

**ADVERTISEMENT FOR ENGINEERING AND RELATED SERVICES
SEPTEMBER 14, 2022**

ADDENDUM NO. 1, OCTOBER 3, 2022

CONTRACT NO. 4400025193

**CONTRACT FOR PAVEMENT DISTRESS DATA COLLECTION
STATEWIDE**

DBE GOAL = 4%

Under the authority granted by Title 48 of Louisiana Revised Statutes, the Louisiana Department of Transportation and Development (DOTD) hereby issues this advertisement for consulting firms to provide engineering and related services. **Consultants who are a Louisiana or foreign LLC or corporation should be appropriately registered with the Louisiana Secretary of State, as contemplated by Title 12 of the Louisiana Revised Statutes, and with the Louisiana Professional Engineering and Land Surveying (LAPELS) Board under its rules for firms. If a consultant is not in good standing in accordance with those provisions, it may be subject to consequences contemplated in Title 12 and/or the LAPELS rules. All requirements of LAPELS must be met at the time the proposal is submitted. Prime consultants must be registered with the Louisiana Secretary of State and the Federal Government, using SAM.gov, prior to contract execution.**

One (1) proposal will be selected for the contract solicited per this advertisement. Only one (1) DOTD Form 24-102 proposal is required for this advertisement, and it represents the prime consultant's qualifications and those of any and all sub-consultants proposed to be used for the referenced contract(s). All identifying contract number(s) should be listed in Section 2 of the DOTD Form 24-102. **USE THE 4400025193 Pavement Distress Data Collection 24-102 DOTD FORM September 2022 file, PROVIDED WITH THE ADVERTISEMENT.**

Any questions concerning this advertisement must be sent in writing to DOTDConsultantAds80@la.gov no less than 48 hours (excluding weekends and holidays) prior to the proposal deadline.

SCOPE OF SERVICES

The general tasks to be performed by the consultant for this contract are described more specifically in Attachment A, which is incorporated herein by reference.

The consultant shall perform the work in accordance with the requirements of this advertisement and the resulting contract. Deliverables shall be in such format as required in Attachment A. The work performed by the consultant shall be performed in a manner consistent with that degree of care and skill ordinarily exercised by members of the same profession currently practicing under similar circumstances.

MINIMUM PERSONNEL REQUIREMENTS (MPRs)

The requirements set forth in Attachment B must be met at the time the proposal is submitted.

EVALUATION CRITERIA

The criteria to be used by DOTD in evaluating responses for the selection of a consultant to perform these services are listed below:

TIER I Evaluation:

1. firm experience on similar projects, weighting factor of three (3);
2. staff experience on similar projects, weighting factor of four (4);
3. firm size as related to the project magnitude, weighting factor of three (3);
4. past performance on similar DOTD projects, weighting factor of six (6)*;
5. current work load with DOTD, weighting factor of five (5);
6. approach and methodology, weighting factor of nine (9); and

TIER II Evaluation:

7. Field Trials (see page 3), weighting factor of nine (9).

*The consultant is to identify in the table below those evaluation disciplines consistent with the approach and methodology proposed in Section 18 of the DOTD Form 24-102.

THE FOLLOWING TABLE MUST BE COMPLETED AND INCLUDED IN SECTION 12 OF THE DOTD FORM 24-102 PROPOSAL.

<p>Sub-consultants are allowed to be used for this proposal. Fill in the table by identifying only those evaluation disciplines consistent with the approach and methodology proposed in Section 18 of the DOTD Form 24-102*, the name of each firm that is part of the proposal, and the percentage of work in each past performance evaluation discipline to be performed by that firm. The percentage estimated for each evaluation discipline is for evaluation purposes only and will not control the actual performance or payment of the work. The percentages for the prime and sub-consultants must total 100% for each past performance evaluation discipline, as well as the overall total percent of the contract. (Add rows and columns as needed)</p>							
Evaluation Discipline(s)	% of Overall Contract	Prime	Firm B	Firm C	Firm D	Firm E	Each Discipline must total to 100%
							100%
							100%
							100%
Identify the percentage of work for the overall contract to be performed by the prime consultant and each sub-consultant.							
Percent of Contract	100%						-----

*The past performance evaluation disciplines are: Road, Bridge, Traffic, CE&I/OV, Geotech, Survey, Environmental, Data Collection, Planning, Right-of-Way, CPM, ITS, Appraiser and/or Other.

If sub-consultants are used, the prime consultant must perform greater than 50% of the work for the overall contract.

TIER I Evaluation:

Proposals will be evaluated as set forth in the “Evaluation Criteria” section of this advertisement. The evaluation will be by means of a point-based rating system. Each of the above Tier I criteria will receive a rating on a scale of one (1) through five (5). The ratings will then be multiplied by the corresponding weighting factor. The rating for each evaluation criteria will then be added to arrive at the proposal’s TIER I rating.

DOTD’s Project Evaluation Team (PET) will be responsible for performing the above described evaluation, and will establish a shortlist of the three (3) (if three are qualified), highest rated consultants.

TIER II Evaluation:

The Consultants identified on the Tier I short list will participate in Tier II.

Prior to the start of Tier II, an informational meeting will be held with the Tier I shortlist consultants to discuss the Field Trial (evaluation criteria no. 7). The purpose of the Field Trial is to allow the consultants to demonstrate their ability to collect and reduce data. The Consultants shall collect forward facing perspective images, right facing right-of-way images, pavement images and pavement distress data necessary to digitally quantify all of the requirements specified for this Project. This information shall be provided to DOTD in advance of the Tier II Presentation. The schedule for the Field Trial and Tier II Presentation will be given at this meeting.

Subsequent to the Field Trial, each proposer will be given up to 30 minutes to conduct their Tier II Presentation, followed by a short recess, then up to 20 minutes to answer any questions asked by the DOTD Project Evaluation Team.

The Consultant’s Field Trial will receive a rating on a scale of one (1) through five (5). This rating will then be multiplied by the corresponding weighting factor.

The TIER I score in combination with the TIER II score will be used to develop the final short-list. A final short-list of the three (if three are qualified) highest rated Consultants will be submitted to the Secretary for final selection.

COMPLIANCE WITH SUPPLEMENTAL ETHICS REQUIREMENTS

DOTD has established supplemental ethics requirements applicable to consultants and PET members. These requirements are found in the “Supplemental Ethics Requirements” article of the sample contract linked to this advertisement, which are incorporated herein by reference. Any firm that is found to have violated these requirements may not be considered for this selection.

By submission of a proposal to perform services pursuant to this advertisement, the consultant agrees to comply with DOTD’s Supplemental Ethics Requirements.

RULES OF CONTACT UPON ADVERTISEMENT

DOTD is the single source of information regarding the contract selection. Any official correspondence will be in writing, and any official information regarding the contract will be disseminated by DOTD's designated representative via the DOTD website. The following rules of contact will apply during the contract selection process, commencing on the advertisement posting date and ceasing at the time of final contract selection. Contact includes face-to-face communication, the use of a telephone, facsimile, electronic mail (email), or formal or informal written communications with DOTD. Any contact determined to be improper, at the sole discretion of DOTD, may result in the rejection of the proposal (i.e., DOTD Form 24-102).

Consultants and consultant organizations shall correspond with DOTD regarding this advertisement only through the email address designated herein; DOTDConsultantAds80@la.gov and during DOTD sponsored one-on-one meetings.

No consultant, or any other party on behalf of a consultant, shall contact any DOTD employee, other than as specified herein. This prohibition includes, but is not limited to, the contacting of: department, office, or section heads, project managers, members of the evaluation teams, and any official who may participate in the decision to award the contract resulting from this advertisement.

DOTD will not be responsible for any information or exchange that occurs outside the official process specified above.

By submission of a proposal to perform services pursuant to this advertisement, the consultant agrees to the communication protocol herein.

PROJECT TIME

The overall time for the completion of the scope of services is estimated to be **6 years, covering 3 data collection cycles.**

COMPENSATION

The estimated compensation payable to the consultant for all services rendered in connection with this contract shall be **\$30,000,000**. This estimate will be used for grading purposes only. Actual compensation will be determined by DOTD based on work hours negotiated between DOTD and the selected consultant. Within fifteen (15) calendar days of notification of selection, a kick-off meeting will be held with the selected consultant and appropriate DOTD personnel. The selected consultant will be required to submit a work hour proposal within thirty (30) calendar days following the notification of selection. All negotiations must be completed within the timeframe set forth in the Consultant Contract Services Manual.

Payment will be made based on negotiated lump sum.

DIRECT EXPENSES

To the extent that the consultant is allowed to claim reimbursement for direct expenses, all direct expense items that are not paid for in the firm's indirect cost rate and are needed and will be consumed during the life of the contract must be identified by the consultant during contract development. Standard equipment or resources to be used in the provision of services rendered for this contract will not be considered for payment under direct expenses.

The consultant should own most of the equipment required to provide the work and services. The cost of this equipment should be included in the consultant's indirect cost rate. Equipment may be considered "specialized" if it cannot be considered standard equipment for that particular consultant's normal operating business needs. If a consultant believes special equipment is needed for the contract, the consultant must inquire through the Question and Answer process, as provided herein, whether the identified item will be considered specialized equipment for the individual contract.

All travel related expenses will be compensated under direct expenses, and will be in accordance with the most current Louisiana Office of State Travel regulations as promulgated in the Louisiana Administrative Code under the caption "PPM No. 49", with the exception that compensation for vehicle usage will be based on actual miles traveled directly and exclusively related to project needs. Vehicle rental rates will require prior approval from the PM.

CYBERSECURITY TRAINING

In accordance with La. R.S. 42:1267(B)(3) and the State of Louisiana's Information Security Policy, if the Consultant, any of its employees, agents, or sub-consultants will have access to State government information technology assets, the Consultant's employees, agents, or sub-consultants with such access must complete cybersecurity training annually, and the Consultant must present evidence of such compliance annually and upon request. The Consultant may use the cybersecurity training course offered by the Louisiana Department of State Civil Service without additional cost or may use any alternate course approved in writing by the Office of Technology Services.

For purposes of this Section, "access to State government information technology assets," means the possession of credentials, equipment, or authorization to access the internal workings of State information technology systems or networks. Examples would include but not be limited to State-issued laptops, VPN credentials to credentials to access the State network, badging to access the State's telecommunications closets or systems, or permissions to maintain or modify IT systems used by the State. Final determination of scope inclusions or exclusions relative to access to State government information technology assets will be made by the Office of Technology Services.

QUALITY ASSURANCE/QUALITY CONTROL

The prime consultant must submit a QA/QC plan document specifically developed for this contract as part of the DOTD Form 24-102. DOTD requires the consultant and all sub-consultants to develop a Quality Assurance/Quality Control (QA/QC) program in order to provide a mechanism by which all deliverables will be subject to a systematic and consistent review. The

consultant shall address in its plan the review of all sub-consultant work and deliverables. Consultants must ensure quality and adhere to established DOTD policies, procedures, standards and guidelines in the preparation and review of all deliverables. DOTD may provide limited input and technical assistance to the consultant. Any deliverables to be transmitted by the consultant shall be transmitted with a DOTD Quality Assurance/Quality Control Checklist, and a certification that the deliverables meet DOTD's quality standards.

If Attachment A includes specific QA/QC requirements that contradict those set forth above, the requirements in Attachment A control.

TRAFFIC ENGINEERING PROCESS AND REPORT TRAINING REQUIREMENTS

As part of DOTD's on-going commitment to high quality traffic engineering reports, a traffic engineering training course must be taken by traffic engineering PEs and EIs in order to be eligible to work on DOTD projects. When traffic is included as a discipline on which past performance is evaluated, for consultants performing traffic engineering services (i.e., traffic analysis throughout all DOTD project stages and/or QC of traffic analysis), appropriate personnel must successfully complete the three (3) modules of the Traffic Engineering Process and Report Course offered by Louisiana Transportation Research Center (LTRC). This Course must be completed no later than the time the proposal is submitted or show proof of registration for the Course from the LTRC's Registration site. **Copies of training certificates or proof of registration are to be included in Section 20 of the proposal.** It will be the prime consultant's responsibility to ensure their staff and sub-consultants complete the training. Copies of training records may be obtained from the LTRC website <https://registration.ltrc.lsu.edu/login>.

WORK ZONE TRAINING REQUIREMENTS

As part of DOTD's on-going commitment to work zone safety, required work zone training courses must now be taken every four (4) years in order for personnel to remain eligible to work on DOTD projects. For consultants performing preconstruction services (e.g., design, survey, subsurface utility, geotechnical, traffic, bridge inspection, environmental services), appropriate personnel must successfully complete these courses. In general, the person in responsible charge of traffic control plans shall be required to have Traffic Control Supervisor training. For preconstruction field services performed within the clear zone, at least one (1) member of the field crew shall have Traffic Control Supervisor or Traffic Control Technician training. The consultant should identify all personnel listed in the staffing plan for the contract who have completed the appropriate work zone training courses. All preconstruction work zone training requirements shall be met **prior to contract execution**. It will be the prime consultant's responsibility to ensure their staff and sub-consultants have the appropriate work zone training.

In addition to the above requirements, if the Scope of Services set forth in Attachment A includes Construction Engineering and Inspection (CE&I), the following training requirements shall be met **at the time the proposal is submitted**:

Field Engineers:	Traffic Control Technician
	Traffic Control Supervisor
	Flagger

Field Engineer Interns:	Traffic Control Technician Traffic Control Supervisor Flagger
Field Senior Technicians, Survey Party Chiefs, and SUE Worksite Traffic Supervisors*:	Traffic Control Technician Traffic Control Supervisor Flagger
Other Field Personnel*:	Traffic Control Technician Flagger

* excluding Asphalt Plant Inspector, Paint Managers, and Paint Inspectors

Approved courses are offered by ATSSA and AGC. Substitutes for these courses must be approved by the DOTD Work Zone Task Force. For more information, please contact DOTD HQ Construction at 225-379-1584. Specific training course requirements are:

Flagger: Successful completion every four (4) years of a work zone flagger course approved by the Department. The “DOTD Maintenance Basic Flagging Procedures Workshop” is not an acceptable substitute for the ATSSA and AGC flagging courses.

