Consultant will not be penalized for not proposing any optional tasks.

## C. Standards of Work

CONFLICTS / DESIGN EXCEPTIONS. In case of conflict, ambiguities, discrepancies, errors, or omissions, Consultant shall submit the matter to City for clarification. Any work affected by such conflicts, ambiguities, discrepancies, errors or omissions which is performed by Consultant prior to clarification by City shall be at Consultant's risk and expense.

DELIVERABLE DOCUMENTS. Deliverables shall be prepared in English units and in conformance with the latest editions of applicable standards.

REFERENCE MATERIALS. The Consultant shall make use of additional reference material as appropriate. Consultant shall also be responsible for ensuring the most recent version of all reference materials are used, including any addenda and errata.

May 9, 2023

Ms. Jamie Lai  
Director of Public Works / City of Engineer  
City of Yorba Linda  
4845 Casa Loma Avenue  
Yorba Linda, CA 92886

**Re: Proposal for Yorba Linda Boulevard/Weir Canyon Road Corridor RTSSP – Optional Task for VMS Installation**

Dear Ms. Lai,

**Iteris, Inc.** (Iteris) is pleased to present this proposal for the optional task under the Yorba Linda Boulevard/Weir Canyon Road Corridor Regional Traffic Signal Synchronization Program (RTSSP) project to install a video management system (VMS) for the City of Yorba Linda. Currently, the city uses individual web pages to access their video feeds by entering the IP Address. The VMS will assist City staff efficiently access and manage video feeds to monitor traffic.

## 1 SCOPE OF SERVICES

Iteris will procure, install, and integrate all necessary hardware/software for a fully functional system. Iteris is recommending AVIGILON Access Control Center (ACC) 7 for the City's Video Management System (VMS). The VMS server configuration being installed exceeds the minimum recommended specifications recommended by Avigilon. Iteris staff will integrate the City's existing video sources into the new Avigilon video management system. These activities will happen as soon as the City provides notice to proceed.

Iteris has attached product data sheets for your review of ACC 7. This is a VMS software product that Iteris has deployed in several Traffic Management Centers (TMCs) and it matches the goals of the City's requirements. The NVR Server is a purpose-built machine certified by Avigilon for the application. These are Dell machines that Avigilon rebrands for their specific use. The servers support 300+ number of cameras but limited only by disk storage space and related configuration. The NVR5-STD-16TB-W10-NA NVR server, is a 2U rack mount server, it comes with 16TB storage, Windows 10, and Avigilon ACC7 Enterprise edition. It can support up to 600 Mbps live streaming while simultaneously recording up to 700 Mbps video on a 1GE network connection. The Avigilon ACC7 client software can be installed on any City PC supporting the client requirements. The system is provided with the ability to install an unlimited number of clients for video viewing – limited by hardware only. Iteris staff will install and integrate new server and software with existing/planned camera systems. ONVIF will be used to interface your field cameras, as well as generic interfaces RTSP streaming.

## 2 SCHEDULE

Iteris understands that the City of Yorba Linda would like to implement these systems as soon as possible. Several options will be discussed with the city to expedite delivery of the system.

### 3 COMPENSATION/METHOD OF PAYMENT

In consideration of the services set forth in the Scope of Work for this optional task, Iteris shall be compensated on a firm fixed price lump sum (FFP) basis set forth below. Except to the extent the amount is increased by mutual written agreement, the total compensation shall not exceed **\$30,573.98**, as summarized below.

|                                       |    |                     |
|---------------------------------------|----|---------------------|
| Equipment: Avigilon Hardware/Software | \$ | 19,073.98           |
| Labor and ODC                         | \$ | 11,500              |
| <b>TOTAL</b>                          |    | <b>\$ 30,573.98</b> |

The fee includes all equipment, labor, and direct expenses for this optional task.

The compensation/payment schedule sheet for the overall project including this optional task breakdown is provided on the following page.

### 4 TERMS AND CONDITIONS

This fee proposal is submitted subject to the successful negotiation of a mutually agreeable contract between Iteris and the City of Yorba Linda

The equipment quoted in this proposal is good for 30 days as specified in the attached quote from the day it was quoted 4/27/2023.

I, Scott Carlson, PE, have the authority to bind and negotiate on behalf of the firm. Thank you for the opportunity to submit our proposal. Iteris looks forward to assisting the City on this important project. Please contact me at (714) 724-7089 or sec@iteris.com, or the designated Project Manager (PM), Mr. Braulio Ramirez at (949) 270-9663 or BRamirez@iteris.com, should you have any questions.

Sincerely,  
**Iteris, Inc.**



Scott Carlson, PE  
General Manager  
Mobility Consulting Solutions

**AVIGILON™**

Ship To:

|                               | Currency | USD                           |
|-------------------------------|----------|-------------------------------|
| MSRP Subtotal                 |          | <del>\$118,873.20</del>       |
| Partner Discount (30%)        |          | <del>\$35,661.75</del>        |
| Discounted Subtotal           |          | \$83,211.45                   |
| Estimated Shipping & Handling |          | \$0.00                        |
| Estimated Tax                 |          | Not Included                  |
| <b>Total</b>                  |          | <del><b>\$83,211.45</b></del> |

|                    |  |
|--------------------|--|
| <b>\$17,275.95</b> |  |
| <b>\$200</b>       |  |
| <b>9.25%</b>       |  |
| <b>\$1,598.03</b>  |  |
| <b>\$19,073.98</b> |  |



# 5<sup>TH</sup> GENERATION NETWORK VIDEO RECORDERS

16 TB

24 TB

32 TB

48 TB

64 TB

96 TB

128 TB

192 TB

224 TB

252 TB

288 TB

360 TB

432 TB

5-YEAR WARRANTY

The fifth-generation Avigilon Network Video Recorder (NVR5) delivers unparalleled, high-performance recording, throughput, data availability, and protection for your Avigilon video security system. Featuring the densest storage capacity Avigilon has to offer on a single NVR, security teams can scale up to petabytes of storage at a single location, with up to 432 TB in storage per NVR. All NVR models come optimized with RAID technology, hot-swappable drives, and a five-year Avigilon warranty with dedicated support to increase system uptime and availability.



NVR5 PRM (252-432 TB)



NVR5 PRM (192-224 TB)



NVR5 STD (16-64 TB) and  
NVR5 PRM (96-160 TB)

## FEATURES



### FLEXIBLE & SCALABLE TIER-1 STORAGE

NVR5 offers flexible configurations for security teams to cost-effectively scale up to 432 TB in tier 1 storage capacity and tailor it to their unique retention requirements.



### HIGH DATA AVAILABILITY

Reliable storage with RAID-configured redundancy offers a highly available and resilient system that protects your data. All our STD & PRM models include reliable hard drives with RAID 6/60 redundancy to tolerate up to 2/4 hard drive failures.



### LOWER DEPLOYMENT COSTS WITH QUICK & SIMPLE DEPLOYMENT WITH ACC PRE-CONFIGURED

The NVR5 comes pre-configured with ACC software for secure network video recording and management of Avigilon cameras up to 61 MP resolution.



### INCREASE SYSTEM UPTIME & PRODUCTIVITY

Sites that have connected to the cloud and subscribed to advanced system health<sup>1</sup> can take advantage of system health monitoring to increase system availability, streamline maintenance time and minimize on-site service calls.



### RESPOND FASTER WITH AI-POWERED ANALYTICS SUPPORT

Security teams can respond faster to critical events with the NVR5's seamless support for Avigilon Appearance Search, Facial Recognition, and LPR technologies.



### RESOLVE TECHNICAL ISSUES EXPEDIENTLY WITH A SINGLE-POINT-OF-CONTACT

In addition to lifetime 24/7 Avigilon telephone technical support for the Avigilon End-to-End solution, five-year onsite parts and repair service is also included with 24/7 4-hour response SLA<sup>2</sup> for NVR5 PRM, or Next Business Day for NVR5 STD.



### STRENGTHEN CYBERSECURITY

Designed with cybersecurity in mind, the NVR5 comes with a TPM 2.0 module built-in to support hardware Root of Trust authentication and data encryption.



### EASY RECOVERY SOLUTION

Designed with a separate and redundant array of Solid-State Drives for the operating system (PRM and STD), with a built-in recovery partition to simplify the recovery process, if needed.

<sup>1</sup> On NVR5 PRM 252-432 TB, ACC 7.14.8 or later is required for full advanced system health functionality.

<sup>2</sup> Warranty coverage and support Service Level Agreement is subject to end user's geographic location. Please refer to <https://www.avigilon.com/support/warranty/avigilon> for more information.

# ANALYTICS



## AVIGILON APPEARANCE SEARCH™

Quickly locates a specific person or vehicle of interest across an entire site using a sophisticated deep learning AI search engine.  
ACC Enterprise required.



## LICENSE PLATE RECOGNITION (LPR)

Significant improvements<sup>2</sup> in LPR performance compared to the previous generations of NVRs. Works with ACC software for accurate license plate capture at a range of distances and speeds. Requires an additional license.  
ACC7-LPR license per channel required.



## FACE RECOGNITION

Detects matches from managed watchlists to alert operators of people of interest. Requires Appearance Search and an additional license.  
ACC7-FACE license required



## ACC™ VIDEO MANAGEMENT SOFTWARE

Pre-installed and pre-configured solution for managing multi-megapixel digital IP and analog cameras.

| MODEL                            | CPU OR RAM KIT       | MAXIMUM SUPPORTED CAMERAS BY FEATURE <sup>1</sup> |   | NUMBER OF LPR LANES <sup>2</sup> |                   |                    |                    |
|----------------------------------|----------------------|---|---|----------------------------------|-------------------|--------------------|--------------------|
|                                  |                      | APPEARANCE SEARCH ONLY <sup>3</sup>               | FACE RECOGNITION + APPEARANCE SEARCH <sup>3</sup> | 5 FPS (<16 KM/H)                 | 10 FPS (<48 KM/H) | 20 FPS (<100 KM/H) | 30 FPS (<150 KM/H) |
| NVR5 PRM<br>(252 288 360 432 TB) | -                    | 200   | 50  | 20                               | 10                | 5                  | 3                  |
|                                  | 2 × NVR5-RAM-16GB-B  |   |   | 20                               | 10                | 5                  | 3                  |
| NVR5 PRM<br>(192 224 TB)         | -                    |   |   | 18                               | 9                 | 4                  | 3                  |
|                                  | 1 × NVR5-PRM-2NDCCPU |   |   | 24                               | 12                | 6                  | 4                  |
| NVR5 PRM<br>(96 128 160 TB)      | -                    |   |   | 15                               | 7                 | 3                  | 2                  |
|                                  | 2 × NVR5-RAM-16GB-A  |   |   | 20                               | 10                | 5                  | 3                  |
| NVR5 STD<br>(16 24 32 48 64 TB)  | -                    |   |   | 12                               | 6                 | 3                  | 2                  |
|                                  | 1 × NVR5-RAM-16GB-A  |   |   | 15                               | 7                 | 3                  | 2                  |

<sup>1</sup> These performance figures are based on validation testing by Avigilon. Assumes appliance-wide average per camera rates of classified objects leaving field of view:

- H5A Cameras - One every second;
- H4A Cameras - One every two seconds.

Additional licenses may be required. For more information, contact Avigilon Sales.

<sup>2</sup> Assumes a 3 MP camera with 1 MP license plate scan area and Frames Per Second (FPS) to recognize license plates up to vehicle speeds in Kilometers Per Hour (KM/H). Results may vary according to camera mounting parameters. ACC 7.14.10 or later is required.

<sup>3</sup> Requires H5A or H4A cameras. The Avigilon Appearance Search camera support limit does not affect any NVR throughputs for simultaneous recording, playback and live streaming.

# SPECIFICATIONS

| SYSTEM  |                   | NVR5 PRM<br>(252-432 TB)                                    | NVR5 PRM<br>(192-224 TB)                                    | NVR5 PRM<br>(96-160 TB)   | NVR5 STD<br>(16-64 TB)                    |
|---|-------------------|---|---|---|---|
| Capacity  |                   | 252 TB<br>288 TB<br>360 TB<br>432 TB                        | 192 TB<br>224 TB  | 96 TB<br>128 TB<br>160 TB   | 16 TB<br>24 TB<br>32 TB<br>48 TB<br>64 TB |
| Avigilon Control Center™ Edition  |                   | Core, Standard and Enterprise compatible                    |   |   |   |
| Network Video Streaming Performance (10 GbE - Multiple Connections)   | Recording Rate:   | Up to 1500 Mbps   | Up to 1500 Mbps   | Up to 1500 Mbps   | Up to 800 Mbps <sup>1</sup>               |
|   | Playback Rate:    | Up to 600 Mbps <sup>2</sup>                                 | Up to 600 Mbps <sup>2</sup>                                 | Up to 600 Mbps <sup>2</sup>   | Up to 600 Mbps                            |
| Network Video Streaming Performance (1 GbE - Multiple Connections)  | Recording Rate:   | Up to 800 Mbps  | Up to 800 Mbps  | Up to 700 Mbps  | Up to 700 Mbps <sup>3</sup>               |
|   | Playback Rate:    | Up to 800 Mbps  | Up to 600 Mbps  | Up to 600 Mbps  | Up to 600 Mbps                            |
| Operating System  |                   | Microsoft Windows Server 2019 - 16 core                     |   |   |   |
| Hard Disk Drive Configuration   | Video Data:       | RAID 60 Up to 28 × 3.5", hot-swappable                      | RAID 60 Up to 18 × 3.5", hot-swappable                      | RAID 6 Up to 12 × 3.5", hot-swappable   | RAID 6 Up to 10 × 3.5", hot-swappable     |
|   | Operating System: | 2 × 480 GB M.2 SSD Drives, RAID 1                           | 2 × 240 GB M.2 SSD Drives, RAID 1                           |   |   |
| Recording Storage Capacity  |                   | Up to 504 TB raw; 432 TB effective (RAID 60)                | Up to 288 TB raw; 224 TB effective (RAID 60)                | Up to 192 TB raw; 160 TB effective (RAID 6)   | Up to 80 TB raw; 64 TB effective (RAID 6) |
| Network Interface   |                   | 2 × 10 GbE SFP+ ports <sup>4</sup><br>4 × 1 GbE RJ-45 ports | 4 × 10 GbE SFP+ ports <sup>4</sup><br>4 × 1 GbE RJ-45 ports | 2 × 10 GbE SFP+ ports <sup>4</sup> (optional for NVR5 STD)<br>6 × 1 GbE RJ-45 ports |   |
| Memory  |                   | 8 × 8 GB DDR4   | 6 × 8 GB DDR4   | 4 × 8 GB DDR4   | 2 × 8 GB DDR4                             |
| Processor   |                   | 2 × Intel® 8-core Xeon®                                     | 1 × Intel® 16-core Xeon®                                    | 2 × Intel® 8-core Xeon®   | 1 × Intel® 8-core Xeon®                   |
| Video Outputs   |                   | 1 × VGA   |   |   |   |
| Local Viewing   |                   | No  |   |   |   |
| Out-of-band Management  |                   | iLO Advanced  | iDRAC 9 Enterprise  |   |   |
| <sup>1</sup> The maximum recording throughput for STD can be increased to 1100 Mbps by adding a 2nd CPU kit and a 10 GbE Network Card. This requires purchase of a second power supply (NVR5-PSU-800W).<br><sup>2</sup> The max playback throughput for PRM can be increased by reducing the recording throughput.<br><sup>3</sup> The max recording throughput for STD can be increased to 800 Mbps. Requires the use of multiple 1GbE ports in a team using LACP/ALB mode.<br><sup>4</sup> Direct Attach Cables (NVR5-SFPPLUS-DA for all NVR5 models) or system-specific SFP+ transceivers (NVR5-SFPPLUS-SR-A for NVR5 16-224 TB, NVR5-SFPPLUS-SR-B for NVR5 ≥ 252 TB) sold separately. |                   |   |   |   |   |

