

I-76: York St. to Dahlia St.
CONSTRUCTION ADMINISTRATION
SCOPE OF WORK

Scope Date: November 2021
Estimated Construction Start Date: May 2022
Region 1

PROJECT NUMBER: NHPP 0761-238
PROJECT CODE: 23668
CMS ID NUMBER:
PROJECT LOCATION: I-76: York St. to Dahlia St.
CONTRACT TYPE: Project Specific, Specific Rate of Pay
CONTRACT SUBJECT: Construction Management, Inspection, and Testing Services

Description and Overview of Project & Required Services

Services are requested to provide Construction Management, Construction Inspection, and Construction Testing to support the referenced CDOT Project as follows.

I-76, York St. to Dahlia St.

NHPP 0761-238 (23668) is scheduled to reconstruct the asphalt pavement sections of roadway starting west of York St. to Dahlia St. with concrete pavement on I-76 for both directions. And, replace the existing bridge structures at I-76 and York St. with a single bridge structure. An auxiliary lane will be added to westbound I-76 between SH-224 and I-270, and a second lane will be added to the westbound I-76 On-Ramp from SH-224 tying to the auxiliary lane. There will be bridge preventative maintenance, such as removal and replacement of expansion devices, SMA, guardrail, and bridge rail, on the bridge structures over the South Platte River, RTD line, and SH-224. Replace guardrail along the project and improve permanent water quality features off the highway. Numerous other ancillary work items including but not limited to: Embankment material, detour paving, base course material, striping, signing, erosion control, traffic control, bridge rail, guard rail, and lighting

The Contract Administrator for this Contract will be:

Thomas Magenis, PE
Resident Engineer – Region 1 North Program
4670 North Holly Street, Unit D
Denver, CO 80216
Office: 303-398-6747
Email: Thomas.Magenis@state.co.us

Active Day to Day administration and monitoring of this contract will be delegated to the following CDOT employee:

Edgar Balderrama, PE
Project Engineer – Region 1 North Program
4670 North Holly Street, Unit D
Denver, CO 80216
Office: 303-398-6756
Email: Edgar.Balderrama@state.co.us

General Requirements

This Scope of Work (SOW) has been carefully reviewed by the Department and reflects a plan of approach based on the known goals. The Consultant's analysis of the project goals, its evaluation of the work elements, and its formulation of the work plan, coupled with its understanding of and sensitivity to the key issues may produce new approaches or modifications to the project's work elements. Therefore, the Final Scope of Work for the project may change in some details to incorporate the Consultant's input. This work is located in Region 1 of the Colorado Department of Transportation.

The positions described herein are anticipated needs. The Department reserves the right to not utilize any of the positions listed if at the time of construction the Department has available resources to staff the project from within.

Definitions

Resident Engineer - The CDOT Resident Engineer is responsible to the Region Program Engineer for the quality and successful completion of a transportation project. The Resident Engineer authorizes interim and final payments and all changes to the contracts for all Consultants and Contractors.

Engineer - The CDOT Project Engineer.

Assistant Project Engineer - The assistant to the CDOT Project Engineer. Responsible for assisting the CDOT Project Engineer and assisting in overseeing the Inspectors and Testers.

Consultant - The individual, firm, or corporation under contract by this agreement to perform construction services as outlined below.

Consultant Professional Engineer – The Consultant's Professional Engineer in responsible charge of Consultant services performed as described in this Contract. The Consultant's Professional Engineer must be licensed in the State of Colorado.

Consultant Office Engineer - The Consultant Office Engineer works under the responsible charge of the Consultant's Professional Engineer. The Consultant Office Engineer, if a Professional

Engineer licensed in the State of Colorado, may be the same person as the Consultant Professional Engineer.

Consultant Senior Inspector - Consultant employee who performs inspections of the Contractors work under the direction of the Assistant Project Engineer and the Project Engineer.

Consultant Lead Materials Testing Technician - Consultant employee who performs material testing and reviews documentation of the Contractors materials for Contract compliance under the direction of the Senior Consultant Inspector and the Project Engineer.

Consultant Materials Testing Technician/Inspector - Consultant employee who performs material testing of the Contractors materials and performs inspections of the Contractors work under the direction of the Consultant Lead Materials Testing Technician, Inspectors, and the Project Engineer.

Consultant Scheduling Specialist – Consultant employee who performs reviews of the Contractor’s schedules and method statements under the direction of the Project Engineer and/or the Assistant Project Engineer.

Consultant Safety Critical Engineer – Consultant employee who performs reviews of the Contractor’s safety critical operations as defined in the plans and under the direction of the Project Engineer and/or the Assistant Project Engineer. The Safety Critical Engineer must be licensed in the State of Colorado.