Traffic Control Technician (TCT): Successful completion every four (4) years of a work zone traffic control technician course approved by the Department. After initial successful completion, it is not necessary to retake this course every four (4) years if Traffic Control Supervisor training is completed every four (4) years.

Traffic Control Supervisor (TCS): Successful completion of a work zone traffic control supervisor course approved by the Department. Following an initial completion, traffic control supervisors must either complete a one (1)-day TCS refresher course or retake the original two (2)-day TCS course every four (4) years.

ATSSA contact information: (877) 642-4637

REFERENCES

All services and documents will meet the standard requirements as to format and content of DOTD and will be prepared in accordance with the latest applicable editions, supplements, and revisions of the following:

1. AASHTO Standards – The American Association of State Highway Transportation Officials
<https://www.transportation.org/>

2. AASHTO – A Policy on Geometric Design of Highways and Streets –
https://bookstore.transportation.org/collection_detail.aspx?ID=110
3. ASTM Standards – <https://www.astm.org/BOOKSTORE/BOS/index.html>
4. CyberSecurity Training –
<https://forms.gle/deZGAo5hUMWeSG4P6>
5. DOTD – Bridge Design and Evaluation Manual (BDEM) –
http://wwwsp.dotd.la.gov/Inside_LaDOTD/Divisions/Engineering/Bridge_Design/Pages/BDEM.aspx
6. DOTD – Complete Streets –
http://wwwsp.dotd.la.gov/Inside_LaDOTD/Divisions/Multimodal/Highway_Safety/Complete_Streets/Pages/default.aspx
7. DOTD – Construction Contract Administration Manual –
http://wwwsp.dotd.la.gov/Inside_LaDOTD/Divisions/Engineering/Pages/Engineering_Docs.aspx
8. DOTD – Consultant Contract Services Manual –
http://wwwsp.dotd.la.gov/Inside_LaDOTD/Divisions/Engineering/CCS/Manuals/CCS%20Manual%20rev%20Dec%202020.pdf
9. DOTD – Hydraulics Manual –
http://wwwsp.dotd.la.gov/Inside_LaDOTD/Divisions/Engineering/Public_Works/Hydraulics/Documents/Hydraulics%20Manual.pdf
10. DOTD – Location and Survey Manual –
http://wwwsp.dotd.la.gov/Inside_LaDOTD/Divisions/Engineering/LocationSurvey/Manuals%20and%20Forms/Location_and_Survey_Manual.pdf
11. DOTD – Addendum “A” to the Location & Survey Manual –
http://wwwsp.dotd.la.gov/Inside_LaDOTD/Divisions/Engineering/LocationSurvey/Manuals%20and%20Forms/Location%20and%20Survey%20Manual%20-%20Addendum%20A.pdf
12. DOTD – Louisiana Standard Specifications for Roads and Bridges –
http://wwwsp.dotd.la.gov/Inside_LaDOTD/Divisions/Engineering/Standard_Specifications/Pages/Standard%20Specifications.aspx
13. DOTD – Materials Sampling Manual –
http://wwwsp.dotd.la.gov/Inside_LaDOTD/Divisions/Engineering/Materials_Lab/Pages/Men_u_MSM.aspx
14. DOTD – Minimum Design Guidelines –
http://wwwsp.dotd.la.gov/Inside_LaDOTD/Divisions/Engineering/Road_Design/Memoranda/Minimum%20Design%20Guidelines.pdf
15. DOTD – Off-System Highway Bridge Program Guidelines –
http://wwwsp.dotd.la.gov/Inside_LaDOTD/Divisions/Engineering/Bridge_Design/Manuals/Other%20Manuals%20-%20Guidelines/2019%20Federal%20Aid%20Off-System%20Highway%20Bridge%20Program%20Guidelines.pdf

16. DOTD – Roadway Design Procedures and Details Manual –
http://wwwsp.dotd.la.gov/Inside_LaDOTD/Divisions/Engineering/Road_Design/Pages/Road-Design-Manual.aspx
17. DOTD – Stage 1 Planning/Environmental Manual of Standard Practice –
http://wwwsp.dotd.la.gov/Inside_LaDOTD/Divisions/Engineering/Environmental/Pages/Stage_1.aspx
18. DOTD – Testing Procedures Manual –
http://wwwsp.dotd.la.gov/Inside_LaDOTD/Divisions/Engineering/Materials_Lab/Pages/Menu_TPM.aspx
19. DOTD – Traffic Engineering Manual –
http://wwwsp.dotd.la.gov/Inside_LaDOTD/Divisions/Engineering/Traffic_Engineering/Misc%20Documents/Traffic%20Engineering%20Manual.pdf
20. DOTD – Traffic Engineering Process and Report –
http://wwwsp.dotd.la.gov/Inside_LaDOTD/Divisions/Engineering/Traffic_Engineering/ManualsPublications/Pages/TEPR.aspx
21. DOTD – Traffic Signal Manual –
http://wwwsp.dotd.la.gov/Inside_LaDOTD/Divisions/Engineering/Traffic_Engineering/Traffic%20Control/Traffic%20Signal%20Manual%20V3%20-%207.1.20.pdf
22. e-CFR – Electronic Code of Federal Regulations (all applicable) –
<https://ecfr.io/>
23. FHWA – Bridge Inspector’s Reference Manual (BIRM) –
website: <https://www.fhwa.dot.gov/bridge/nbis.cfm>
manual: <https://www.fhwa.dot.gov/bridge/nbis/pubs/nhi12049.pdf>
24. FHWA – Manual on Uniform Traffic Control Devices for Streets and Highways (MUTCD) –
<http://mutcd.fhwa.dot.gov/>
25. National Electrical Safety Code (NESC) –
<https://standards.ieee.org/products-services/nesc/index.html>
26. NFPA 70 – National Electrical Code (NEC) –
<https://www.nfpa.org/codes-and-standards/all-codes-and-standards/list-of-codes-and-standards/detail?code=70>
27. NEPA – National Environmental Policy Act –
<https://www.epa.gov/nepa>

CONTRACT EXECUTION REQUIREMENTS

The selected consultant will be required to execute the contract within ten (10) days after receipt of the contract.

A sample of the contract provisions can be found at the following link: http://wwwsp.dotd.la.gov/Inside_LaDOTD/Divisions/Engineering/CCS/Pages/Advertisements.aspx.

DISADVANTAGED BUSINESS ENTERPRISE REQUIREMENT

This advertised contract has a Disadvantaged Business Enterprise (DBE) goal of **4%** of the contract fee. Credit for DBE participation will be limited to the firms certified pursuant to the Louisiana Unified Certification Program. For convenience, DOTD provides a list on its website (<http://www8.dotd.la.gov/UCP/UCPSearch.aspx>) of firms that have been certified as eligible to participate as DBEs on US DOT assisted contracts. This list is not an endorsement of the quality of performance of any firm but is simply an acknowledgment of the listed firms' eligibility as a DBE. DOTD makes no representations of the accuracy or completeness of this list on any particular date or time. Prime consultants considering the use of a particular DBE sub-consultant are advised to obtain documentation of certification status from that sub-consultant prior to submission of DOTD Form 24-102.

Prime consultants must specify by firm name in Section 11 on the DOTD Form 24-102 all DBE firms which the prime intends will participate in providing services under the contract to meet the DBE goal and indicate for each the percent of the contract fee for the services that will be performed by each specified DBE firm. If the prime did not succeed in obtaining enough DBE participation to meet the goal, it must attach to the DOTD Form 24-102, behind Section 23, documentation of its good faith efforts to meet the goal.

REVISIONS TO THE ADVERTISEMENT

DOTD reserves the right to revise any part of the advertisement by issuing addenda to the advertisement at any time. Issuance of this advertisement in no way constitutes a commitment by DOTD to award a contract. DOTD reserves the right to accept or reject, in whole or part, all DOTD Form 24-102s submitted, and/or cancel this consultant services procurement if it is determined to be in DOTD's best interest. All materials submitted in response to this advertisement become the property of DOTD, and selection or rejection of a proposal does not affect this right. DOTD also reserves the right, at its sole discretion, to waive administrative informalities contained in the advertisement.

CLARIFICATIONS

DOTD reserves the right to request clarification of ambiguities or apparent inconsistencies found within any proposal, if it is determined to be in DOTD's best interest.

PROPOSAL REQUIREMENTS

The consultant's proposal for this advertisement must be submitted by email to DOTDConsultantAds80@la.gov. **USE THE 4400025193 Pavement Distress Data Collection 24-102 DOTD FORM September 2022 file, PROVIDED WITH THE ADVERTISEMENT.** Hard copies of the consultant's proposal are not required. All proposals must be in accordance with the requirements of this advertisement, and the Consultant Contract Services Manual. Unless otherwise stated in this advertisement, copies of licenses and certificates are not required to be submitted with the proposal.

If more than one (1) contract is to be selected based on this advertisement, no prime consultant is allowed to be a sub-consultant on any other consultant's 24-102. If a prime consultant is submitted as a sub-consultant on another consultant's 24-102, its proposal as a prime consultant may be deemed non-responsive.

ANY CONSULTANT FAILING TO SUBMIT ANY OF THE INFORMATION REQUIRED ON THE DOTD FORM 24-102, OR PROVIDING INACCURATE INFORMATION ON THE DOTD FORM 24-102, MAY BE CONSIDERED NON-RESPONSIVE.

DOTD employees may not submit a proposal, nor be included as part of a consultant's proposal.

Contract and/or part-time employees are allowed. Such employees should be shown in Section 14 of the DOTD Form 24-102 with an asterisk denoting their employment status.

The DOTD Form 24-102 should be identified with **contract number 4400025193** and must be received by DOTD via email **no later than 3:00 p.m. Central Time on Thursday, October ~~6~~13, 2022.**

ATTACHMENT A – SCOPE OF SERVICES

The project time is **typical**. **The home office indirect cost rate shall be applicable to all services except as otherwise designated hereafter.** The services to be rendered for this Project shall consist of the following:

1.0 Tasks and Services

1.1 General Information

The Project Task List is provided in the table below. It is provided to serve as a basis for the Project schedule/work plan.

1. Each cycle is comprised of 2 years. The first year is called Phase A. The second is Phase B. There will be a total of 3 Cycles. 6 Years or 72 months.
2. Each Phase will begin on January 1st and end on December 31st (Calendar year).
3. Task 1 shall be performed at the start of each cycle.
4. Task 24 shall be performed at the end of each cycle.
5. Task 2 through 11, along with task 22, are required each year, by the given due dates.
6. Task 12 through 21 will occur on alternating years, as shown below, and are required by the given due date for those years.
7. Tasks 23, 24, and 25 are “one time only” task
8. Tasks 26 and 27b are optional tasks and may not occur.
9. For Tasks identified as “Data Collection,” the Consultant shall generally submit the raw data capture files, or data that has not been processed, forward facing perspective image, right facing right-of-way image capture, etc.
10. For Tasks identified as “Data Delivery,” the Consultant shall generally submit all other processed data files, the processed pavement images, etc.

Project Task List			Cycle 1		Cycle 2		Cycle 3		
Task	Task Description	Due Date	Phase A	Phase B	Phase A	Phase B	Phase A	Phase B	Miles
Biweekly Meetings		Continuous bi-weekly Meetings throughout the term of the contract							
1	Preliminary Activities & Initial Pilot		yes		yes		yes		
2	Interstate • Data Collection	Oct 15	yes	yes	yes	yes	yes	yes	1884
3	Interstate • Data Delivery	15-Nov	yes	yes	yes	yes	yes	yes	1884
4	Non-Interstate National Highway System (NHS) * Data Collection	1-Nov	yes	yes	yes	yes	yes	yes	3280
5	Non-Interstate National Highway System (NHS) * Data Delivery	15-Nov	yes	yes	yes	yes	yes	yes	3280
6	Non-Interstate National Highway System (NHS) • ROW Image Only Collection	1-Nov	yes	yes	yes	yes	yes	yes	3280
7	Non-Interstate National Highway System (NHS) *ROW Image Only Delivery	15-Nov	yes	yes	yes	yes	yes	yes	3280
8	Local- National Highway System (NHS) * Data Collection	1-Nov	yes	yes	yes	yes	yes	yes	210

9	Local· National Highway System (NHS) * Data Delivery	15-Nov	yes	yes	yes	yes	yes	yes	210
10	(HPMS) Highway Performance Monitoring *Data Collection	1-Nov	yes	yes	yes	yes	yes	yes	818
11	(HPMS) Highway Performance Monitoring *Data Delivery	15-Nov	yes	yes	yes	yes	yes	yes	818
12	State Systems· Data Collection *Primary Direction	30-Sep	yes		yes		yes		13760
13	State Systems· Data Delivery *Primary Direction	30-Sep	yes		yes		yes		13760
14	State Systems· Image Collection *Secondary Direction	15-Jan		yes		yes		yes	13339
15	State Systems· Image Delivery *Secondary Direction	15-Jan		yes		yes		yes	13339
16	Ramps · Data Collection	30-Sep		yes		yes		yes	738
17	Ramps· Data Delivery	30-Sep		yes		yes		yes	738
18	Frontage/Service Roads · Data Collection *Primary Direction	30-Sep	yes		yes		yes		545
19	Frontage/Service Roads Data Delivery *Primary Direction	30-Sep	yes		yes		yes		545
20	Frontage/Service Roads·Image Collection *Secondary Direction	15-Jan		yes		yes		yes	545
21	Frontage/Service Roads ·Image Delivery *Secondary Direction	15-Jan		yes		yes		yes	545
22	Continuous Friction Testing	30-Oct	yes	yes	yes	yes	yes	yes	
23	Historical Data Conversion	May	yes						
24	Final Cycle Documentation	1-Dec		yes		yes		yes	
25	Hosting State images and Databases	1-Jan	yes	yes	yes	yes	yes	yes	
26	Ground Penetrating Radar	yes		yes	yes	yes			2,000
27	Additional Services (Asset Collection)		Cycle 1		Cycle 2		Cycle 3		
		Due Date	Phase A	Phase B	Phase A	Phase B	Phase A	Phase B	No. Assets
27a	Cable Barrier	30-Sep	yes						556 miles
27b	Vertical Bridge Clearance	30-Sep	yes						2,500
27c	Guardrails	30-Sep	yes						50,000
27d	Cross Drains	30-Sep			yes				99,000
27e	Traffic Signal Inventory	30-Sep			yes				2,800
27f	Highway Signs	30-Sep					yes		42,267
27g	Soundwall	30-Sep					yes		265

System Description

The analysis lane miles are a static snapshot of the initial mileage for this Project. These mileage totals can also be affected by the addition of divided highway sections, which subsequently become part of the data capture requirements. Additionally, the Interstate system is being extended/expanded and shall result in the transfer of some NHS mileage to Interstate mileage as some point.