| MECHANICAL             |  | NVR5 PRM<br>(252-432 TB)   | NVR5 PRM<br>(192-224 TB)                                 | NVR5 PRM<br>(96-160 TB)   | NVR5 STD<br>(16-64 TB)  |
|------------------------|--|--|--|---|---|
| Form Factor            |  | 2U Rack Mount Chassis  |  |   |   |
| Dimensions (L x W x H) |  | 872.0 mm × 479.0 mm × 87.5 mm<br>34.33" × 18.86" × 3.44"   | 751.3 mm × 482.0 mm × 86.8 mm<br>29.58" × 18.98" × 3.42" | 721.6 mm × 482.0 mm × 86.8 mm<br>28.4" × 18.98" × 3.42"                   |   |
| Weight                 |  | 252 TB: 48 kg (107 lbs)<br>288 TB: 50 kg (110 lbs)<br>360 TB: 53 kg (116 lbs)<br>432 TB: 55 kg (122 lbs) | 192 TB: 32 kg (70 lbs)<br>224 TB: 33 kg (73 lbs)         | 96 TB: 27 kg (60 lbs)<br>128 TB: 27 kg (60 lbs)<br>160 TB: 29 kg (63 lbs) | 16 TB: 24 kg (54 lbs)<br>24 TB: 26 kg (57 lbs)<br>32 TB: 24 kg (54 lbs)<br>48 TB: 26 kg (57 lbs)<br>64 TB: 27 kg (60 lbs) |

| ELECTRICAL        | NVR5 PRM<br>(252-432 TB)                 | NVR5 PRM<br>(192-224 TB)   | NVR5 PRM<br>(96-160 TB)    | NVR5 STD<br>(16-64 TB)     |
|-------------------|--|----------------------------|----------------------------|----------------------------|
| Power Input       | 100 to 240 VAC, 50/60 Hz, auto-switching |                            |                            |                            |
| Power Supply      | Dual (1+1) 1000 W redundant              | Dual (1+1) 1100 W          | 2 × 1100 W Mixed Mode      | 800 W Mixed Mode           |
| Power Consumption | Maximum 580 W (1978 BTU/h)               | Maximum 803 W (2740 BTU/h) | Maximum 789 W (2691 BTU/h) | Maximum 604 W (2061 BTU/h) |
| Power Efficiency  | Titanium                                 |                            |                            | Platinum                   |

| ENVIRONMENTAL         | NVR5 PRM<br>(252-432 TB)  | NVR5 PRM<br>(192-224 TB)   | NVR5 PRM<br>(96-160 TB)  | NVR5 STD<br>(16-64 TB) |
|-----------------------|---|--|--|------------------------|
| Operating Temperature | 10°C to 35°C (50°F to 95°F)   | 10°C to 35°C (50°F to 95°F)  | 5°C to 45°C (41 °F to 113°F)   |                        |
| Storage Temperature   | -30°C to 60°C (-22°F to 140°F)  | -40°C to 65°C (-40°F to 149°F)   |  |                        |
| Operating Humidity    | 8% to 90% relative humidity with 28°C (82.4°F) max dew point                                      | 10% to 80% relative humidity with 29°C (84.2°F) max dew point                                | 8% to 95% relative humidity with 27°C (80.6°F) max dew point                                   |                        |
| Storage Humidity      | 5% to 95% RH with 38.7°C (101.7°F) max dew point. Atmosphere must be non-condensing at all times. | 5% to 95% RH with 33°C (91°F) max dew point. Atmosphere must be non-condensing at all times. | 5% to 95% RH with 27°C (80.6°F) max dew point. Atmosphere must be non-condensing at all times. |                        |
| Operating Vibration   | 0.15 Grms at 10 Hz to 300 Hz  | 0.26 Grms at 5 Hz to 350 Hz  | 0.21 Grms at 5 Hz to 500 Hz  |                        |
| Storage Vibration     | 0.5 Grms at 10 Hz to 500 Hz   | 1.88 Grms at 10 Hz to 500 Hz   | 1.88 Grms at 10 Hz to 500 Hz   |                        |
| Operating Shock       | 2 G   | 6 G  |  |                        |
| Storage Shock         | 15 G  | 71 G   |  |                        |
| Operating Altitude    | 3,050 m (10,000 ft)   | 3,048 m (10,000 ft)  |  |                        |
| Storage Altitude      | 9,144 m (30,000 ft)   | 12,000 m (39,370 ft)   |  |                        |

| CERTIFICATIONS            | NVR5 PRM<br>(252-432 TB)  | NVR5 PRM<br>(192-224 TB)  | NVR5 PRM<br>(96-160 TB) | NVR5 STD<br>(16-64 TB)   |
|---------------------------|---|---|-------------------------|--|
| Certifications/Directives | UL, cUL, CE, RCM, BSMI, EAC, KC, NRCS, VCCI, RoHS, WEEE   | UL, cUL, CE, LOT9, NRCS, NOM, RCM, EAC, VCCI, BSMI, CCC (STD only), KC, BIS, UKCA   |                         |  |
| Safety                    | UL/CSA/EN/IEC 62368-1   | UL/CSA/IEC/EN 62368-1:2014 (2nd ed)   |                         |  |
| Electromagnetic Emissions | CFR Title 47, FCC Part 2, 15 Class A, ICES-003(A), EN 55032 Class A, EN 61000-3-2, EN 61000-3-3 | FCC Title 47 CFR Part 15 Canadian ICES-003(A) Issue 7 EN 55032:2015/CISPR 32:2015 EN 61000-3-2:2014/IEC 61000-3-2:2014 EN 61000-3-3:2013/IEC 61000-3-3:2013 |                         |  |
| Electromagnetic Immunity  | EN 55024  | EN 55024:2010 +A1:2015/CISPR 24:2010 +A1:2015 or EN 55035:2017  |                         |  |
| Warranty                  | 5-year 4-hour mission critical warranty with onsite parts delivery service.                     |   |                         | 5-year NBD (Next Business Day) with onsite parts delivery service. 4-hour mission critical warranty upgrade available. |

| SUPPLIED ACCESSORIES | NVR5 PRM<br>(252-432 TB)   | NVR5 PRM<br>(192-224 TB)                           | NVR5 PRM<br>(96-160 TB) | NVR5 STD<br>(16-64 TB)  |
|----------------------|--|--|-------------------------|---|
| Rack Rail System     | Sliding rail system with cable management arm <sup>1</sup>           | ReadyRails Sliding Rails with Cable Management Arm |                         |   |
| Bezel                | 1, front   |  |                         |   |
| Power Cords          | 4 total:<br>2 × C13 / C14, 2 × country variants (from options below) |  |                         | 2 total:<br>1 × C13 / C14, 1 × country variant (from options below) |

<sup>1</sup> Supports tool-less mounting in 19"-wide EIA-310-E compliant square hole, unthreaded round-hole 4-post racks, and threaded hole 4-post racks

(NA) NEMA 5-15P / C13



(UK) BS1363 / C13



(EU) SCHUKO / C13



(AU) AS3112 / C13



# OUTLINE DIMENSIONS

| [X.X] | INCHES |
|-------|--------|
| X     | MM     |

## NVR5 PRM (252 288 360 432 TB)

### FORM FACTOR

2U rack mount chassis

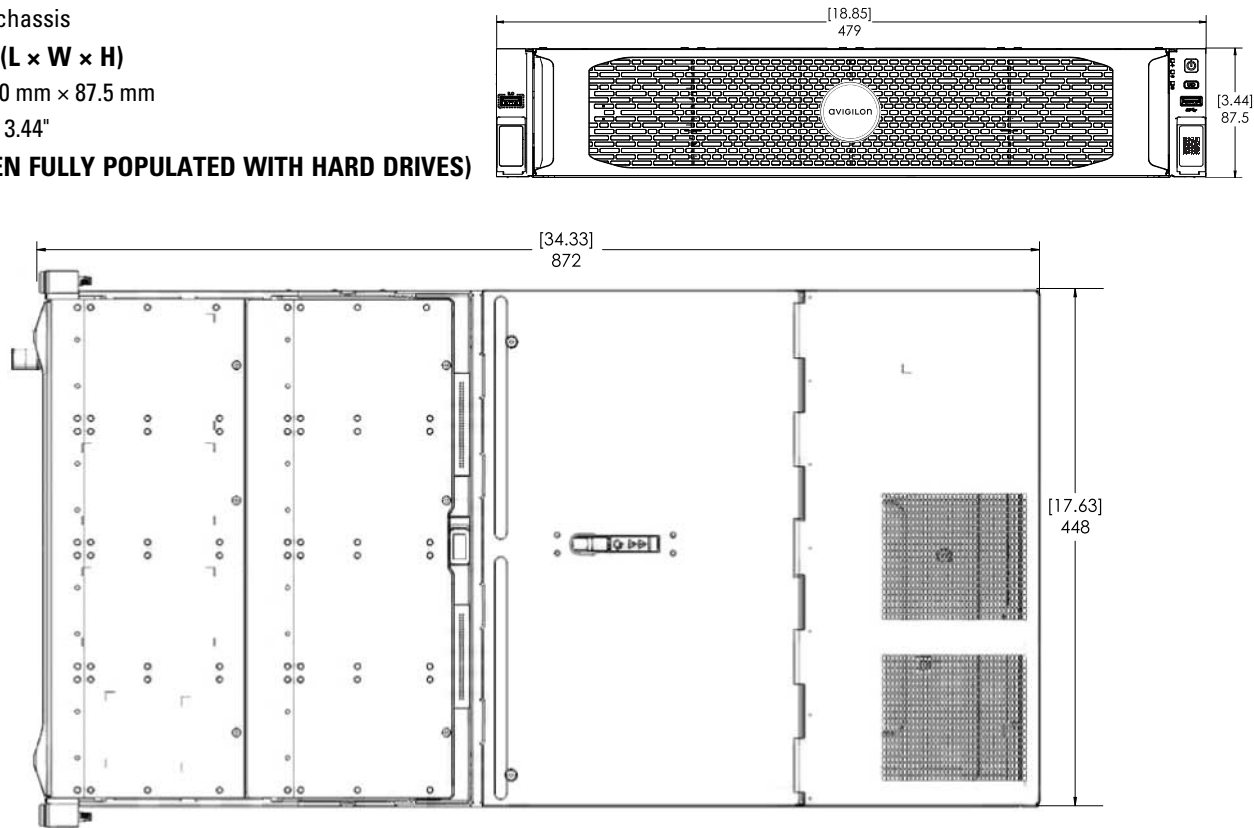
### DIMENSIONS (L x W x H)

872.0 mm x 479.0 mm x 87.5 mm

34.33" x 18.86" x 3.44"

### WEIGHT (WHEN FULLY POPULATED WITH HARD DRIVES)

55 kg [122 lbs]



## NVR5 PRM (192 224 TB)

### FORM FACTOR

2U rack mount chassis

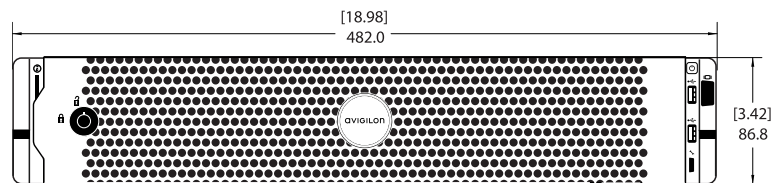
### DIMENSIONS (L x W x H)

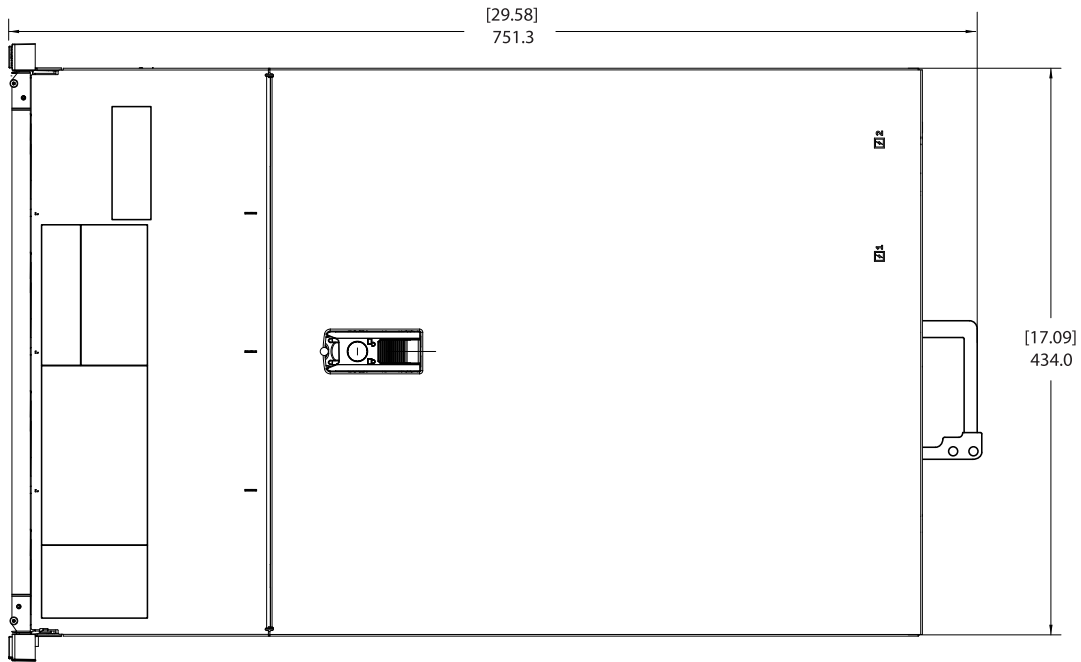
751.3 mm x 482.0 mm x 86.8 mm

29.58" x 18.98" x 3.42"

### WEIGHT (WHEN FULLY POPULATED WITH HARD DRIVES)

33.1 kg [72.91 lbs]





## NVR5 STD (16 24 32 48 64 TB) & NVR5 PRM (96 128 160 TB)

### FORM FACTOR

2U rack mount chassis

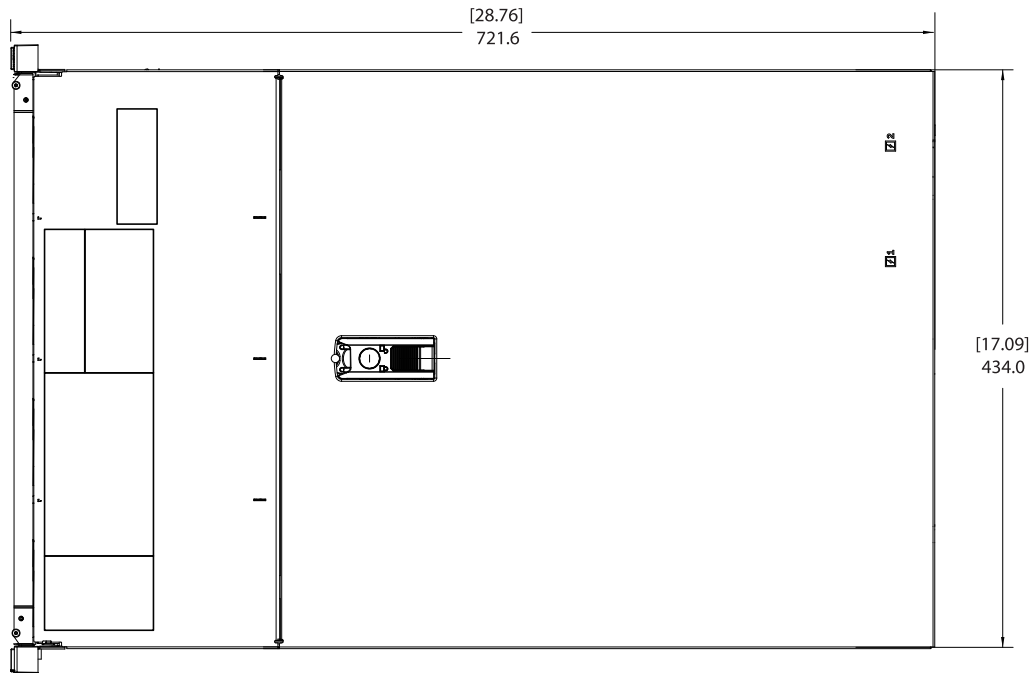
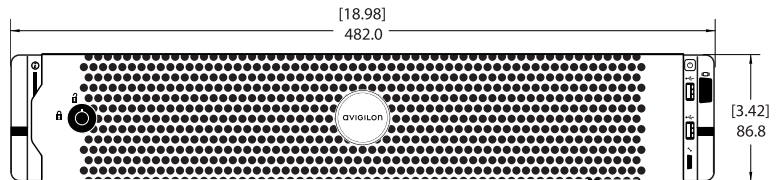
### DIMENSIONS (L × W × H)

721.6 mm × 482.0 mm × 86.8 mm

28.4" × 18.98" × 3.42"

### WEIGHT (WHEN FULLY POPULATED WITH HARD DRIVES)

28.76 kg [63.40 lbs]