Contractor - The individual, firm, or corporation under contract with CDOT to construct the facility.

Initial Project Meeting

The Consultant shall meet with CDOT project personnel to coordinate and schedule the required work prior to active construction. The Consultant shall complete all work in accordance with the approved schedule or as approved by the Engineer.

Work Duration

The time for the work described in this scope of work covers the period from Notice to Proceed to November 1, 2024 or 90 days after Final Acceptance of the construction project, whichever is later. For portions of the project, night work will be required. Work will also be required during the day, on weekends, holidays, and/or on a split-shift basis. Workweeks may be in excess of or less than the standard 40-hour week. The number and types of personnel may be adjusted up or down to meet project workload. The Consultant shall meet with the CDOT Project Engineer if it is anticipated that Consultant services may not be required for a period exceeding one week. A procedure shall be agreed upon at the Initial Project meeting to resolve this issue.

Anticipated Construction Schedule: May 2022 to July 2024 (subject to change)

During construction, CDOT anticipates utilizing approximately:

1 Full Time - Consultant Office Engineer,

- 1 Full Time - Consultant Senior Inspector (Structural),**
- 1 Full Time - Consultant Lead Materials Testing Technician,**
- 1 Full Time - Consultant Materials Testing Technician/Inspector,**
- 1 Part Time - As needed Consultant Scheduling Specialist**
- 1 Part Time - As needed Consultant Safety Critical Engineer**

Conditions Applicable to all Consultant Personnel: Overtime / Travel Pay / Commute Miles

Overtime hours are not allowable per State Fiscal Rules. Labor Hours will be billed to CDOT at the same rate as regular, non-overtime hours. Travel time will not be paid for travel to and from the project from permanent or temporary residences. Commuting mileage will only be paid for travel to and from the Consultants/Subconsultant's Front Range office. Mileage for travel while on the project will be paid for at the applicable State rate.

Authorization to Proceed

Work shall not commence until the written Notice to Proceed is received by the consultant, and shall be completed in the time specified.

Routine Billing & Reporting

The consultant shall provide the following on a regular basis:

- Monthly billing reports in formats suitable to the Engineer for all contract activities performed by Consultant personnel authorized to perform work on the project.
- Periodic reports and billings required by CDOT Procedural Directive 400.2.

The consultant shall bear all costs related to delay of construction when the Consultant fails to provide qualified personnel when required. The Consultant's monthly payments may be withheld for that portion of the work for which the consultant personnel fail to provide accurate and timely reporting.

Status of Contract

The consultant shall monitor the fiscal status of the contract, and advise the CDOT Project Engineer of any potential need to supplement their contract. Failure to monitor contract status and provide timely notification may result in discontinuation of the Consultant's services. The invoice shall include monthly status reports per the consultant guidelines and shall include budget information.

Consultant Professional Engineer Requirements:

The Consultant Professional Engineer shall be available during construction and will be utilized as needed to provide engineering guidance and oversight of the Consultant's employees. The number and types of personnel may be adjusted up or down to meet project workload and Contractor's schedule.

The Consultant Professional Engineer shall meet with the CDOT Project Engineer if it is anticipated that Consultant services may not be required for a period exceeding one week. A procedure will be agreed upon at the Initial Project meeting to address this issue.

Consultant Office Engineer Requirements:

Project Standards

The Consultant will provide support to the CDOT Project Engineer through assignment of personnel to construction management. He or she shall be either a Colorado Registered Professional Engineer or non-licensed individual with demonstrable construction administration experience. A non-licensed individual shall be under the direct supervision of a consultant Professional Engineer.

Required Experience

The Consultant Office Engineer shall demonstrate experience in the following:

- CDOT Contract Specifications (Emphasis in Section 100)
- Dispute Resolution Process
- Contract Modification Order Process
- Writing Speed Memos
- SiteManager
- Submittal Reviews
- Budget Tracking
- Project Management

General Work Description

The Consultant Office Engineer shall provide support to the CDOT project staff through assignment of personnel to assist with project management and inspection responsibilities. This position is primarily an “Office Engineer”. Responsibilities include but are not limited to:

Assist the CDOT PE and Construction Engineering Staff in the following Construction activities:

- Assist Project Engineer with coordination of all construction contract activities, assist in the supervision of other project staff and assignment of duties and responsibilities;
- Review, give comments, and acknowledge completeness of required submittals resulting from but not limited to:
 - CDOT 205 Permit to Sublet
 - Method of Handling Traffic
 - Progress Schedule
 - Method Statements
 - All EEO Requirements
 - Materials mix designs
 - Shop and Working Drawings
 - Permits
 - EEO, DBE, OJT and other miscellaneous similar documents
 - Project Safety Management Plan and implementation
 - All Erosion Control SWMP documentation, reporting, inspections, etc.
- Prepare inspection documentation for development of progress payments for the contractor in accordance with prescribed procedures;
- Standing Dispute Resolution Board participation and/or facilitation;
- Maintaining of project files, project diaries and time counts;
- Prepare periodic reports and billings required by CDOT Procedural Directive 400.2;
- Monitor contractor payroll compliance;

