July 11, 2022

3D Scan Report of AVR Unit of 10619 Timberland Road, Surrey, BC

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Introduction

Kopahi Manufacturing was approached by Enginuity-Consulting with regards to a 3D Scan project at an asbestos-containing AVR Unit in 10619 Surrey Road, BC. A first attempt was made on June 16, 2022 but a curtain wall prevented access to back piles. On the second visit on July 7th, we managed to capture. Here is a link of the unit. We ended the day by taking samples from each pile and measuring their mass, calculating their density and ultimately, reaching the mass of each pile by multiplying to the volume. In this report, we include a summary page for the results, and dig a bit deeper into details of challenges and solutions we adapted for this project. Please let me know if you have any questions or comments about this report.

Summary

We divided the AVR unit piles into 5 piles, marked A to E based on the type of pile. Please see the table below for summary about each pile

Pile	Color	Volume (cubic meter)	Volume Confidence	Density (kg/m3)	Density Confidence	Mass (Kg)	Mass Confidence	Fine or Coarse Pile
A	Green	107.77	99%	261	75%	28128	80%	Pulverized
B	Blue	2631.48	95%	326	75%	857862	80%	Pulverized
C	Yellow	57.78	99%	480	95%	27734	95%	Crushed
D	Red	32.23	99%	287	95%	9190	90%	Crushed
E	Pink	84.7	99%	235	80%	19905	90%	Small spheres
Total		2913.96				942819		