# ORDERING INFORMATION

| NVR5   |  |
|--|--|
| NVR5-STD-16TB-W10  | 16 TB (24 TB Raw) NVR5 Standard with Microsoft Windows 10 v1809 LTSC and Avigilon Control Center     |
| NVR5-STD-16TB-S19  | 16 TB (24 TB Raw) NVR5 Standard with Microsoft Windows Server 2019 LTSC and Avigilon Control Center  |
| NVR5-STD-24TB-W10  | 24 TB (32 TB Raw) NVR5 Standard with Microsoft Windows 10 v1809 LTSC and Avigilon Control Center     |
| NVR5-STD-24TB-S19  | 24 TB (32 TB Raw) NVR5 Standard with Microsoft Windows Server 2019 LTSC and Avigilon Control Center  |
| NVR5-STD-32TB-W10  | 32 TB (48 TB Raw) NVR5 Standard with Microsoft Windows 10 v1809 LTSC and Avigilon Control Center     |
| NVR5-STD-32TB-S19  | 32 TB (48 TB Raw) NVR5 Standard with Microsoft Windows Server 2019 LTSC and Avigilon Control Center  |
| NVR5-STD-48TB-W10  | 48 TB (64 TB Raw) NVR5 Standard with Microsoft Windows 10 v1809 LTSC and Avigilon Control Center     |
| NVR5-STD-48TB-S19  | 48 TB (64 TB Raw) NVR5 Standard with Microsoft Windows Server 2019 LTSC and Avigilon Control Center  |
| NVR5-STD-64TB-W10  | 64 TB (80 TB Raw) NVR5 Standard with Microsoft Windows 10 v1809 LTSC and Avigilon Control Center     |
| NVR5-STD-64TB-S19  | 64 TB (80 TB Raw) NVR5 Standard with Microsoft Windows Server 2019 LTSC and Avigilon Control Center  |
| NVR5-PRM-96TB-S19  | 96 TB (120 TB Raw) NVR5 Premium with Microsoft Windows Server 2019 LTSC and Avigilon Control Center  |
| NVR5-PRM-128TB-S19   | 128 TB (160 TB Raw) NVR5 Premium with Microsoft Windows Server 2019 LTSC and Avigilon Control Center |
| NVR5-PRM-160TB-S19   | 160 TB (192 TB Raw) NVR5 Premium with Microsoft Windows Server 2019 LTSC and Avigilon Control Center |
| NVR5-PRM-192TB-S19   | 192 TB (256 TB Raw) NVR5 Premium with Microsoft Windows Server 2019 LTSC and Avigilon Control Center |
| NVR5-PRM-224TB-S19   | 224 TB (288 TB Raw) NVR5 Premium with Microsoft Windows Server 2019 LTSC and Avigilon Control Center |
| NVR5-PRM-252TB-S19   | 252 TB (324 TB Raw) NVR5 Premium with Microsoft Windows Server 2019 LTSC and Avigilon Control Center |
| NVR5-PRM-288TB-S19   | 288 TB (360 TB Raw) NVR5 Premium with Microsoft Windows Server 2019 LTSC and Avigilon Control Center |
| NVR5-PRM-360TB-S19   | 360 TB (432 TB Raw) NVR5 Premium with Microsoft Windows Server 2019 LTSC and Avigilon Control Center |
| NVR5-PRM-432TB-S19   | 432 TB (504 TB Raw) NVR5 Premium with Microsoft Windows Server 2019 LTSC and Avigilon Control Center |
| Avigilon Control Center licenses must be purchased separately.<br>Avigilon Appearance Search and facial recognition requires Enterprise version of the ACC software. |  |

| ACCESSORIES (NVR5 PRM 252-432 TB) |  |
|-----------------------------------|--|
| NVR5-SFPPLUS-DA                   | 3 m (10 ft) SFP+ 10 GbE Twinax Direct Attach cable   |
| HD-NVR4-SFPPLUS-DA                | 3 m (10 ft) SFP+ 10 GbE Twinax Direct Attach cable   |
| NVR5-SFPPLUS-SR-B                 | SFP+ Transceivers for Short Range (Multi-mode) on server side, NVR5 >= 252 TB  |
| NVR5-SFPPLUS-LR-B                 | SFP+ Transceivers for Long Range (Single-mode) between SAN switches, NVR5 >= 252 TB  |
| NVR5-10GBASET-B                   | Network Card, QP 10 G-Base-T NVR5 PRM >= 252 TB  |
| NVR5-RAM-16GB-B                   | RAM Upgrade Kit for 1 CPU Processor Only, 2 x 8 GB DDR4 3200 MT/s DIMMs, NVR5 PRM >= 252 TB  |
| NVR5-PSU-1000W                    | 1000 W Flex Slot Titanium Hot Plug/Swappable Power Supply Kit, NVR5 PRM >= 252 TB  |
| NVR5-HDDS-INT-18TB                | Spare hard drive, 18 TB, internal bay, compatible with NVR5 PRM >= 252 TB  |
| NVR5-HDDS-HOT-18TB                | Spare hard drive, 18 TB, front/rear bay, compatible with NVR5 PRM >= 252 TB  |
| AVA-HED1-NVR5-CONNECT-B           | AVA Connectivity Kit for Direct Attachment of a NVR5 PRM >= 252 TB   |
| AVA-SAN-CONNECT-1                 | AVA Head Unit Connectivity Kit, includes 1 x transceiver and fiber optic cable for SAN networking  |
| AVA-SAN-CONNECT-8                 | AVA Head Unit Connectivity Kit, includes 8 x transceivers and fiber optic cables for SAN networking with two network switches                                      |
| NVR5-AVA-SAN-CONNECT-B            | Connectivity Kit for AVA SAN networking, compatible with NVR5 PRM >= 252 TB (excluding AVA Transceiver and Fiber Optic Cables included in AVA-HED1-NVR5-CONNECT-B) |
| NVR-KYD-WARR-5YR-B                | 5-year Keep-Your-Drive Warranty Upgrade for NVR5 PRM >= 252 TB   |

| ACCESSORIES (NVR5 STD/PRM 16-224 TB) |   |
|--------------------------------------|---|
| NVR5-SFPPLUS-DA                      | 3 m (10 ft) SFP+ 10 GbE Twinax Direct Attach cable            |
| HD-NVR4-SFPPLUS-DA                   | 3 m (10 ft) SFP+ 10 GbE Twinax Direct Attach cable            |
| NVR4X-SFPPLUS-SR                     | SFP+ Transceivers for Short Range (Multi-mode) on server side |

| ACCESSORIES (NVR5 STD/PRM 16-224 TB)   |   |
|--|---|
| NVR5-SFPPLUS-SR-A  | SFP+ Transceivers for Short Range (Multi-mode) on server side, NVR5 16-224 TB   |
| NVR5-SFPPLUS-LR-A  | SFP+ Transceivers for Long Range (Single-mode) between SAN switches, NVR5 16-224 TB   |
| NVR5-STD-10GBE   | Network Card, DP 10 GbE SFP+ NVR5 STD 16-64 TB  |
| NVR5-10GBASET-A1   | Network Card, QP 10 G-Base-T NVR5 STD/PRM 16-160 TB (excluding 2nd CPU for NVR5 STD)  |
| NVR5-10GBASET-A2   | Network Card, QP 10 G-Base-T NVR5 PRM 192-224 TB  |
| NVR5-RAM-16GB-A  | RAM Upgrade Kit for 1 CPU Processor Only, 2 × 8 GB DDR4 3200 MT/s DIMMs, NVR5 STD/PRM 16-224 TB   |
| NVR5-STD-2NDCPU <sup>1</sup>   | 2nd CPU Upgrade Kit, 2 × 8 GB DDR4 3200 MT/s DIMMs, NVR5 STD 16-64 TB   |
| NVR5-PRM-2NDCPU  | 2nd CPU Upgrade Kit, 6 × 8 GB DDR4 3200 MT/s DIMMs, NVR5 PRM 192-224 TB   |
| NVR5-PSU-800W  | 800 W Hot Plug/Swappable Power Supply Kit, NVR5 STD 16-64 TB  |
| NVR5-PSU-1100W-A1  | 1100 W Hot Plug/Swappable Power Supply Kit, NVR5 PRM 96-160 TB  |
| NVR5-PSU-1100W-A2  | 1100 W Hot Plug/Swappable Power Supply Kit, NVR5 PRM 192-224 TB   |
| NVR5-HDD-HOT-4TB   | Spare hard drive, 4 TB, front/rear bay, compatible with NVR5 STD 16-24 TB   |
| NVR5-HDD-HOT-8TB   | Spare hard drive, 8 TB, front/rear bay, compatible with NVR5 STD 32-64 TB   |
| NVR5-HDDS-HOT-12TB   | Spare hard drive, 12 TB, front/rear bay, compatible with NVR PRM 96 TB  |
| NVR5-HDDS-INT-16TB   | Spare hard drive, 16 TB, internal bay, compatible with NVR5 PRM 192-224 TB  |
| NVR5-HDDS-HOT-16TB-A1  | Spare hard drive, 16 TB, front/rear bay, compatible with NVR5 PRM 128-160 TB  |
| NVR5-HDDS-HOT-16TB-A2  | Spare hard drive, 16 TB, front/rear bay, compatible with NVR5 PRM 192-224 TB  |
| AVA-HED1-NVR5-CONNECT-A  | AVA Connectivity Kit for Direct Attachment of a NVR5 STD/PRM ≤ 224 TB (excluding 2nd CPU for NVR5 STD)  |
| AVA-SAN-CONNECT-1  | AVA Head Unit Connectivity Kit, includes 1 × transceiver and fiber optic cable for SAN networking   |
| AVA-SAN-CONNECT-8  | AVA Head Unit Connectivity Kit, includes 8 × transceivers and fiber optic cables for SAN networking with two network switches   |
| NVR5-AVA-SAN-CONNECT-A   | Connectivity Kit for AVA SAN networking, compatible with NVR5 STD/PRM ≤ 224 TB (excluding 2nd CPU for NVR5 STD as well as AVA Transceiver and Fiber Optic Cables included in AVA-HED1-NVR5-CONNECT-A) |
| NVR-KYD-WARR-5YR-A   | 5-year Keep-Your-Drive Warranty Upgrade for NVR5 STD/PRM 16-224 TB  |
| NVR5-STD-WARR-5Y4HMC   | 5-year 4-Hour-Mission-Critical Warranty Upgrade for NVR5 STD 16-64 TB   |
| <sup>1</sup> The NVR5-STD-2NDCPU Kit requires purchase of a second power supply (NVR5-PSU-800W). |   |

## SUPPORT

Learn more and find additional documentation at [avigilon.com](https://www.avigilon.com) or email [sales@avigilon.com](mailto:sales@avigilon.com) for specific product support.



Jan 2023 | Rev 3

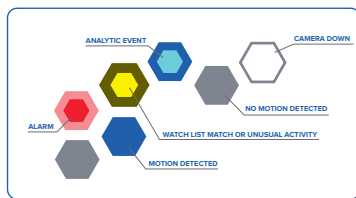
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[sales@avigilon.com](mailto:sales@avigilon.com) | [avigilon.com](https://www.avigilon.com)



# Avigilon Control Center™ 7 Software

Avigilon Control Center (ACC) software is an easy-to-use video management software that is designed to optimize the way security professionals manage and interact with high-definition video. It efficiently captures and stores HD video, while intelligently managing bandwidth and storage using our patented High Definition Stream Management (HDSM) technology. Version 7 of the software introduces an entirely new way to monitor live video through its Focus of Attention interface, enabling operators to see at a glance what is happening across the entire site and more effectively triage and respond to the most important events.



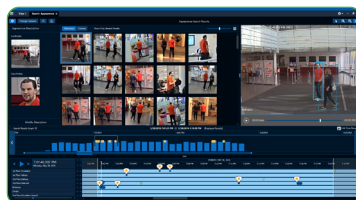
## Focus of Attention Interface

Redefining live video monitoring, Focus of Attention helps increase operator effectiveness by providing an overview of events across all cameras in the site, including Avigilon analytic events, face and license plate watch list matches, Unusual Activity Detection (UAD) events, Unusual Motion Detection (UMD) events, motion events, and alarms. Operators can triage the most important events, reviewing associated video to determine if a response is required.



## Facial Recognition Technology

Accelerate response times using AI-powered facial recognition technology to detect people of interest based on secure watch lists managed by authorized users at the organization. Populate watch lists by uploading an image or finding a face from recorded video. Robust controls govern the accessibility and retention of watch list data. Start an Avigilon Appearance Search™ query for watch list entries, or receive alerts for potential watch list matches through the Focus of Attention interface. For added security, create alarms that trigger when any individual on the watch list is detected.



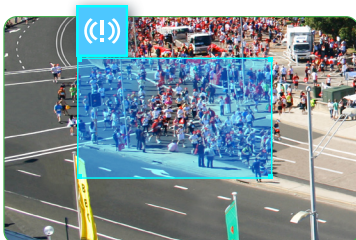
## Avigilon Appearance Search Technology

A sophisticated AI search engine that enables investigators to sort through hours of recorded video with ease and quickly locate a person or vehicle of interest across an entire site. Search for a person or vehicle of interest by entering a physical description, by uploading a photo, or by finding an example in recorded video.



## Next-Generation Analytics and Self-Learning Video Analytics

ACC™ video management software enables analytic events and alarms to be viewed and searched through an intuitive user interface. Real-time events and forensic capabilities detect and notify operators of scene changes and rules violations.



## Unusual Activity and Unusual Motion Detection (UAD & UMD)

Advanced AI technology highlights the unanticipated by automatically flagging unusual activity and motion. Without any configuration, UMD detects atypical movement while UAD is object-aware and detects anomalous behavior (speed and location) of people and vehicles.

|     |     |     |      |     |     |      |              |
|-----|-----|-----|------|-----|-----|------|--------------|
| UAD | H5A | UMD | H5SL | H5M | H4A | H4SL | H4 MINI DOME |
|-----|-----|-----|------|-----|-----|------|--------------|

## Preinstalled on Avigilon Recorders and Appliances

ACC software is pre-installed and configured on Avigilon HD Video Appliances, Network Video Recorders (NVRs), NVR Workstations, ACC ES Recorders, ACC ES Analytics Appliances, ACC ES 8-Port Appliances and the H4ES camera line. You can also install the stand-alone ACC software to meet the needs of a wide variety of projects. Our NVRs come pre-installed with the NVR Analytics Kit to enable our patented Avigilon Appearance Search technology.



# Avigilon Control Center Advanced Features

- **HDSM™ Technology**

Intelligently manages HD image communications to optimize network bandwidth and workstation performance for even the highest resolution Avigilon cameras.
- **HDSM SmartCodec™ Technology Support**

Automatically adjusts compression levels for regions in a scene, to optimize bandwidth while still maintaining image quality.
- **Avigilon Appearance Search Technology**

Quickly search recorded video to find instances of a person or vehicle across all sites using cameras with Avigilon self-learning analytics. Search for a person by physical description, including clothing color, hair color, gender and age group. Search for a vehicle by physical description, including color and category - car, truck, bus, bicycle, and motorcycle. Search for a person or vehicle by uploading a photo.
- **Facial Recognition Technology**

AI-powered facial recognition algorithms notify operators when a person of interest returns to a facility. Add a person to a face watch list by uploading a photo or from recorded video. Create watch list alarms, monitor the Focus of Attention interface to detect matches, or start an Appearance Search for a person on a watch list.
- **Intelligent Search**

Powerful search tools enable you to quickly search recorded video for motion, the presence of classified objects (people or vehicles), background changes in the scene (thumbnail search), and for events.
- **Simple Camera and Server Installation**

Plug-and-play capabilities for NVRs and cameras that automatically identify themselves on the network, without manual configuration or searching.
- **License Plate Recognition (LPR) Analytics**

Second generation LPR analytics engine with easy configuration and improved accuracy for faster security response. Multiple license watch lists can trigger unique ACC rules when detecting a match.
- **ACM-ACC Interoperability**

The Access Control Manager (ACM) system receives, processes, and acts on ACM™ door events, hardware input events, and access grants, enabling operators to unlock access doors directly from a camera view. Identity Verification enables users to see ACM system credentials dynamically displayed with ACC camera views. Identity Search enables users to visually verify access events, and initiate an Avigilon Appearance Search across the entire site for the same person.
- **Avigilon Cloud Services Web Client**

Securely stream live and recorded video from firewall-protected ACC sites using a Chrome or Safari web browser. With no client installation required, this solution leverages Avigilon Cloud Services to support secure peer-to-peer connections to ACC servers.
- **ACC Mobile Software**

Push alarm notifications, live and recorded video, two-way audio, self-learning video analytics overlays, digital output triggers, and PTZ control for Android™ and iOS mobile devices. Using Avigilon Cloud Services, log in to connected ACC sites without any complicated firewall configuration.
- **Video Archive**

Retain and manage large amounts of video for on-demand retrieval and review. Extend your storage beyond NVRs using the Avigilon Video Archive for reliable and scalable storage.
- **Detailed Management, Monitoring, and Reporting of System Status and Security**

Detailed logs of storage, network, and overall system status to help ensure the highest possible system uptime for critical applications.
- **Point-of-Sale Transaction Engine**

Link HD security recorded video (viewed instantly) with transaction data to address compliance requirements and help reduce shrinkage and theft.
- **Scalable Integration with External Systems**

Distributed architecture features .NET-based and REST-based APIs that can easily be integrated with other systems, such as access control and building management.
- **ONVIF® Profile S, T and G Compliant VMS**

Ensures interoperability between IP based ONVIF conformant security devices regardless of manufacturer. Allows video and audio recovery from SD cards installed in Profile G cameras in case of network failure.
- **Unusual Activity Detection**

UAD technology enables object-level detection of atypical activity. This edge-based intelligence uses advanced AI technology and is designed to be object-aware, enabling operators to know when a person or vehicle is in an unusual location in the scene or moving at an unusual speed.
- **Unusual Motion Detection**

UMD technology enables fast video search and is designed to reduce hours of work to minutes by narrowing potentially thousands of motion events to a handful. This allows operators to focus their attention on recorded video needing further investigation.
- **Federal Government Compliance with FIPS 140-2 Certified Encryption**

To comply with policies, Federal Government and other customers can enable FIPS 140-2 certified cryptography on ACC software and on supported Avigilon cameras. Required camera cryptography licenses are centrally managed in ACC. Within ACC, optionally turn on licensed FIPS cryptography on Avigilon cameras. ACC inventories the number of FIPS camera licenses being used and determines whether customers have the required number of licenses within a facility.