- Participate in and ability to facilitate (as necessary) weekly progress meetings with contractor, subcontractors, utilities and other interested parties;
- Secure project documentation from the contractor;
- Anticipate project problems and propose solutions to CDOT Project Engineer;
- Review drawings and data submitted by the construction contractor and suppliers for conformance with the intent of the specifications;
- Obtain concurrence as needed from the CDOT Project Engineer and keep relative documentation for project records;
- Communicate with adjacent landowners and other project stakeholders as required to resolve issues that arise due to construction;
- Monitor compliance with and take appropriate action to preserve safety on the project for all workers and traveling public in accordance with Method of Handling Traffic (MHT);
- Notify contractors and CDOT Project Engineer of non-compliance with the contract plans and specifications;
- Prepare punch lists of uncompleted work, non-conformance reports, and deficiency notices;
- Prepare responses to contractors' and suppliers' requests for information, submittals, change notices, claims, and correspondence;
- Prepare and transmit updates of construction activities to the CDOT Public Information Office;
- Change Orders/MCR – discussions with: Contractor, Area Engineer, RE, Specialties as necessary. Also write CMO and justification letter, prepare package with attachments, price justification/negotiation, form 90, etc.
- Ability to prepare responses to contractors' and suppliers' requests for information, submittals, change notices, claims, and correspondence;
- Monitor Contract Time Count
- Assist and/or prepare entirely partial monthly payment Estimates
- Review/Monitor Schedule (baseline, updates and narrative reviews)
- Budget: track all project financial information, notify RE of any/all budgetary concerns, financial tracking form 65's monthly and with each CMO/MCR
- Weekly meetings (agendas, minutes, preparation, facilitation, etc...)
- Pre-con meetings (agendas, minutes, distribution, preparation, facilitation, etc...)
- Review inspectors work (diaries, 266's, DWR's, calculations, spreadsheets, etc...)
- Respond to citizen complaints and CDOT PR office
- Participate in Traffic Control Reviews
- Prepare complete and accurate DWR's/266's
- SiteManager (all pay items, CMO's/MCRs, time count, diaries, stockpiled materials tracking and payment, monthly pay estimates, overs/unders.)
- Review inspectors work (diaries, 266's, DWR's, calculations, spreadsheets, etc...)
- Erosion control management and oversight, bi-weekly reviews, post-storm event reviews, MARs
- Submittal review and approve and forward to specialties as appropriate for review/approval
- Complete 11"x 17" as-constructed drawings of work completed by the Contractor, including final pay quantities.
- Assist in determining final pay quantities with appropriate supporting documentation and checks.
- Perform miscellaneous project-related duties as requested by the CDOT Project Engineer.

Labor, Materials, Vehicles & Equipment

The Consultant shall provide the Consultant Office Engineer with the following:

- A suitable vehicle equipped with at least one (1) flashing, oscillating, or rotating amber beacon that shall be visible a minimum of five hundred (500) feet in normal sunlight.
- A cellular smart phone.

- A state-of-the-art computer with networking capability sufficient for accessing internet email through a project-supplied internet-service provider. Each computer shall be loaded with MS Office software (Office 365), including MS Word and MS Excel at a minimum. Ability to utilize Google Chrome and its applications, such as Google Drive. Computers shall be capable of running current CDOT software, including Asphalt '03, Voids '03, Site Manager, etc.
- Miscellaneous equipment (calculator, office supplies, safety equipment, etc.) required to perform the work (ASTM Certified Work Boots, ANSI Certified Hardhat (Z89.1 stamp and be High Visibility), Safety Glasses (Z87 stamp on the glasses/goggles) and Approved Safety Vest. (Meeting or exceeding ISEA for Class 3), including all applicable manuals.
- CDOT will provide a field-office space.

Personnel qualifications, staffing level, and number and types of vehicles shall be subject to the approval of the Engineer. The Consultant shall assign personnel for the duration of the Contract unless otherwise approved by the Engineer. Employees required to operate vehicles must possess and maintain a valid State of Colorado driver's license. The Consultant Office Engineer(s) permanently assigned to a project shall be competent in road and bridge construction and be thoroughly familiar with CDOT specifications, manuals, forms, and documentation requirements including SiteManager. The level of qualification provided shall be as requested and approved by the CDOT Resident Engineer. The qualifications for the level(s) shall be commensurate to experience, and are as follows:

1. Consultant Office Engineer – Ten (10) or more years of experience in highway construction project administration with a minimum of five (5) or more years of supervision of consultant inspectors and testers.

