### Project Title:
Drainage Information, Analysis, and Mapping Project

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<th>Project Title:</th>
<th>Drainage Information, Analysis, and Mapping Project</th>
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<td>RFP Number:</td>
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<tr>
<td>NJDOT Project Manager:</td>
<td>Stefanie Potapa</td>
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<td>Task Order Number:</td>
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<tr>
<td>Consultant:</td>
<td>New Jersey Institute of Technology</td>
</tr>
<tr>
<td>Customer:</td>
<td>Ms. Nancy Ciaruffoli and Mr. Richard M. Shaw</td>
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<td>Principal Investigator:</td>
<td>Meegoda, Jay N.</td>
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<td>Project Starting Date:</td>
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### Project Objectives:
The specific objectives of this study are:
- Development of Drainage Identification, Analysis and Mapping (DIAM) Project System using SQL Server
- Collection of Inspection and Evaluation Data of Drainage Infrastructure and Online Submission
- Financial Analysis of Drainage Infrastructure
- Generation of information for Cost-effective Maintenance of Drainage Infrastructure

### Project Abstract:
This Drainage Identification, Analysis and Mapping (DIAM) Project, proposed to
be completed in a time frame of two years, will help ensure the identification of the NJ's State drainage infrastructure. It will provide accurate location information for GIS and SLD mapping. It will also provide comprehensive information about specific drainage infrastructure (culverts/pipes, inlet/outlets, outfalls and storm-water facilities) and their inspection and condition. This project will also attempt to include information on catch basins, detention basins, filter strips, riparian buffers, infiltration trenches, sand filters, constructed wetlands, vortex units, wet basins, bio-retention systems, low flow bypasses, and storm-water conveyances in the database. The project will provide inspection frequency and cost information for the drainage assets in the database. Additionally, this project will also establish a "NJ First" for NJDOT and our State.

1. Progress this quarter by task:
We have approximately completed 32% of the project. Following is a task by task break down of the project.
Literature Search: 100% completed and literature search report submitted for NJDOT review.
Task 1: Approximately 40% is completed.
1. Reviewed relationship between SQL database and Data Review Forms primarily to make sure all necessary items appear on the form.
2. Distributed questionnaire to solicit the data needs of the stakeholder business units. (Received feedback from Connie House, NJDOT Environmental group, which was very useful in editing/modifying DIAMs)
3. Data Review Forms for Pipe, Structure and Outfall have been modified based on feedback.

Task 2: Approximately 90% is completed.
1. Visited two vendors and provided vendor data conversion templates software with data mapping documents.
2. Developed the user guide for DIAMs and installed DIAMs in NJDOT computer.

Task 3: Approximately 40% is completed.
1. Modified online submission web application
2. Performed further testing and evaluation of the data quality control module will be performed
3. Received lat/long field coordinates for state highways from NJDOT and now evaluating if that can be used for QAQC check of vendor submitted data.
4. Ready for online data submission testing using NJIT server
Task 4: Approximately 50% is completed.
1. Complete import of the final versions of MTD asset data form, inspection data form, and maintenance data form into the drainage management system database.
2. No other activities are reported for this quarter as team is waiting for MTD clean-up.

Task 5: Approximately 50% is completed.
1. The application system contains Structure, Pipe, Outfall, Stormwater Treatment Device assets and inspection data review/edit/updating modules. As of now we have 11,935 inlet/outlet structures, 10,180 pipes, 33,276 pipe inspection records, 1,240 outfall data and 159 MTDs in the database.
2. It includes a vendor database uploading module for NJDOT users to check and/or upload vendors' pipe inspection data records into the DIAMS database.
3. It includes a pipe financial analysis module for NJDOT users to assess current condition status of the pipes and to make maintenance decisions on how to treat the pipes. Based on the assessments, the system provides an optimization procedure to organize pipe segments into 'projects' and allocate (plan/estimate) capital (budget) among the pipe segment maintenance jobs.
4. User manual is 80% updated.
5. A demo data set was produced based on the NWMCC database.
6. Our pipe treatment Unit Cost table has been used as the cost estimation baseline. These baseline data have been smoothly extended through available points to make up some missing values for certain diameters.

2. Proposed activities for next quarter by task:
   Task 1:
   1. Meet with business unit stakeholders that did not respond to questionnaire: Asset Management, Operations, Drainage, Maintenance, and Data Development/Straight Line Diagrams.
   2. Finalize content and appearance of Data Review Forms.

   Task 2:
   1. Meet pipe inspection vendors to confirm data mapping and test templates
   2. Provide user training for NJDOT staff
Task 3:
1. Test online submission on NJIT SQL server
2. Upload DVD pipe inspection records, Outfall records, and MTD records into DIAMS databases

Task 4:
1. The request will be made to be notified by NJDOT of the device cleanout schedule for all the 14 devices.
2. The samples would be taken from the cleanout materials for physical and chemical analysis. Start field monitoring of the two (2) additionally selected devices once the NJDOT contractor cleans them out.

Task 5:
1. We will continue to collect and upload additional data.
2. A work order generation module is under development, based on the planned pipe maintenance jobs.
3. A managerial report generation module that creates customized summary reports, e.g., total length of pipe segments inspected, current conditions, current worth values, total budget requirements for pipe maintenance treatments, and high-risk location areas.
4. Further investigation of historical data may reveal the structure/pipe erosion trends and identify factors that influence performance.
5. User manual will be completed.
6. Pipe treatment Unit Cost table will be completed.
7. User Training Materials will be updated based on the demo data set.

3. List of deliverables provided in this quarter by task (product date):
   Task 1: First draft of information requirements for Business Requirements Specifications document
   Task 2: Installed DIAMs in NJDOT computer. User guide for DIAMs and vendor data conversion templates software and data mapping documents.

4. Progress on implementation and training activities:
The consolidated list of MTDs, the interim report including road maps, and the draft MTD asset, inspection, and maintenance data forms were submitted to NJDOT. These submittals have been used by NJDOT to initiate the comprehensive MTD inspection and maintenance process, and the necessary supports were provided.

Contacts and Meetings
(1) Met Mr. Desai and installed DIAMs.
(2) Visited NWMCC and Mount to install data patch
(3) Phone and email correspondence with Nancy Ciaruffoli and Marc Dorsch regarding Business Requirements Specification throughout the quarter.
(4) Met with Nancy Ciaruffoli, Marc Dorsch, Gary Zayas, Cindy Dey (NJDOT) and Deb Orzol (OIT) at NJDOT on March 29 to discuss preparation and needs of the Business Requirements Specification document and to receive CD of SRI/milepost to latitude/longitude coordinates conversion script.
(5) Project Team Meeting at NJIT - near weekly

5. Problems/proposed solutions:
None

6. Budget summary:

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NJDOT Research Project Manager Concurrence: ________________________ Date: ___________