Should additional miles be added or discovered within a system, that exceeds the analysis lane miles shown below, DOTD expects the Consultant to capture and deliver this additional mileage at no additional charge, so long as the total additional mileage does not exceed 0.5%, or one half of one percent, of the total analysis miles for the contract cycle. Should the added mileage exceed the 0.5%, DOTD reserves the right to proportionally reduce the analysis lane miles in Task 22 to compensate for the increased mileage in other areas, to prevent the overall cost of the Project from exceeding the funds available for this Project.

The approximate analysis lane miles of pavement included in the study are as follows:

Interstate Highway System	1884 analysis lane miles
Non-Interstate National Highway System (NHS)	3280 analysis lane miles
Local National Highway System (LNHS)	210 analysis lane miles
Highway Performance Monitoring System (HPMS)	818 analysis lane miles
State Systems	13760 analysis lane miles
Ramps	738 analysis lane miles
Frontage/Service Roads	545 analysis lane miles

- A.** The (IHS) Interstate Highway System, Task 2 and 3, consists of 942 centerline miles, with 1,884 analysis lane miles. 43.3% or 815 analysis lane miles are classified as urban.
 - 1.** For the IHS, the Consultant shall collect forward facing perspective images, right facing right-of-way images, pavement images and pavement distress data necessary to digitally quantify all of the requirements specified for this Project for 1,884 analysis lane miles, which represents both directions of the Interstate Highway System.
- B.** The (NHS) Non-Interstate National Highway System, Task 4, 5, 6, and 7, consists of 2,095 centerline miles, with 3,279 analysis lane miles. 46.2% or 1,515 analysis lane miles are classified as urban.
 - 1.** For the NHS, the Consultant shall collect forward facing perspective images, right facing right-of-way images, pavement images and pavement distress data necessary to digitally quantify all of the requirements specified for this Project for 3,279 analysis lane miles.
- C.** The (LNHS) Local National Highway System, Task 8 and 9, consists of 106 centerline miles, with 210 analysis lane miles. This system is not a state maintained system, and 100% of the analysis lane miles are classified as urban.
 - 1.** For the LNHS, the Consultant shall collect forward facing perspective images, right facing right-of-way images, pavement images and pavement distress data necessary to digitally quantify all of the requirements specified for this Project for 210 analysis lane miles.

- D.** The (HPMS) Highway Performance Monitoring System, Task 10 and 11, consist of 881 miles of roads
1. For the HPMS, the Consultant shall collect forward facing perspective images, right facing right-of-way images, pavement images and pavement distress data necessary to digitally quantify all of the requirements specified for this Project for all of the 881 miles.
 2. INFRASTRUCTURE INVESTMENT AND JOBS ACT (IIJA) may change the data collection requirements for HPMS. The Consultant is expected to provide a per mile estimate for this requirement that handles all legitimate minor changes. Should legitimate major changes occur, at DOTD's sole discretion, DOTD may negotiate a price per mile change with the Consultant. This price per mile change could result in DOTD reducing the Task 20 miles accordingly since this price change cannot cause the total price of the contract to exceed the Consultant's bid total.
- E.** The State System, Task 12, 13, 14 and 15, consists of 13,760 analysis lane miles, which includes primary direction miles and secondary direction divided highway miles. The secondary direction mileage for this effort is 13,339 miles. 17.4% or 2,312 analysis lane miles are classified as urban.
1. For 13,760 analysis lane miles on the State System, the Consultant shall collect forward facing perspective images, right facing right-of-way images, pavement images and pavement distress data necessary to digitally quantify all of the requirements specified for this Project.
 2. For 13,339 secondary direction miles on the State System, the Consultant shall collect and provide forward facing perspective images and right facing right-of-way images.
- F.** Louisiana has 1,620 Ramps, Task 16 and 17, that comprise a total of 738 analysis lane miles.
1. For 738 analysis lane miles of Ramps, the Consultant shall collect forward facing perspective images, right facing right-of-way images, pavement images and pavement distress data necessary to digitally quantify all of the requirements specified for this Project.
 2. All Ramps shall be collected in the primary direction of travel only.
- G.** Louisiana has 545 analysis lane miles of Frontage/Service Roads, Task 18, 19, 20 and 21.
1. For 545 analysis lane miles of Frontage/Service Roads, the Consultant shall collect forward facing perspective images, right facing right-of-way images, pavement images and pavement distress data necessary to digitally quantify all of the requirements specified for this Project.
 2. For 545 secondary direction miles of Frontage/Service Roads, the Consultant shall collect and provide forward facing perspective images and right facing right-of-way images.

H. The distribution of the approximate Analysis Lane miles, by district, is shown in the following table.

Analysis Lane Miles										
SYSTEM	Totals	02	03	04	05	07	08	58	61	62
Interstate	1886	158	214	347	237	159	227	0	175	369
Non-Interstate NHS	3279	469	301	288	325	281	628	303	510	174
Local NHS	210	81	36	1	7	4	0	0	49	31
HPMS Entire Roadway	818	267	80	186	81	75	15	1	64	48
RHS	7067	571	1235	658	845	406	961	708	887	795
SHS	6694	301	934	1108	876	581	1144	484	533	733
STATE SYSTEMS -Primary Direction	13760	872	2169	1766	1722	987	2104	1192	1420	1528
STATE SYSTEMS -Secondary Direction	13162	656	2078	1673	1710	961	2037	1192	1365	1490
Frontage/Service Roads Primary Direction	545	59	154	30	37	63	36	0	76	89
Frontage/Service Roads Secondary Direction	545	59	154	30	37	63	36	0	76	89
Non-Interstate NHS & State System - Includes some divided highway analysis lane miles in the secondary direction										

1.1 Project Delivery Schedule:

The Consultant shall develop and present a Project Delivery Schedule for all tasks identified in for each cycle of the contract as well as the additional asset collection tasks

Under no circumstances shall the Consultant be allowed to back load the deliveries of the Tasks, or deliver significant portions of the Task. All tasks are expected to be evenly delivered during the appropriately identified Phase A or B, unless otherwise noted.

The Project Delivery Schedule shall, at a minimum, account for the following:

A. The delivery of all tasks outlined in Project Task List table.

1. Bi-weekly project status update meetings will be called and held by the Consultant. All appropriate DOTD personnel shall be invited. Any and all discussion related to the project specifics will be covered during this meeting.
2. For yearly (Phase A & B) Tasks 2 through 11, the Consultant is expected to provide the data collection and data delivery submittals as needed to comply with the delivery due dates. These deliveries are due on a bi-weekly basis. Federal deadlines eliminate options for timeline adjustments for task 2 through 9.
3. For Phase A, Task 12 and 18 (data collection), the Consultant is expected to provide early bi-weekly deliveries of task 12 and 18 as soon as they are approved to start capturing data.
4. For Phase A, Task 13 and 19 (data deliveries), the Consultant is encouraged to provide bi-weekly deliveries as soon as possible, and is required to start bi-weekly deliveries no later than May 1st and to complete those bi-weekly deliveries no later than September 30th.
 - a. This shall allow for a reasonable work load for the DOTD staff charged with QA/QC review and the delivery's final acceptance. The Consultant shall be allowed to capture and deliver these data/images in any reasonable order that fulfills the deliverables and shall no longer be required to sequentially capture these data/images in a district by district manner.
 - b. The data/image submittals must still have district identification information to allow separation by district in all data tables.

5. For Phase B, Tasks 14, 15, 20 and 21, the Consultant shall provide the deliverables as early as March 1st but no later than December 15th at the start of Phase B.
 - a. This basically requires the Consultant to capture these deliverables in Phase A, but for budget purposes DOTD cannot provide payment for these items in Phase A. DOTD expects this also proves to be a more efficient collection approach for the Consultant.
 6. For Phase B, Tasks 16 and 17, the Consultant is expected to provide bi-weekly delivery submittals in a manner that shall allow for the most reasonable work load for the DOTD staff charged with QA/QC review and the delivery's final acceptance.
 - a. The Consultant shall be allowed to capture and deliver these tasks in any reasonable order that fulfills the deliverables.
- B.** All data, data analysis, and image delivery, necessary to meet the requirements of the Project Task List, the analysis deliverables, and the documented requirements outlined in this Project.
- C.** Data collection cannot begin before contractual notice to proceed.
- D.** The "Preliminary Activities & Initial Pilot" shall be completed and accepted before general data collection can begin.
- E.** The Project Delivery Schedule shall be finalized and approved during preliminary activities.
 1. Preliminary Activities includes a review and acceptance of (SOP) Standard Operating Procedures, integrated with the QA/QC Plan.
 2. Data cannot be captured until the specific SOP and the QA/QC Plan are approved by DOTD.
- F.** The Consultant's submittals shall require completed QA/QC reviews and acceptance of deliverables for invoice approvals.
 1. The Consultant shall be advised if the submitted deliverables are accepted.
 2. If some percentage of a deliverable is not accepted, DOTD shall advise the Consultant of the specific problems, and the expected problem resolution. Once advised of such a need to resolve a problem, the Consultant is expected to resolve problem, at no additional cost to the DOTD, within fourteen (14) calendar days.

2.0 Scope of Work Elements

The scope of this Project shall cover all necessary engineering, GIS, technology and related services, including Quality Assurance and Quality Control, required to collect and analyze pavement distress data, various pavement attributes, pavement images, and forward facing perspective and right facing right-of-way images for other asset data inventory.

This data and image collection and analysis is primarily intended to provide, at a minimum, all the necessary information to assess current pavement conditions and to assist in projecting future pavement conditions in Louisiana to support both State and Federal Pavement Management and Asset Management requirements.

The following table provides an outline of the various Pavement Condition Measures.

**Asphalt & Composite Pavements
Pavement Condition Measures**

Asphalt Pavement Distress Types	Composite Pavement Distress Types	Units of Measure
Fatigue (Alligator) Cracking		Sq.Ft. (Wheelpath)
Longitudinal Cracking	Longitudinal Cracking	Linear Ft.
Transverse Cracking	Transverse Cracking	Linear Ft.
Patch\Patch Deterioration	Patch\Patch Deterioration	Sq. Ft. & Count
Potholes	Potholes	Sq. Ft. & Count
Rutting	Rutting	Inches
IRI	IRI	Inches / Mile
	Blowups	Sq. Ft. & Count
Fill Quantities	Fill Quantities	Cu. Ft.
High/Low Shoulder	High/Low Shoulder	Inches
Macrotexture	Macrotexture	Inches

**Jointed & Continuously Reinforced Concrete Pavements
Pavement Condition Measures**

Jointed Concrete Pavement Distress Types	Continuously Reinforced Pavement Distress Types	Units of Measure
Longitudinal Cracking	Longitudinal Cracking	Linear Ft.
Transverse Cracking	Transverse Cracking	Linear Ft.
Patch\Patch Deterioration	Patch\Patch Deterioration	Sq. Ft. & Count
Blowups	Blowups	Sq. Ft. & Count
IRI	IRI	Inches / Mile
Faulting		Inches
	Punchouts	Sq. Ft. & Count
High/Low Shoulder	High/Low Shoulder	Inches
Macrotexture	Macrotexture	Inches

These condition measures shall be configured and supplied to DOTD specification.

In addition to these measures, various condition indexes shall be generated from these measures and severity levels. These condition indexes would include, but are not limited to, indexes for fatigue (alligator) cracking, longitudinal cracking, transverse cracking, random cracking, rutting, roughness, patching and performance indexes.

2.1 Functional Requirements

This Project is designed to provide the necessary information to support both State and Federal Asset Management and Pavement Management requirements. DOTD is issuing this Project to continue its ongoing efforts to obtain all relevant information necessary to meet these requirements.

Quality Control is a mandatory requirement for INFRASTRUCTURE INVESTMENT AND JOBS ACT. Under no circumstances shall the Consultant be permitted to submit finalized summary data, where the raw data was not or could not be evaluated and validated by DOTD. Fully automated or black box generated final data shall not be accepted.

2.2 Technical Requirements

The Consultant shall use 3D technology system that was in “Technical Detail Response” (Reproduce below for quick reference) or DOTD approved equivalent.

