CAAP Quarterly Report

Date of Report: *April 7, 2016*

Contract Number: *DTPH5615HCAP09*

Prepared for: *U.S. Department of Transportation/Pipeline and Hazardous Materials Safety Administration (USDOT-PHMSA)*

Project Title: *Advancement in the Area of Intrinsically Locatable Plastic Materials*

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For quarterly period ending: *March 31, 2016*

Business and Activity Section

1. Generated Commitments

2.1 *Agreement Changes*

There has been no change in project participants or other contracts details during the last quarter.

2.2 *Purchases*

Some supplies have been purchased during this reporting period. These items are listed in Table 1. Some of the items are shown in Figure 1.

Table 1: Supplies purchased

No.	Item Description	Quantity
1	12” diameter PVC pipes, 5’ long	6
2	6” diameter PVC pipes, 10’ long	2
3	3” diameter PVC pipes, 5’ long	10
4	2” diameter PVC pipes, 5’ long	1
5	12” diameter PVC pipe caps	14
6	12” diameter Fernco caps	12
7	6” diameter PVC pipe caps	11

8	3” diameter PVC pipe caps	24
9	3” diameter Fernco caps	2
10	2” diameter PVC pipe caps	2
11	Methyl Ethyl Ketone Peroxide (MEKP) – for composite bonding	2 gallons
12	Miscellaneous items (zip ties, scissors, respirators, spray paint, gloves, plastic buckets, paint brushes, rollers, aluminum tapes, sanding paper, pipe lube, pipe glue, box cutters and blades)	Varies

Note: In addition to the items listed above for this quarter, several Glass and Carbon Fiber Reinforced Polymer Composite pipes were already acquired in the first quarter.

2. Graduate Students Working on the Project

Ph.D. Students – 2

MSCE Student – 1

BSCE Student – 1

Note: All students have part-time appointments on research project.

3. Status Update of Past Quarter Activities

The following project planning and research activities have been completed in the last quarter (January 1 – March 31, 2016);

2.1 *Procurement of Materials*

Several 12”, 6”, and 3” diameter plastic (PVC) pipes (Figure 1) and caps were acquired. 12” diameter Carbon Fiber Reinforced Polymer (CFRP) pipes and 3” diameter Glass Fiber Reinforced Polymer (GFRP) pipes are in the process of being fabricated, and should be ready soon. 3” diameter CFRP pipes are already available. CFRP fabric and metallic tapes were also acquired, and these will be used to wrap PVC and GFRP pipes to improve Ground Penetrating Radar (GPR) detectability of these pipes. Unwrapped PVC and GFRP pipes will also be buried along with CFRP pipes to serve as control specimens. The GFRP and CFRP pipes are shown in Figure 2.

(a) 12” PVC Pipes

(b) 6” PVC pipes

(c) 3” PVC pipes

Figure 1: Plastic (PVC) pipes for use in this research

(a) 12” GFRP Pipes

(b) 3” CFRP Pipes

Figure 2: Composite pipes for use in this research

2.1 *Material Preparation*

Different preparatory works were done on the procured pipes over the past months. The surfaces of the pipes were grinded (Figure 3) to enable adequate bonding with the CFRP fabric during wrapping. The CFRP fabric has also been cut into the appropriate dimensions for wraping the different pipe diameters.

Figure 3: Surface of 12" diameter PVC pipe being grinded

2.2 *Pipe Layout*

Over the past quarter, the site for burying the pipes was assessed and the best layout of the different pipeline segments was determined. This site assessment and pipe layout configuration was done to ensure that all the different pipeline segments fit within the allocated site, and also to ensure that there is no interference coming from nearby objects/utilities (including adjacent pipelines) in the GPR signal during testing.

4. Description of any Problems/Challenges

No challenges were encountered in the past quarter.

5. Planned Activities for the Next Quarter

The following activities are planned for the next quarter:

1. Fabrication of the 12" diameter CFRP pipe and 3" diameter GFRP pipes will be completed in the next quarter.

2. Preparatory works, including wrapping some of the pipes with CFRP fabric and metallic rings/strips, will be completed in the next quarter.

3. The PVC, GFRP, and CFRP pipes will be buried at the located site inside WVU and their detectability using GPR will be evaluated over the next several quarters under various soil moisture conditions.

4. Also, a wooden soil box will be constructed to bury a pipe with compressed gas for the purpose of leak detection using FTIR equipment in future quarters.