## Specialty Devices

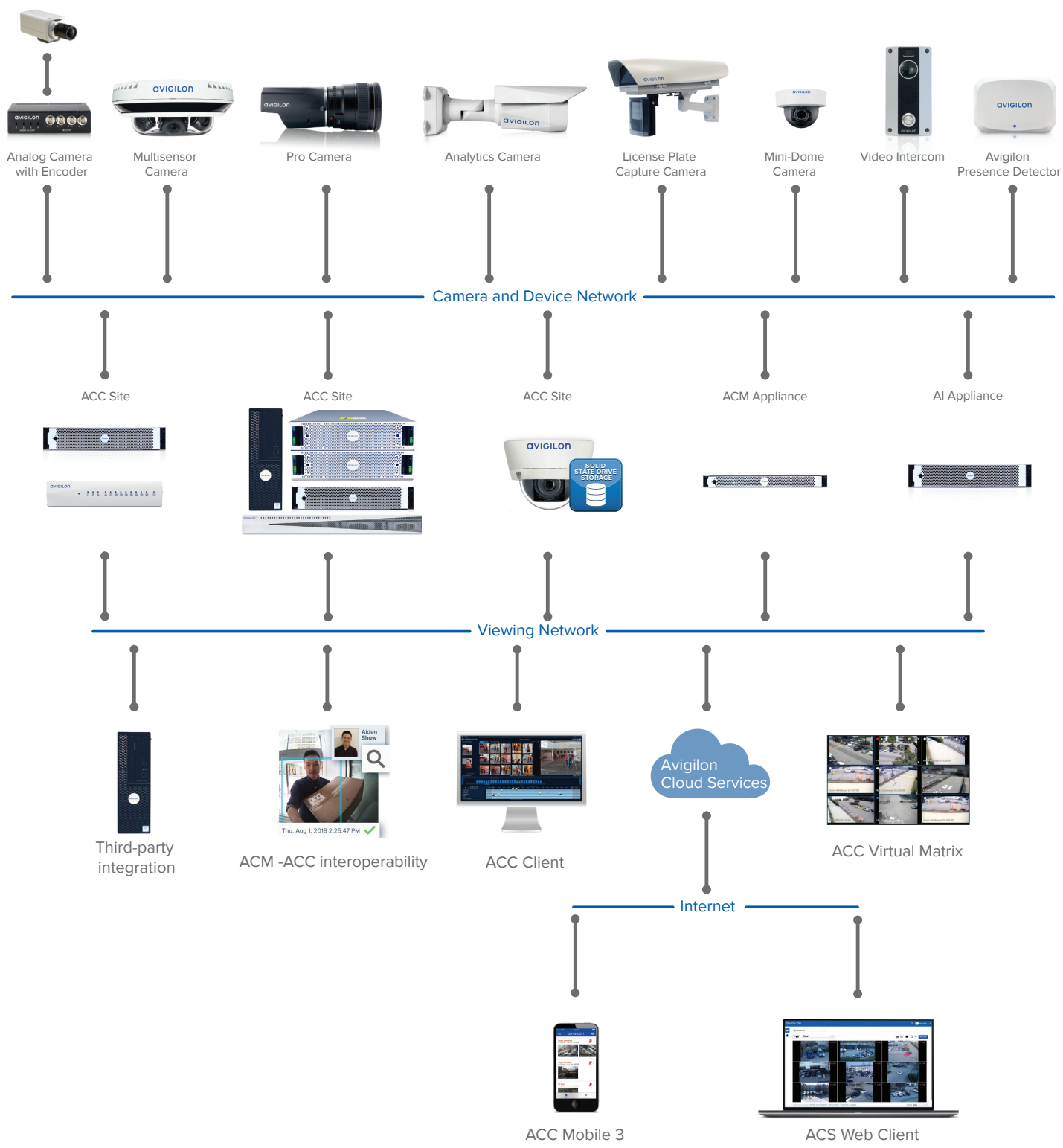


**Avigilon Presence Detector Support**  
The Avigilon Presence Detector™ sensor is a small form factor impulse radar device with self-learning radar analytics that accurately detects the presence of a person even if they have stopped moving or are hidden. It has the ability to detect presence through blankets, cardboard, wood and drywall.



**H4 Video Intercom Support**  
Video Intercom support provides operators with visual and audio verification of visitors. The H4 Video Intercom integration uses wide dynamic range and echo canceling technologies for clear viewing and two-way communication with visitors.

# System Architecture



# Software Editions

The Avigilon Control Center software is offered in three editions: Core, Standard and Enterprise. The Core edition is an entry-level version of our award-winning software that delivers advanced high definition video security capabilities, ease of use, and superior image quality to smaller implementations. The Standard edition is a cost-effective security solution that meets the vital and focused needs of mid-size operations. The Enterprise edition includes all of the Core and Standard features, plus advanced features to make it a powerful, open platform for large-scale video security needs.

| SYSTEM   | CORE   | STANDARD | ENTERPRISE |
|--|--------|----------|------------|
| Cameras per server                                     | 24     | 75       | 300+*      |
| Cameras per site                                       | 24     | 75       | 10 000+*   |
| Servers per site                                       | 1      | 1        | 100+*      |
| Client licenses per server                             | 2      | 10       | Unlimited  |
| Maximum bookmarks                                      | 10 000 | 10 000   | 10 000     |
| Rule triggers  | 0      | 51       | Unlimited  |
| HDSM technology support                                | Yes    | Yes      | Yes        |
| HDSM SmartCodec technology support                     | Yes    | Yes      | Yes        |
| Dual Streaming for ONVIF compliant cameras             | Yes    | Yes      | Yes        |
| H.265, H.264, MPEG4, MJPEG, JPEG2000 video compression | Yes    | Yes      | Yes        |

\* Actual limits will depend on the hardware environment. Please review Avigilon server and appliance datasheets for applicable limits.

| DEVICE SUPPORT   | CORE | STANDARD | ENTERPRISE |
|--|------|----------|------------|
| Automatic device discovery   | Yes  | Yes      | Yes        |
| Third-party IP cameras and encoders  | Yes  | Yes      | Yes        |
| ONVIF compliant cameras and encoders   | Yes  | Yes      | Yes        |
| H5A cameras with Next-Generation Video Analytics   | Yes  | Yes      | Yes        |
| H4A cameras with Self-Learning Video Analytics   | Yes  | Yes      | Yes        |
| H5SL, H5M, H4SL, H4 Multisensor, H4 PTZ, H4 IR PTZ, H4 Fisheye, H4 Mini Dome, H4ES, and H4 Thermal cameras | Yes  | Yes      | Yes        |
| H4 Thermal Elevated Temperature Detection (ETD) cameras  | Yes  | Yes      | Yes        |
| Avigilon H3, HD and earlier cameras  | Yes  | Yes      | Yes        |
| Fisheye dewarping  | Yes  | Yes      | Yes        |
| Avigilon analog video encoder  | Yes  | Yes      | Yes        |
| Avigilon Presence Detector (APD) sensor  | No   | Yes      | Yes        |
| H4 Video Intercom  | No   | Yes      | Yes        |
| H5 Pro and H4 Pro cameras  | No   | No       | Yes        |
| Avigilon AI Appliance  | No   | No       | Yes        |

| CLIENT   | CORE | STANDARD | ENTERPRISE |
|--|------|----------|------------|
| Video Analytics overlays<br><i>(Next-Generation Video Analytics, Self-Learning Video Analytics, UAD and UMD)</i> | Yes  | Yes      | Yes        |
| Joystick support   | Yes  | Yes      | Yes        |
| ACC Mobile 3 app / Web Endpoint including mobile alarm notifications   | Yes  | Yes      | Yes        |
| Avigilon Cloud Services Web Client   | Yes  | Yes      | Yes        |
| FIPS 140-2 Encryption  | Yes  | Yes      | Yes        |
| Certificate management between ACC Client and Server   | Yes  | Yes      | Yes        |
| Emergency privilege override   | Yes  | Yes      | Yes        |
| Two-factor authentication  | Yes  | Yes      | Yes        |
| Password strength meter  | Yes  | Yes      | Yes        |
| Light and dark interface themes  | Yes  | Yes      | Yes        |
| Editable Site View   | Yes  | Yes      | Yes        |
| Multi-camera export with optional password protection  | Yes  | Yes      | Yes        |
| Hourly configurable recording schedule   | Yes  | Yes      | Yes        |
| Saved views  | No   | Yes      | Yes        |
| Maps with configurable icons and camera thumbnail previews   | No   | Yes      | Yes        |
| Integrated web page bookmarking and display  | No   | Yes      | Yes        |
| Focus of Attention interface   | No   | No       | Yes        |
| Active Directory integration   | No   | No       | Yes        |
| Intelligent Virtual Matrix   | No   | No       | Yes        |
| Collaborative investigations   | No   | No       | Yes        |
| Multi-camera privacy blurred export from Avigilon Appearance Search results                                      | No   | No       | Yes        |

| SEARCH  | CORE | STANDARD | ENTERPRISE |
|---|------|----------|------------|
| UAD and UMD timeline filtering with Skip Play | Yes  | Yes      | Yes        |
| Intelligent motion search                     | Yes  | Yes      | Yes        |
| Thumbnail search                              | Yes  | Yes      | Yes        |
| Event search                                  | Yes  | Yes      | Yes        |
| Point-of-sale (POS) transaction search        | No   | Yes      | Yes        |
| Avigilon Appearance Search technology         | No   | No       | Yes        |
| Alarm search                                  | No   | No       | Yes        |
| License plate event search                    | No   | No       | Yes        |

| ACC INTEROPERABILITY WITH ACM SYSTEMS | CORE | STANDARD | ENTERPRISE |
|---------------------------------------|------|----------|------------|
| Door and panel input event triggers   | No   | Yes      | Yes        |
| Door access grants                    | No   | Yes      | Yes        |
| Shared operator access                | No   | Yes      | Yes        |
| ACM Identity Verification             | No   | Yes      | Yes        |
| ACM Identity Search                   | No   | Yes      | Yes        |

| ADD-ON MODULES AND INTEGRATIONS                     | CORE | STANDARD | ENTERPRISE |
|---|------|----------|------------|
| POS transaction engine                              | No   | Yes      | Yes        |
| Avigilon developed and supported integrations       | No   | Yes*     | Yes        |
| Third party system integrations                     | No   | Yes      | Yes        |
| License Plate Recognition with multiple match lists | No   | No       | Yes        |
| Face Recognition with multiple watch lists          | No   | No       | Yes        |

\*CommScope® iPatch®, RS2 Access It!®, DDS Amadeus 5 and DSX only

| ADDITIONAL FEATURES   | CORE | STANDARD | ENTERPRISE |
|---|------|----------|------------|
| System and motion event e-mail notifications  | Yes  | Yes      | Yes        |
| Two person authenticated recorded video viewing                                       | Yes  | Yes      | Yes        |
| Camera replacement  | Yes  | Yes      | Yes        |
| Central station notifications including ANSI/SIA DC-09-2013                           | No   | Yes      | Yes        |
| Digital input email trigger   | No   | Yes      | Yes        |
| Manual digital output trigger   | No   | Yes      | Yes        |
| Audio recording and output  | No   | Yes      | Yes        |
| APD™ event trigger  | No   | Yes      | Yes        |
| Next-Generation Video Analytics and Self-Learning Video Analytics event configuration | No   | Yes      | Yes        |
| Camera standby / privacy mode   | No   | Yes      | Yes        |
| Avigilon AI Appliance analytics configuration   | No   | No       | Yes        |
| Redundant recording   | No   | No       | Yes        |
| Failover connections  | No   | No       | Yes        |
| ACC Client alarm notifications and escalation   | No   | No       | Yes        |
| One-time Video Archive  | No   | Yes      | Yes        |
| Tiered Storage Management with Continuous Archive                                     | No   | No       | Yes        |

For the latest list of integrations and add-ons supported by Avigilon Control Center software, visit [avigilon.com](http://avigilon.com).

# System Requirements

## Note:

- Run Windows Update before launching Avigilon Control Center (ACC) software.
- NVR recording throughput and retention times can vary according to the number of cameras, camera resolution, estimated percent of motion, continuous recording settings and predefined retention period.
- For best-in-class performance, choose an **Avigilon Certified Solution**.

## ACC Client Software

### AVIGILON CERTIFIED SOLUTIONS

|   | DISPLAY MODEL NUMBER | KEY FEATURES  |
|---|----------------------|---|
| 2 Monitor Professional High Performance Remote Monitoring Workstation | RM6-WKS-2MN          | <ul style="list-style-type: none"><li>• Preactivated with ACC Client software.</li><li>• Supports high resolution monitors.</li><li>• Includes the adapters and accessories for quick deployment.</li><li>• Avigilon warranty and support included.</li></ul> |
| 4 Monitor Professional High Performance Remote Monitoring Workstation | RM6-WKS-4MN          |   |

| SYSTEM REQUIREMENTS | MINIMUM  | RECOMMENDED                                 |
|---------------------|--|---|
| Operating System    | Windows 8.1 (64-bit) or Windows 10 (64-bit)<br>Microsoft .NET 4.6.2  | Windows 10 (64-bit)<br>Microsoft .NET 4.6.2 |
| Processor           | Intel® dual-core CPU (2.0 GHz)<br>Streaming SIMD Extensions 2 (SSE2) | 8th Generation Intel Celeron® CPU or higher |
| System RAM          | 4 GB DDR3  | 8 GB DDR4                                   |
| Video Card          | PCI Express, DirectX 10.0 compliant with 256 MB RAM                  | NVIDIA® Quadro P620                         |
| Network Interface   | 1 Gbps   | 1 Gbps                                      |
| Hard Disk Space     | 500 GB   | 500 GB                                      |

## ACC Server Software

### AVIGILON CERTIFIED SOLUTIONS

|              | DISPLAY MODEL NUMBER   | KEY FEATURES  |
|--------------|--|---|
| NVR Premium  | NVR4X-PRM-64TB / 96TB / 128TB / 157TB / 192TB / 217TB  | <ul style="list-style-type: none"><li>• Optimized for video security applications in a 24/7/365 environment</li><li>• ACC Server software is preinstalled, configured and enhanced for optimal system compatibility</li><li>• Certified for the Avigilon video security environment - ACC software, LPR, Web Endpoint, Analytics, HDSM and 1-30MP cameras</li><li>• High throughputs of up to 1800 Mbps</li><li>• Documented network architecture for a wide variety of applications</li><li>• Avigilon warranty and support included</li><li>• Access to Avigilon System Design Tool (SDT) to calculate storage requirements</li></ul> |
| NVR Standard | NVR4X-STD-16TB-S16 / 16TB / 24TB-S16 / 24TB / 32TB-S16 / 32TB / 48TB-S16 / 48TB  |   |
| NVR Value    | NVR4-VAL-6TB / 12TB / 18TB / 24TB  |   |
| AI NVR       | AINVR-PRM-PLUS-64TB / 96 TB / 128 TB / 160 TB<br>AINVR-PRM-64TB / 96 TB / 128 TB / 160 TB<br>AINVR-STD-24TB / 32 TB / 48TB<br>AINVR-VAL-6TB / 12TB |   |

| SYSTEM REQUIREMENTS | MINIMUM   | RECOMMENDED                                    |
|---------------------|---|--|
| Operating System    | Windows Server 2012 R2, Windows 8.1 (64-bit) or Windows 10 (64-bit), Windows Server 2016, Windows Server 2019 | Windows Server 2016 or Windows 10              |
| Processor           | x86 64 bit dual-core (1.9 GHz)<br>SSE2  | Intel® Xeon® E5 v3 (6 cores, 1.9GHz)           |
| System RAM          | 4 GB DDR3   | 16 GB DDR4                                     |
| Network Interface   | 1 Gbps  | 4 x 1 Gbps                                     |
| Hard Drives         | SATA-II 7200 RPM Enterprise Class Hard Drives   | SATA-III 7200 RPM Enterprise Class Hard Drives |