Technical Detail Response		
Requirement	3D Equipment (List Sensors, etc.)	3D Specifications & Features (Provide All Informative Details)
Distance Measurement Instrument (DMI)	BEI DMI	-rugged duty heavy shaft revolutions per minute - accurate to +/-0.02% - validation of low speed requirements down to 12.5 mph - Meets requirements of ASTM E-950 and Class 1 instrument
Global Positioning System (GPS)	Trimble Differential Global Positioning (DGPS) System	-Twelve channel mobile receiver with Realtime DPGS services such as OmniStar and Coast Guard Beacon
Inertial Navigation System	Applanix Positioning and Orientation System for Land Vehicles (POS LV) 220	-IMU with Gyros and Accelerometers - Latitude, longitude, elevation and heading positioning accuracies within 1 ft -Pitch and roll: 0.020 degrees -Heading: 0.050 degrees Post Processing software=PosPac -With PosPac processing software accuracies achieved are sub-meter (less than 3 feet) in real-time and approximately 2 inches with post processing
Forward facing perspective images, right facing right-of-way images	Sony 320 Full High Definition (HD) Camera	-Filter diameter of 82 mm, pitch 0.75 mm (on lens) -Focal length of 5.8 mm to 93 mm (equivalent to 31.4 mm to 503 mm on 35 mm lens) -Focus: AF/MF/Full MF selectable -Iris: F1.9 to F16 and Close , auto/manual selectable -Zoom ratio of 16x (optical), servo/manual -3-chip 1/2 inch type EXMOR Full HD CMOS -True 24 -color pixel -Better adaptability for local environmental lighting conditions -MPEG-2 Long GOP Compression Resolution pixels=1920 x 1080 pixels Field of view=90 degree field of view Free-running frame rate of 30 frames per second

Longitudinal Profile International Roughness Index (IRI)	Laser SDP (South Dakota Profiler)	<ul style="list-style-type: none"> -Point laser roughness with GoCator line lasers as an option (4 inch (100 mm) scan width) -Collects longitudinal profile at user defined intervals as low as 0.5 inches -Military Grade Accelerometer -High accuracy: +/-5% of the measurements -Position Referencing Accuracy of 0.02% -Vertical resolution of 0.0004 inch -Travelled distance accuracy of 0.02% 		
		Validation of low speed measurements down to less than 15 mph		
		Meets all AASHTO standards and are ASTM Class 1 profilers (ASTM E-950)-Yes		
Pavement Images	Pave3D System	<ul style="list-style-type: none"> -High speed cameras, custom optics and laser line projectors to acquire both 2D (black and white intensity) and high resolution 3D profiles (surface elevations) of the road -Operation in all types of lighting conditions both during the day and at night without the need for artificial illumination of pavement -Sun and shadows as well as various types of pavement types ranging from dark asphalt to light colored concrete can be measured at highway speeds 		
		<ul style="list-style-type: none"> -High resolution 3D profiles (elevations) of road surface - Continuous collection of pavement images with no interruptions (or seams between images) -Pavement images for 100% of lane width (up to 14 ft) 		
Distress Crack Identification	Pave3D System	<ul style="list-style-type: none"> -0.04 inch transverse resolution and accuracy -0.02 inch Z-axis (depth resolution and accuracy) -Cracks as small as 0.04 inch width and length can be detected, 0.08 inch typical -Automated Crack Detection using Vision -Automated Detection of Pavement Type -Automated Detection of Joints -Automated Detection of cracks on JCP pavement due to the automatic removal of tining 		
Distress Crack Identification	Distress	Unit of Measure	3D Method	3D Accuracy
	Longitudinal	Linear Ft	Automated	+/-0.04"
	Transverse	Linear Ft	Automated	+/-0.04"
	Alligator (Fatigue)	Sq .Ft.	Automated	+/-0.04"
	Patching	Sq .Ft.&Cnt.	Manual	+/-5%
	Pothole	Sq .Ft.&Cnt.	Automated	+/-1%
	Blowups	Sq .Ft.&Cnt.	Manual	+/-5%
Rutting	Pave3D System	<ul style="list-style-type: none"> -2 Laser Profiles -Sampling rate of 5,600 profiles/s -4,096 points per profile -Profile spacing: 0.2 inches -Transverse field-of-view: maximum up to 14 ft -Depth of range of operations: 9.8 inches -Z axis (depth resolution): 0.02 inches -X-axis (transverse resolution):0.04 inches 		

Faulting	Pave3D System	-Pave3D Faulting -Transverse field-of-view: maximum up to 14 ft -Faulting Detected and Reported across the full width of the wheelpath -Z-axis (depth resolution): 0.02 inches -X axis (transverse resolution): 0.04 inches -Automatic detection of transverse joints
Macrotecture	Pave3D System	-Automated detection of pavement texture across the wheelpath or according to five AASHTO bands -Can measure for all road zones but report only for right wheel path -Transverse resolution of 0.04 inches Meets ASTM E1845-09 standard=Yes
Roadway Geometry	ARAN Roadway Geometry System	-Longitudinal grade accuracy of +/- 10% against rod and level requirements -Horizontal cross slope/super elevation (slope) accuracy of +/- 10% -Collection interval: exporting at intervals of <16 ft
Skid Resistance Testing		-Testing conducted at speeds of 40 mph or greater -Section length Testing Intervals are: LRS-ID Length # of Test 0 - 1 mile 5 1 - 3 miles 3 3 - 5 miles 2 Over 5 miles 1 -Skid (friction) summary report, GIS data and maps provided as deliverables
		Meets all requirements of ASTM E274, ASTM E501, ASTM E524=Yes

A. Equipment, Technology & Software Tool Requirements

1. Inertial Navigation System

- a. The Consultant shall identify all equipment and technical details included in the DCV that shall provide accurate and synchronized spatial location reference for the DCV.
- b. This includes all devices and technology such as real time kinematic Global Positioning System (GPS) technology, inertial measurement units (accelerometers, gyroscopes), distance measuring instruments, etc. required to provide roadway geometry (cross slope, super elevation(slope), grade, vertical curve, etc.), pavement elevations, stationing, latitude/longitude coordinates, pavement images, forward facing perspective images, right facing right-of-way images, pavement distress measures, etc.

This plan shall identify the technical details, procedures and methodology demonstrating how this equipment is configured and integrated to allow the field collected data, pavement imagery, and forward facing perspective images and right facing right-of-way images to be linked, synchronized and georeferenced.

- c. This plan shall identify how the Consultant shall deal with GPS signal loss and satellite outages.
- d. This plan shall identify how the Consultant shall deal with driver introduced bias.
- e. The Consultant shall collect the most accurate GPS coordinates possible.

1. The Consultant shall reference the Louisiana Transportation Research Center's Final Report 539 "DOTD Standards for GPS Data Collection Accuracy" found at https://www.ltrc.lsu.edu/pdf/2015/FR_539.pdf
 2. X and Y coordinates shall be reported in decimal degrees to six (6) decimal places. i.e. Latitude = 29.682063, Longitude = -91.006403
 3. Z coordinates shall be reported in feet to two (2) decimal places. i.e. 5.62 feet
 4. The Consultant shall use the LSU Center for GeoInformatics' (C4G) CORS network which is the vertical control standard for the State of Louisiana via the statewide Real Time Kinematic (RTK) Virtual Reference Station (VRS) service or Real-Time Network (RTN). The website for the C4G is <http://c4g.lsu.edu/>
 5. The Consultant shall acquire C4G's RTN services, which are automatically tied into the National Spatial Reference System (NSRS) and Louisiana's Vertical Geodetic Control throughout the entire State while receiving Real-Time Network GPS/GNSS positions.
 6. The Consultant shall use the CORS network, and all the base stations making up the network, for the post processing and correction of the differential GPS calculations.
 7. The Consultant shall adhere to all specifications and subscription requirements of the LSU's Louisiana Spatial Reference Center needed to ascertain the GPS calculations.
- f. All accuracies which are expected to be achieved by the proposed devices/equipment shall be defined, in appropriate places throughout the plan document and then summarized in the "Technical Detail Response" table. The plan shall also identify the accuracies for the data output by these devices/equipment when acquisition of the output data relies on multiple devices with different accuracies. This shall include both real time data capture accuracies and post processed data accuracies.
2. **Synchronization of Data & Images with Global Positioning System (GPS); Geographic Information System (GIS); & Linear Reference System (LRS)**
 - a. The Consultant shall provide details for all aspects of data/image collection and reporting with respect to location reference and data/image synchronization.
 - b. All required deliverable data, pavement images, forward facing perspective images and right facing right-of-way images shall include all necessary location references per this section.

This plan shall identify the technical details, procedures and methodology demonstrating how the field collected data, pavement imagery, and forward facing perspective images and right facing right-of-way images shall be captured, linked/synchronized and referenced to GPS, and the LRS using GIS technology DOTD standard ESRI Arc GIS v10.7 or later file geodatabase.

 1. The primary Linear Reference System (LRS) is a Control Section, log mile based system that includes starting and ending descriptive information.
 2. DOTD is in the process of transitioning from this corridor based Control Section system LRS (XXX-XX-X-XXX) that provides a unique identifier for each segment of roadway within the control section corridor to a Statewide Route LRS called Route ID

(XXX_XXXXX_X_X_XXX). Generally the Control section based LRS has shorter segments (up to 50 miles). The Route ID system is the sum measurement for the entirety of the route. I-10 for example spans border to border of Louisiana and is approximately 300 miles as measured by the ROUTE ID LRS, while the Control Section based LRS has several sections of I-10 at smaller lengths.

3. All databases, tables, and documents that reference along a roadway should include Route ID along with the LRS_ID reference.
4. The Consultant is required to report both the Control Section and LRS_ID location information in the first Phase of the contract data and image delivery.
- c. The plan shall identify what data/images are synchronized in real time during data/image capture and what data/images are synchronized in a post processed method. This shall be identified for all data/image collection requirements, including optional items defined in this document.
- d. This plan shall identify the procedures and methodologies for identifying data/image start and stop locations, lead-ins/lead-outs and under runs/over runs. These procedures and methodologies must receive approval from DOTD before use to submit data or images.
- e. This plan shall identify expected positional accuracies for the synchronized locations either in this section or in the Inertial Navigation Section.
- f. The Consultant can offer special provisions with respect to this requirement, not specified here. If DOTD feels that these special provisions provide a valid capability that enhances or improves this requirement, DOTD reserves the right to consider this extra functionality relevant in the selection process.
- g. The Consultant shall be required to provide a software viewing tool that allows DOTD to perform both QA/QC on the data/image synchronization as well as to use this viewing tool for later data analysis.

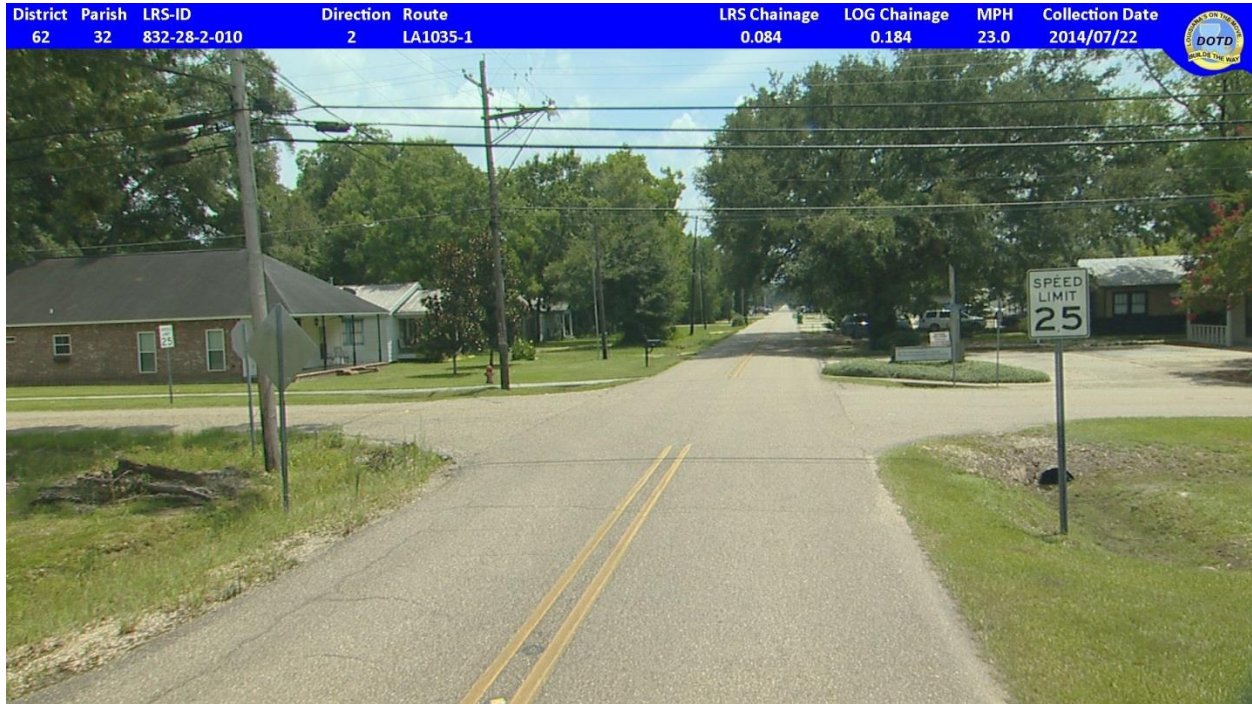
3. Forward Facing Perspective & Right Facing Right-of-way Image Camera Requirements

- a. The Consultant shall provide details for all aspects of forward facing perspective and right facing right-of-way color image collection and reporting.
- b. The Consultant shall use two motion picture quality cameras with three (3) EXMOR Full HD CMOS sensors, or DOTD approved equals. The lens package shall include auto focus and auto iris adjustment capabilities for varying light conditions due to underpasses and tree canopied areas. The SOP shall include the Consultant's proposed cameras for this requirement.

It is preferred that the forward facing perspective and right facing right-of-way cameras be mounted in an environmentally secure enclosure(s) above the DCV cabin to afford maximum visibility for the driver. Camera enclosures shall have temperature control devices or other means to eliminate fogging and condensation on both the enclosure and the camera lens. In addition, camera lens and enclosures shall be cleaned regularly to prevent a buildup of road debris and bugs.

- c. The forward facing perspective camera shall be angled to optimize the view of the entire roadway, shoulders and overhead roadway signs.
 - 1. This camera shall have a sky to pavement ratio of sky 45% / pavement 55%.
 - 2. This camera shall have a left to right ratio of left 60 % / right 40%
- d. The right facing right-of-way camera shall be angled to optimize roadside asset inventory collection.
 - 1. The final angle of this camera shall be approved by DOTD.
- e. Cameras are to be calibrated and aligned to meet DOTD requirements for this Project. Once camera positioning and angle are accepted by DOTD, they must be maintained for the course of the Project. Any deviation of the accepted camera positioning and alignment may result in re-collection of affected LRS-ID at the Consultants expense.
 - 1. The Consultant shall validate continuous camera alignment in calibration reporting.
- f. The forward facing perspective and right facing right-of-way camera images shall be collected at DMI intervals sufficient to provide the optimum image, and image quality, for asset image identification and collection.
 - 1. The images are expected to represent a 0.004 miles (21.12 feet) segment length.
 - 2. These images shall be delivered in a JPEG format.
- g. All image locations shall be identified to the nearest thousandth (0.001) mile increment (5.28 feet) or better in the data submittals.
- h. All image locations shall also be identified by their GPS coordinates in the data submittals.
 - 1. All JPEG images shall also be either geocoded or geotagged with GPS coordinates.
- i. The resolution of the collected images shall not be less than 1920 pixels x 1080 pixels or as approved by DOTD.
- j. The Consultant shall collect and deliver the forward facing perspective and right facing right-of-way digital color images, in JPEG format, on external hard drives (USB 3.0) or on other pre-approved storage media.
- k. Upon approval and acceptance of images by DOTD, the Consultant shall add “Header Information” to the final JPEG image submittals identifying the district, the parish, the LRS-ID, the direction of travel, the route, the direction of travel chainage, the primary direction chainage, the vehicle speed, the collection date and the DOTD Logo for image source reference. A sample image is provided below for reference.
 - 1. The “Header Information” shall represent, except for collection date, the QA/QC approved final data, not the raw data collected in the field.
 - 2. DOTD reserves the right to require additional and/or different “Header Information” not identified above, from other captured data in the Raw Data File.