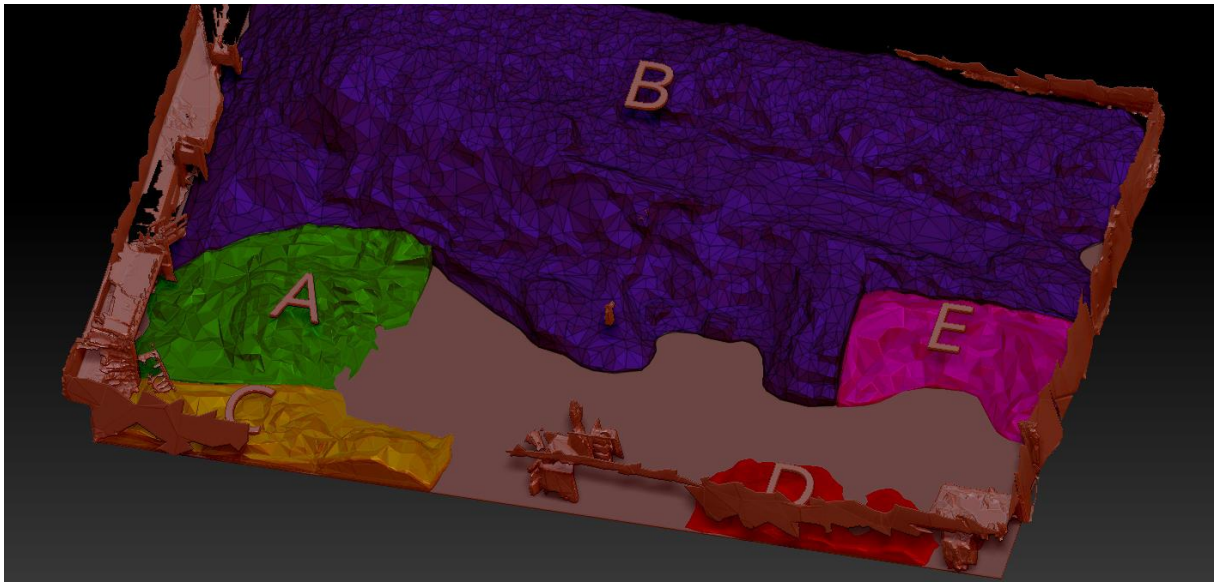

Figure 1 - Piles in AVR Unit color and alphabetically identified

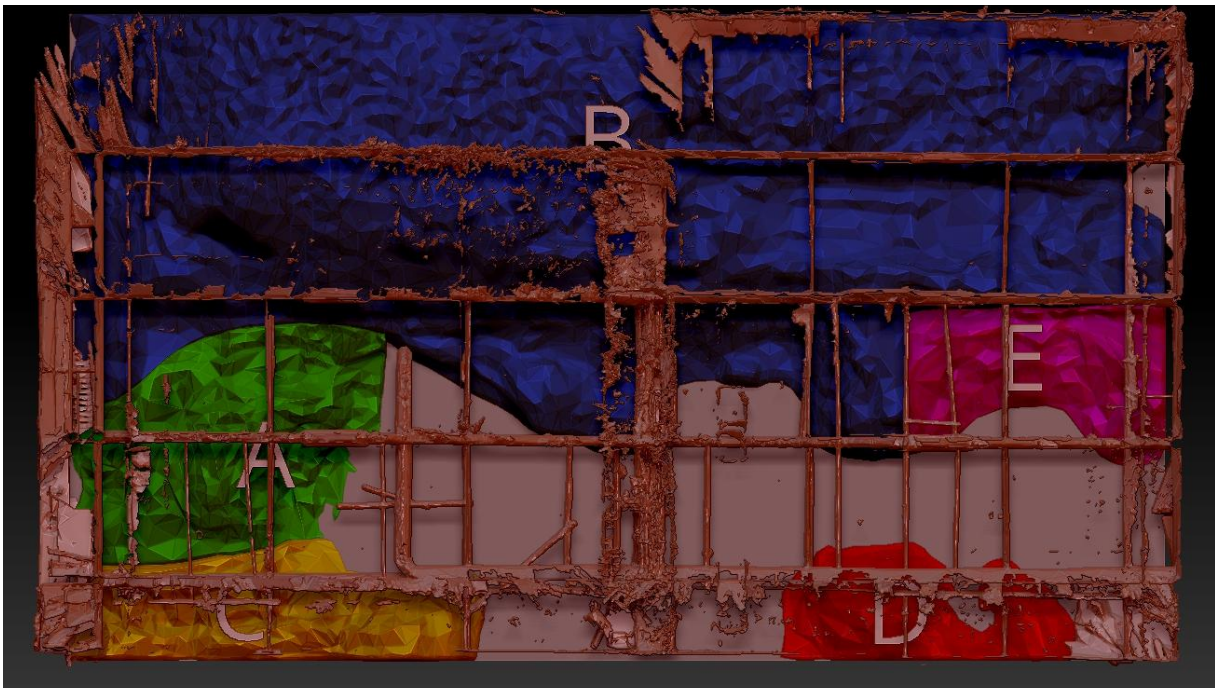

Figure 2 - Top View of the piles with some of the structural components of the AVR Unit