## ACC Server Workstation

### AVIGILON CERTIFIED SOLUTIONS

|                            | DISPLAY MODEL NUMBER  | KEY FEATURES  |
|----------------------------|---|---|
| HD Video Appliance         | VMA-AS3-8P2 / VMA-AS3-8P4 / VMA-AS3-8P8 / VMA-AS3-16P06<br>VMA-AS3-16P09 / VMA-AS3-16P12 / VMA-AS3-24P12<br>VMA-AS3-24P18 / VMA-AS3-24P24 | <ul style="list-style-type: none"> <li>• Preloaded and configured with ACC software</li> <li>• High-performance recording capacity</li> <li>• Throughputs of up to 400 Mbps</li> <li>• Avigilon warranty and support included</li> <li>• Access to Avigilon System Design Tool (SDT) to calculate storage requirements</li> </ul> |
| ACC ES HD Recorder         | VMA-RPO-4P2 / VMA-RPO-4P4   |   |
| ACC ES Analytics Appliance | VMA-RPA-4P2 / VMA-RPA-4P4   |   |
| ACC ES 8-Port Appliance    | VMA-ENVR1-8P4 / VMA-ENVR1-8P8   |   |
| NVR4X Workstation          | NVR4X-WKS-4TB / NVR4X-WKS-8TB   |   |

| SYSTEM REQUIREMENTS | MINIMUM   | RECOMMENDED                                |
|---------------------|---|--|
| Operating System    | Windows 8.1 (64-bit) or Windows 10 (64-bit)         | Windows 10 (64-bit)                        |
| Processor           | Intel Quad-core CPU (2.0 GHz) SSE2                  | 8th Generation Intel Celeron CPU or higher |
| System RAM          | 4 GB DDR3   | 8 GB DDR4                                  |
| Network Interface   | 1 Gbps  | 1 Gbps                                     |
| Video Card          | PCI Express, DirectX 10.0 compliant with 256 MB RAM | NVIDIA Quadro P620                         |
| Hard Drives         | SATA-II 7200 RPM Hard Drives                        | SATA-III 7200 RPM Hard Drives              |

## Avigilon Appearance Search Technology and Face Recognition

Avigilon Appearance Search technology and Face Recognition require the ACC Analytics Service to be installed on the same computer as the ACC Server software and must meet the listed system requirements:

### AVIGILON CERTIFIED SOLUTIONS

|   | DISPLAY MODEL NUMBER  | KEY FEATURES  |
|---|---|---|
| AI NVR  | AINVR-PRM-PLUS-64TB / 96TB / 128TB / 160 TB<br>AINVR-PRM-64TB / 96TB / 128TB / 160TB<br>AINVR-STD-24TB / 32 TB / 48TB<br>AINVR-VAL-6TB / 12TB | Security-hardened NVR that provides server-side analytics for connected third-party and non-analytic cameras. |
| Analytics Kit for Avigilon Appearance Search Software | HD-NVR-ANK2-1   | Tested and verified to provide enough processing power to run Avigilon Appearance Search feature.             |

| SOFTWARE SYSTEM REQUIREMENTS | APPEARANCE SEARCH ONLY  | APPEARANCE SEARCH AND FACE RECOGNITION  |
|------------------------------|---|---|
| NVIDIA GPU Requirements      | <ul style="list-style-type: none"> <li>• 4 GB RAM</li> <li>• NVIDIA Turing™, NVIDIA Pascal™ or NVIDIA Maxwell™ architecture</li> <li>• CUDA compute capability 7.5, 6.1 or 5.2</li> <li>• Windows x86_64 Driver Version 451.48 or above (462.31 if Turing)</li> </ul> | <ul style="list-style-type: none"> <li>• 4 GB RAM</li> <li>• NVIDIA Turing™ architecture, NVIDIA T1000 video card, NVIDIA Pascal™ architecture or NVIDIA Quadro P1000 video card</li> <li>• CUDA compute capability 7.5 or 6.1</li> <li>• Windows x86_64 Driver Version 451.48 or above (462.31 if Turing)</li> </ul> |

## ACC Mobile 3 Software

ACC Mobile version 3 is available for the listed device platforms and requires the ACC Web Endpoint service. The ACC Web Endpoint service comes pre-installed on the AI NVR, ACC ES HD Recorder, ACC ES Analytics Appliance and ACC ES 8-Port Appliance. For NVR systems and HD Video Appliances, it should be installed on the same server as the ACC Server software.

|           | ANDROID                      | IOS   |
|-----------|------------------------------|---|
| Platforms | Android version 6.0 or later | iPad with iOS 11 or later<br>iPhone with iOS 11 or later<br>iPod touch with iOS 11 or later |
| Processor | n/a                          | 64-bit (Apple A7 or later)  |

Some images of the product interface have been simulated for illustrative purposes.

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Jan 2022 — Rev 10



## RFP Scope of Service Included

Per the RFP instructions, Iteris included Section IV of the RFP on the following pages.

## **SECTION IV**

### **SCOPE OF SERVICES**

#### **A. PRIMARY IMPLEMENTATION SERVICES:**

##### **Task 1: Project Management**

Project management will be ongoing throughout the duration of the Project in both the Primary Implementation Phase (Task 1) and Ongoing Monitoring and Maintenance Phase (Task 9). This task includes day-to-day Project management, such as meetings, progress reports, tracking of schedules, invoicing and overall administration of the Project. The Project management team will be comprised of City personnel, Partner Agency representatives and the selected Proposer.

Project management costs shall be split between the two Project phases. Project management for the Primary Implementation Phase is Task 1 and for Ongoing Monitoring and Maintenance Phase is Task 9.

The following lists a minimum of what is required of Project management:

1. The selected Consultant for the Project shall prepare a detailed budget, schedule and estimates for all tasks, providing specific Project milestones for review and approval by the City. These items shall be detailed and include expected meetings, activities (by work task, whether performed by Consultant team or by others), start dates, activity durations, product submittal dates, relationships among work tasks (including critical path items), and a detailed Gantt chart for the Project tasks, and float time.
2. Consultant shall lead two Project Kick-Off Meetings with all applicable parties.
  - a. The first meeting will be to kick-off the Project with the City: establish communication channels and protocols, discuss the scope of work, schedule, and budget, gather available information, and obtain a thorough understanding of the goals for the Project. Specific topics to discuss include data collection needs, Traffic Signal Timing Optimization software programs, and construction considerations and required/optional procurement methodologies, intent of the original application and allowances or variants in design engineering, and Project schedule. Administrative items to be discussed will include contact persons and secondary contacts for different functions of the Project. Invoicing and reporting with explanations on how to provide monthly information on prime, sub-consultant, and vendor expenses on the invoice submittal will be discussed.
  - b. The second meeting will be with the Consultant, City, and Partner Agencies that have signalized intersections along the Project. The focus of this meeting shall be to identify specific goals and develop effective strategy to accomplish them. Consultant shall prepare an agenda to discuss critical tasks and schedule of work and a memorandum to document the Project goals and strategy. Data collection needs and requirements shall be outlined to the Partner Agencies. Consultant shall notify each agency of the type of work, and when the work is to be performed within that agency. Consultant shall notify each Partner Agency of any and all documents that need to be produced pertaining to the construction of the facilities and the coordination, including but not limited to: as-built drawings, new Plans, Specifications and Estimates (PS&E) for new construction related to this Project,

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intersection timing charts, existing Synchro models, aerial photos, Average Daily Traffic (ADT) and Turning Movement Counts (TMC) data, etc.

3. Consultant shall organize and lead Project meetings as directed by City to include Consultant staff, City, Partner Agencies and other Project-related participants. The purpose of these meetings will be to ensure that proper input is being received and included in the work effort by Consultant and City.
  - a. Consultant shall prepare agendas, provide status updates, discuss the progress and direction of the work, and provide notes of these meetings as directed by City to all relevant parties. These meetings will also serve to provide regarding specific issues of the effort, including facilitating the development of measures of effectiveness, and constructability reviews.
  - b. At a minimum, one meeting per month for the Primary Implementation Phase (Task 1) should be scheduled and budgeted. Consultant shall evaluate Project needs and propose the appropriate discussion sessions to properly facilitate the Project. During the Ongoing Monitoring and Maintenance Phase (Task 9), meetings shall be on an as-needed basis. Consultant shall anticipate at least one kick-off meeting for the Ongoing Monitoring and Maintenance phase to discuss scope and schedule.
  - c. Consultant will be responsible for documentation of all Project meetings with the City. Meeting minutes with action items shall be distributed within five (5) working days to all attendees.
4. Consultant shall attend and be an active presenter, as requested, at the OCTA-led OCTA Traffic Forum, updating the group on the effort, and its status. The Traffic Forum is a semi-annual forum envisioned to further communication and information exchange between OCTA and the local agencies regarding traffic signal synchronization and intelligent traffic system.
5. Consultant may be requested to prepare and present the Project at two public forum meetings for the City of Yorba Linda: City Council and/or Traffic Commission.
6. Consultant shall create and maintain a file-sharing portal that shall be used for all Project correspondence, file transfer, and schedule management. Platform shall be approved by the City prior to implementation. All email correspondence shall include the City as a recipient.
7. Consultant shall keep a running record of Project cost broken down by task and sub-task. Project costs attributed to each Partner Agency shall be identified, tracked and included in this cost record. This information may be requested by the City at any time. The Project cost record shall be actively maintained on the file-sharing portal for Project files.
8. Consultant shall also keep a running record of all scope changes and/or any deviations from awarded contract. This information will be used by the City to request for Scope Changes at the Semi-Annual Review (SAR). This information may be requested by the City at any time. The record of Project changes shall be actively maintained on the file-sharing portal for Project files.
9. Consultant shall submit monthly invoices in an acceptable format. Each invoice shall include a detailed progress report for the reporting month, all third-party invoices, schedule, and other backup documentation as requested by the City. Each invoice shall clearly identify the tasks worked on and percent complete. All costs accrued shall be broken down by task. All supporting documents for costs accrued shall be submitted as back-up. When

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applicable, the task, associated progress and costs shall be broken out and tracked by Partner Agency.

10. Consultant shall be familiar with all relevant OCTA Project delivery and documentation requirements, including, but not limited to Comprehensive Transportation Funding Programs (CTFP) Guidelines, Project P, and Measure M2. Consultant shall develop Project schedule to ensure satisfying Project delivery timelines; and advise City of all applicable OCTA requirements. Consultant shall prepare, coordinate, and submit all necessary reporting and close-out documentations in compliance with OCTA requirements on behalf of the City. The Consultant shall manage the Project to ensure the CTFP Guidelines and funding deadlines are met.
11. Consultant shall perform required coordination among Project team, lead agency, participating agencies, Caltrans and OCTA.
12. Consultant shall coordinate with Caltrans for execution of cooperative agreements with Partner Agencies for implementation of Project improvements and signal synchronization at Caltrans operated intersections. Consultant shall refine scope and responsibility and coordinate Project efforts in the Caltrans operated intersections. Caltrans cooperative agreement fees will be paid by the City with proper documentation.
13. Consultant shall coordinate with City and Partner Agencies to verify all software preferences being used in the various tasks and deliverables, including software versions and compatibility for each agency.

**Task 1 Deliverables:**

1. Organize and lead Project Kick-off Meetings and prepare agendas and meeting materials.
2. Draft and Final Detailed budget and schedule.
3. Monthly progress reports, including detailed status of the work effort, outlook, issues/solutions, and updated schedule shall be e-mailed to the City and Partner Agencies.
4. Attend all coordination meetings and prepare meeting materials, including agenda, action items, graphics, presentation aides, and notes/minutes.
5. Attend OCTA Traffic Forum meetings (as requested) and prepare meeting materials, graphics, presentation aides, and notes.
6. Retain and provide electronic versions of all data files as directed by the City.
7. Prepare graphics and presentation aides required for all meetings.
8. All documents provided in electronic form should be those currently used by the City: Microsoft Office and PDF files.
9. All electronic data produced for the Project shall be provided on a flash drive.
10. Monthly invoices in a format acceptable to the City, shall include all third-party invoices and other supporting documentation as requested by the City.
11. All reporting and close-out documentations in compliance with OCTA requirements and any applicable regulatory agency.

**Task 2: Data Collection**

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Consultant will collect data necessary to thoroughly understand existing traffic conditions in the study area, develop a concept of operations and develop optimal time-of-day traffic signal coordination plans for specific zones and traffic generators as applicable. At a minimum, Consultant shall collect the following data:

1. Consultant shall collect any existing timing charts/sheets, existing coordination plans, as-built/record drawings, aerial photos, maps, traffic collision data, and collision diagrams for the study intersections, if available. Consultant shall be responsible for any and all documentation reproduction, as necessary.
2. Consultant shall consult with the City and Partner Agencies on signal timing and signal priority preferences, including, but not limited to, those related to pedestrian, equestrian and bicycle timing, phase sequence modifications and preferences, and special operations such as change in clearance intervals, coordination preferred phase re-service, and ring-barrier logic, as well as the timing optimization software preferences.
3. Consultant shall conduct seven-day 24-hour Average Daily Traffic (ADT) counts with vehicle and bike classification counts to determine heavy vehicle (Buses and Trucks) percentage information. The vehicle classification categories shall correspond to the latest Federal Highway Administration (FHWA) vehicle class categories. Include proposed peak period and durations for AM peak, mid-day peak, PM peak, and weekend peak. All count locations and day will be approved by the City and Partner Agencies prior to collection.
4. Consultant shall conduct weekday and weekend peak period intersection turning movement (ITM) counts at each and every one of the Project signalized intersections, including pedestrian and bicycle counts. ITM counts shall be conducted, with approval of City and Partner Agencies for weekday and weekend peak periods. Peak periods can be estimated to last for two hours of each weekday peak period (AM, mid-day, and PM ) and a single four-hour Saturday mid-day peak period. Consultant shall consult with Project team to determine if additional ITMs are necessary to account for special events and/or special generators. The proposed day/time for ITM counts shall be approved by the City and Partner Agencies prior to collection.
5. All counts shall be summarized in Microsoft Excel format. All data shall adhere to the CTFP Guidelines for data compatibility. Counts shall also be summarized in a Comma Separated Values (CSV) file in the Universal Traffic Data Format (UTDF) for direct volume import into Synchro (latest version) by peak period. Copies of the raw data count sheets shall also be provided.
6. Consultant shall field measure all advanced loops to the stop bar and compare to the latest California Manual of Uniform Traffic Control Devices (MUTCD) guidelines to calculate appropriate extension time. Submit all measurements and calculations in Microsoft Excel format to the City and Partner Agencies for review.
7. Consultant shall use the latest California MUTCD guidelines to field measure all crosswalks for all intersections. Submit all measurements and calculations in Microsoft Excel format to the City and Partner Agencies for review.
8. Consultant shall use the latest California MUTCD guidelines to measure and calculate bicycle timing for all movements. Submit all measurements in AutoCAD format and calculations in Microsoft Excel format to the City and Partner Agencies for review.
9. Consultant shall coordinate with Partner Agencies and include an identification of all planned and programmed improvements (widening projects, intersection improvements,

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etc.) as well as planned developments on the Project corridor or on intersecting corridors or streets that might affect the Project. The identification of these projects should be at minimum a list summarizing all improvements.

10. Consultant shall also investigate factors that are expected to affect signal progression including, but not limited to: intersections with high pedestrian or bicyclist volumes; over-saturated intersections; uneven lane distribution; high volumes of trucks and buses; schools; high-volume un-signalized intersections, including interchanges; parking maneuvers; presence and location of bus stops; differing signal timing patterns; etc.