3. “Header Information” is required to assist field staff in locating pavement or asset issues and to identify the source of the image.



4. Pavement Data and Image Capture Requirements

- a. The Consultant shall provide details for all aspects of downward pavement data and image collection and reporting.
- b. The Consultant shall use the 3D specifications that were specified in their proposal for original contract under sensor technology in “Technical Detail Response” table.
 1. Appropriate compression technology should be used to reduce data and image storage capacity requirements.
- c. The system shall capture clear, high resolution digital pavement images, in JPEG format, that represent the width of transverse road section, including the shoulder and pavement edge for high/low shoulder measures.
- d. The imaging system shall be configured to allow for the optimum contrast and visibility of transverse and longitudinal cracks via laser lighting to eliminate shadows and variations in ambient lighting.
- e. The resolution of pavement images should be sufficient, under optimal conditions, to identify cracks of 0.04 inch (1 mm) width in both the transverse and longitudinal directions when traveling at survey speeds, or to the lowest measure that can be practically or reasonably achieved with 3D technology.
 1. The Consultant shall document both the ideal condition minimum crack width measurement and the reasonable minimum crack width measurement in the “Technical Detail Response” table.

2. The Consultant shall process these images in a manner that shall synchronize, properly overlap and fuse or stitch together these images into one uninterrupted continuous pavement JPEG image for the section length of 0.004 miles (21.12 feet).

The Consultant shall use a semi-automated solution to quantify pavement cracking, or rate the pavement distresses, with manual assistance as necessary, per the Louisiana Distress Identification Protocols.

- f. The Consultant shall generate color coded digital line work and grids representing the various distress types and severity. This rating shall be indicated on the stitched pavement images identified in this section, which shall be submitted for QA/QC purposes.
 1. Pavement images shall be used to measure line work, grids, etc., so they must be of sufficient quality to allow this to occur.
 2. DOTD shall have final approval over size, shape, color, patterns, etc. for this line work.
- g. For QA/QC purposes, all pavement distress data and pavement management data shall be synchronized and linked to the pavement images, forward facing perspective images and right facing right-of-way images for viewing and data analysis purposes, via the Software Viewing Tool identified in this Project.
- h. The Consultant shall furnish the stitched and rated images on external hard drives (USB 3.0) or on other pre-approved storage media.
- i. Pavement Images shall not be collected during times when the visibility of cracking and other distress forms are continuously obstructed by road conditions. This includes, but is not limited to, water on the pavement surface and either sand or mud on the pavement surface, etc. Locations with unacceptable pavement image quality shall be collected again at no additional cost to DOTD.
- j. All image start locations shall be identified to the nearest thousandth (0.001) mile increment (5.28 feet) or better and also include GPS coordinates.
- k. All pavement JPEG images should also be either geocoded or geotagged with GPS coordinates.

5. Software Viewing Tool

- a. The Consultant shall provide an application, preferably web based, that provides a user customizable workspace that shall allow simultaneous viewing of synchronized pavement images and/or forward facing perspective images and/or right facing right-of-way images with either QA/QC level data for high level “super” users or with selected distress data and/or pavement management data summarized to tenth (0.100) mile segments for general user.
 1. The Consultant shall provide all necessary software licenses (if applicable).
 2. The pavement images, forward facing perspective images and right facing right-of-way images for this viewing tool shall be in thumbnail format and shall be 243 x 397 pixels or as approved by the DOTD. When DOTD staff decides to investigate a point of concern, the ability to easily pull up the full size image, represented by the thumbnail image, is required to view details that are more extensive.

- b. The Consultant shall provide extensive details outlining all capabilities of this software-viewing tool. This shall include the most recent version of the training manual.
 - 1. The Consultant may be required to demonstrate this solution using data collected and processed for field trials.
 - 2. The Consultant shall provide training classes yearly for this solution to approximately 25 people per class, at no additional charge to DOTD. DOTD shall work with the Consultant to schedule these training dates.
- c. This solution shall have the ability to export data for use in DOTD's Pavement Management System in an approved data format provided by DOTD.

6. Software Data Processing & Management Tool

- a. The Consultant shall provide an application and database that provides full data processing, analysis and management capabilities on all distress data and/or pavement management data. This application shall also need to validate, and if necessary, manage the synchronization requirements for pavement images and/or forward facing perspective images and/or right facing right-of-way images and all data.
 - 1. This solution shall host the "Raw Data Files" that is expected to be the original data source for both the QA/QC Electronic Data Files and the Summary Data Files. It shall contain data at increments relative to the capabilities of the data collection technology, which shall be generally termed "Raw Data" and shall provide DOTD with the opportunity to look at a more detailed level of data than the summary provided in the Electronic Data Files.
 - 2. The Electronic Data Files shall generally summarize data to 0.004 mile (21.21 foot) lengths.
 - 3. The Summary Data Files shall generally summarize data to 0.100 mile (528 foot) lengths.
 - 4. Additional Data Files, as noted via various data dictionaries, shall be delivered as per the details outlined for those data dictionaries.
 - 5. The Consultant shall provide all necessary software licenses (if applicable).
- b. The Consultant shall provide extensive details outlining all capabilities of this data management software tool. This shall include the most recent version of the training manual.
 - 1. The Consultant may be required to demonstrate this solution using data collected and processed for field trials.
 - 2. The Consultant shall provide training classes yearly for this solution to approximately 25 people per class, at no additional charge to DOTD. DOTD shall work with the Consultant to schedule these training dates.
- c. This solution shall have the ability to export data for use in DOTD's Pavement Management System.

7. Software Asset Inventory Capture Tool

- a.** The Consultant shall provide an application, preferably web based, that provides full data capture functionality necessary for asset inventory capture, using the forward facing perspective images and/or right facing right-of-way images.
 - 1.** The Consultant shall provide all necessary software licenses (if applicable).
 - 2.** Potential asset inventory items may include, but are not limited to, traffic signals, signs, sign structures, guardrail, guardrail end treatments, crash attenuators, high mast lighting, cable barriers, etc.
- b.** This application shall be required to engage the DMI measures, the inertial navigation system, the location reference system and/or the Geographic Information System in whatever manner necessary to accurately geo-reference and location reference the asset.
 - 1.** The location data shall be provided by the Consultant in the Asset Inventory Capture Tool data files, near the end of each A or B Phase, or as directed by DOTD. It is the intent of DOTD to allow for all final location corrections to occur prior to delivery of this location data.
 - 2.** These location data files shall allow the data to be associated by districts.
 - 3.** These location data files shall not be a separate task, or payment item, since this data is already captured for, and paid for by, other task.
- c.** The application shall be capable of acquiring accurate linear measurements from the forward facing perspective images and/or right facing right-of-way images.
- d.** The Consultant shall provide extensive details outlining all capabilities of this asset inventory capture software tool. This shall include the most recent version of the training manual.
 - 1.** The Consultant may be required to demonstrate this solution using images collected and processed for field trials.
 - 2.** The Consultant shall provide one (1) training class for this solution to approximately 25 people, at no additional charge to DOTD. DOTD shall work with the Consultant to schedule the training date for this class.

B. Pavement Condition Measures

All pavement condition measures shall be reported in the appropriate data shell per the appropriate data dictionary for that measure. The Consultant can choose to submit separate data tables for each data dictionary or can submit a single data table with appropriate filters and defined queries that allow for differentiation of the data deliveries. DOTD shall have final approval and acceptance for either of these chosen delivery methods. The items that follow provide additional information relative to providing the data to populate the data dictionary tables. Refer to the data dictionary for full deliverables and details.

1. Pavement Distress Cracking

- a.** The Consultant shall provide details for all aspects of cracking data collection and reporting.

- b. The Consultant shall conform to the Louisiana Distress Identification Protocols, or later versions, is required.
- c. The Consultant shall identify if and when the proposed technology can identify cracks of 0.04 inch (1 mm) width per the proposed INFRASTRUCTURE INVESTMENT AND JOBS ACT Notice of Proposed Rules. The Consultant shall identify the lowest theoretical measure possible, and the lowest measure that can be practically or reasonably achieved, with 3D technology.
- d. All distresses, and calculated indexes, shall be evaluated and reported in tenth (0.100) mile increments.
- e. The Consultant shall provide data as defined in the Louisiana Distress Identification Protocols.
- f. The Consultant shall report condition data for all analysis lane miles, excluding Local Roads, described in the section “System Description”. Local Roads shall be addressed differently as defined in this Project.
- g. The Consultant shall report all condition data by Control Section logmile, LRS-ID logmile and GPS coordinates.
- h. Visual distress identification and quantification in real time from the DCV shall not be allowed.

2. Roughness – (IRI) International Roughness Index

- a. The Consultant shall provide details for all aspects of IRI data collection and reporting.
- b. The Consultant shall identify the lowest allowable speed at which their DCV can accurately capture valid IRI measurements within this SOP.
- c. Conformance to the ASTM E950-09 Standard Test Method for Measuring the Longitudinal Profile of Traveled Surfaces with an Accelerometer Established Inertial Profiling Reference, or its latest version, is expected.
- d. Conformance to the AASHTO R43-13 Standard Practice for Quantifying Roughness of Pavements, or its latest version, is expected.
- e. The longitudinal profile of a pavement surfaces, shall be captured in both wheel paths, for 100% of all Analysis Lane Miles. Roughness data shall be acquired using a Class II laser type profiler supplied and calibrated using the Quarter Car Simulation approach via 3D system specified in original contract proposal.
- f. International Roughness Index (IRI) shall be reported in units of inches/mile.
- g. For QA/QC purposes, IRI values shall be summarized in section lengths of 0.004 miles (21.12 feet) in the Electronic Data Files.
- h. In addition, longitudinal profile data should be stored in Raw Data Files for every one (1) inch of pavement, while the computed IRI values shall be summarized and retained for every four (4) inches of pavement in the left wheel path and the right wheel paths, along with the standard deviations of the left and right wheel paths. These values shall be made available to DOTD for further review via the Software Data Processing & Management Tool.

- i. For Reporting purposes, computed IRI values shall be averaged and reported for each tenth (0.100) mile segment (528 feet) for both the left and right wheel paths in the Summary Data File. These reports shall include an average IRI for the tenth (0.100) mile segment.

3. Faulting

- a. The Consultant shall submit provide details for all aspects of Faulting data collection and reporting.
- b. The Consultant is expected to exceed the requirements of the AASHTO R36-13 Evaluating Faulting of Jointed Concrete Pavements (JCP) as defined below.
- c. The Consultant shall be required to capture and deliver faulting data, longitudinally, in the right wheel path only, for 100% of the analysis lanes on all jointed concrete pavements.
 - 1. The Consultant must be able to synchronize the pavement image with the data, and then identify the actual location of all construction joints for the jointed concrete pavement via pavement images. Real time fault data capture and reporting shall not be acceptable. The Consultant shall not be allowed to solely establish joint detection or location via algorithms such as ProVal or via a pre-defined nominal joint spacing variable such as 20 foot spacing.
 - 2. Joint location can be programmatically determined, but the final actual joint locations must be manually validated, prior to determine faulting values.
- d. The Consultant shall then post process the faulting data to determine the value of all faults at these actual defined joints, using no minimum faulting threshold.
- e. Faulting depth data shall be captured and reported to the nearest 0.04 inch (1 mm), or to the lowest measure that can be practically or reasonably achieved with the 3D system.
- f. Where the "approach" slab is higher than the "departure" slab, faulting shall be reported as a positive (+) fault. Where the "approach" slab is lower than the "departure" slab, faulting shall be reported as a negative (-) fault.
- g. The average faulting for each tenth (0.100) mile increment (528 feet) shall be calculated using the absolute value of all fault measures, including fault measures of (0.0 inch) values and using the actual number of manually identified joints.
- h. For QA/QC purposes, post process generated faulting values, using no minimum fault threshold, shall be provide in a separate table in the Electronic Data Files at each defined joint.
 - 1. Also the location of each defined joint shall be provided to the nearest thousandth (0.001) of a mile (5.28 feet), control section logmile, LRS-ID logmile, and GPS coordinates.
 - 2. The defined joint locations shall also be identified via some type of colored marking, on the submitted pavement images supplying the pavement distress data for QA/QC.
- i. For Reporting purposes, the maximum positive fault, maximum negative fault, the computed average faulting and the number of identified joints for each tenth (0.100) mile increment (528 feet) shall be reported in the Summary Data File. This reporting data shall

be compiled from the faults derived using defined joints using no minimum fault threshold.

4. Rutting

- a. The Consultant shall provide details for all aspects of rutting data collection and reporting. Fill quantities and high/low shoulder data collection and reporting shall be required and require an SOP. These items shall, as determined by the Consultant, be included in the Rutting SOP or they shall have their own SOP.
- b. Conformance to the AASHTO PP 38-00 (2006) Standard Practice for Determining Maximum Rut Depth in Asphalt Pavements, or later version, is expected.
- c. Rutting depth shall be captured and reported in units of inches, to the nearest 0.04 of an inch (1 mm), or to the lowest measure that can be practically or reasonably achieved with 3D specifications in original contract proposal.
- d. For QA/QC purposes, computed rutting data shall be summarized in section lengths of 0.004 miles (21.12 feet) in the Electronic Data Files, for the left wheel path and the right wheel paths.
 1. Rutting **shall NOT** be identified on the submitted pavement images supplying the pavement distress data for QA/QC.
- e. For Reporting purposes, the average rut depth shall be reported for each tenth (0.100) mile increment in the Summary Data File.
 1. The maximum rut depth for each tenth (0.100) mile increment shall also be reported.
 2. The count of rut depth measures, identified at each 0.004 miles (21.12 feet) measure, that exceed 0.40 inches, summarized for each tenth (0.100) mile increment shall be reported.
 3. **Fill Quantities** shall be calculated and reported to identify the volume of asphalt necessary to fill ruts for each tenth (0.100) mile increment. These fill quantities shall be reported in cubic feet.

