



Department of  
Environmental  
Conservation

## 17th Street Development Site

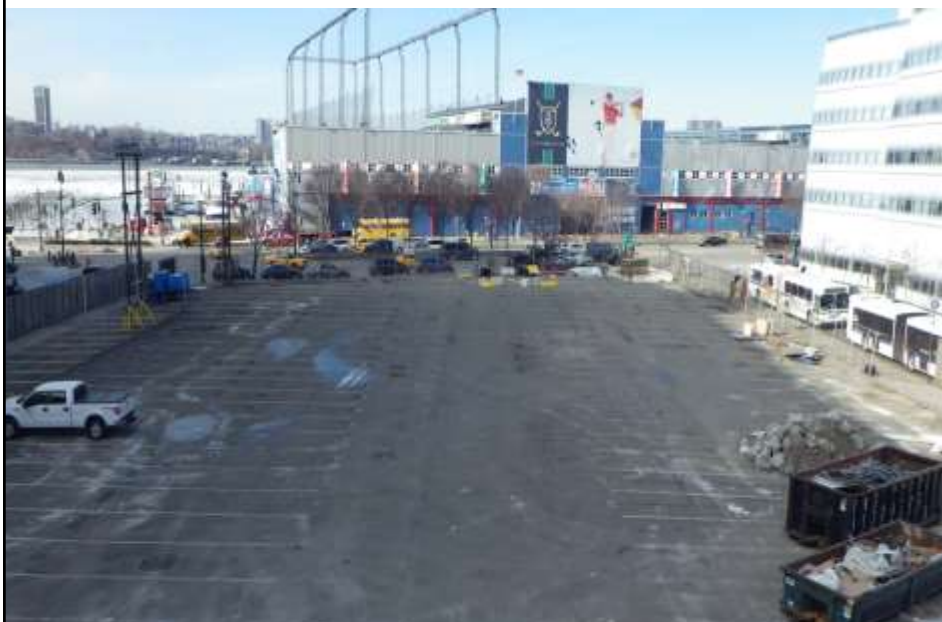
Remediation of a former manufactured gas plant  
West Side of Manhattan, New York City

April 8, 2015

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## Parties

### **Brownfield Cleanup Program Volunteer:**

Edison Properties

### **Consultant:**

Langan Engineering & Environmental Services

### **Contractor:**

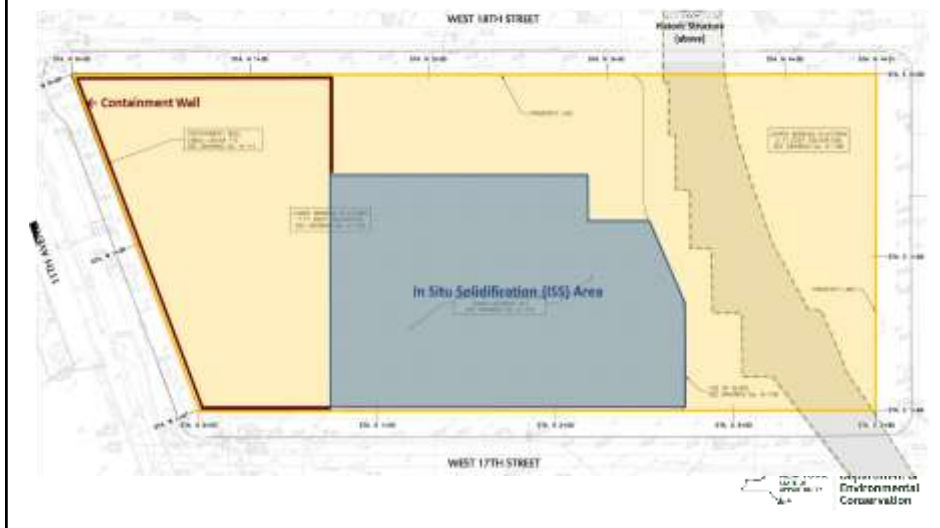
Posillico Environmental

### **In-Situ Solidification Contractor:**

Hayward Baker Geotechnical Construction

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## Design



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## Why In Situ Solidification at this site?