**Task 2 Deliverables:**

1. Prepare a report summarizing the findings of the data collection completed in Task 2. This report is to be incorporated in the Primary Implementation Project Report (Task 8).
2. Electronic versions of all data files, organized and compiled in a logical manner.

**Task 3: Field Review and Plans, Specification and Estimates**

Consultant shall identify and attribute Task 3 costs to each Partner Agency. For duration of Task 3, all costs shall be tracked accordingly. Cost and work scope for Task 3 in the City of Anaheim are not part of this RFP. See cost proposal instructions in Section 9 for more information.

**Sub-Task 3.1 Field Review**

Consultant will review any and all relevant information related to traffic signal operations and equipment, including the geometric layout, existing traffic signal equipment, and signal synchronization related infrastructure to identify any deficiencies for each intersection and along the Project corridor. The review shall include an assessment of the existing intersection geometry, traffic conditions, traffic signal control equipment, and telemetry/interconnect facilities along the corridor and of each intersection using observation, available as-built plans, consultation with the local agencies, and supplied aerial photos. Based on the initial assessment by the Partner Agencies and with their respective permission, Consultant shall inspect the interior of each traffic control cabinet, inspect the telemetry and ethernet systems to determine their respective condition and make recommendations for equipment upgrades. Key components of the Project corridor review shall include, at a minimum, the following:

1. Corridor lane configurations;
2. Existing street and lane geometries, curbs, bus turnouts, and medians;
3. Existing signal operation characteristics – signal phasing, cycle lengths, phase sequence alteration, protective-permissive, etc.;
4. Crossing arterial coordination operations;
5. Crossing arterial or street with adjacent intersections;
6. All traffic control devices related to traffic signal operations at all Project intersections, approaches to cross streets, and along the Project corridor;
7. Traffic signal control device information, such as type of device, brand and make, and condition of equipment. Open each controller cabinet and take digital photos of all existing equipment. Intersection photographic documentation log of existing equipment condition shall be required;

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8. Necessary configuration and parameters, such as advanced loop distances and detector channel assignments, for Automated Traffic Signal Performance Measures (ATSPM);
9. Existing controller and telemetry/ethernet interconnect equipment, if any. Note if to be reused;
10. Existing time-referencing setup, if any;
11. Existing Central Master Equipment;
12. Existing Field Master equipment or peer-to-peer operation, if any. Note if to be reused and modified, salvaged and/or new;
13. Note any deficiencies of traffic control equipment at each intersection; and
14. Note the maintenance condition or existence of the traffic signal equipment, controllers and synchronization related infrastructure.

With the view of enhancing, and improving the traffic operations along this corridor, Consultant shall identify any deficiencies of the existing traffic signal control and telemetry infrastructure and geometric layout, and provide recommendations towards solutions that may be implemented to correct such deficiencies.

**Sub-Task 3.1 Deliverables:**

1. Prepare a report summarizing the findings and recommendations of the field review. This report is to be incorporated in the Primary Implementation Project Report (Task 8).
2. Electronic versions of all data files, organized and compiled in a logical manner.

**Sub-Task 3.2 Plans, Specification and Estimate**

Consultant shall prepare a set of plans, specification and estimate (PS&E) for the implementation of Project improvements to be accomplished through a competitive bid process. The specific improvements required as a part of this Project are outlined in the Project application to OCTA (Appendix 4). The improvements include but are not limited to: traffic signal controllers, controller cabinets, traffic signal improvements, communication equipment, Traffic Management Center (TMC) upgrades, Closed Circuit Television Cameras (CCTV) and Intelligent Transportation System (ITS) equipment and elements.

Consultant shall prepare one PS&E package, containing improvements for all Partner Agencies. The bid package shall be organized such that each agency's requirements, standards and specifications are incorporated. The bid package will be advertised by the City for construction. Consultant will ensure timely coordination and preparation of PS&E package to ensure City and Partner Agency review.

As described in Task 4, Synchronization System Construction, Consultant shall provide Bid Support and Construction Engineering and Management services for the Project. Consultant shall produce final As-Built record drawings.

At a minimum, Consultant shall:

- Conduct all required utility research and coordination for Project, including ownership, information requests, preliminary notices and final notices. Consultant shall identify any required relocations.
- Survey existing conditions to locate existing improvements. Survey data collection should extend outside Project limits sufficiently to plot joins to existing improvements, verification



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of unimpeded intersection sight distance triangles, and others. All survey data shall be located in the California state plane horizontal coordinate system, North American Datum 1983 and North American Vertical Datum 1988 and their latest adjustments/epochs.

- Existing right-of-way limits and easements shall be identified and shown. Any required temporary construction easements shall be identified.
- Prepare and submit permit applications to each regulatory agency required for plan approvals. Permit application fees will be paid by the City with proper documentation. Anticipated permits:
  - Encroachment permit from Caltrans
  - No-fee encroachment permits for work within each Partner Agency's right-of-way.
- Coordinate with Southern California Edison (SCE) for design of new or upgraded services. SCE design and installation fees shall be paid by the Consultant and reimbursed by the City with proper documentation. Consultant shall coordinate to ensure any required fees have been paid in time for relevant construction activities to begin.
- Prepare PS&E package for 60%, 90% and Final level of design.
- Plans shall be prepared using owning Agency CAD standards and in the latest version of AutoCAD or Microstation software.
- Coordinate review of PS&E with each Partner Agency, within jurisdiction, at each level of design. All comments shall be tracked and addressed at each subsequent level of design.
- Comply with all laws, rules and regulations concerning environmental permitting.

### **Sub-Task 3.2 Deliverables**

1. Utility coordination documents and records, including all letters of requests, responses, as-built drawings, utility logs, Preliminary and Final Notices.
2. All permit application submittals and final issued permits.
3. Plans, specifications and estimates for 60% and 90% level design, in both hard copy and electronic copy format. Copies of each level of design shall be provided to each Partner Agency.
4. SCE approved final plans for new or upgraded services and relevant invoices.
5. Review Comment and Resolution tracking log, in Excel format.
6. Original files of the PS&E for each level of design (60%, 90% and Final), including AutoCAD or Microstation files, Word and Excel files.
7. Any design and quantity calculations.
8. Final PS&E package, signed and stamped by a California Licensed Professional Engineer. Final PS&E package shall be in both electronic and hard copy. Electronic file shall be in PDF format. Hard copy shall include one full size (36"x24") set of plans, on mylar for City records. Hard copy specifications shall be GBC bound. Copies of Final design shall be provided to each Partner Agency.

### **Task 4: Synchronization System Construction**

The timeline for Project construction is outlined in the following section, Tentative Project Schedule. Consultant is expected to provide bidding and construction management services. Such services include, but are not limited to, responding to Contractor questions and requests for information, redesign of Project plans due to unforeseen conditions, traffic control plans that may be required, and system integration support services. Task 7 costs shall be attributed to each Partner Agency



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and tracked accordingly. Cost and work scope for Task 4 in the City of Anaheim are not part of this RFP. See cost proposal instructions in Section 9 for more information.

**Sub-Task 4.1: Bid Support**

The Consultant shall provide assistance during the bidding phase, including, but not limited to, pre-proposal meetings, responding to requests for information (RFIs), issuing addenda, and bid analyses.

**Sub-Task 4.2: Construction Engineering and Management**

Consultant shall provide professional construction management services, including inspection coordination, quality control, Critical Path Method (CPM) schedule management, utility coordination, and administration services during construction. Work shall be performed in accordance with City of Yorba Linda standards of practice.

Consultant shall respond to all requests for information (RFIs), review shop drawing and material submittals, plans, and any other Project related documents. Consultant shall assist the City with reviewing and negotiating proposed Construction Change Orders.

Consultant is expected to support the Project Construction Contractor with system integration (including, but not limited to installing/implementing and integrating all hardware and software) during the construction phase of the Project. Consultant is expected to coordinate with the Construction Contractor, for installing and/or integrating new traffic signal controllers and cabinets, communication hardware, communication equipment, ITS equipment, etc.

During construction, each Partner Agency will provide construction inspection services for those components subject to that agency's inspection. Construction management services, at a minimum, include the following:

Construction Phase:

1. Arrange and conduct Pre-Construction meeting, inviting the Project Manager, Inspector, public utilities, private entities, general contractor and other Project stakeholders. Prepare minutes of Pre-Construction meeting for distribution to all attendees.
2. Provide and maintain sufficient field personnel to administer and manage construction contract.
3. Review construction schedule, including activity sequences and duration, schedule of submittals and delivery schedule of long lead materials and equipment. Review contractor's update and revisions as may be required to reflect actual progress of work.
4. Schedule and conduct progress meetings to discuss contract issues, procedures, progress, problems, change orders, submittals, request for information (RFIs), deficiencies and schedules. Prepare minutes of progress meetings for distribution to all attendees.
5. Coordinate construction inspection.
6. Investigate field problems affecting property owners and contractors.
7. Process, review and coordinate with City and Partner Agencies to approve contractor's submittals
8. Process, review and track RFIs, submittals, shop drawings, proposed change orders and revisions.

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9. Review and evaluate proposed change orders. Review estimates for reasonableness and cost effectiveness and render recommendations to City. Conduct negotiations with contractors and resolve problems.
10. Maintain cost accounting records on authorized work performed under contract unit costs and additional work performed based on actual costs of time (labor) and materials (T&M).
11. Review contractor submittals for extra or unforeseen work. Review potential Construction Change Orders (CCO) for accuracy and provide recommendation(s) to City staff for proper course of action and processing of CCOs.
12. Develop a reasonable cost control system, including regular monitoring of actual costs for activities in progress and estimates for uncompleted tasks and proposed changes.
13. Assist City in coordinating services of other consultants that may be hired or selected for the Project.
14. Respond to contractor's requests for interpretation or clarification of meaning and intent of Project plans and specifications.
15. Establish and implement job safety procedures in compliance with CAL-OSHA requirements. Monitor contractor's compliance with established safety program, respond to deficiencies and hazards, and investigate and report on accidents.
16. Track quantities of work completed for progress payments. Develop and implement procedures for review and processing of progress payment applications. Assist City with review and certification for payment.
17. Establish procedures and monitor contractor compliance with state prevailing wage regulations and requirements.
18. Assist City in preparing and processing reimbursements.
19. Maintain a complete Project filing system, including records of all changes and field notes. Filing system shall be in accordance with City procedures.

Post-Construction Phase:

1. Evaluate completion of work and recommend to City and Partner Agencies when work is ready for final inspection.
2. Conduct final inspection/walk through with agency staff.
3. Coordinate with Inspector final punch list, including schedule for punch list completion. Monitor and follow through with contractor until completion of all punch list items.
4. Secure and transmit required guarantees, certifications, affidavits, leases, easement deeds, operating & maintenance manuals, warranties and other documents as stipulated in contract documents.
5. Secure and provide neat and orderly material sheets, inspection reports,
6. Review and process contractor's request for final payment and release of retention.

**Sub-Task 4.3: As-Built Records**

At the conclusion of construction contract, produce As-Built record drawings in both electronic and hard copy format of all improvements. The electronic copy shall include both original file format (AutoCAD) and PDF. Hard copy shall include one full size (36"x24") set of plans, on mylar for City records and one set on bond paper. A copy of both formats (electronic and hard copy) shall be provided to each Partner Agency.

**Task 4 Deliverables:**

1. Response to RFIs, Addenda and Bid Analyses as a result of Bid Support.
2. Construction engineering and management records and files, including, but not limited to:

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- a. Pre-Construction meeting agenda and notes
  - b. Construction progress meeting minutes and notes
  - c. Submitted shop drawings and materials submittals and subsequent reviews and responses
  - d. Contractor correspondence
  - e. Contract change order requests, calculations, estimates and documentation
  - f. Compilation of all relevant inspection reports and photos
  - g. Tracking of quantities of work completed and progress payments records and calculations
  - h. Guarantees, certifications, affidavits, leases, easement deeds, operating & maintenance manuals, warranties and other documents as stipulated in contract documents
  - i. Electronic versions of all files, organized and compiled in a logical manner.
3. Final As-Built record drawings in both hard copy and electronic format; provided to each Partner Agency.

#### **Task 5: Corridor “Before” Study**

Consultant shall conduct “Before” floating car travel runs prior to timing implementation. Between three (3) to five (5) runs shall be completed in each direction for each of the peak periods. For weekday timing plans, this includes AM, mid-day, and PM peak periods. For weekend timing plan, this includes Saturday mid-day peak period. The number of runs shall be consistent for both directions and time periods. Consultant shall notify and receive approval from City and Partner Agencies on number of runs to be accomplished prior to commencement of data collection.

1. Consultant will prepare a “Before” field study report representative of the peak times and days for which synchronization plans will be developed. The report shall identify Measures of Effectiveness (MOE) to evaluate the effects of the synchronization plans. MOEs shall include traffic flow, travel time, average speed, number of stops per mile, number of intersections traversed on green vs. stopped by red (Greens per Red) per the OCTA MOE, Corridor Synchronization Performance Index (CSPI). Other MOEs shall include fuel consumption reduction, pollution reduction, and other pertinent items. Consultant shall collect data or analytics from Partner Agencies with Automated Traffic Signal Performance Measures (ATSPM) as part of the “Before” study. This report is to be incorporated in the Primary Implementation Project Report (Task 8).

Consultant shall prepare two (2) synchronized videos of “Before” and “After” (Task 7) condition, one for AM peak and one for PM peak. The videos shall be synchronized to show side by side of the “Before” and “After” run. The videos are to be used by City and Partner Agencies for presentation purposes.

#### **Task 5 Deliverables:**

2. “Before” Study report.
3. Electronic versions of all data files, organized and compiled in a logical manner.

## **Task 6: Signal Timing Optimization and Implementation**

Consultant shall develop synchronized timing for the AM peak, PM peak, mid-day peak, and weekend mid-day peak periods. Special generators such as schools and businesses along with cross street traffic, will be considered. Crossing arterial projects that have recently been timed shall be considered as part of the Project.

Please note that any offset signal that was included in the application is expected to undergo the same signal timing tasks (basic timing review, counts, model in Synchro, optimization, implementation, and O&M). Before/after study is the only tasks that would not be necessary. However, depending on the status of these offset signals, the level of effort may not be the same. It would be good to show the level of effort put into these offset signals even if it ends up being free operation due to their size and traffic

### **Sub-Task 6.1: Proposed Network Modeling**

Consultant shall develop signal timing based on field observation of existing conditions and the data obtained from previous tasks. Synchro will be utilized to perform timing analysis and generate the network model. Existing coordination parameters will also be checked in network modeling to provide smooth progression at crossing arterial intersections.

Consultant shall develop network modeling timing plans and time-space-diagrams for each period – AM peak period, midday peak period, PM peak period, and weekend peak period for City of Yorba Linda and Partner Agencies intersections. Time-space-diagrams shall be horizontal and to scale, labeled with cycle lengths, offset locations, phase directions and values, design speeds, and green bands. Evaluate the possibility of partitioning network into sub- systems. Provide cycle evaluation analysis for each time period and sub-system. Attempt to minimize impact to progression across sub-systems. Pedestrian and bicycle timings should be included in the optimized model. Consultant shall implement appropriate Macro/Micro search optimization steps based on the practices of each Participating Agency.

Consultant shall evaluate the signal timing and coordination parameters to optimize coordination timing using:

- Modified Phase Sequence Rotation
  - Lead/Lead
  - Lead/Lag
  - Leading and lagging the same phase within a given cycle (re-servicing)
- Harmonic cycling – double or half
- Other innovative techniques upon approval of the owning agency

The submittal will include electronic version for the City's and Partner Agencies' review and approval. Submit Draft Network Model and Cycle Evaluation three weeks after turning counts are approved by the relevant Partner Agency. Cycle Evaluation should be presented in table format for each peak period and sub-system. A re-submittal will be required within two weeks of the receipt of the relevant Partner Agency comments. Each Partner Agency will provide existing phasing configuration and timing parameters. All time-space diagrams shall be optimized using Tru-Traffic .

Upon final approval of the network model, the timing plans shall be converted and organized in tables in accordance with NEMA phase and sequence. Submit two weeks after each Partner Agency approves the optimal cycle. A re-submittal with corrections will be required within two weeks of the receipt of Partner Agency's comments.

Consultant shall determine and use the versions of Synchro and Tru-Traffic that is compatible with all Partner Agencies.