5. High/Low Shoulders

- a. The Consultant shall capture the elevation difference between the right side shoulder and pavement edge, regardless of the shoulder type. This value shall be measured in units of inches, to the nearest 0.04 of an inch (1 mm), or to the lowest measure that can be practically or reasonably achieved with 3D technology.
 1. Where the "shoulder" is higher than the "pavement edge", the value shall be reported as a positive (+) value. Where the "shoulder" is lower than the "pavement edge", the value shall be reported as a negative (-) value.
- b. For QA/QC purposes, high/low shoulder data shall be summarized in section lengths of 0.004 miles (21.12 feet) in the Electronic Data Files.
- c. For Reporting purposes, the high/low shoulders shall be averaged and reported for each tenth (0.100) mile increment in the Summary Data File.

1. The number of high shoulders exceeding (2) two inches, for each tenth (0.100) mile increment, shall also be reported in the Summary Data File.
2. The number of low shoulders exceeding (-2) negative two inches, for each tenth (0.100) mile increment, shall also be reported in the Summary Data File.

6. Macrotexture

- a. The Consultant shall provide details for all aspects of Macrotexture data collection and reporting.
 1. DOTD only intends to use this data to provide appropriate information for Friction calculations. So 3D capabilities must demonstrate, if possible, how the data can be supplied for the area represented by the right wheel path.
- b. Conformance to the ASTM E1845-15 Standard Practice for Calculating Pavement Macrotexture Mean Profile Depth, or later version, is expected.
- c. The Consultant shall provide the Mean Profile Depth, the Root Mean Square and the Percentage of Valid Samples, for the right wheel path, for 100% of all pavements.
- d. The sampling frequency shall comply with the ASTM E1845-15 specification.
- e. The Percentage of Valid Samples, as defined by ASTM E1845-15, must remain above 90% or the data shall be recollected.
- f. The Mean Profile Depth and Root Mean Square shall be identified in units of inches to four (4) decimals.
- g. For QA/QC purposes, macrotexture data shall be summarized in section lengths of 0.004 miles (21.12 feet) in the Electronic Data File.
- h. For Reporting purposes, RMS, MPD & Percentage of Valid Samples shall be reported for each tenth (0.100) mile increment in the Summary Data File.

7. Pavement Grade Classification & HPMS Reporting

- a. The Consultant shall provide details for all aspects of Grade data collection and reporting.
- b. Conformance to the most current Highway Performance Monitoring System Field Manual is expected.
- c. Grade classifications shall be captured and reported per HPMS Item 45: Grades A through Grades F for all pavement sections as shown below.

Grade Classification	Percent Grade
A	0.0 – 0.4
B	0.5 – 2.4
C	2.5 – 4.4
D	4.5 – 6.4
E	6.5 – 8.4
F	8.5 or greater

- d. Should the HPMS Grade designation or segregation change, as a result of INFRASTRUCTURE INVESTMENT AND JOBS ACT during this contract, the Consultant shall make the necessary adjustments to provide the new deliverables without additional compensation.
- e. For QA/QC and Reporting purposes, the Consultant shall report the various grade classification data in a Grade data table, with the data as identified in the “Grade” Data Dictionary, summarized to tenth (0.100) mile increments.
- f. For Reporting HPMS sections only, the Consultant shall generate another separate HPMS Grade data table, with the same data as identified in the “Grade” Data Dictionary summarized to tenth (0.100) mile increments.

8. Vertical Curve Classification

- a. The Consultant shall provide details for all aspects of Vertical Curve data collection and reporting.
- b. Vertical Curve classifications shall be captured and the following table for all pavement sections.

Curve Classification	Degrees
A	Under 3.5 degrees (i.e., 0.061 radians)
B	3.5 – 5.4 degrees (i.e., 0.061 – 0.094 radians)
C	5.5 – 8.4 degrees (i.e., 0.096 – 0.147 radians)
D	8.5 – 13.9 degrees (i.e., 0.148 – 0.243 radians)
E	14.0 – 27.9 degrees (i.e., 0.244 – 0.487 radians)
F	28 degrees (i.e., 0.489 radians) or more

- c. For QA/QC and Reporting purposes, the Consultant shall report the various vertical curve classification data in a Vertical Curve data table, with the data as identified in the “Vertical Curve” Data Dictionary, summarized to tenth (0.100) mile increments.

9. Pavement Curve Classification & HPMS Reporting

- a. The Consultant provide details for all aspects of Horizontal Curve data collection and reporting.
- b. Conformance to Item 43 Curves A through Curves F (Curve Classification), in the most recent Highway Performance Monitoring System Field Manual.

- c. Horizontal Curve classifications shall be captured and reported for all pavement sections, as shown below.

Curve Classification	Degrees
A	Under 3.5 degrees (i.e., 0.061 radians)
B	3.5 – 5.4 degrees (i.e., 0.061 – 0.094 radians)
C	5.5 – 8.4 degrees (i.e., 0.096 – 0.147 radians)
D	8.5 – 13.9 degrees (i.e., 0.148 – 0.243 radians)
E	14.0 – 27.9 degrees (i.e., 0.244 – 0.487 radians)
F	28 degrees (i.e., 0.489 radians) or more

- d. Should the HPMS Horizontal Curve Classification or segregation change, as a result of INFRASTRUCTURE INVESTMENT AND JOBS ACT during this contract, the Consultant shall make the necessary adjustments to provide the new deliverables without additional compensation.
- e. For QA/QC and Reporting purposes, the Consultant shall report the various curve classification data in a separate Horizontal Curve data table, with the data as identified in the “Horizontal Curve” Data Dictionary summarized to tenth (0.100) mile increments.
- f. For Reporting HPMS sections only, the Consultant shall generate another separate HPMS Horizontal Curve data table, with the same data as identified in the “Horizontal Curve” Data Dictionary summarized to tenth (0.100) mile increments.

10. Continuous Friction testing

- a. The Consultant shall provide details for all aspects of Continuous Testing data collection and reporting.
- b. The measuring system shall consist of a vehicles equipped with a data collection computer.
- c. For continuous Friction Testing consultants will be required to collect and deliver data in accordance with AASHTO TP-143 (2021) “Continuous Measurement of Sideway-Force Friction Number for Highway Pavements”. The Tire specified in this publication will suffice for data collection.
- e.d. The data collected shall include friction values obtained according fixed-slip (ASTM E 2340), sideway force coefficient, and variable-slip (ASTM E 1859) (Henry 2000). These high-speed methods are operated at a fixed speed, generally between 30 and 50 mph, while they simultaneously wet the surface with a user-defined, uniform water film thickness on the pavement surface in front of the test wheel(s), usually 0.0197 inches (0.5 mm).
- d.e. The friction values at all locations shall be obtained for two tire types within 0.5 miles of each other, the standard rib (tread) tire, as prescribed in ASTM E501 Standard Specification, and standard smooth (blank) tire as prescribed in ASTM E524 Standard Specification.

- e.f.** Each wheel of the trailer shall be equipped with a transducer to measure the vertical and horizontal load experienced by the wheel. The trailer shall also be equipped with a water dispensing nozzles for each wheel, which shall spray water onto the road surface ahead of each test to simulate wet weather conditions.
- f.g.** The measuring system shall have an annual certification of calibration and correlation conducted at a nationally recognized certified friction measuring system evaluation site such as Central/Western Field Test and Evaluation Center located in College Station, TX or Eastern Field Test and Evaluation Center located in East Liberty, OH.
- g.h.** The Consultant shall conduct additional check runs against local sites, selected by the department, to ensure proper calibration and accuracy of the system, in the event of any repairs having to be performed on the mechanical or electronics of the system while the Consultant is in the process of collecting data for this contract.
- h.i.** The Consultant shall create a calibration factor from the old data (Skid testing) using a minimum of 100 miles of roads.
- i.j.** The Consultant shall link the Testing measuring system to the DCV's DMI (Distance Measuring Instrument). The Consultant must follow all DMI calibration protocols outlined in this Project.
- j.k.** DOTD shall identify the analysis lane miles each year.
- k.l.** The test speed should be conducted at 40 mph within ± 1 mph where the speed limit is below 50 mph and at a speed of 50 mph within ± 1 mph where the speed limit is greater than 50 mph.
- l.m.** All bridge decks, that have a different surface material than the pavement prior to the bridge, shall be tested separately, in accordance to its length, in the appropriate intervals that are described above.
- m.n.** If Consultant proposes to use multiple skid testing units, it shall be demonstrated that all vehicles are calibrated to produce measurement differences 5% or less between units. This demonstration must be documented and reported in writing to the DOTD. The units must be identified with a unique number and that number must accompany all data reported from that unit.
- n.o.** For QA/QC and Reporting purposes, the Consultant shall generate separate Friction data table, with the same data as identified in the "Friction" Data Dictionary.
1. The Friction data shall be reported at the appropriate locations where it is collected per the testing frequency intervals.

2.3 Project Requirements

A. Quality Control Plan

The Consultant shall submit a Quality Control Plan that provides extensive details of their quality control methods, procedures, and protocols. The QC Plan shall be integrated with the required SOPs, and their requirements, identified in this Project.

This QC Plan shall require the Consultant to assure that data is collected accurately and that data quantification reflects actual pavement condition, within the requirements in this Project. The

Consultant's personnel shall work with DOTD to analyze and review the data and immediately reschedule data/image capture for any section found to be invalid.

DOTD expects the Consultant to fully cooperate with DOTD with respect to the QC plan. This implies that the necessary efforts by the Consultant to repair, recapture, or in some manner correct all issues that arise, in a mutually agreed upon solution, shall occur.

DOTD reserves the right to require additional procedures, methods, protocols, data items, reporting measures or any reasonably appropriate modifications to the Consultant's QC plan when issues arise that could jeopardize successful capture and delivery of these Project requirements.

In addition to the QA/QC requirements identified throughout this Project, the QC plan shall also address, but is not limited to, the following items.

1. Equipment Calibrations & Camera Maintenance

- a.** All equipment calibrations and camera maintenance are to be performed in accordance with specific manufacturer recommendations.
- b.** Equipment calibrations refer to anything that requires proper/regular calibration to ensure that it is in proper working order and shall produce expected, acceptable results.
- c.** A regular maintenance and testing program of the equipment and cameras, in accordance with the manufacturer's recommendations, shall be performed and documented by the Consultant.
- d.** DOTD shall establish Primary Baseline calibration sites. Prior to being authorized by DOTD to collect data, the Consultant's Data Collection Vehicle (DCV) shall be calibrated to a Primary Baseline calibration site. Data acquisition and data evaluation shall be performed at least three times on each pavement calibration section to allow for the calibration of electronic sensor data. Such calibration must be maintained for the duration of subsequent data collection. The electronic sensor data shall be evaluated for accuracy, under DOTD supervision, as appropriate for the equipment.
- e.** Calibrations shall be repeated as needed, or as defined further in following sections.
- f.** All calibrations procedures performed during this Project, along with the recorded calibration data, are to be documented (i.e., results from tests are recorded and any corrective action taken shall be explained in detail) and reported to DOTD on a monthly basis.
- g.** The Consultant's Final Report shall also document the calibration procedures, the calibration data that was collected and any corrective action taken and explained in detail.
- h.** DCVs that leave the State, require repairs, to either the vehicle or data collection equipment, or are out of service for an extended period of time, must be recalibrated on the DOTD approved Primary Baseline calibration sites.
- i.** DCVs must be recalibrated at least once per month at DOTD approved Primary Baseline calibration sites, or as directed by DOTD.

2. Quality Control Verification Sites

- a.** The Consultant shall calibrate all DCV's on the DOTD baseline Primary Baseline calibration sites prior to a DCV collecting any data and also just prior to establishing a (DQCVS) District Quality Control Verification Sites in a district.
- b.** During the first week of data collection in each new district, a DQCVS shall be established by the Consultant on a Control Section. The Consultant shall establish a DQCVS with known IRI and Rutting or Faulting values. Separate DQCVS sites are required for each district.
- c.** For subsequent ongoing data collection within a particular district, the DQCVS shall be run weekly by each DCV and compared with the original data collected for that section. The Consultant shall evaluate these measurements to determine the accuracy of field measurements and to identify needed equipment recalibrations at the Primary Baseline calibration sites.
- d.** All weekly DQCVS data collection shall be documented in writing and electronically (digital images with electronic sensor data) and both shall be delivered to DOTD in monthly reports.

3. Distance Measuring Instrument

- a.** The Consultant shall calibrate the DMI (Distance Measuring Instrument) using Primary Baseline calibration sites provided by DOTD.
- b.** The Consultant must provide all findings, inclusive of the calibration number before the calibration process, the calibration number after the calibration process, location of the calibration site, DOTD provided length of the calibration site, and length of calibration site as measured by the DMI before and after calibration, and list any discrepancies found during the calibration process.
- c.** The calibration of the DMI shall be reported monthly to DOTD. The report shall include any discrepancies that are found, the corrective action taken, and a detailed explanation of the matter.
- d.** The Consultant's Final Report shall also document DMI calibration details.

4. Inertial Navigation System, LRS, GIS

- a.** The QC Plan shall define the quality assurance methods and procedures in place to ensure that both georeferenced, and location referenced, data and images are located within proposed precision and accuracies.
 - 1.** The Consultant shall reference the Louisiana Transportation Research Center's Final Report 539 "DOTD Standards for GPS Data Collection Accuracy" found at https://www.ltrc.lsu.edu/pdf/2015/FR_539.pdf
- b.** The Consultant shall report monthly all calibration details and efforts to ensure accurate coordinates and location reference is occurring.

5. Manual Distress Rater and Review of Automated Distress Ratings

- a.** The QC Plan shall include the requirements outlined in this section.