- Less disruption to surrounding community
- Less chance of odor generation
- Less expensive
- Remedy chosen by the Volunteer

(All things being equal, New York State law requires us to choose removal of the source of contamination)



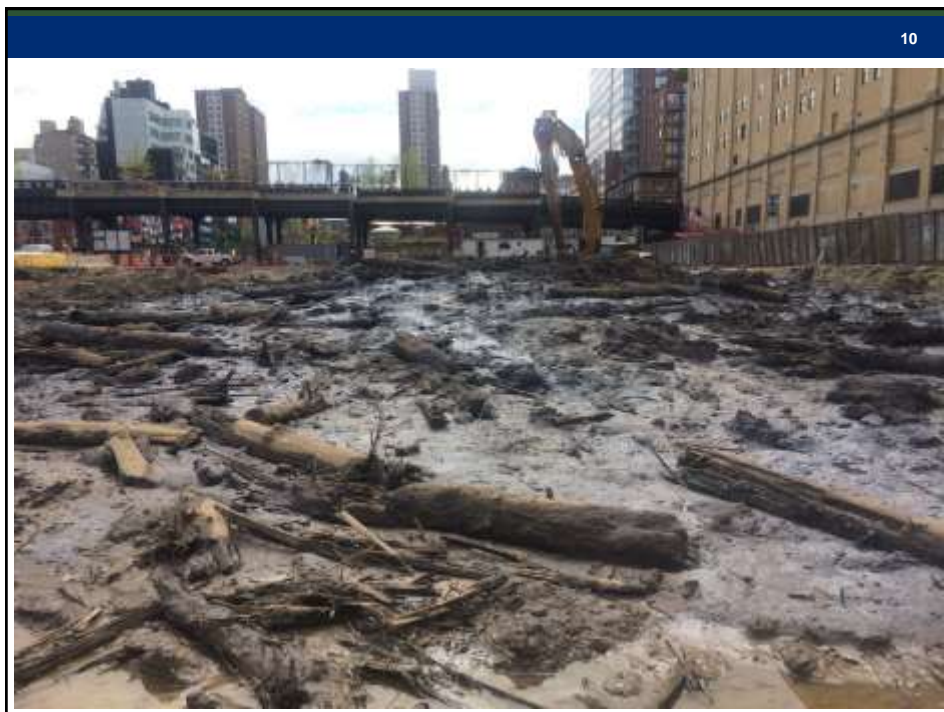
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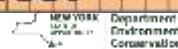
## High Line Park

Winter, 2014









## In Situ Solidification Design Considerations

Mixing Technology  
Treatability Study  
Grout Reagents (dry weight)