**Sub-Task 6.1 Deliverables:**

1. Proposed Synchro with optimized timing parameters.
2. Proposed Tru-Traffic with optimized timing parameters.
3. Draft Network Modeling Technical Memorandum.
4. Final Network Modeling Technical Memorandum.
5. Implementation-ready timing sheets summarizing optimized timing parameters and plans

**Sub-Task 6.2: New Timing Implementation**

Consultant shall implement signal timing plans to coordinate the traffic signals on the Project corridor.

For all Project intersections, Consultant shall coordinate with each owning agency in the development and implementation of new timing plans.

For Caltrans locations, Consultant shall coordinate with Caltrans in the implementation of optimized timing plans.

Consultant shall implement approved timing plans at each Partner Agency's Traffic Management Center or at the local controller. Timing plan development should consider optimization of delay, progression saturation flow rate and lost time.

Consultant will contact and work with other Partner Agencies affected by the Project and will coordinate efforts with concurrent cross street projects to achieve mutually acceptable results.

**Sub-Task 6.2 Deliverables:**

1. Implementation-ready timing sheets summarizing optimized timing parameters and plans.

**Sub-Task 6.3: Optimize Signal Timing**

Consultant shall implement and fine-tune the timing plans. Consultant shall verify the implemented timing plans by performing field checks and keep City and Partner Agency staff informed in writing of the implementation progress.

Upon completion of Implementation Phase, Consultant shall incorporate all changes and re-submit Synchro files, Tru-Traffic files, timing plans and tables with final implemented data.

**Sub-Task 6.3 Deliverables:**

1. Final optimized Synchro files
2. Final optimized Tru-Traffic files

### **Task 7: Corridor “After” Study**

Consultant shall conduct “After” floating car travel runs after timing implementation. Between three (3) to five (5) runs shall be completed in each direction for each of the peak periods. For weekday timing plans, this includes AM, mid-day, and PM peak periods. For weekend timing plan, this includes Saturday mid-day peak period. The number of runs shall be consistent for both directions and time periods. Consultant shall notify and receive approval from City and Partner Agencies on number of runs to be accomplished prior to commencement of data collection.

1. Consultant will conduct an “After” field study representative of the peak times and days for which synchronization plans will be developed. The “After” study must be conducted in the same manner and contain the same MOEs as the “Before” study described in Task 5 in order to evaluate the improvements of the synchronization plans. The vehicles conducting the “After” study shall not exceed the design speeds shown in the final time-space-diagrams and Task 7 deliverables below. MOEs should be compiled for the optimized corridor using the floating car method. Consultant shall collect data or analytics from Partner Agencies with Automated Traffic Signal Performance Measures to complement both the before and after studies. This report is to be incorporated in the Primary Implementation Project Report (Task 8).

Consultant shall prepare two synchronized videos of “Before” (Task 5) and “After” condition, one for AM peak and one for PM peak. The videos shall be synchronized to show side by side of the “Before” and “After” run. The videos are to be used by City and Partner agencies for presentation purposes.

#### **Task 7 Deliverables:**

1. “After” Study report.
2. Electronic versions of all data files, organized and compiled in a logical manner.
3. Two (2) synchronized videos showing “Before” and “After” runs for AM and PM peaks.
4. All Trip Logs gathered during the “After Runs” shall be plotted accurately on the final time-space-diagrams.

### **Task 8: Primary Implementation Project Report**

Using the data, information and analyses gathered in the previous tasks, Consultant will develop a Primary Implementation Project Report. This report will provide an analysis of the “Before” and “After” studies for the Project identifying signal coordination benefits. The report will be completed after the Primary Implementation is completed and will include the following:

- **Introduction/Project description:** a summary of the Project including the purpose, background, and objectives of the Project.
- **Data collection:** a summary of the data collected as part of the effort including the traffic counts, phasing, lane configurations, etc.

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- **Traffic signal systems improvements:** a summary of the implemented traffic signal systems improvements by the Project.
- **Signal timing optimization:** a summary of the development and implementation of updated signal timing including the models, selected cycle lengths, intersection groupings, etc.
- **Results:** the study will contain directional morning, mid-day, evening, and weekend peak periods using travel times, average speeds, green lights to red lights, stops per mile, and the derived Corridor Synchronization Performance Index (CSPI) metric. This information shall be collected both before and after any signal timing changes have been made. Additional details based on the Final Report Template will also be included.
- **Benefits to cost analysis:** Project benefits resulting from signal synchronization will be evaluated based on the “Before” and “After” study results. Savings will be calculated for travel time, fuel consumptions, vehicle maintenance, Greenhouse Gas (GHG) reduction, and a final benefit cost ratio.
- **Future signal corridor improvements:** recommendations for system and equipment enhancements to improve traffic flow and signal synchronization will be provided.
- **Conclusion:** a summary of the “Before” and “After” study and its findings.

**Task 8 Deliverables:**

1. Primary Implementation Project Report.

**ONGOING MONITORING AND MAINTENANCE SERVICES:**

**Task 9: Ongoing Monitoring and Maintenance Project Management**

Consultant shall provide continuous Project management for the duration of the Ongoing Monitoring and Maintenance Phase. Project management during this Phase, at a minimum, includes monthly status reports, tracking of schedules, invoicing, coordination between agencies and overall administration of the Project. Consultant shall provide Project close-out documentation, as needed, for completion of the project. See Task 1 Project Management in Section IV of this RFP for additional description of Project management activities.

**Task 10: Ongoing Monitoring and Maintenance (OMM)**

Consultant shall provide “on-call” signal timing support services **for a period of 24 months following the complete closeout and all payments made for the Primary Implementation phase**, to address any future adjustments that may be needed during this period. During this 24-month period, Consultant will be prepared to review any Project intersection requested within 24 hours of written notice, including observing and fine-tuning the signal timing. Consultant will also assist with resolving communications and detection issues along the corridor.

**Sub-Task 10.1: Monitoring and Improving Optimized Signal Timing**

Consultant will drive the length of the Project arterial during all designated corridor synchronization timing plan hours of operation **on a monthly basis** in order to verify that the synchronization timing is working as designed, and complete any necessary adjustments.

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Monthly driving times will consist of a full 12-hour weekday and a 4-hour Saturday. All drives shall be documented. Consultant shall collect data or analytics from Partner Agencies with ATSPM as part of monitoring and improving optimized signal timing.

**Sub-Task 10.2: Communication and Detection Support**

Consultant will coordinate with respective agencies to monitor, maintain, and repair communication and detection for 24 months after signal timing is implemented along Project corridor including offset signals.

**Sub-Task 10.3: Ongoing Monitoring and Maintenance Memo**

Consultant will prepare an Ongoing Monitoring and Maintenance (OMM) memorandum to summarize the Ongoing Monitoring and Maintenance phase, including details on when travel runs were conducted; issues and solutions throughout the phase; and recommendations for future improvements.

**Task 10 Deliverables**

1. Summary of drives completed and ATSPM data collected in Sub-Task 10.1 and resulting findings and adjustments on a monthly basis. A copy, limited to jurisdictional boundaries, shall also be sent to each Partner Agency.
2. Draft and final OMM memorandum.
3. Electronic versions of all files, organized and compiled in a logical manner.

**B. MISCELLANEOUS**

Selected Consultant shall provide insurance documents per the attached checklist prior to contract award. Consultant shall ensure insurance companies used are admitted to conduct insurance business along the lines of insurance supplied in the State of California and have a Best Guide rating of Grade A or better and Class VII or better.

The City shall coordinate, prepare and execute a cooperative agreement with Caltrans for Caltrans operated signals along the Project corridor. Consultant shall assist the City with execution of Caltrans cooperative agreement, including but not limited to coordination and scope refinement.

The City recognizes that the Consultant in their preparation of a response to this RFP may have other ideas to improve the efficiency, safety, cost effectiveness or resiliency of the project beyond what is outlined in this RFP. Based on the Project understanding and goals, the Consultant may provide optional tasks that will enhance the performance and delivery of the project in the most efficient and effective manner. Optional tasks presented by the Consultant shall be cognizant of the overall project schedule and budget. For every optional task, the Consultant shall provide an explanation of additional enhancement, efficiency or cost savings to the Project along with a detailed scope of work, timeline, estimated not-to-exceed cost for each item, and deliverables.

Additional work items are not required, and thus a Consultant will not be penalized for not proposing any optional tasks.



### **C. STANDARDS OF WORK**

CONFLICTS / DESIGN EXCEPTIONS. In case of conflict, ambiguities, discrepancies, errors, or omissions, Consultant shall submit the matter to City for clarification. Any work affected by such conflicts, ambiguities, discrepancies, errors or omissions which is performed by Consultant prior to clarification by City shall be at Consultant's risk and expense.

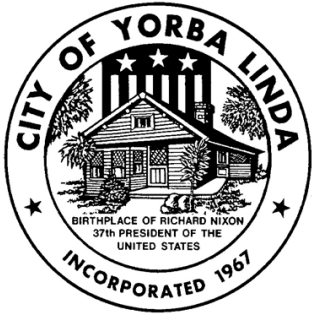
DELIVERABLE DOCUMENTS. Deliverables shall be prepared in English units and in conformance with the latest editions of applicable standards.

REFERENCE MATERIALS. The Consultant shall make use of additional reference material as appropriate. Consultant shall also be responsible for ensuring the most recent version of all reference materials are used, including any addenda and errata.

## **EXHIBIT B**

### **SCHEDULE OF COMPENSATION**

Payment shall be on a “Fixed Fee” basis in accordance with the Consultants Schedule of Compensation attached herewith as Exhibit “B-2” for the work tasks performed in conformance with Section 2.2 of the Agreement. Total compensation for all work under this contract shall not exceed **One Million Two Hundred Seventeen Thousand Nine Hundred Fifty-One and 98/100 Dollars (\$1,217,951.98)** except as specified in Section 1.2 - Changes and Additions to Scope of Services of the Agreement.