A copy of work experience shall be provided to the CDOT Project Engineer before work begins. Personnel provided by the Consultant who do not meet all the specified requirements, or who fail to perform their work in an acceptable manner, shall be removed from the project when determined and directed by the CDOT Project Engineer.

Documentation

Maintain a daily diary for each day they perform work on the project. He/she shall use CDOT's automated Form 103a - Project Diary unless otherwise directed by the Engineer. The contents of the diary shall be brief and accurate statements of progress and conditions encountered during the prosecution of the work, and sketches as needed for clarification and documentation. Editorial comments are not to be incorporated in the diaries or on any written correspondence applicable to the project. A copy of the daily diary shall be available to the CDOT Project Engineer at the end of each workday and a copy shall be filed in the project records within one working day of its date.

Consultant Senior Inspector Requirements (Structural):

Required Experience

The Senior Inspector (Structural) shall demonstrate experience in the following:

- CDOT Contract Specifications (Emphasis in Section 500 and 600)
- Structural Plan Reading Proficiency
- Safety Critical Work
- Excavations
- Deep foundations
- Knowledge of Contractor Construction Methods

General Work Description

The Consultant Senior Inspector shall provide support to the CDOT project staff through assignment of personnel to assist with project management and inspection responsibilities. Responsibilities include but are not limited to:

Assist the CDOT Project Engineer and Construction Engineering Staff in the following Construction activities:

- Coordination of all construction contract activities as assigned by PE;
- Lead, guide and coordinate all inspection activities and oversee, monitor and provide QA on other inspectors and testers work product related to all structural work for the project;
- Review, give comments, and acknowledge completeness of required submittals resulting from but not limited to:
 - CDOT 205 Permit to Sublet
 - Method of Handling Traffic
 - Progress Schedule
 - Method Statements
 - Misc. required project plans (e.g. Safety, EEO, Environmental)
 - All EEO Requirements
- Prepare inspection documentation for development of progress payments for the contractor in accordance with prescribed procedures, review and approve inspection documentation from other inspectors;
- Assist in maintaining of project files, project diaries and time counts;
- Monitor contractor payroll compliance;
- Participate in and ability to facilitate (as needed) weekly progress meetings with contractor, subcontractors, utilities and other project stakeholders;
- Secure project documentation from the contractor;
- Anticipate project problems and propose solutions to CDOT Project Engineer;
- Review drawings and data submitted by the construction contractor and suppliers for conformance with the intent of the specifications;
- Obtain concurrence as needed from the CDOT Project Engineer and keep relative documentation for project records;
- Communicate with adjacent landowners as required to resolve issues that arise due to construction;
- Monitor compliance with and take appropriate action to preserve safety on the project for all workers and traveling public in accordance with Method of Handling Traffic (MHT);
- Monitor compliance with and take appropriate action for all required project permits, including but not limited to: CDPS, MS4, Construction Dewatering, etc.;
- Act as Project lead on Storm Water Erosion Control, act as CDOT designated ECS on Project, perform maintain in CDOT CARL computer system and maintain all SWMP notebooks;
- Notify contractors and CDOT Project Engineer of non-compliance with the contract plans and specifications;
- Prepare punch lists of uncompleted work, non-conformance reports, and deficiency notices;
- Ability to prepare and transmit construction activity updates to the CDOT Public Information Office;
- Perform miscellaneous project-related duties as requested by the CDOT Project Engineer.
- Conduct 280 Interviews in accordance with Davis-Bacon Requirements
- Plan and Spec Interpretation (communications with: designers, bridge, utilities, ROW, Traffic, etc...)
- CDOT to Contractor correspondence (letters, 105's...)
- Project Diary/Weather
- Individual diary
- Payrolls/OJT/DBE/Specialized reporting like (1405's, Faster, ARRA, etc...)

- Form 7's/TC and daily hourly pay items
- Form 10's/FA/CMO/MCR
- Traffic Control – management, oversight, review and approve MHT's
- Prepare complete and accurate DWR's/266's
- SiteManager (all pay items, CMO's/MCRs, time count, diaries, stockpiled materials tracking and payment, monthly pay estimates, overs/unders.)
- Review inspectors work (diaries, 266's, DWR's, calculations, spreadsheets, etc...)
- Erosion control management and oversight, bi-weekly reviews, post-storm event reviews, MARs
- Submittal review and approve and forward to specialties as appropriate for review/approval
- Perform miscellaneous project-related duties as requested by the CDOT Project Engineer.