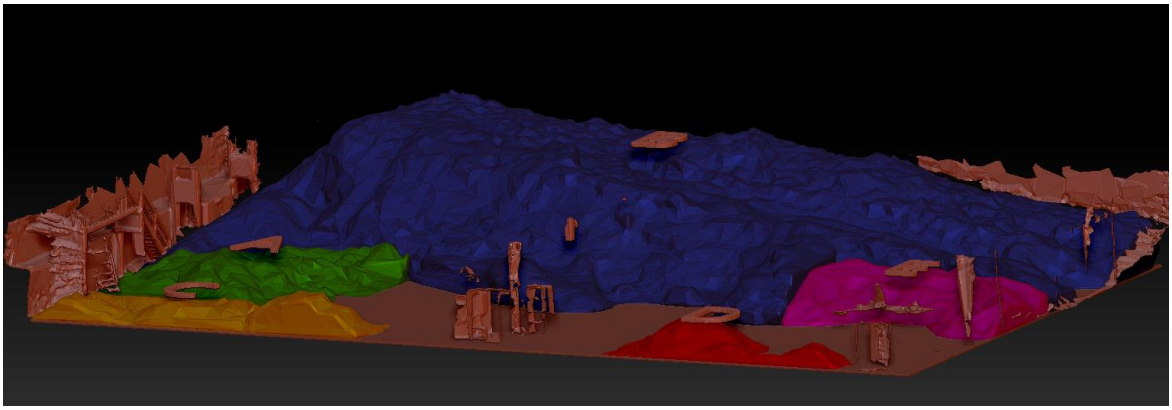

Figure 3 - Isometric View of the AVR Unit without ceiling structural components

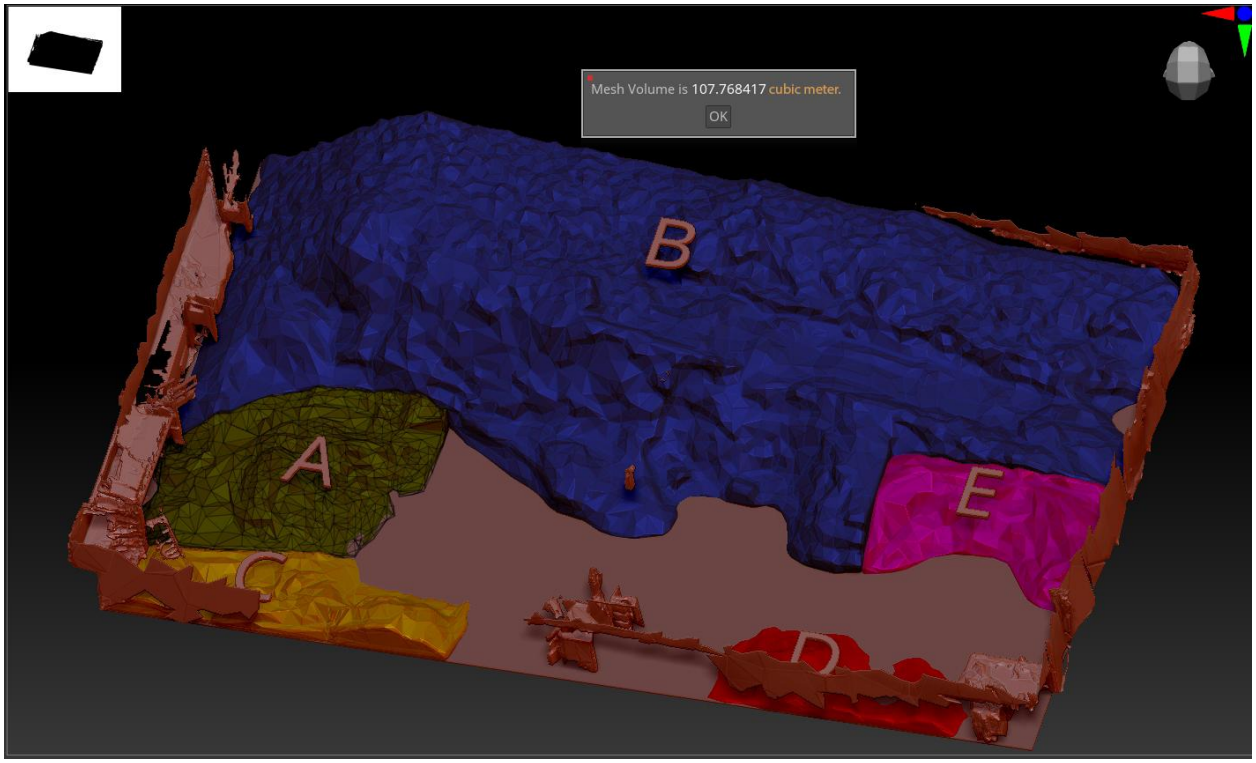

Figure 4 - Volume of Pile A (107.77 cubic meter)