7% Portland Type-I/II

0.5% Bentonite

Obstructions

Field Demonstration

Seam between ISS and containment wall



ALLU STABILISATION SYSTEM

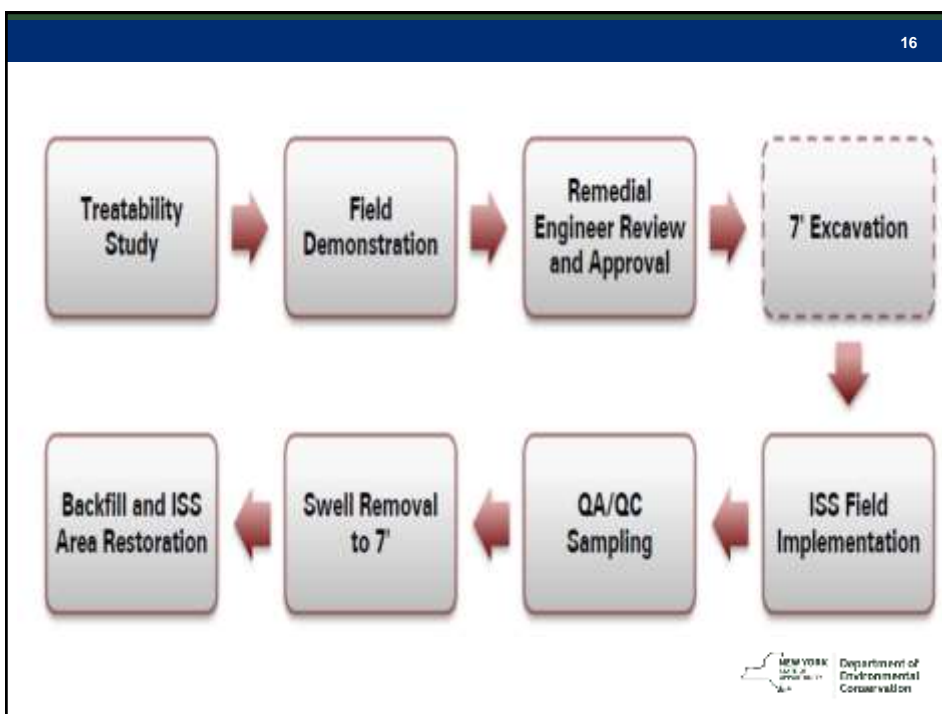
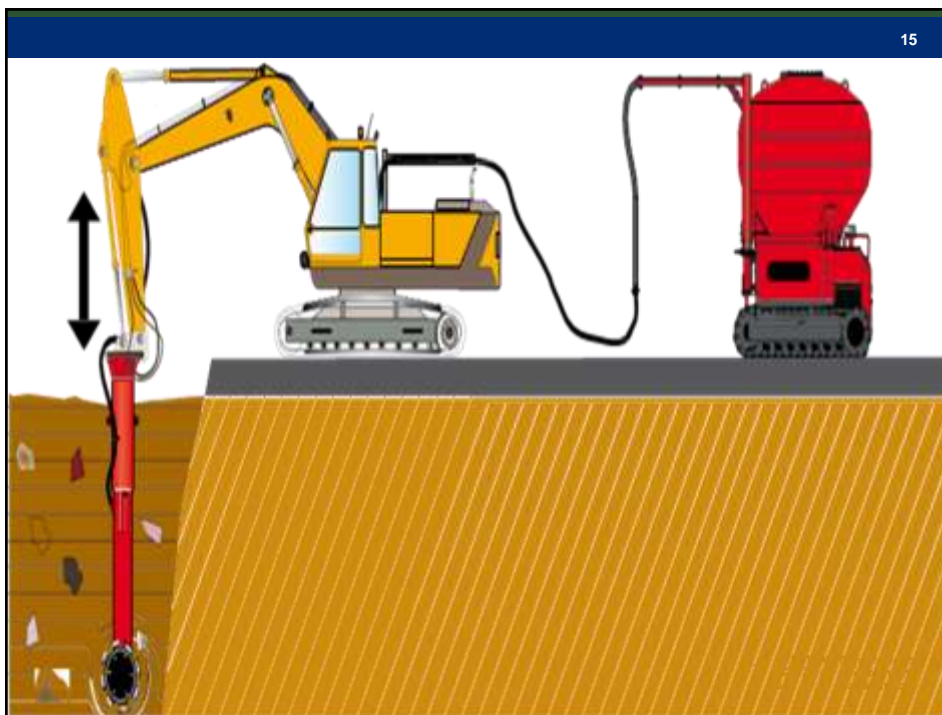
### MASS STABILISATION MANUAL