Labor, Materials, Vehicles & Equipment

The Consultant shall provide the Consultant Senior Inspector with the following:

- A suitable vehicle equipped with at least one (1) flashing, oscillating, or rotating amber beacon that shall be visible a minimum of five hundred (500) feet in normal sunlight.
- Consultant Senior Inspector's vehicle shall be equipped with an electronic distance-measuring device, accurate to within +/- 5 feet per mile.
- A cellular smart phone.
- A state-of-the-art computer with networking capability sufficient for accessing internet email through a project-supplied internet-service provider. Each computer shall be loaded with MS Office software (Office 365), including MS Word and MS Excel at a minimum. Ability to utilize Google Chrome and its applications, such as Google Drive. Computers shall be capable of running current CDOT software, including Asphalt '03, Voids '03, Site Manager, etc.
- Miscellaneous equipment (calculator, office supplies, safety equipment, etc.) required to perform the work (ASTM Certified Work Boots, ANSI Certified Hardhat (Z89.1 stamp and be High Visibility), Safety Glasses (Z87 stamp on the glasses/goggles) and Approved Safety Vest. (Meeting or exceeding ISEA for Class 3), including all applicable manuals.
- CDOT will provide a field-office space.

Personnel qualifications, staffing level, and number and types of vehicles shall be subject to the approval of the Engineer. The Consultant shall assign personnel for the duration of the Contract unless otherwise approved by the Engineer. Employees required to operate vehicles must possess and maintain a valid State of Colorado driver's license. The Consultant Senior Inspector(s) permanently assigned to a project shall be competent in road and bridge construction and be thoroughly familiar with CDOT specifications, manuals, forms, and documentation requirements including SiteManager. The level of qualification provided shall be as requested and approved by the CDOT Resident Engineer. The qualifications for the level(s) shall be commensurate to experience, and are as follows:

2. Consultant Senior Inspector (Structural) – Five (5) or more years of experience specifically related to bridge construction or a minimum construction of three (3) new bridge structures.

A copy of work experience shall be provided to the CDOT Project Engineer before work begins. Personnel provided by the Consultant who do not meet all of the specified requirements, or who fail to perform their work in an acceptable manner, shall be removed from the project when determined and directed by the CDOT Project Engineer.

Documentation

Maintain a daily diary for each day they perform work on the project. He/she shall use CDOT's automated Form 103a - Project Diary unless otherwise directed by the Engineer. The contents of the diary shall be brief and accurate statements of progress and conditions encountered during the prosecution of the work, and sketches as needed for clarification and documentation. Editorial comments are not to be incorporated

in the diaries or on any written correspondence applicable to the project. A copy of the daily diary shall be available to the CDOT Project Engineer at the end of each workday and a copy shall be filed in the project records within one working day of its date.

Consultant Lead Materials Testing Technician (LMTT) and Materials Testing Technician/Inspector (MTTI) Requirements:

Required Experience

The Lead Materials Testing Technician (LMTT) shall demonstrate experience in the following:

- CDOT Processes
- SiteManager/LIMS
- Concrete, soil, and asphalt (sampling, testing, and documenting)

The Materials Testing Technician/Inspector (MTTI) shall demonstrate experience in the following:

- CDOT Processes or Heavy Civil Construction
- Concrete, soil, and asphalt (sampling, testing, and documenting)

It is expected that the MTT/Inspector will be assisting with inspections for approximately 25 to 50 percent of the time when low volume/frequency testing is occurring. Inspection duties will be as a supporting role to the senior inspectors and under their supervision.

Project Standards

All sampling, testing, inspection, and documentation shall be in accordance with the Colorado Department of Transportation (CDOT) Construction Manual, Field Materials Manual, CDOT M&S Standards, and applicable Project and Standard Special Provisions in the construction project contract and the applicable CDOT Standard Specifications for Road and Bridge Construction. The applicable CDOT Manual shall be the one currently in use when the construction project is advertised.

If the required method is not described in the CDOT Field Materials Manual, the required work shall be completed in accordance with:

1. AASHTO Standard Specifications for Transportation Materials and Methods of Sampling and Testing (as revised and supplemented), or
2. The ASTM Standards and Tentatives, in this order.

Proposed work procedures shall be coordinated with the CDOT Project Engineer prior to the start of work.

General Work Description

The Consultant LMTT and MTTI shall sample, test, and document all materials incorporated into the project. This includes materials delivered to the project that are listed in the Summary of Approximate Quantities or referred to in the Plans and Specifications. The number of tests required shall be in accordance with the Schedule in the Field Materials Manual. Additional quantities may be added by Contract Modification Order, or plan approximate quantities may be increased or decreased. The LMTT and MTTI, the Consultant Project Manager, and CDOT's Project Engineer will review project quantities on a weekly basis to ensure that sufficient tests have been performed for all material placed to date. The LMTT will set-up and maintain all materials books and LIMS documentation. At project completion, a registered P.E. will sign the final form #250 for the LMTT's work. The consultant shall also provide any other project-related services requested by the CDOT Project Engineer.

LMTT will have the lead role with regards to testing needs shall supervise and assign the MTTI testing duties.

Testing of materials that are specifically designated to be pre-inspected or pre-tested by this or any other Department of Transportation will remain the responsibility of CDOT. The LMTT or MTTI shall document and transport samples of any and all materials to the CDOT Region or Central Laboratory that are required to be tested by CDOT, regardless of pre-inspection or pre-testing responsibilities. The items and test frequencies of CDOT tested materials shall be in accordance with the column titled "Central Laboratory" in the Schedule in the Field Materials Manual.

The Consultant shall follow the requirements of CP-16 to meet, coordinate and schedule the required work with the Project Engineer, Resident Engineer, and Residency Head Tester. The consultant shall complete all work in accordance with their approved schedule. The consultant materials testing evaluation form shall be completed by the CDOT Project Engineer or Resident Engineer and head tester, and distributed as described in CP-16. The project Engineer shall forward a copy of the completed Pre-Testing Meeting Agenda for Consultant Materials Testing to the Region Materials Engineer.

The Consultant Lead Materials Testing Technician shall be have knowledge of LIMS and shall be thoroughly familiar with CDOT Forms and documentation requirements and have had LIMS training in Site Manager with the ability to enter all materials documentation into Site Manager LIMS program.

The consultant shall sample, test and inspect those specified materials utilized in construction. Other services may be requested in writing by the Project Engineer. Test results and inspection observations shall be documented by the consultant and approved by the Project Engineer in accordance with the references cited above in Project Standards. The materials tester will be responsible for materials sampling, testing, and documentation as directed by the Project Engineer to supplement the project testing staff during peak periods. The materials tester needs to be certified to perform the project sampling and testing in accordance with CDOT requirements. These requirements typically include the following certifications: CDOT Field Tester Certification, LIMS, CAPA levels A&B, ACI field I, and WAQTC, and nuclear gauge operation.

In addition to the tasks identified in **Consultant Materials Lead Testing Technician and Materials Testing Technician/Inspector Requirements**, the MLTT and MTTI shall assist the Project Engineer in performance of construction inspection activities and other project-related activities, as directed by the Project Engineer, when they are not required to perform materials testing related activities. Inspection responsibilities may include but are not limited to those identified in the **Consultant Inspector Requirements** above.

Labor, Materials, Vehicles & Equipment

The Consultant shall furnish the Consultant LMTT and MTTI with the following:

- **Consultant shall provide laboratory facilities for Asphalt Ignition Burn-Off testing and Concrete Compression testing. These facilities shall be separate from the CDOT-supplied Class II field laboratory facilities and shall be located off the construction site, at a permanent materials-testing laboratory facility. Compensation for this equipment and testing will not be paid separately but shall be included in the hourly cost of the LMTT and MTTI assigned to the project.**
- A suitable vehicle equipped with at least one (1) flashing, oscillating, or rotating amber beacon that shall be visible a minimum of five hundred (500) feet in normal sunlight.
- A cellular smart phone.
- A state-of-the-art computer with networking capability sufficient for accessing internet email through a project-supplied internet-service provider. This computer shall be loaded with MS

Office software (2003 version or later), including MS Word and MS Excel at a minimum. Ability to utilize Google Chrome and its applications, such as Google Drive. This computer shall be capable of running current CDOT software, including Asphalt '03, Voids '03, Site Manager LIMS, etc. This computer shall be connected or networked to the Consultant-supplied main project printer/scanner described above, or shall be provided with a separate stand-alone printer.

- Miscellaneous equipment (calculator, office supplies, safety equipment, etc.) required to perform the work (ASTM Certified Work Boots, ANSI Certified Hardhat (Z89.1 stamp and be High Visibility), Safety Glasses (Z87 stamp on the glasses/goggles) and Approved Safety Vest. (Meeting or exceeding ISEA for Class 3) including all applicable manuals.
- CDOT will provide a Class II field laboratory and any required traffic control.

The following equipment shall be furnished along with the LMTT and MTTI for each project in sufficient quantity and in good working order (with current calibration) to ensure accurate performance of all work required in a timely manner. Such equipment and supplies shall remain the property of the consultant.

- Nuclear Asphalt-Content Gauge;
- Nuclear Moisture/Density Gauge;
- Concrete air meter, slump cone, and other concrete testing equipment;
- Sieves for aggregates and soil gradations;
- Electronic scales;
- Asphalt & A/C sample containers and small tools;
- Proctor equipment for soil curves and one point tests;
- Atterburg, Rice value, and Sand Equivalent equipment;
- Sample drying equipment;
- Concrete cylinder molds which meet AASHTO requirements except that paper molds shall not be used, and plastic molds shall not be reused;
- Miscellaneous equipment for performing the required soils, asphalt and concrete tests.
- Ignition Oven for determining asphalt binder content and RAP gradations meeting specifications of CPL 5120.

Personnel qualifications, staffing level, and number and types of vehicles shall be subject to the approval of the Engineer. The LMTT shall be thoroughly familiar with CDOT specification, manuals, forms, and documentation requirements. The LMTT shall be permanently assigned to a project for the duration of the project and shall have the following qualifications:

1. A degree in Engineering from a four year curriculum school or a *National Institute for Certification in Engineering Technology (NICET)* Level II Certification in Construction Materials Testing and Inspection for the types of work being performed, e.g. aggregates, asphalt, concrete, and soils or five (5) years of field testing experience with CDOT construction projects
2. The LMTT performing concrete tests shall be certified by *The American Concrete Institute (ACI)* with ACI - Concrete Field Testing Technician - Grade I and ACI - Concrete Strength Testing Technician
3. The LMTT performing hot bituminous pavement tests shall be Level II, A&B certified by *The Colorado Asphalt Technician Certification Program (LabCAT)*
4. CDOT AASHTOWare SiteManager Training for Materials Management and LIMS
5. WAQTC Embankment & Base Testing Technician
6. CDOT/ACPA Concrete Pavement Inspector Training & Certification
7. In addition, the Consultant LMTT must be certified in the appropriate classes of CDOT's Inspector Qualification Program
8. Traffic control Supervisory class within the last 3 years

The MTTI shall demonstrate knowledge of heavy civil construction experience. The MTTI shall be permanently assigned to a project for the duration of the project and shall have the following qualifications:

1. Two (2) years of field testing experience with CDOT construction projects or three (3) years of field testing experience with heavy civil construction projects
2. The MTTI performing concrete tests shall be certified by *The American Concrete Institute (ACI)* with ACI - Concrete Field Testing Technician - Grade I
3. The MTTI performing hot bituminous pavement tests shall be Level II, A&B certified by *The Colorado Asphalt Technician Certification Program (LabCAT)*
4. WAQTC Embankment & Base Testing Technician
5. CDOT/ACPA Concrete Pavement Inspector Training & Certification

A copy of work experience and proof of Certification, Degree, and/or License shall be provided to the CDOT Project Engineer before work begins. Personnel provided by the consultant who do not meet all of the specified requirements, or who fail to perform their work in an acceptable manner, shall be removed from the project when determined and directed by the CDOT Project Engineer.

Documentation

The LMTT and MTTI shall maintain a daily diary for each day the LMTT and MTTI performs work on the project. The LMTT and MTTI shall use CDOT's automated Form 103a - Project Diary, or other form directed by the Engineer. The contents of the diary shall be brief and accurate statements of progress and conditions encountered during the prosecution of the work, and sketches as needed for clarification and documentation. Editorial comments are not to be incorporated in the diaries or on any written correspondence applicable to the project. A copy of the daily diary shall be available to the CDOT Project Engineer at the end of each workday.

Test results and sample submittals transmitted to CDOT's Region or Central Laboratory shall be recorded on appropriate CDOT Forms. The LMTT and MTTI may use CDOT worksheets or worksheets approved by the CDOT Project Engineer. CDOT Forms and worksheets are available through the CDOT Project Engineer.

The LMTT shall furnish the CDOT Project Engineer with original copies of all worksheets and test results on a daily basis. The LMTT shall also keep the CDOT Form 626 up to date at all times and provide copies of this form to the CDOT Project Engineer within 12 hours. The CDOT Project Engineer shall be informed immediately of any non-specification material. At the discretion of the CDOT Project Engineer, the MTT may also be required to provide the CDOT Form 626 to the contractor within 12 hours for any non-specification material.

The LMTT shall provide all correspondence and applicable CDOT forms to the CDOT Project Engineer or his authorized representative for review and signature.

The LMTT and MTTI shall also be capable of performing project inspection duties as necessary, during periods of high inspection demand or low material testing demand or a combination thereof.

Assurance Sampling and Testing

The MTT shall coordinate the schedule of the Independent Assurance Tests (IAT) for the project with the Region Materials Section in accordance with the CDOT Form 379. Advance notice of 48 hours is required for proper coordination.

Submittal of Final Documentation

Final documentation shall be submitted to the CDOT Project Engineer within 30 working days after completion of all work. A completed CDOT Form 250 shall be submitted to the CDOT Project Engineer 10 days after the consultant has been notified of final quantities. Failure to submit final documentation as required will result in withholding of consultant payments.

Consultant Scheduling Specialist Requirements

General Work Description

The Scheduling Specialist shall be responsible for analyzing the contractor's schedule in accordance with the requirements of the construction contract on CDOT's behalf. The Contractor's progress schedule along with the weekly three-week "look ahead" schedule will be reviewed on a weekly basis. In addition, the Consultant CPM Schedule Expert will provide scheduling support to the project and the Project Engineer as needed. At a minimum the Consultant CPM Schedule Expert will be expected to:

- Review the Contractor's accepted as-planned schedule, schedule updates, and method statements for compliance with contract requirements.
- Provide initial schedule review including durations, logic, sequencing, and methods statements. Provide written comments and recommendation to Project Engineer.
- Review complete project schedule submitted by contractor and provide written comments and recommendation to Project Engineer.
- Re-review complete project baseline schedule. Provide written comments and recommendation to Project Engineer.
- Review proposed activities, durations, and logic resulting from changes for the purposes of establishing a new baseline schedule.
- Review monthly project schedule updates.
- Assemble and review as-built data and review as-built schedules.
- Perform a schedule delay analysis and determine the amount of Contractor and/or CDOT excusable delays.
- Prepare schedule reports and exhibits to assist in evaluation of schedule delays and remaining as-planned work.
- Provide ongoing schedule review and evaluation support through project completion.
- If needed, assist the project team assemble the data needed to create an as-built schedule

The Consultant CPM Schedule Expert shall be permanently assigned to the project for the duration of the project and shall have the following qualifications:

- Proficiency in latest versions of Primavera and MS Project.
- Consultant CPM Schedule Expert – Five (5) years of overall experience in highway construction, and a minimum of three DOT projects with a minimum construction cost of \$20 million, which were performed in accordance with Standard Specification 108.03 and a certified Planning & Scheduling Professional (AACE International PSP Certification).

Additional Software & Equipment Required:

The following equipment shall be furnished along with the Consultant CPM Schedule Expert in sufficient quantity and in good working order:

- A cellular smartphone.
- A computer with networking capability sufficient for accessing internet email through a project-supplied internet-service provider. This computer shall be loaded with MS Office software (2016 version or later), including MS Word, MS Excel and MS Project at a minimum, the latest version of Primavera Professional Project Management Software. This computer shall be connected or networked to the Consultant-supplied main project printer/scanner described above, or shall be provided with a separate stand-alone printer.

Consultant Safety Critical Engineer Requirements

General Work Description

- Review the Contractor’s safety critical work plans, method statements, procedures, etc. for compliance with contract requirements. Provide a written report of each work item to the engineer, with comments and a recommendation to approve, reject/revise/resubmit, or accept with comments.
- Participate in pre-construction meetings for safety critical work items (such as pre-bridge demo, pre-girder erection, etc.). Assist CDOT in maintaining full-compliance with CDOT policies and procedures and contractual compliance.
- Participate in on-site inspection activities associated with safety critical work items (such as bridge demo, girder erection, etc.). Assist CDOT in maintaining full-compliance with CDOT policies and procedures and contractual compliance.
- Assist and review safety critical elements of a special nature requirements, policies, procedures, etc.
- Assist the Engineer in any other areas or special requests.
- Maintain documentation of all safety critical work, analysis, comments, reviews, documentation, etc.
- Be able to attend meetings, give presentations, provide input and comments as requested.

The Consultant Safety Critical Engineer shall be permanently assigned to the project for the duration of the project and shall have the following qualifications:

- The Safety Critical Engineer must be licensed in the State of Colorado.
- Consultant Safety Critical Engineer – Ten (10) years of overall experience in highway construction.

A copy of work experience and proof of Certification, Degree, and/or License shall be provided to the CDOT Project Engineer before work begins. Personnel provided by the consultant who do not meet all of the specified requirements, or who fail to perform their work in an acceptable manner, shall be removed from the project when determined and directed by the CDOT Project Engineer.

In addition to the qualifications, requirements set forth above, the following certifications will also be required:

Class/Certification	Consultant Office Engineer	Consultant Senior Inspector	Consultant LMTT	Consultant MTTI
Basic Highway Math	X *	X *	X *	X *
Basic Construction Surveying	X *	X *	X *	X *
Basic Hwy Plan Reading	X *	X *	X *	X *

Storm water Management and Erosion Control	X	X		
CCA Traffic Control Supervisor	X	X	X	
CDOT/ACPA Conc. Pavement Inspector			X	X
LabCAT Level A&B			X	X
Asphalt Paving Inspection LabCAT Level I			X	X
WAQTC			X	X
ACI Field Testing Tech I			X	X
SiteManager/LIMS			X	

* Not required if the Consultant is a licensed Professional Engineer, or has an Engineering Degree from an accredited institution.