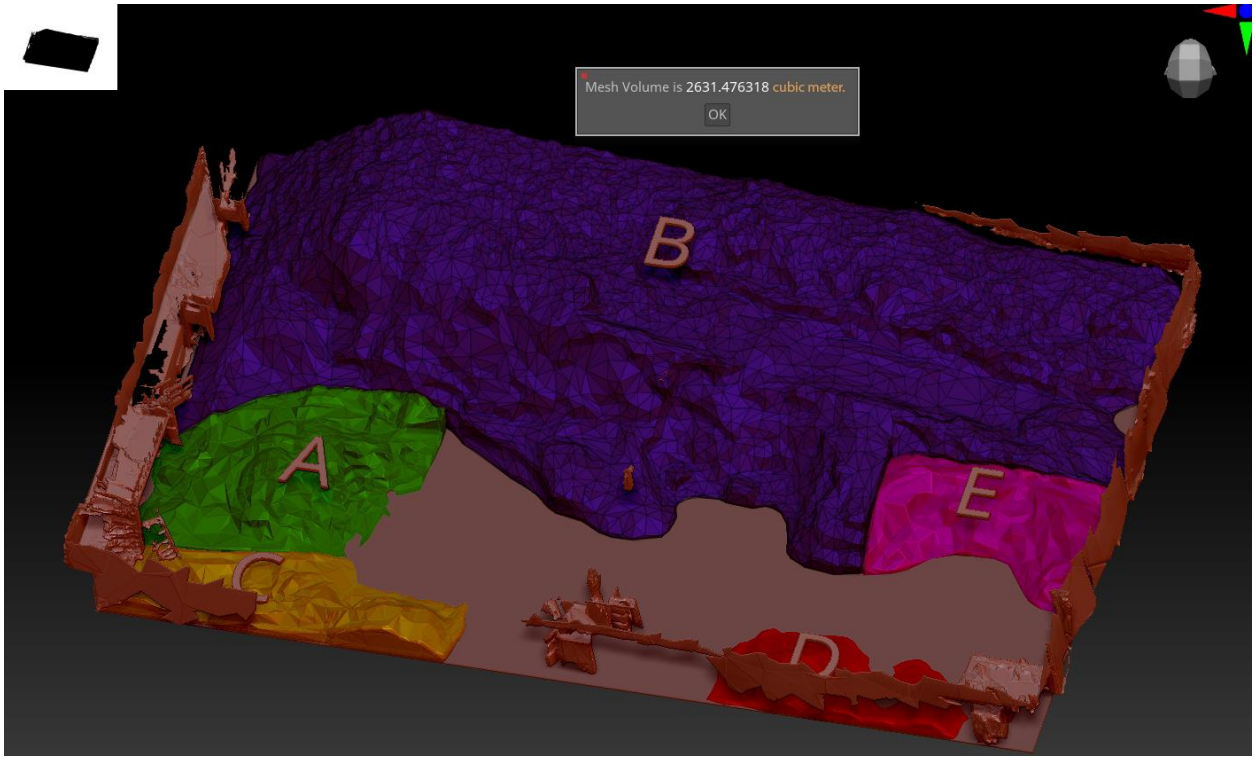

Figure 5 - Volume of Pile B (2631.48 cubic meter)

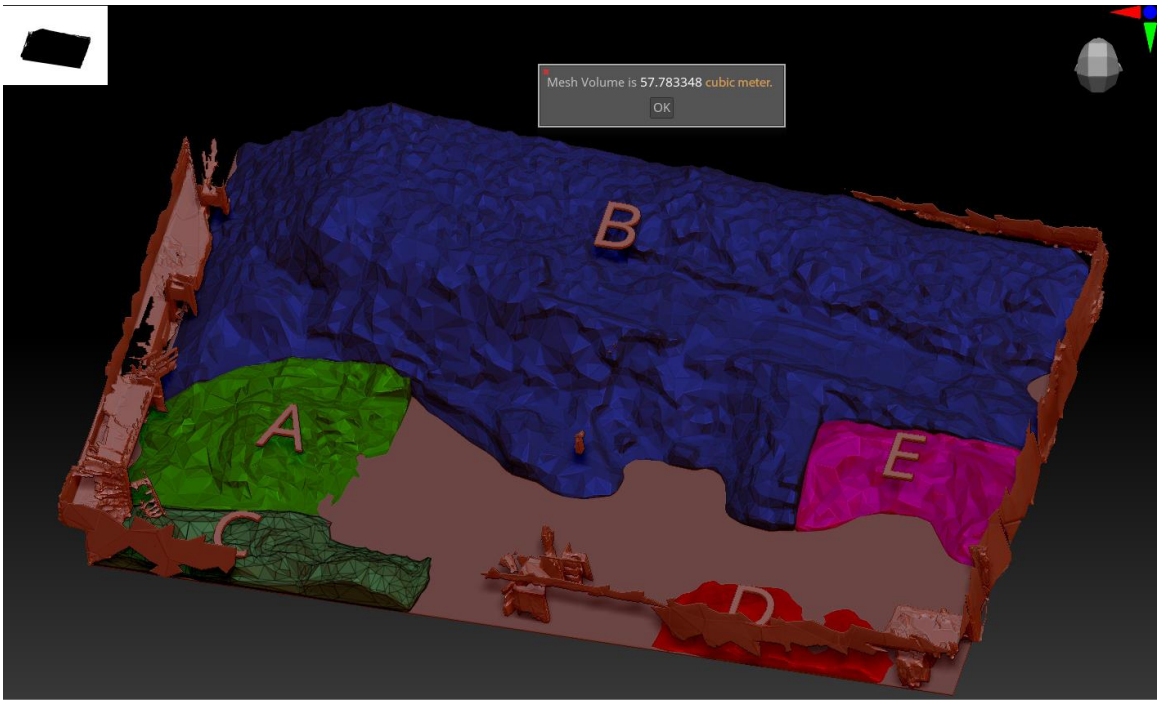

Figure 6 - Volume for Pile C (57.78 cubic meter)