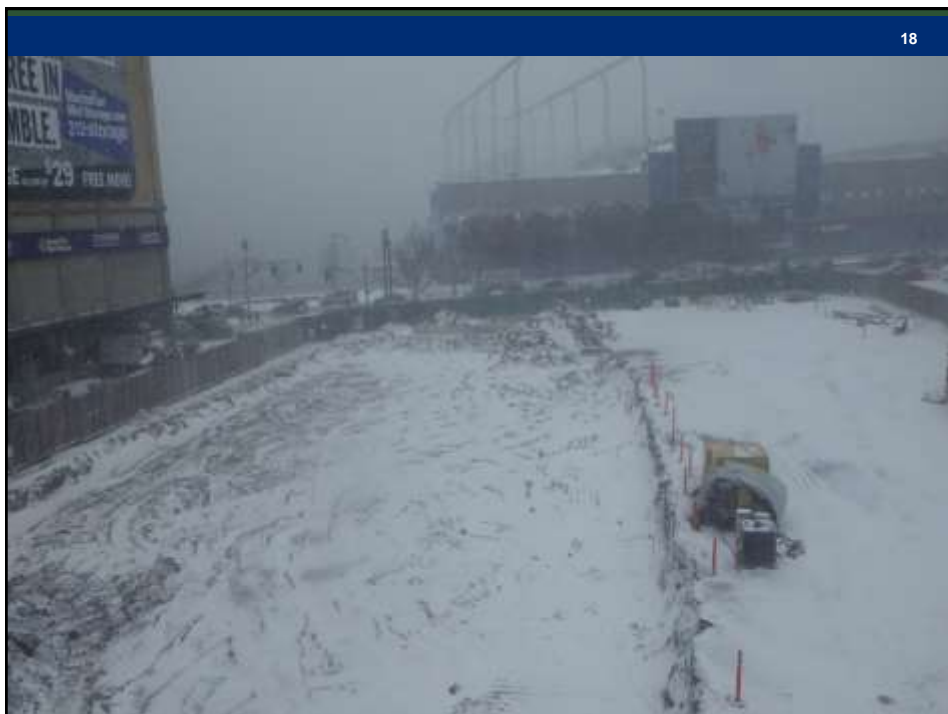
ALLU Finland Oy

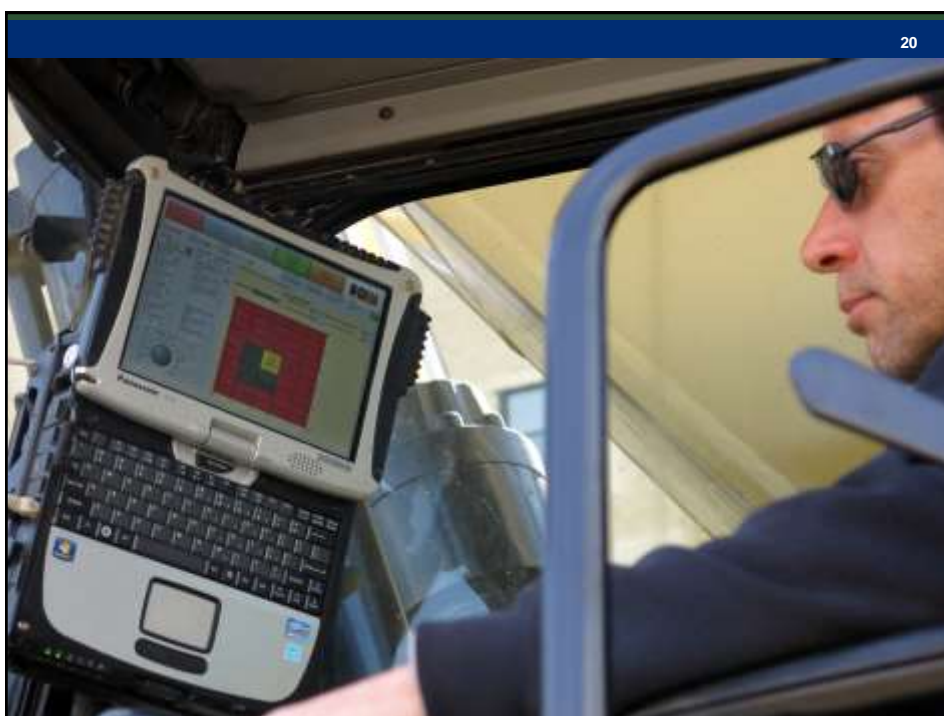
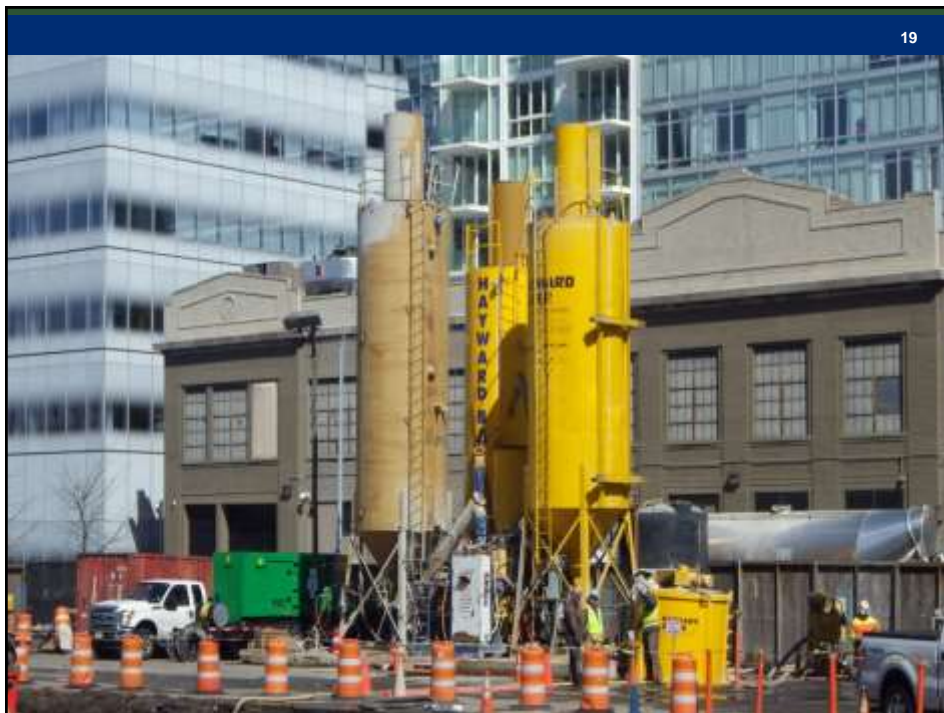
P.O. Box 22,  
10001 Oostvliet, FINLAND  
Tel: +358 (0) 882 140  
Fax: +358 (0) 882 144  
Email: info@allu.fi  
www.allu.fi

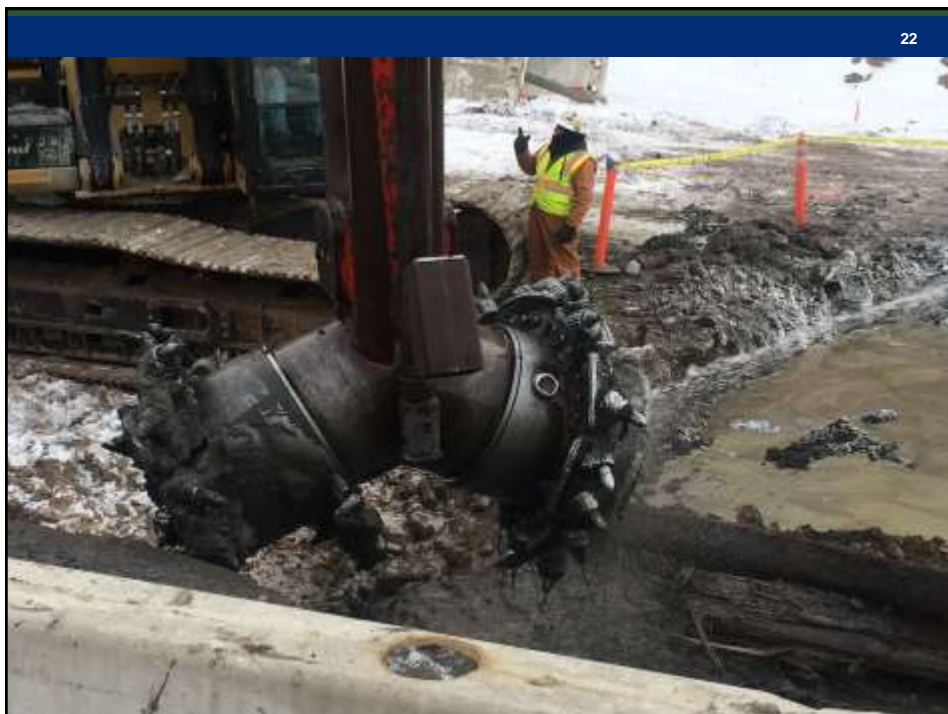




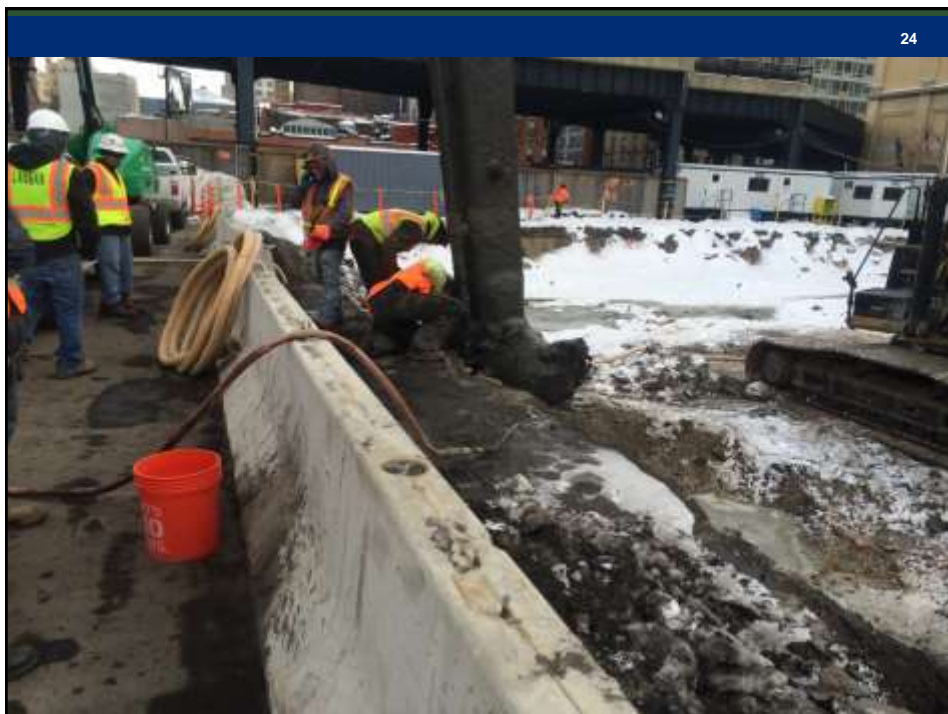




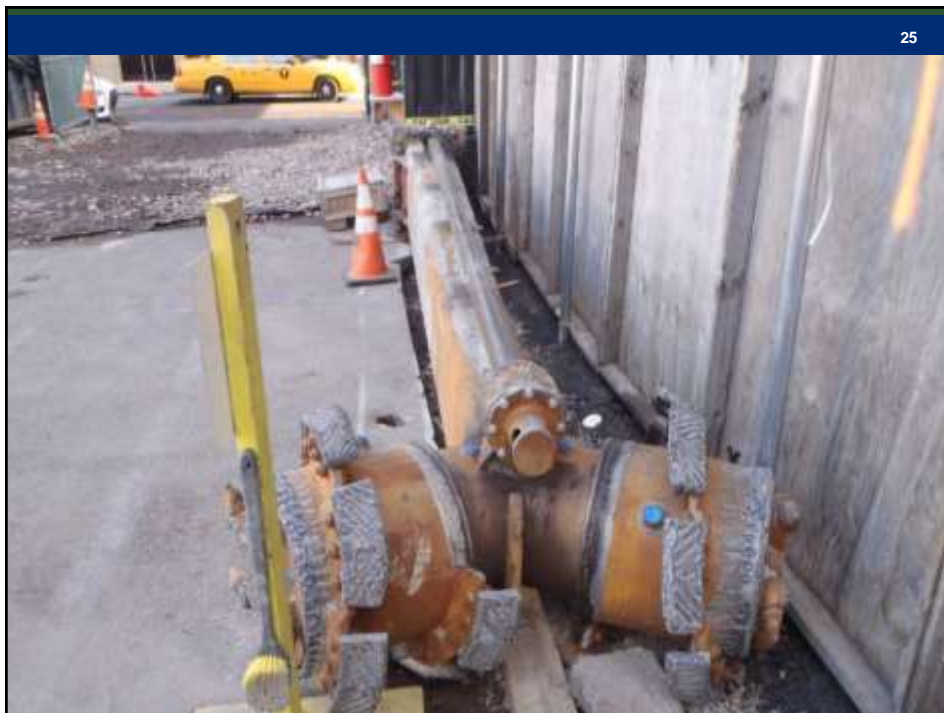




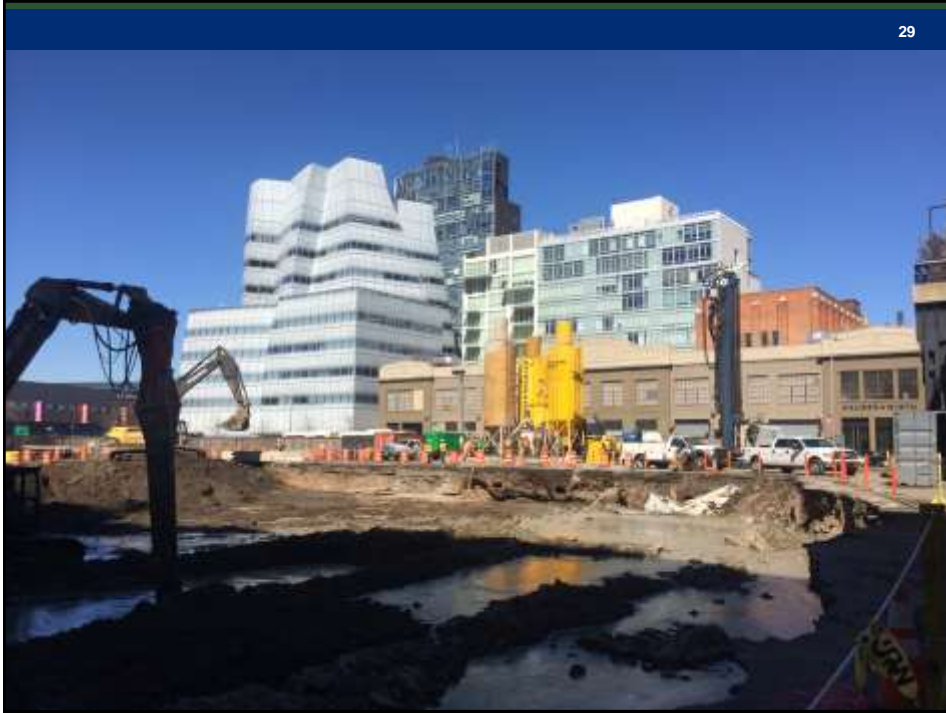




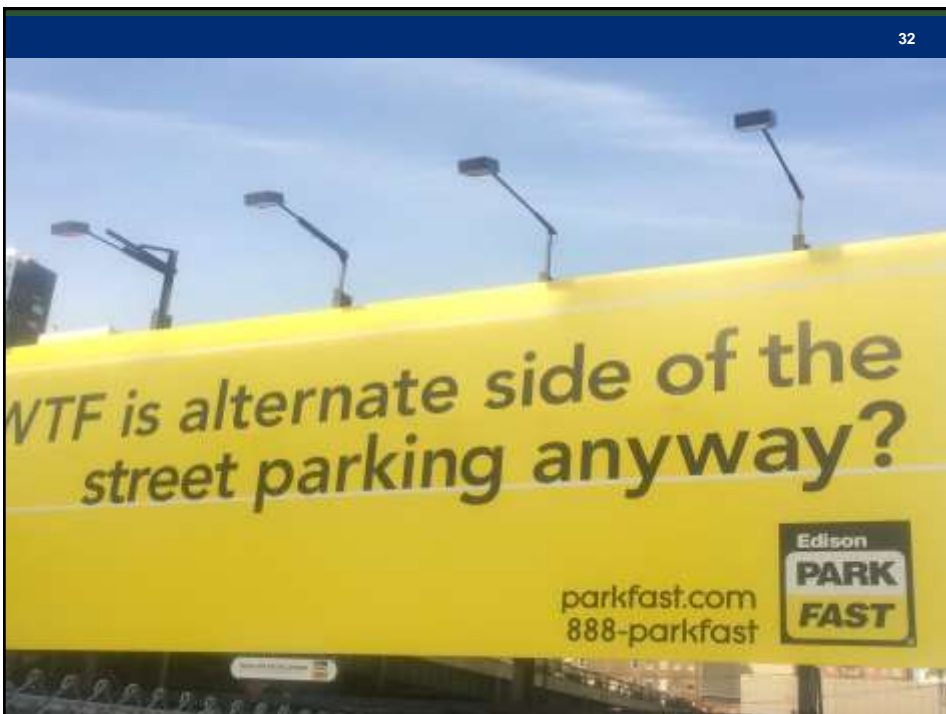




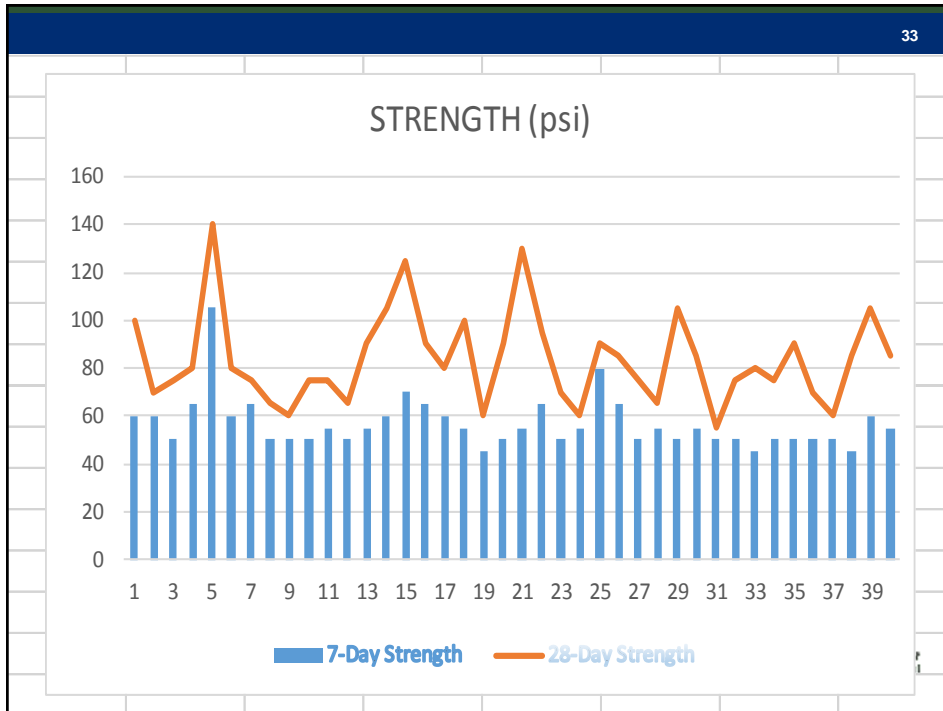