- b. When manual rating of various pavement distresses/conditions are provided, or when distress rating review of automated distress identifications are provided, the Consultant shall provide a data quantification rating/review process which shall include a rater training plan and ongoing rater consistency testing for the data quantification or review.
- c. The data quantification rating/review process shall assure rater accuracy and consistency, throughout the state, over the Project duration for the distresses being rated.
 - 1. For manual rating, the data collection and quantification process should be applied in the same manner by all raters using the process. The plan must address the methods to demonstrate and monitor rater consistency throughout the entire data collection and quantification process.
 - 2. For review of automated rating, the plan must address how reviewers provide consistency via the methods and procedures in place to validate automated ratings.
- d. The Consultant shall be required to have a unique identification of both their DCV's and their raters, to facilitate comparison and to aid in the determination of the consistency of both.
- e. The data quantification rating process must be approved by DOTD prior to implementation.
- f. The Consultant shall provide monthly reports of the results of the data quantification rating process, for the duration of the Project, and summarized the test results in the final report.

6. Forward Facing Perspective and Right Facing Right-of-way Image Capture

- a. The QC Plan shall define the quality assurance methods and procedures in place to ensure appropriate image capture.
- b. The Consultant shall document the following in monthly reports.
 - 1. Daily validation of clean enclosures and/or camera lenses for Forward Facing Perspective and Right Facing Right-of-way Cameras.

7. Pavement Data and Image Capture

- a. The QC Plan shall define the quality assurance methods and procedures in place to ensure appropriate pavement data and pavement image capture.
- b. The Consultant shall document daily validation of functioning sensors and pavement imaging cameras in the monthly reports.
- c. The pavement view camera image shall be measured and verified by using the Consultant's crack detection/measurement system to determine the actual footprint (width) of the image for each Data Collection Vehicle (DCV) prior to data collection. That footprint image must be maintained for the duration of the contract. The Consultant shall be required to verify daily that the DCV(s) footprint is the same as the previous day. Such verification shall be documented (i.e., results from tests are recorded and any corrective action taken explained in detail) and reported in monthly reports.
 - 1. These items shall also be included as an appendix in the final report.

2.4 Deliverables

2.4.1 Preliminary Activities & Initial Pilot (Task 1)

A. Consultant Responsibilities

1. Following the Notice to Proceed, the Consultant shall attend meetings and discussions with DOTD personnel to finalize the deliverables, methods, technical requirements, procedures and guidelines for the Project.
2. The Consultant in conjunction with DOTD shall develop and finalize the invoicing and Project delivery schedule.
3. The Consultant shall perform calibration test for the proposed DCVs; shall initiate and test the Quality Assurance and Quality Control Program; and shall begin to calibrate raters and or rating schemes for automated crack detection software in identifying typical highway pavement types and distress classifications.
4. For calibration testing, the Consultant shall be responsible for all traffic control as per the U.S. Department of Transportation - Manual of Uniform Traffic Control Devices for Streets and Highways (MUTCD) and safety related procedures for the mutual protection of the Consultant's personnel, DOTD employees, and the public. The Consultant shall provide a seat for DOTD staff in the Data Collection Vehicle(s). The occupants and DCV(s) must comply with all Louisiana statutes that regulate vehicle operation (i.e. seat belts, insurance, driver's license, operational permits, oversized vehicle permits, speed limits, etc.).
5. The Consultant shall provide initial training for all proposed software for up to six (6) DOTD employees. Additional training is noted with the software requirements.
6. The Consultant shall participate in a small Pilot Project to finalize and gain acceptance of methods, procedures, deliverables, reporting, etc. that shall be used for the remainder of the Project. This Pilot Project shall include roadway systems found in Task 2 through 9 so that upon completion acceptance by DOTD, the pilot deliverables shall complete some percentage of those Task's and as such would be billable.
7. DOTD reserves the option to request a Pilot Project at the start of each full cycle.

B. DOTD Responsibilities

1. Identification of roadways for the calibration test and the types of data to be collected for each type of roadway.
2. Identification of roadways for the Pilot Project.
3. Provide various data delivery formats, tables, databases, etc.
4. Provide the updated Louisiana Distress Identification Protocols.
5. Finalize the maximum and minimum values, where appropriate for various distress items, during "Task 1: Preliminary Activities & Initial Pilot"
6. DOTD shall review with the Consultant the DOTD's Location Reference System, Inertial Navigation System, and Geographic Information System.

C. Consultant Deliverables

The Consultant's deliverables for Task 1 shall include:

1. The Quality Assurance and Quality Control Program that is documented and published by the Consultant. This document shall be presented to DOTD for review and approval prior proceeding with further Tasks.
2. Final or updated installation of all appropriate software solutions.
3. A copy of the processed data results of the calibration test runs.
4. Test loading of processed pavement condition data into the DOTD's dTIMS® (Deighton Solution) import database.
5. An updated Master Schedule plan for the data collection and quantification of the field condition data.
6. Forward facing perspective images and right facing right-of-way images, with "Header Information," as specified in this Project.
7. Pavement images with distress identification markings, joint locations, etc.
8. Electronic Data Files, with all appropriate QA/QC data, as identified in this Project.
9. Summary Data Files, with all appropriate summary data, as identified in this Project.
10. The software-viewing tool, the software data processing and management tool, the software asset inventory capture tool and appropriate training.
11. Confirmation of data and image synchronization, and location verification, via the software above.
12. Monthly Reports, detailing the results of calibration sites, Rater calibration, results of data test load, sensor calibrations, inertial navigation data, etc. including all monthly reporting requirements outlined in this Project.
13. All data and image files shall be submitted on external hard drives (USB 3.0) or on other pre-approved storage media.

2.4.2 Data & Image Collection (for Tasks 2, 4, 8, 10, 12, 16, 18)

A. Consultant's Responsibilities

1. Meet all technical requirements outlined in this Project, Supporting Documents and Data Dictionaries required to meet the deliverables of these Task.
2. Collect all appropriate data for the pavement condition assessment requirements of the Project.
3. Collect clear, digital forward facing perspective images, right facing right-of-way images, pavement images for all pavements.
4. Report the locations of all construction zones and or other route deviations.

B. DOTD's Responsibilities

1. Identify roadways and types of data to be collected for each class of roadway.
2. Supply the Consultant with copies of the Department's control section database file, and district control section base map; Listing of GPS coordinates for start and end of each control section.
3. Supply electronic copies of the roadways base maps and databases.
4. Supply at least one DOTD representative to assist in the navigation on the State Highway System when deemed necessary by DOTD
5. Determine when conditions are acceptable for data collection, either by being in the Consultant's DCV or by a review of the digital images afterward.
6. Determine when images are acceptable, via a bi-weekly DOTD review of submitted images.

C. General Requirements

1. All data is to be collected via the "from" location descriptions and the "to" location descriptions in the DOTD Location Referencing System and the GIS base map.
2. All data shall be collected with respect to the requirements of this Project in conjunction with Louisiana Distress Identification Protocols.
3. All data shall be collected in the right lane of the ascending direction of Control Section log mile on undivided two, three, and 4 lane roads and from the right lane in each direction on divided roads with four or more total lanes. Additionally, there shall be a limited number of two lane roadways that shall be run in both directions. The DCV shall begin collection of digital images not less than a tenth (0.100) mile before the beginning of each control section and shall stop collection of digital images not less than a tenth (0.100) mile past the end of the control section.
4. The Consultant shall report when construction zones, bridges, lane deviations, and railroad crossings occur, or are encountered, during data collection.
 - A. Data from construction zones, bridges, lane deviations and any diversions from the correct travel lane shall not be used in calculating one-tenth mile averages and other statistics, but shall be reported in the Raw Data File.
 - B. Consultant shall report when construction zones are encountered within the tenth (0.100) mile segments.
 - C. Consultant shall report when bridges are encountered and identify the number of bridges within the tenth (0.100) mile segments.
 - D. Consultant shall report when railroad crossings are encountered and identify the number of railroad crossings within the tenth (0.100) mile segments.
 - E. Consultant shall report when lane deviations occur and identify when they occur in the tenth (0.100) mile segments.
5. The Consultant field staff shall have the capability of monitoring data collection in real time in the DCV so as to minimize data errors.

6. The Consultant shall demonstrate that all DCV's are calibrated to produce measurement differences (IRI, rutting and faulting data) of 5% or less between vehicles.
7. The Consultant must notify the DOTD whenever the DCV first enters any district, reenters a district after an absence of a week or more, or returns to the Project after leaving the state. DOTD uses these notifications to advise District Administrators, as a professional courtesy, of the presence of the Consultant in their district.
8. Vehicles must be identified with a unique number and that number must accompany all data reported from that vehicle.
9. DOTD shall provide pavement type for reference (i.e., asphalt, composite, and jointed concrete) information for all on-system routes. The Consultant shall present a methodology for validating this pave type information prior to, or during, data distress quantification. Before any distress quantification is done, the Consultant needs to be certain what the pave type is as to quantify the correct distress types.

D. Deliverables

1. The Consultant shall furnish the images to DOTD on external hard drives (USB 3.0) or on other pre-approved storage media, on a bi-weekly basis. The bi-weekly delivery shall be accompanied by all required files need for viewing the images with the software to enable the automatic retrieval of a specific segment of road, viewing of its image, image clarity (i.e. darkness, extreme sun, light rain or standing water or other debris in roadway). Locations with unacceptable image quality shall be collected again at no additional cost to the department.
2. The Consultant shall deliver bi-weekly Raw Data Files containing the DCV's electronic sensors (rutting, IRI, faulting, GPS data, etc.).
3. All daily/weekly equipment calibrations test results (i.e. DMI, Laser Profiler, video footprint, etc.) submitted on a monthly basis.
4. All daily/weekly electronic sensor verification results (i.e. re-run of sections that had been run the previous Monday to determine that the DCV is still in calibration) submitted on a monthly basis.

2.4.3 Distress Data Analysis & Delivery (for Tasks 3, 5, 9, 11, 13, 17, 19)

A. Consultant's Responsibilities

1. Meet all technical requirements outlined in this Project, Supporting Documents and Data Dictionaries required to meet the deliverables of these Task.
2. Perform data analysis, quantify distresses, generate index data
3. Evaluate and report pavement distresses on 0.100 mile increments
4. Supply data for each LRS_IDs in DOTD's Location Reference Systems
5. Submit clear, digital pavement images, forward facing perspective images, and right facing right-of-way images for all pavements.

B. DOTD's Responsibilities

1. Provide to the Consultant the Louisiana Distress Identification Protocols.
2. Supply at least one DOTD representative to review distress quantification and assist the Consultant's personnel in the coordination of the Quality Assurance and Quality Control Program.

C. General Requirements

1. Reporting Increments: All distresses shall be evaluated and reported on tenth mile (0.100) increments. DOTD shall provide, and the Consultant shall use, the Louisiana Distress Identification Protocols. The Consultant shall report condition data for all of the 28,198 analysis lane miles, which are to be reported per the Location Reference System.
2. As previously required in "Quality Assurance and Quality Control Program", the DOTD shall test and verify (as part of the Quality Assurance and Quality Control Program) the consistency of several quantified processed data. Such verification by the department may result in the Consultant being notified to resolve problems with the quantified distress data.
3. The Consultant shall deliver all data/images, on external hard drives (USB 3.0) or DOTD approved storage media, to the DOTD Management Systems offices located at 1201 Capital Access road, Baton Rouge, Louisiana.
4. The Consultant shall quantify and summarize distresses and report those quantified distresses (along with the rutting, roughness, faulting, and GPS data) as outlined in the Deliverables. The Consultant shall load into the DOTD's dTIMS® import database and query for errors before delivery. The dTIMS® import database containing the summarized district data is to be delivered by the Consultant's personnel who are responsible for preparing and loading the summarized data for the dTIMS® import database. The Consultant's personnel shall assist DOTD in the review of the data and immediately reschedule for testing any section found to be invalid.

D. Deliverables

1. All quantified pavement condition assessment data properly loaded into the dTIMS® import database (provided to the Consultant during Task 1 Preliminary activities) and reported in tenth (0.100) mile increments as required.
2. All data/images are to be delivered on external hard drives (USB 3.0) or on other pre-approved storage media.
3. Electronic Data Files/Tables containing all relevant requirements outlined in this Project.
4. Summary Data Files/Tables containing all relevant requirements outlined in this Project.
5. Image Location Data Files/Tables containing all relevant location information and image file storage location.
6. All asset inventory location files to allow asset measuring in the Asset Inventory Software tool.

7. Raw Data Files containing the DCV's electronic sensors (rutting, IRI, faulting, pavement distress, GPS data, etc.) shall also be included within this deliverable, in addition to the Electronic Data Files.
8. As a final delivery, the Consultant shall supply for each district, all approved forward facing perspective images and right facing right-of-way images and pavement images accompanied by all approved associated files and databases with supporting files for that district.
 - a. This delivery shall be on an approved storage media (server) that shall have the ability to connect to the DOTD network via an Ethernet connection with its own IP address.
 - b. The server for each of the 9 district deliverables shall be formatted properly to enable the access of this media by the software provide via this Project.
 - c. These servers shall be DOTD's property after the completion of the Project.
 - d. These deliveries must be completed by August 1st of each year.

2.4.4 Image Collection & Image Delivery (for Tasks 6, 7, 14, 15, 20, 21)

A. Consultant's Responsibilities

1. Meet all technical requirements outlined in this Project, Supporting Documents and Data Dictionaries required to meet the deliverables of these Tasks.
2. Collect clear, digital forward facing perspective images and right facing right-of-way images for all pavements.
3. Report the locations of all construction zones and or other route deviations.

B. DOTD's Responsibilities

1. Identify roadways where data is to be collected.
2. Supply the Consultant with copies of the Department's control section database file, and district control section base map; Listing of GPS coordinates for start and end of each control section.
3. Supply electronic copies of the roadways base maps and databases.
4. Supply at least one DOTD representative to assist in the navigation on the State Highway System when deemed necessary by DOTD.
5. Determine when conditions are acceptable for data collection, either by being in the Consultant's DCV or by a review of the digital images afterward.
6. Determine when images are acceptable, by a bi-weekly DOTD review of submitted images.

C. General Requirements

1. All images are to be collected with respect to the DOTD's Location Referencing System.
2. All images shall be collected in the right lane of the secondary direction of Control Section.

3. Images from construction zones, detours and other diversions from the correct travel lane shall still be submitted. The Consultant shall report the locations of construction zones encountered.
4. The Consultant shall demonstrate that all DCV's are calibrated to generate proper location measurements per the DCV calibration requirements. This must be documented and reported in writing, in the monthly reports, to the DOTD. Vehicles must be identified with a unique number and that number must accompany all data reported from that vehicle.

D. Deliverables

1. The Consultant shall furnish the JPEG images to DOTD on external hard drives (USB 3.0) or on other pre-approved storage media, on a bi-weekly basis.
2. Images shall initially be submitted without "Header Information". Upon QA/QC and acceptance testing approval, the Consultant shall resubmit the final images with appropriate "Header Information" applied.
3. The bi-weekly delivery shall be accompanied by all required files need for viewing the images within the software, to enable the automatic retrieval of a specific segment of road, viewing of its image, allow verification of location, and image clarity (i.e. darkness, extreme sun light rain or standing water or other debris in roadway). Locations with unacceptable image quality shall be collected again at no additional cost to the department.
4. All weekly equipment calibrations test results (i.e. DMI, camera angles, video footprint, etc.) submitted on a monthly basis.
5. All weekly electronic sensor verification results (i.e. re-run of sections that had been run the previous Monday to determine that the DCV is still in calibration) submitted on a monthly basis.

2.4.5 Continuous Friction Testing (Task 22)

A. General Requirements

1. Friction Testing shall not be part of the Field Trials.
2. Compliance with ASTM E274, the *Standard Test Method for Skid Resistance of Paved Surfaces Using a Full-Scale Tire*.
3. Compliance with ASTM E501 Standard Rib (Tread) Tire Specification, and ASTM E524 Standard Smooth (Blank) Tire Specification.
4. Obtain annual certification of calibration and correlation conducted at a nationally recognized certified friction measuring system evaluation site such as Central/Western Field Test and Evaluation Center located in College Station, TX or Eastern Field Test and Evaluation Center located in East Liberty, OH.
5. Perform routine calibration checks against established (DQCVS) District Quality Control Verification Sites.
6. Compliance with DMI calibration protocols outlined in this Project.

7. Perform data capture in analysis lane miles as described in this Project and the Louisiana Distress Identification Protocols.
8. Meet multiple testing unit calibration requirements.

B. Deliverables

1. The Consultant shall generate separate Friction data table, with the same data as identified in the “Friction” Data Dictionary.
 - a. Continuous skid testing data shall include the date and time of collection
 - b. The data shall include the location of each test shall include control section, LRS-ID, direction of travel and LRS-ID logmile. Also to be recorded with each test should be the friction number, test speed, tire type used, wheel path (right or left) and the pavement surface type.
2. If it is determined at the time of collection that tests could not be performed on all or a portion of a section because of construction, unsafe condition or other factor, this should also be recorded into a file.
3. The Consultant shall report the GPS coordinates for the beginning, at every tenth (0.100) mile increment, at every testing location and at the end of each section.
4. DOTD shall provide the Consultant with an example of the latest friction report for the Consultant to use in submitting this data.
5. The report shall also contain a Map of the Friction Number (Ribbed < 30, Smooth < 20) and deliver the ARCGIS file that created the map.
6. Also included in this report should be parish and district summary tables. The sort order for these tables should be parish, surface type, test speed and tire type. Reported in these tables using all test from each grouping are the total number of test, the average SN and the standard deviation. Also reported using the Continuous Test Result tables are the minimum and maximum SN averages and the control sections that these numbers represent.

2.4.6 Historical Data conversion (Task 23)

A. Consultant’s Responsibilities

1. The Consultant shall provide DOTD the capability to see images and databases for 3 previous cycles.
2. The Consultant shall provide these viewing capabilities via their pavement viewer.
3. The Consultant shall ensure that these previous cycles can be viewed seamlessly with the new contract images and databases in order that analysis between them can take place.
4. This task shall be completed no later than the end of the first year of the contract.

B. DOTD’s Responsibilities

1. DOTD will provide the images and databases for these cycles via external hard drive.

2.4.7 Final Documentation (Task 24)

The Consultant shall provide the following final documentation by June 1st for each Cycle.

- A.** A final delivery of all quantified data (i.e. previously delivered district data inclusive of any subsequent required revisions) for all districts, on external hard drives (USB 3.0) or on other pre-approved storage media.
- B.** Final copies of all Raw Data Files, Electronic Data Files, and Summary Data Files generated during the course of the Project with the appropriate software to access, review, view, etc. these files.
- C.** DOTD shall be the owner of all data and images delivered for this Project and the Consultant shall not be allowed to subsequently charge or make money for this data and images.
- D.** Copies of all reports, routing sheets, field notes, documents relating to or affecting the Project, etc.
- E.** All reports shall be delivered in hard copy format and in electronic format (Word 2016) (.docx) on external hard drives (USB 3.0) or on other pre-approved storage media.

2.4.8 Pavement Viewing interface Hosting State (Task 25)

A. Description of Work to be performed

For the duration of the contract the consultant will provide the following:

- 1. Hosting Services: host, maintain and provide access to ROW Images and Downward Facing Pavement Images if available.
- 2. Viewing Software: access and technical support for the Pavement Viewing interface application for viewing of ROW and downward facing images.
- 3. Direct Data Access: direct access to hosted data for use of the imagery in GIS applications.
- 4. Usage Statistics: annual reporting of usage statistics for strategic planning

B. Specifications

- 1. Hosting Services - Hosted content as specified below:
 - a. Hosted imagery will include:
 - i. State ROW and pavement images for the term of this contract. 3 Cycles (2023-2028)
 - b. Hosted imagery will be available to DOTD at a 99.5% uptime over the life of the contract during core operating hours of 6:00 am and 6:00 pm CST and as needed when an emergency event such as a hurricane, flooding, etc. occurs.
 - c. Contractor is required to provide the DOTD Point of Contact notice in at least 24 hours of advance of anticipated downtime during core operating hours.
 - d. Photos should be available to users at a minimum resolution of 1920 x 1080.
 - e. A Technical Support contact will be provided to DOTD for use in the case of non-performant or unavailable services.
- 2. Software: Pavement Viewing interface application will be as specified below:

- a. Application provided to the Department will be Pavement Viewing interface of the most recent version.
 - b. Pavement viewing application will be compatible with DOTD preferred web browser of Google Chrome.
 - c. Will include the ability for DOTD staff to update GIS shapefiles for both mapping and table functionality. *In the absence of this functionality for LADOTD, contractor will manage the update of this information for five agreed upon shapefiles that will be updated at a frequency no more than once every two months.*
 - d. Licenses maintained under this contract will be as follows:
 - i. Admin / Professional – 9
 - ii. Standard Users – 0
 - iii. Guest Users – 90
3. Direct Data Access: Access to hosted data
 4. Usage Statistics: annual reporting will be provided including the following.
 - a. Number of sessions by:
 - i. License level
 - ii. Number of different individuals
 - b. Average length of session per user

C. Deliverables

1. Established hosting of specified imagery, Pavement viewing application and direct data` access within 30 days of final execution of contract.

D. Details of Payment

1. The Consultant will submit invoices for services in six-month periods. The payments will be made January 1st and July 1st of each year.

2.4.9 Ground Penetrating Radar (GPR) (Task 26)

A. General Requirements

The Ground penetrating radar surveys of road networks provide the engineer or asset manager with a cost-effective and comprehensive overview of pavement structure. It provides a traffic speed, non destructive testing method to obtain pavement layer thickness and material types. GPR data shall be collected during the 2010-2011 data collection cycle and processed in all 3 cycles.

GPR data using a multi-channel digital radar system across the specified roadways. We recommend collecting data using two dipole (ground coupled) antennae operating at centre frequencies of 900 MHz and 1.5 GHz meaning that pavement layers greater than 4 inches thick can be resolved to a depth of approximately 3 feet below the pavement surface. We recommended ground coupled antenna as the equipment can operate simultaneously without obscuring either the right of way or pavement video survey equipment such as an air coupled antenna shall. However the antenna choice and frequency can be discussed and altered at the request of the department

upon award of contract. The GPR profile shall be positioned so that the collected data points are coincident with the core locations.

The GPR equipment shall be integrated into the data collection vehicle to allow simultaneous collection of pavement surface condition (as appropriate) and pavement construction information. The GPR shall be connected to the data collection vehicle's DMI and inertial corrected GPS systems, meaning that the position of all datasets shall be coincident. The GPR equipment shall be set up to collect one scan (consisting of both frequencies) every 1.5 along the pavement. Verification cores shall be taken as necessary to verify pavement thickness. Cores shall not be taken at more than one sample per 5 miles.

Following processing and analysis, derived pavement construction information (layer thickness and type) for each section shall be reported at:

- The beginning of the section
- Tenth mile increments
- The position of major step changes in layer thickness
- Where anomalies occur in the GPR data
- The end of each section

Information on material type shall be in generic major engineering categories such as: asphaltic material, Portland cement concrete, granular subbase and cement bound subbase.

Information shall be supplied and delivered in an Access database, including the GPR and core data.

B. Deliverables

1. All core images (picture of location of core, picture measuring core and unique identifier, and picture of hole that core came from). Data is to be reported on external hard drives (USB 3.0) appropriate in both size and compatibility or other approved media.
2. DOTD approved Core Database linked to images above and core report. Data is to be reported on external hard drives (USB 3.0) appropriate in both size and compatibility or other approved media.
3. DOTD approved GPR database containing derived pavement construction information. Data is to be reported on external hard drives (USB 3.0) appropriate in both size and compatibility or other approved media.
4. Raw data files and software to view GPR raw data files and convert to a usable format.

2.5 Additional Services

2.5.1 Road asset Inventory Collection (Task 27)

If required, the Consultant will collect the features defined below. The Consultant shall use and provide software that allows for collection of highway inventory assets, make linear measurements and gather GPS point locations on the perspective view and right view camera images. All data collected shall be locatable using the Linear Reference System Identification (LRSID) provided by DOTD. All data must have the ability to be exported to an appropriate geodatabase and shapefiles for use in GIS applications. For collected Lidar data it must be able to be processed with POSPAC, Trimble Business Center or TopoDOT. In addition to the assets listed below, retroreflectivity of pavement markings may be required at some point.

- A. Cable Barrier.
 - 1. 560 miles.
- B. Vertical Bridge Clearance. For Vertical Bridge Clearance Mobile Light Detection and Ranging (Lidar) of Topographic type will be required.
 - 1. 2,500
- C. Guardrails
 - 1. 50,000
- D. Cross Drains
 - 1. 99,000
- E. Traffic Signal Inventory
 - 1. 2,800
- F. Highway Signs includes signs on overhead structures
 - 1. 43,000
- G. Soundwall
 - 1. 265

ITEMS TO BE PROVIDED BY DOTD

- DOTD's dTIMS CT import database
- Louisiana Distress Identification Protocols
- DOTD's Control section database file
- DOTD data dictionaries
- Pavement types for all State maintained routes
- Data Shells

ELECTRONIC DELIVERABLES

Consultant hereby agrees to produce electronic deliverables in conformance with DOTD Software and Deliverable Standards for Electronic Plans document in effect as of the effective date of the most recent contract action or modification, unless exempted in writing by the Project Manager. Consultant is also responsible for ensuring that sub-consultants submit their electronic deliverables in conformance with the same standards. DOTD Software and Deliverable Standards for Electronic Plans document and DOTD CAD Standards Downloads are available via links on the DOTD web site.

Consultant shall apply patches to CAD Standard Resources and install incremental updates of software as needed or required. Consultant hereby agrees to install major updates to software versions and CAD Standard Resources in a timely manner. Major updates of CAD standards and software versions shall be applied per directive or approval of the DOTD Design Automation

Manager. Such updates will not have a significant impact on the plan development time or project delivery date, nor will they require Consultant to purchase additional software. Prior to proceeding with plan development, Consultant shall contact the Project Manager for any special instructions regarding project-specific requirements.

In the event that any Digital Plan Delivery Standard conflicts with written documentation, including DOTD plan-development Manuals, the Digital Plan Delivery Standard governs. Consultant is responsible for contacting the Project Manager should questions arise.

Consultant shall upload (or check in) electronic deliverables directly into the DOTD ProjectWise repository at each plan delivery milestone. Consultants are responsible for performing certain operations at each milestone including, but not limited to, the following:

- Upload (or check in) CAD plan deliverables to the discipline “Plans” folder
- Apply and maintain indexing attributes to CAD plans (and other deliverables as needed)
- Publish PDF format plan submittals in ProjectWise using automated publishing tools
- Digitally sign PDF format plan submittals in ProjectWise according to DOTD standards and procedures (Final Plans, Revisions and Change Orders). Signatures shall be applied in signature blocks provided with electronic seals and Title Sheets.

Additionally, after reviewing deliverables for each submittal milestone, the Project Manager shall notify Consultant regarding the availability of two automatically-generated informational reports in ProjectWise. These reports document the completion status and other information regarding indexing attributes and CAD standards. Consultants shall take these reports into account and make any necessary adjustments to plans before the next submittal milestone; or sooner, if directed by the Project Manager.

ATTACHMENT B – MINIMUM PERSONNEL REQUIREMENTS (MPRs)

The following requirements must be met at the time the proposal is submitted:

1. At least one (1) principal of the prime consultant shall be professionally competent in pavement data collection methods (visual, automated methods, road profilers, etc.) and in pavement data collection, analysis, and quality control and assurance.
2. At least one (1) principal or responsible member of the prime consultant shall have a minimum of five (5) years of experience in responsible charge of pavement data collection and quality assurance.
3. At least one (1) Pavement Data Collection and Analysis Quality Assurance Manager who has five (5) years of experience in pavement data collection and quality assurance.
4. At least one (1) GIS Analyst shall have a minimum of five (5) years of GIS experience.

MPRS ARE TO BE MET BY SEPARATE INDIVIDUALS OF THE PRIME CONSULTANT, UNLESS STATED OTHERWISE BELOW.

MPR Nos. 1 through 3 may be met by the same person.

NOTE: WHEN SATISFYING A MINIMUM PERSONNEL REQUIREMENT, PLEASE ENSURE THE RÉSUMÉ REFLECTS REQUIRED EXPERIENCE AS REQUESTED.

Although the MPRs must be met by the prime consultant only, this does not preclude the use of sub-consultant(s) in the performance of the contract.

- Please note the number of MPRs are minimal; however, all relevant personnel necessary to perform the Scope of Services must be identified in Section 14 of the DOTD Form 24-102 and their resumes included in Section 16 of the DOTD Form 24-102.