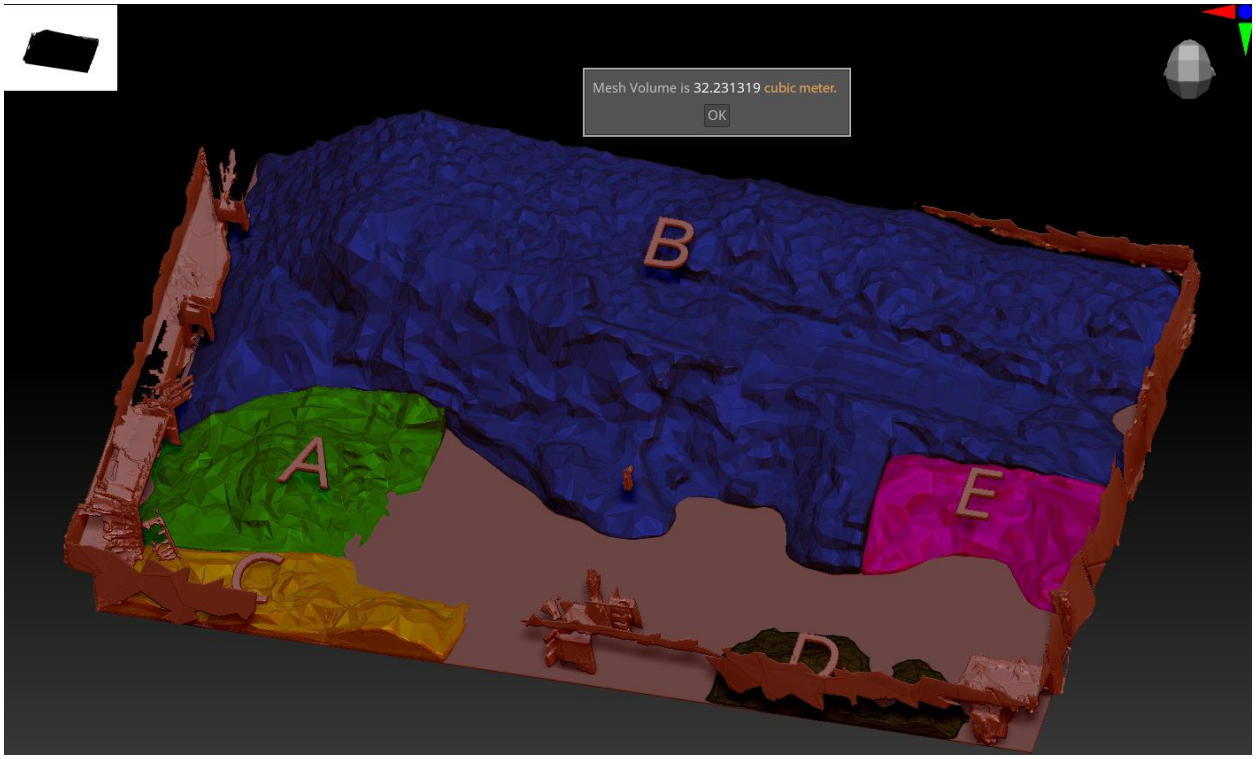

Figure 7 - Volume for Pile D (32.23 cubic meter)