COMPENSATION/PAYMENT FEE SCHEDULE



| Prime Consultant Team - PROJECT FEE BY TASK BY PERSONNE       |   | LABOR/PERSONNEL COSTS         |                         |                      |                            |                  |                    |                    |             |                  |              |                  |            |            |                                |                                  |                               |                            | OTHER                                  |                                   |                                   |   |                                 |                                 |                                       |   |       |  |
|---|---|-------------------------------|-------------------------|----------------------|----------------------------|------------------|--------------------|--------------------|-------------|------------------|--------------|------------------|------------|------------|--------------------------------|----------------------------------|-------------------------------|----------------------------|--|-----------------------------------|-----------------------------------|---|---------------------------------|---------------------------------|---------------------------------------|---|-------|--|
| Task/Phase No.  | Task Description  | ITERIS                        |                         |                      |                            |                  |                    |                    |             | AET              |              |                  |            |            | LLG                            |                                  |                               |                            | TOTAL HOURS<br>ITERIS PRIME CONSULTANT | TOTAL HOURS<br>AET SUB CONSULTANT | TOTAL HOURS<br>LLG SUB CONSULTANT | TOTAL FEE<br>Iteris Prime Consultant Name | TOTAL FEE<br>AET Sub Consultant | TOTAL FEE<br>LLG Sub Consultant | TOTAL FEE<br>Other Reimbursable Costs | TOTAL PROJECT FEE<br>(Labor and Direct Costs) |       |  |
|   |   | Project Manager               | Principal - In - Charge | Senior Advisor QA/QC | Task Lead/ Senior Engineer | Project Engineer | Associate Engineer | Assistant Engineer | Admin Staff | Sr. Professional | Professional | Jr. Professional | Analyst II | Analyst II | Senior Transportation Engineer | Senior Signal Systems Specialist | Senior Transportation Planner | Transportation Engineer II |  |                                   |                                   |   |                                 |                                 |                                       |   |       |  |
|   |   | Burdened Hourly Rate PI Phase | \$250.00                | \$383.00             | \$270.00                   | \$255.00         | \$166.00           | \$138.00           | \$120.00    | \$164.00         | \$265        | \$225            | \$195      | \$165      | \$150                          | \$189                            | \$189                         | \$184                      |  |                                   |                                   |   |                                 |                                 |                                       |   | \$155 |  |
|   | Burdened Hourly Rate O&M Phase  | \$265.00                      | \$421.00                | \$296.00             | \$280.00                   | \$182.00         | \$152.00           | \$132.00           | \$180.00    | \$-              | \$-          | \$-              | \$-        | \$-        | \$-                            | \$-                              | \$-                           | \$-                        |  |                                   |                                   |   |                                 |                                 |                                       |   |       |  |
| TASK 1: PROJECT MANAGEMENT                                    |   |                               |                         |                      |                            |                  |                    |                    |             |                  |              |                  |            |            |                                |                                  |                               |                            |  |                                   |                                   |   |                                 |                                 |                                       |   |       |  |
|   | Project Meetings  | 6                             | 2                       | 2                    | 8                          |                  |                    |                    |             |                  |              |                  |            |            |                                |                                  |                               |                            | 18                                     | 0                                 | 0                                 | \$ 4,846.00                               | \$ -                            | \$ -                            | \$ 100.00                             | \$ 4,946.00                                   |       |  |
|   | Coordination and Meetings   | 120                           | 4                       | 4                    | 40                         | 40               |                    |                    | 10          |                  |              |                  |            |            |                                |                                  |                               |                            | 218                                    | 0                                 | 0                                 | \$ 51,092.00                              | \$ -                            | \$ -                            | \$ 100.00                             | \$ 51,192.00                                  |       |  |
|   | SUBTOTAL  | 126                           | 6                       | 6                    | 48                         | 40               | 0                  | 0                  | 10          | 0                | 0            | 0                | 0          | 0          | 0                              | 0                                | 0                             | 0                          | 236                                    | 0                                 | 0                                 | \$ 55,938.00                              | \$ -                            | \$ -                            | \$ 200.00                             | \$ 56,138.00                                  |       |  |
| TASK 2: DATA COLLECTION                                       |   |                               |                         |                      |                            |                  |                    |                    |             |                  |              |                  |            |            |                                |                                  |                               |                            |  |                                   |                                   |   |                                 |                                 |                                       |   |       |  |
|   | Data Collection and QC  | 6                             |                         | 8                    | 20                         | 20               | 50                 | 50                 |             |                  |              |                  |            |            |                                |                                  |                               |                            | 154                                    | 0                                 | 0                                 | \$ 24,980.00                              | \$ -                            | \$ -                            | \$ 300.00                             | \$ 25,280.00                                  |       |  |
|   | TRAFFIC COUNT(AimTD)  |                               |                         |                      |                            |                  |                    |                    |             |                  |              |                  |            |            |                                |                                  |                               |                            | 0                                      | 0                                 | 0                                 | \$ -                                      | \$ -                            | \$ -                            | \$ 70,611.00                          | \$ 70,611.00                                  |       |  |
|   | Data Collection Report  | 10                            |                         | 2                    |                            |                  | 40                 | 40                 |             |                  |              |                  |            |            |                                |                                  |                               |                            | 92                                     | 0                                 | 0                                 | \$ 13,360.00                              | \$ -                            | \$ -                            |                                       | \$ 13,360.00                                  |       |  |
|   | SUBTOTAL  | 16                            | 0                       | 10                   | 20                         | 20               | 90                 | 90                 | 0           | 0                | 0            | 0                | 0          | 0          | 0                              | 0                                | 0                             | 0                          | 246                                    | 0                                 | 0                                 | \$ 38,340.00                              | \$ -                            | \$ -                            | \$ 70,911.00                          | \$ 109,251.00                                 |       |  |
| TASK 3: FIELD REVIEW AND PLANS, SPECIFICATIONS, AND ESTIMATES |   |                               |                         |                      |                            |                  |                    |                    |             |                  |              |                  |            |            |                                |                                  |                               |                            |  |                                   |                                   |   |                                 |                                 |                                       |   |       |  |
| Sub-Task 3.1  | Field Review  | 4                             |                         |                      | 16                         | 16               | 140                | 140                |             | 12               |              |                  |            |            | 35                             | 40                               |                               |                            | 316                                    | 12                                | 75                                | \$ 43,856.00                              | \$ 3,180.00                     | \$ 14,175.00                    | \$ 300.00                             | \$ 61,511.00                                  |       |  |
| Sub-Task 3.2  | Plans, Specification and Estimate   | 16                            |                         | 8                    | 60                         | 60               | 300                | 300                |             | 36               | 84           | 120              | 80         | 45         | 145                            | 80                               | 36                            | 80                         | 744                                    | 365                               | 341                               | \$ 108,820.00                             | \$ 71,790.00                    | \$ 61,549.00                    | \$ 100.00                             | \$ 242,259.00                                 |       |  |
|   |   |                               |                         |                      |                            |                  |                    |                    |             |                  |              |                  |            |            |                                |                                  |                               |                            | 0                                      | 0                                 | 0                                 | \$ -                                      | \$ -                            | \$ -                            |                                       | \$ -  |       |  |
|   | SUBTOTAL  | 20                            | 0                       | 8                    | 76                         | 76               | 440                | 440                | 0           | 48               | 84           | 120              | 80         | 45         | 180                            | 120                              | 36                            | 80                         | 1,060                                  | 377                               | 416                               | \$ 152,676.00                             | \$ 74,970.00                    | \$ 75,724.00                    | \$ 400.00                             | \$ 303,770.00                                 |       |  |
| TASK 4: SYNCHRONIZATION SYSTEM CONSTRUCTION                   |   |                               |                         |                      |                            |                  |                    |                    |             |                  |              |                  |            |            |                                |                                  |                               |                            |  |                                   |                                   |   |                                 |                                 |                                       |   |       |  |
| Sub-Task 4.1  | Bid Support   | 20                            |                         |                      | 20                         |                  | 20                 | 30                 |             |                  |              |                  |            |            | 5                              | 20                               |                               |                            | 90                                     | 0                                 | 25                                | \$ 16,460.00                              | \$ -                            | \$ 4,725.00                     | \$ 50.00                              | \$ 21,235.00                                  |       |  |
| Sub-Task 4.2  | Construction Engineering and Management Support (Includes Integration Services) | 20                            | 2                       | 4                    | 80                         | 220              | 220                | 220                |             |                  |              |                  |            |            | 5                              | 60                               | 15                            | 20                         | 766                                    | 0                                 | 100                               | \$ 120,526.00                             | \$ -                            | \$ 18,145.00                    | \$ 300.00                             | \$ 138,971.00                                 |       |  |
| Sub-Task 4.3  | As-Built Records  | 10                            |                         |                      | 14                         |                  | 30                 | 40                 |             |                  |              |                  |            |            | 5                              | 20                               |                               |                            | 94                                     | 0                                 | 25                                | \$ 15,010.00                              | \$ -                            | \$ 4,725.00                     | \$ 100.00                             | \$ 19,835.00                                  |       |  |
|   | SUBTOTAL  | 50                            | 2                       | 4                    | 114                        | 220              | 270                | 290                | 0           | 0                | 0            | 0                | 0          | 0          | 15                             | 100                              | 15                            | 20                         | 950                                    | 0                                 | 150                               | \$ 151,996.00                             | \$ -                            | \$ 27,595.00                    | \$ 450.00                             | \$ 180,041.00                                 |       |  |
| TASK 5: CORRIDOR "BEFORE" STUDY                               |   |                               |                         |                      |                            |                  |                    |                    |             |                  |              |                  |            |            |                                |                                  |                               |                            |  |                                   |                                   |   |                                 |                                 |                                       |   |       |  |
|   | Travel Time Studies   | 4                             |                         |                      |                            | 40               | 68                 | 68                 |             |                  |              |                  |            |            |                                |                                  |                               |                            | 180                                    | 0                                 | 0                                 | \$ 25,184.00                              | \$ -                            | \$ -                            | \$ 600.00                             | \$ 25,784.00                                  |       |  |
|   |   |                               |                         |                      |                            |                  |                    |                    |             |                  |              |                  |            |            |                                |                                  |                               |                            | 0                                      | 0                                 | 0                                 | \$ -                                      | \$ -                            | \$ -                            |                                       | \$ -  |       |  |
|   | SUBTOTAL  | 4                             | 0                       | 0                    | 0                          | 40               | 68                 | 68                 | 0           | 0                | 0            | 0                | 0          | 0          | 0                              | 0                                | 0                             | 0                          | 180                                    | 0                                 | 0                                 | \$ 25,184.00                              | \$ -                            | \$ -                            | \$ 600.00                             | \$ 25,784.00                                  |       |  |
| TASK 6: SIGNAL TIMING OPTIMIZATION AND IMPLEMENTATION         |   |                               |                         |                      |                            |                  |                    |                    |             |                  |              |                  |            |            |                                |                                  |                               |                            |  |                                   |                                   |   |                                 |                                 |                                       |   |       |  |
| Sub-Task 6.1  | Proposed Network Modeling   | 80                            | 6                       |                      | 60                         | 80               | 140                | 280                |             |                  |              |                  |            |            |                                |                                  |                               |                            | 646                                    | 0                                 | 0                                 | \$ 103,798.00                             | \$ -                            | \$ -                            | \$ 200.00                             | \$ 103,998.00                                 |       |  |
| Sub-Task 6.2  | New Timing Implementation   | 80                            | 6                       |                      | 60                         | 80               | 200                | 280                |             |                  |              |                  |            |            |                                |                                  |                               |                            | 706                                    | 0                                 | 0                                 | \$ 112,078.00                             | \$ -                            | \$ -                            | \$ 400.00                             | \$ 112,478.00                                 |       |  |
| Sub-Task 6.3  | Optimize Signal Timing  | 60                            | 4                       |                      | 40                         | 40               | 80                 | 120                |             |                  |              |                  |            |            |                                |                                  |                               |                            | 344                                    | 0                                 | 0                                 | \$ 58,812.00                              | \$ -                            | \$ -                            | \$ 200.00                             | \$ 59,012.00                                  |       |  |
|   | SUBTOTAL  | 220                           | 16                      | 0                    | 160                        | 200              | 420                | 680                | 0           | 0                | 0            | 0                | 0          | 0          | 0                              | 0                                | 0                             | 0                          | 1,696                                  | 0                                 | 0                                 | \$ 274,688.00                             | \$ -                            | \$ -                            | \$ 800.00                             | \$ 275,488.00                                 |       |  |
| TASK 7: CORRIDOR "AFTER" STUDY                                |   |                               |                         |                      |                            |                  |                    |                    |             |                  |              |                  |            |            |                                |                                  |                               |                            |  |                                   |                                   |   |                                 |                                 |                                       |   |       |  |
|   | Travel Time Studies   | 4                             |                         |                      |                            | 40               | 68                 | 68                 |             |                  |              |                  |            |            |                                |                                  |                               |                            | 180                                    | 0                                 | 0                                 | \$ 25,184.00                              | \$ -                            | \$ -                            | \$ 600.00                             | \$ 25,784.00                                  |       |  |
|   | SUBTOTAL  | 4                             | 0                       | 0                    | 0                          | 40               | 68                 | 68                 | 0           | 0                | 0            | 0                | 0          | 0          | 0                              | 0                                | 0                             | 0                          | 180                                    | 0                                 | 0                                 | \$ 25,184.00                              | \$ -                            | \$ -                            | \$ 600.00                             | \$ 25,784.00                                  |       |  |
| TASK 8: PRIMARY IMPLEMENTATION REPORT                         |   |                               |                         |                      |                            |                  |                    |                    |             |                  |              |                  |            |            |                                |                                  |                               |                            |  |                                   |                                   |   |                                 |                                 |                                       |   |       |  |
| Sub-Task 8.1  | Draft Report  | 6                             | 1                       | 1                    | 32                         | 32               | 32                 |                    |             |                  |              |                  |            |            |                                |                                  |                               |                            | 104                                    | 0                                 | 0                                 | \$ 20,041.00                              | \$ -                            | \$ -                            | \$ 50.00                              | \$ 20,091.00                                  |       |  |
| Sub-Task 8.2  | Final Report  | 2                             | 1                       | 1                    | 16                         | 24               | 24                 |                    |             |                  |              |                  |            |            |                                |                                  |                               |                            | 68                                     | 0                                 | 0                                 | \$ 12,529.00                              | \$ -                            | \$ -                            | \$ 50.00                              | \$ 12,579.00                                  |       |  |
|   | SUBTOTAL  | 8                             | 2                       | 2                    | 48                         | 56               | 56                 | 0                  | 0           | 0                | 0            | 0                | 0          | 0          | 0                              | 0                                | 0                             | 0                          | 172                                    | 0                                 | 0                                 | \$ 32,570.00                              | \$ -                            | \$ -                            | \$ 100.00                             | \$ 32,670.00                                  |       |  |
| TASK 9: ONGOING MONITORING AND MAINTENANCE PROJECT MANAGEMENT |   |                               |                         |                      |                            |                  |                    |                    |             |                  |              |                  |            |            |                                |                                  |                               |                            |  |                                   |                                   |   |                                 |                                 |                                       |   |       |  |
|   | Project Coordination and Meetings (O&M)   | 16                            |                         |                      | 12                         | 8                |                    |                    | 14          |                  |              |                  |            |            |                                |                                  |                               |                            | 50                                     | 0                                 | 0                                 | \$ 11,576.00                              | \$ -                            | \$ -                            | \$ 100.00                             | \$ 11,676.00                                  |       |  |
|   | SUBTOTAL  | 16                            | 0                       | 0                    | 12                         | 8                | 0                  | 0                  | 14          | 0                | 0            | 0                | 0          | 0          | 0                              | 0                                | 0                             | 0                          | 50                                     | 0                                 | 0                                 | \$ 11,576.00                              | \$ -                            | \$ -                            | \$ 100.00                             | \$ 11,676.00                                  |       |  |
| TASK 10: ONGOING MONITORING AND MAINTENANCE SERVICES          |   |                               |                         |                      |                            |                  |                    |                    |             |                  |              |                  |            |            |                                |                                  |                               |                            |  |                                   |                                   |   |                                 |                                 |                                       |   |       |  |
| Sub-Task 10.1   | Monitoring and Improving Optimized Signal Timing                                | 8                             | 2                       |                      | 24                         | 64               | 260                | 260                |             |                  |              |                  |            |            |                                |                                  |                               |                            | 618                                    | 0                                 | 0                                 | \$ 95,170.00                              | \$ -                            | \$ -                            | \$ 2,000.00                           | \$ 97,170.00                                  |       |  |
| Sub-Task 10.2   | Communication and Detection Support   | 4                             |                         | 4                    | 80                         | 80               |                    |                    |             |                  |              |                  |            |            | 5                              | 80                               |                               |                            | 168                                    | 0                                 | 85                                | \$ 39,204.00                              | \$ -                            | \$ 16,065.00                    | \$ 200.00                             | \$ 55,469.00                                  |       |  |
| Sub-Task 10.3   | Ongoing Monitoring and Maintenance Memo   | 4                             | 1                       | 1                    | 8                          | 30               | 30                 |                    |             |                  |              |                  |            |            |                                |                                  |                               |                            | 74                                     | 0                                 | 0                                 | \$ 14,037.00                              | \$ -                            | \$ -                            | \$ 100.00                             | \$ 14,137.00                                  |       |  |
|   | SUBTOTAL  | 16                            | 3                       | 5                    | 112                        | 174              | 290                | 260                | 0           | 0                | 0            | 0                | 0          | 0          | 5                              | 80                               | 0                             | 0                          | 860                                    | 0                                 | 85                                | \$ 148,411.00                             | \$ -                            | \$ 16,065.00                    | \$ 2,300.00                           | \$ 166,776.00                                 |       |  |
| PROJECT SUBTOTALS   |   |                               |                         |                      |                            |                  |                    |                    |             |                  |              |                  |            |            |                                |                                  |                               |                            |  |                                   |                                   |   |                                 |                                 |                                       |   |       |  |
|   | PI PHASE SUBTOTAL (Tasks 1-8)   | 448                           | 26                      | 30                   | 466                        | 692              | 1,412              | 1,636              | 10          | 48               | 84           | 120              | 80         | 45         | 195                            | 220                              | 51                            | 100                        | 4,720                                  | 377                               | 566                               | \$ 756,576.00                             | \$ 74,970.00                    | \$ 103,319.00                   | \$ 74,061.00                          | \$ 1,008,926.00                               |       |  |
|   | O&M PHASE SUBTOTAL (Tasks 9 & 10)   | 32                            | 3                       | 5                    | 124                        | 182              | 290                | 260                | 14          | 0                | 0            | 0                | 0          | 0          | 5                              | 80                               | 0                             | 0                          | 910                                    | 0                                 | 85                                | \$ 159,987.00                             | \$ -                            | \$ 16,065.00                    | \$ 2,400.00                           | \$ 178,452.00                                 |       |  |
|   | TOTAL FEE   | 480                           | 29                      | 35                   | 590                        | 874              | 1,702              | 1,896              | 24          | 48               | 84           | 120              | 80         | 45         | 200                            | 300                              | 51                            | 100                        | 5,630                                  | 377                               | 651                               | \$ 916,563.00                             | \$ 74,970.00                    | \$ 119,384.00                   | \$ 76,461.00                          | \$ 1,187,378.00                               |       |  |

Optional Task Pricing

| Optional Task 1. City of Yorba Linda VMS Install |  |     |    |    |     |     |       |       |    |    |    |     |    |    |     |     |    |     |       |     |             |               |              |               |              |                 |
|--|--|-----|----|----|-----|-----|-------|-------|----|----|----|-----|----|----|-----|-----|----|-----|-------|-----|-------------|---------------|--------------|---------------|--------------|-----------------|
|  | Equipment  |     |    |    |     |     |       |       |    |    |    |     |    |    |     |     |    | 0   | 0     | 0   | \$ -        | \$ -          | \$ -         | \$ 19,073.98  | \$ 19,073.98 |                 |
|  | Procurement, Installation, and Integration Labor | 1   |    |    | 38  |     |       |       |    |    |    |     |    |    |     |     |    | 39  | 0     | 0   | \$ 9,940.00 | \$ -          | \$ -         | \$ 1,560.00   | \$ 11,500.00 |                 |
|  | SUBTOTAL   | 1   | 0  | 0  | 38  | 0   | 0     | 0     | 0  | 0  | 0  | 0   | 0  | 0  | 0   | 0   | 0  | 39  | 0     | 0   | \$ 9,940.00 | \$ -          | \$ -         | \$ 20,633.98  | \$ 30,573.98 |                 |
|  | TOTAL FEE including Optional Task                | 481 | 29 | 35 | 628 | 874 | 1,702 | 1,896 | 24 | 48 | 84 | 120 | 80 | 45 | 200 | 300 | 51 | 100 | 5,669 | 377 | 651         | \$ 926,503.00 | \$ 74,970.00 | \$ 119,384.00 | \$ 97,094.98 | \$ 1,217,951.98 |

NOT-TO-EXCEED AGREEMENT AMOUNT = \$1,217,951.98

## **EXHIBIT C**

### **SCHEDULE OF PERFORMANCE**

Consultants Project Schedule is attached and made a part of this agreement. Consultant shall complete services presented within the contained within the project schedule attached as Exhibit "C-2".

# PROJECT SCHEDULE

| TASKS     |                                       |   | 2023 (May 16th, anticipated start date) |     |     |     |     |     |     |     | 2024 |     |     |     |     |     |     |     |     |     |     |     | 2025 |     |     |     |     |     |     |     |     |     |     |     | 2026 |     |     |     |     |     |
|-----------|---------------------------------------|---|---|-----|-----|-----|-----|-----|-----|-----|------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|-----|-----|-----|-----|-----|
|           |                                       |   | May                                     | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Jan  | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Jan  | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Jan  | Feb | Mar | Apr | May | Jun |
| PI Phase  | TASK 1                                | Project Administration                                |   |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |
|           | TASK 2                                | Data Collection                                       |   |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |
|           | TASK 3                                | Field Review and Plans, Specifications, and Estimates |   |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |
|           | 3.1                                   | Field Review for Design                               |   |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |
|           | 3.2                                   | Plans, Specifications and Estimates                   |   |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |
|           | TASK 4                                | Synchronization System Construction                   |   |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |
|           | 4.1                                   | Bid Support   |   |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |
|           | 4.2                                   | Construction Engineering and Management               |   |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |
|           | 4.3                                   | As-Built Records                                      |   |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |
|           | TASK 5                                | Travel Time “Before” Study                            |   |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |
|           | TASK 6                                | Signal Timing Optimization and Implementation         |   |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |
|           | 6.1                                   | Proposed Network Modeling                             |   |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |
|           | 6.2                                   | New Timing Implementation                             |   |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |
|           | 6.3                                   | Optimize Signal Timing                                |   |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |
|           | TASK 7                                | Travel Time “After” Study                             |   |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |
| TASK 8    | Primary Implementation Project Report |   |   |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |
| O&M Phase | TASK 9                                | Ongoing Monitoring and Maintenance Project Management |   |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |
|           | TASK 10                               | Ongoing Monitoring and Maintenance Services           |   |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |
|           | 10.1                                  | Monitoring & Improvement of Optimized Signal Timing   |   |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |
|           | 10.2                                  | Communications & Detection Support                    |   |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |
|           | 10.3                                  | On-Going Operations & Maintenance (O&M) Memo          |   |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |