**Version Date: 12/22/2020**

**Application:** This template is used when the Certified LPA owns the contract on a federal funded project.

**GENERAL INSTRUCTIONS:**

* Yellow highlighted areas include instructions that should be deleted prior to release.
* Blue highlighted areas indicate text or fields that need information provided or revised.
* “Agency” means the Certified LPA as defined in the CLPA Contract.
* **Delete instructions throughout the document before executing Contract or amendment. Deletions can be automated as follows:**
  + From the “Edit” menu (or “Editing” menu on the “Home” ribbon) select “Replace”;
  + With cursor in the “Find what” field, click “More” button, then “Format”, then “Font”, then in the font field select “Times New Roman” text;
  + Leave the “Replace with” field blank;
  + Click “Replace All”. This will delete all yellow highlighted text.

**PROJECT-SPECFIC INSTRUCTIONS:**

Not all subtasks are needed for each project.  **If an entire subtask is not needed, leave the task number, add “RESERVED” after the subtask title, and delete all subtask text.**

**Task 6 GEOTECHNICAL / PAVEMENT SERVICES**

Consultant shall conduct [choose one or leave both] geotechnical and pavement field investigation(s) to explore the following: [remove or add items, as needed for the Project]

* Surface and subsurface conditions in proposed improvement areas, including bridge foundations, retaining walls, traffic structures, grading, trenchless installations, underground and utilities
* Area of pavement preservation, rehabilitation and new pavement construction, as applicable
* Surface and subsurface conditions in area of [choose one or leave both] existing and potential slope instability

Consultant shall provide documentation which summarizes and presents the results of the investigation, analyses, and recommendations.

**6.1 Data Review / Reconnaissance**

Data Review:

Consultant shall review available existing information to evaluate the following: [remove or add items, as needed for the Project]

* Geologic conditions along the proposed Project alignment, such as geologic units, historic land use, fill materials, and geologic hazards.
* Pavement construction history

Consultant shall review available information from the following sources (as applicable):

[remove or add items, as applicable to the Project]

* Existing published and unpublished literature from Agency, ODOT, federal, city, or county records
* Published geologic literature including geologic or hazard maps
* Previous geological and geotechnical reports from Agency, ODOT, federal, city, county, or other officials, consultants, groups or individuals pertinent to the Project
* As-built roadway plans (as available)
* Bridge plans and Foundation or Geotechnical Data Sheets
* Maintenance records

Reconnaissance:

Consultant shall conduct a [choose as appropriate] pavement, geologic, and geotechnical reconnaissance of the site consisting of up to 2 separate site visits. Consultant shall identify the following: [remove or add items, as needed for the Project]

* Geologic conditions at the Project site, any geologic hazards present and their impacts to the proposed Project elements.
* General condition of the existing pavement

As part of the site reconnaissance work, Consultant shall [remove or add items, as needed for the Project]:

* Observe surface conditions that may be indicative of subsurface conditions of concern, as well as past or ongoing geologic processes (e.g., areas of seeps or springs, erosion, unstable slopes, shallow groundwater, roadway settlement, offsets and depressions, existing earthwork performance, exposed soil and bedrock units).
* Identify site constraints, staging concerns (for exploration and construction).
* Identify areas for Falling Weight Deflectometer (“FWD”) testing, core samples, dynamic cone penetration (“DCP”) testing, rut measurements, photographs, and laboratory testing.
* Identify potential exploration and monitoring locations.
* Locate potential pavement core explorations and paint on the ground proposed core locations.
* Locate geotechnical explorations and stake or paint on the ground proposed boring locations.

**6.1 Consultant Deliverables and Schedule:**

Consultant shall incorporate information from this task into deliverables for tasks 6.2, 6.5 and 6.6.

**6.2 Exploration and Testing Work Plan (“ETWP”)**

Consultant shall prepare an ETWP prior to beginning field work. No field work is to be performed, other than initial site reconnaissance, before review and approval by Agency of the ETWP.

The ETWP shall address the proposed [delete or add as appropriate]drilling (geotechnical borings and/or pavement cores), cone penetration test (“CPT”) probes, DCP test probes, test pits, and drive probe locations; site access; exploration and sampling procedures; limits for FWD, DCP testing and rut measurements; preliminary laboratory testing plan; safety plan; and the traffic control plan. The traffic control plan must address minor road encroachments as well as any lane or shoulder closures for activities associated with [delete or add as appropriate] cores, borings, CPT probes, test pits, drive probes, DCP testing, rut measurements, and restoration of pavements, shoulders, and other areas disturbed due to subsurface exploration activities, including erosion control measures.

Consultant shall comply with any and all environmental permits, including archeology clearance, and approvals prior to any geotechnical drilling work (as per ODOT Geotechnical Design Manual sections 3.8 and 3.8.4).

Consultant shall obtain required Right-of-Way Permits from Agency for exploration locations in public ROW prior to beginning field work.

Consultant shall obtain required Right-of-Entry Agreement(s) from the property owner(s) under task 14.1 prior to beginning field work.

**6.2 Consultant Deliverable and Schedule:**

Consultant shall provide:

* Draft ETWP in MS Word format to APM
* Final ETWP in MS Word format at least 5 business days prior to beginning field work to APM

### 6.3 Geotechnical and Pavement Explorations

Consultant shall conduct field investigation work in accordance with the most current versions of the [ODOT Geotechnical Design Manual](https://www.oregon.gov/ODOT/GeoEnvironmental/Pages/Geotech-Manual.aspx) and the [ODOT Pavement Design Guide](https://www.oregon.gov/ODOT/Construction/Documents/pavement_design_guide.pdf).

Consultant shall perform all field explorations in conformance with the approved ETWP developed in task 6.2. [Remove next sentence if not applicable]When possible, Consultant shall coordinate traffic control and other subcontractors, such as drillers, to provide exploration Services for both pavement and geotechnical explorations concurrently. Consultant shall follow all environmental permits and approvals prior to performing any exploration Services by drilling subcontractors. Consultant or their drilling contractor shall locate all underground utilities.

[Include section #1 if geotechnical explorations are needed]

Once all environmental permits and approvals have been provided, consultant shall perform subsurface explorations to estimate and characterize the in situ soils and obtain design parameters for the purposes of addressing foundation support and other geotechnical or geological considerations for the following: [remove/add/revise items, as needed for the Project]

* Traffic Structures
* Retaining walls
* Utilities
* Trenchless Installations
* Non-vehicle access ways, such as multi-use paths. walkways, boardwalks, and pedestrian bridges
* Slope stability
* Embankment subgrade
* Shallow excavations to estimate topsoil stripping depth for new earthwork
* Onsite infiltration of storm water

Consultant shall use data from the subsurface explorations to determine if site conditions are consistent with the assumptions stated on ODOT standard drawings for [remove or add items, as needed for the Project] traffic structures and retaining walls, and to provide soil bearing information to support the anticipated structure(s).The anticipated subsurface explorations to be performed for the Project are shown in the following table:

| **TEST METHOD** | **EST #** | **DEPTH(S) OF EXPLORATION(S)** | **INSTRUMENT(S) TO BE INSTALLED** |
| --- | --- | --- | --- |
| Drilled Borings | X |  |  |
| Pavement Cores | X |  |  |
| Hand Auger Borings | X |  |  |
| Cone Penetration Testing | X |  |  |
| Test Pits | X |  |  |
| Drive Probes | X |  |  |
| Infiltration Tests | X |  |  |

Consultant shall provide an experienced Professional Engineer or Certified Engineering Geologist, licensed in Oregon to supervise the field operations for in situ data gathering.

[End section #1 – geotechnical explorations]

[Include section #2 if pavement explorations or testing is needed]

Consultant shall perform appropriate pavement explorations and tests in order to estimate the following: [remove or add items, as needed for the Project]

* Subgrade conditions for new or existing roadway alignments
* Structural capacity of the existing pavement
* Thickness of the existing pavement section
* Visual condition of the existing pavement

Consultant shall perform a pavement field investigation program which includes the tests and explorations shown in the following table:

* Remove or add items, as needed for the Project.
* Delete any items that are redundant with testing required in the table above.
* The ODOT Pavement Design Guide specifies minimum interval spacing for various tests**. If LPA wants greater frequency (less spacing) than the minimums specified in the Pavement Design Guide for a given test, revise quantities and intervals below**.

|  |  |  |
| --- | --- | --- |
| **TEST METHODS** | **EST #** | **TEST INTERVALS** |
| Falling Weight Deflectometer (FWD) tests | X | As specified in [ODOT Pavement Design Guide](https://www.oregon.gov/ODOT/Construction/Documents/pavement_design_guide.pdf) |
| Pavement core explorations | X | As specified in [ODOT Pavement Design Guide](https://www.oregon.gov/ODOT/Construction/Documents/pavement_design_guide.pdf) |
| Dynamic cone penetrometer (DCP) testing | X | As specified in [ODOT Pavement Design Guide](https://www.oregon.gov/ODOT/Construction/Documents/pavement_design_guide.pdf) |
| Shallow borings (5ft minimum) or soil probe explorations | X | As needed per site conditions |
| Rut depth measurement of the existing pavement |  | As specified in [ODOT Pavement Design Guide](https://www.oregon.gov/ODOT/Construction/Documents/pavement_design_guide.pdf) |
|  |  |  |
|  |  |  |
| **EXPLORATIONS** | | |
| Visual condition survey of the existing pavement within Project limits | | |
| Shallow excavations (as needed per site conditions) to estimate topsoil stripping depth for alignments | | |
|  | | |
|  | | |
|  | | |

Consultant shall provide an experienced engineer or geologist, as applicable, to supervise the field operations and conduct a detailed visual pavement condition survey to identify the type, extent and severity of the distress present.

[End section #2]

Consultant shall perform the exploration work while following additional requirements as follows:

[remove or add items, as applicable to the Project]

* Boring locations that have restrictions must be performed in conformance with the permit requirements.
* Collect the drill cuttings and drilling mud in sealable steel drums and remove from the site, unless otherwise coordinated with Agency.
* The borings must be abandoned and backfilled according to Oregon Water Resources Department (“OWRD”) regulations.
* All borings and core holes through pavement must be patched with cold patch asphalt emulsion, quick set PCC, or as approved by Agency.
* Instruments must be capped by lockable monuments, or traffic-grade vaults, or as approved by Agency
* Borings must be completed by drillers appropriately licensed by OWRD
* Core samples of the pavement must be retrieved using a diamond bit core drill.
* Pavement cores must be logged according to the ODOT Pavement Design Guide and photographed for inclusion in the report.

[Use the following paragraph if Consultant is collecting traffic count information, unless this effort is included in task 8 Traffic]

Consultant shall gather the appropriate traffic information in order to compute the 18-kip equivalent single axle loads (“ESALs”) within the Project limits. Compute the ESALs as required by the ODOT Pavement Design Guide. Consultant shall estimate the growth rate based on available traffic forecasts and shall acquire the traffic data for ESAL calculations by conducting classified traffic counts or using data from Agency.

**6.3 Consultant Deliverables and Schedule:**

Information from this task shall be incorporated into deliverables for tasks 6.5 and 6.6.

**6.4 Laboratory Testing**

Consultant shall perform laboratory tests on disturbed and undisturbed soil samples obtained from the explorations in order to:

* Characterize the subgrade and subsurface soils
* Determine index properties

Develop engineering soil parameters for the design and construction of [remove or add items, as applicable to the Project]bridge foundations, traffic structure foundations, pavement, retaining walls, ,embankment design, slope stability analysis, or other geotechnical feature

* Assist with determining engineering geologic unit boundaries
* Check field soil classification.