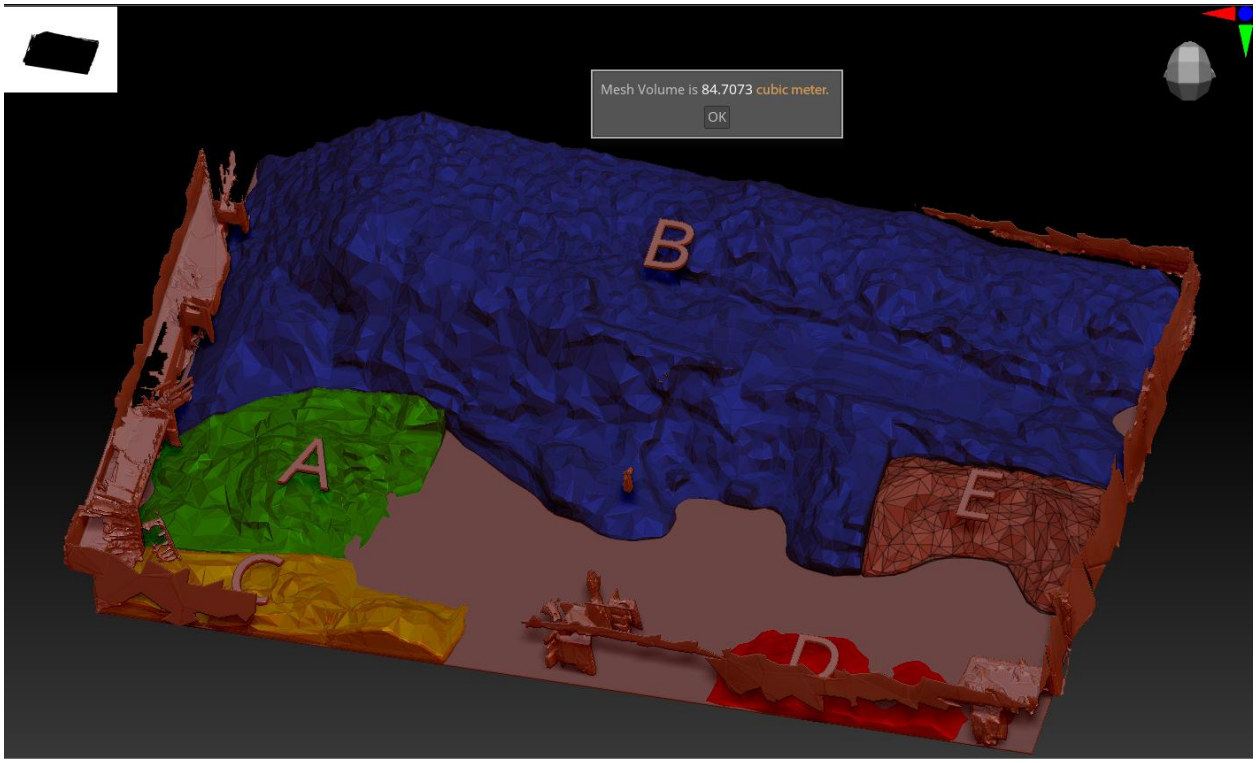

Figure 8 - Volume for Pile E (84.70 cubic meter)

Considerations

- ☐ The volume calculations are accurate for all piles except for Pile B, where the back of the wall was inaccessible and unstable to walk on. The back area of Pile B was reconstructerd manually on computer and is based on video taken at the site.

To obtain Density, we used a 13oz (383ml) cup and a scale, by taking samples that fill the cup and weighting them, we obtained sample density. The issue with all the sample densities are the inconsistency in material of the piles as well as compactability. The Piles with fine (crushed) material were more accurate as they filled the cups evenly. These are Piles C and D. The pile E is accurate because of the consistency of the ball shape dry wall components found in this pile. However, Pile A and B are a mix of material where in some areas are very dense and in some other area very compactible. We have assumed that the piles are very dense beneath the first few inches of layer and a conservative estimation of them is recommended. Here is a table for Density and Mass Calculation for each pile

Pile	Sample Weight range in a 13oz (383ml) cup (g)	Density (kg/m3)	Volume of Pile (cubic meter)	Mass of Pile (kg)
A	80 - 120 (assume average of 100)	261	107.77	28128
B	100 - 150 (assume average of 125)	326	2631.48	857862
C	180 - 190 (Assume average of 185)	480	57.78	27734
D	100 - 120 (assume average of 110)	287	32.23	9190
E	80 - 100 (assume average of 90)	235	84.7	19905

Conclusion

We have high confidence in volume estimation of each pile, except for a small portion of Pile B in the back which was inaccessible and. The density calculations could improve by taking many more samples from each pile. If this is necessary, please let me know so I can schedule a third visit to the site.

Please let me know if you have any questions or comments.

Thank you,

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