The laboratory testing program must be performed in accordance with standard ASTM, AASHTO, Agency, and ODOT practices to include the following:

[remove or add items, as applicable to the Project]

* + Moisture/density;
  + Atterberg limits;
  + Gradation;
  + Organic content;
  + Consolidation;
  + Compressive strength;
  + Triaxial resilient modulus test;
  + Torvane shear strength test
  + Direct shear strength test
  + Electrochemical tests (sulfate, sulfide, chloride, pH, , and resistivity).
  + Other standard tests as required

**6.4 Consultant Deliverables and Schedule:**

Information from this task shall be incorporated into deliverables for tasks 6.5 and 6.6.

**6.5 Pavement Design Report**

Consultant shall prepare a Pavement Design Report indicating pavement design criteria, pavement design, and subgrade stabilization recommendations to be used for the Project, based on data and analysis provided or collected. Consultant shall provide alternative pavement design recommendations for 3 pavement sections for: [remove or add items, as applicable to the Project]

* + New pavement for areas of widening or reconstruction;
  + Rehabilitation of the existing pavement

Consultant shall develop a cost estimate for each of the design alternatives. Consultant shall evaluate the alternative designs to determine the alternative with the lowest life cycle cost. The life cycle cost analysis must be performed using the FHWA’s RealCost software [specify different software if applicable] considering only Agency costs.

To be eligible for federal funding, pavements must be designed to provide a service life of 20 years for new or reconstructed pavements and 15 years for rehabilitated pavements. Any departure from these service life requirements will be considered a design deviation.

The pavement designs must be developed for design periods as provided in the current version of the ODOT Pavement Design Guide. Pavement section design must be performed in accordance with the most current versions of the ODOT Pavement Design Guide and AASHTO Guide for Design of Pavement Structures. Mechanistic design method(s) may also be used as stated in the current version of the ODOT Pavement Design Guide.

**6.5 Consultant Deliverables and Schedule:**

Consultant shall provide:

* Draft Pavement Design Report in MS Word and PDF format to be incorporated into DAP delivered under task 13 or **XX** weeks after NTP.
* Final Pavement Design Report in PDF format to the APM within 2 weeks of receipt of comments from Agency.

[Include this task if applicable for the Project, otherwise mark “reserved”]

**6.6 Geotechnical Report and Foundation/Geotechnical Data Sheets**

Consultant shall prepare a Geotechnical Report according to the ODOT Geotechnical Design Manual criteria for submittal to Agency for review. The Geotechnical Report must:

* Include design assumptions and calculations
* Include Photo Logs
* Geotechnical data sheets
* Include Comments regarding Special Provisions
* Summarize the geotechnical design and construction recommendations.
* Identify general specification criteria for the construction contract and provide recommendations for special provisions, if required.
* Summarize the results of the geotechnical analyses.
* Provide design recommendations for the [remove or add items, as applicable to the Project] bridge foundations, signal and sign foundations, retaining walls, illumination foundation and embankment design.

Consultant shall prepare up to X Geotechnical Data Sheet(s) to be incorporated into the Advance and Final plan sheets.

**6.6 Consultant Deliverables and Schedule:**

Consultant shall provide:

* Draft Geotechnical Report in MS Word and PDF format to be incorporated into DAP delivered under task 13 or **XX** weeks after NTP.
* Final Geotechnical Report in PDF format to APM within 2 weeks of receipt of comments from Agency.
* Geotechnical Data sheets to be incorporated into Advance and Final PS&E packages delivered under tasks 13.1 and 13.2.
* Electronic data provided in the following formats (due with draft Geotechnical Report):
  + - Memoranda, letters, reports, etc. – Microsoft Office Suite, Adobe
    - CADD Files – MicroStation Design File (.dgn) format
    - Other files – in standard software file formats