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## Strength (psi)

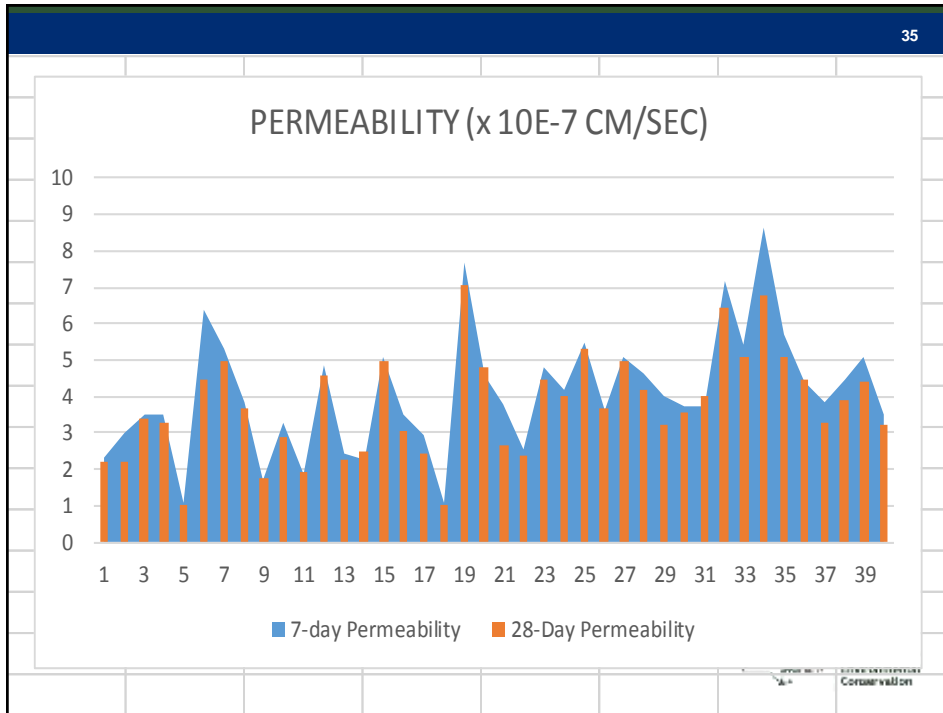
Monolith Strength Performance Goal: 50-150 psi

7-day strength (psi) of ISS monolith:  
 average 53.9 psi  
 range from 45 to 105 psi

28-day strength (psi) of ISS monolith:  
 average 83.5 psi  
 range from 55 to 140 psi

All strength analyses fall within the performance goal

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## Permeability (cm/sec)

Monolith Permeability Goal:  $1 \times 10^{-6}$  cm/sec or lower

28-day permeability:

- average:  $4.0 \times 10^{-7}$  cm/sec
- range:  $7.1 \times 10^{-7}$  cm/sec to  $1.0 \times 10^{-7}$  cm/sec, less than an order of magnitude

All permeability analyses exceed minimum performance goal

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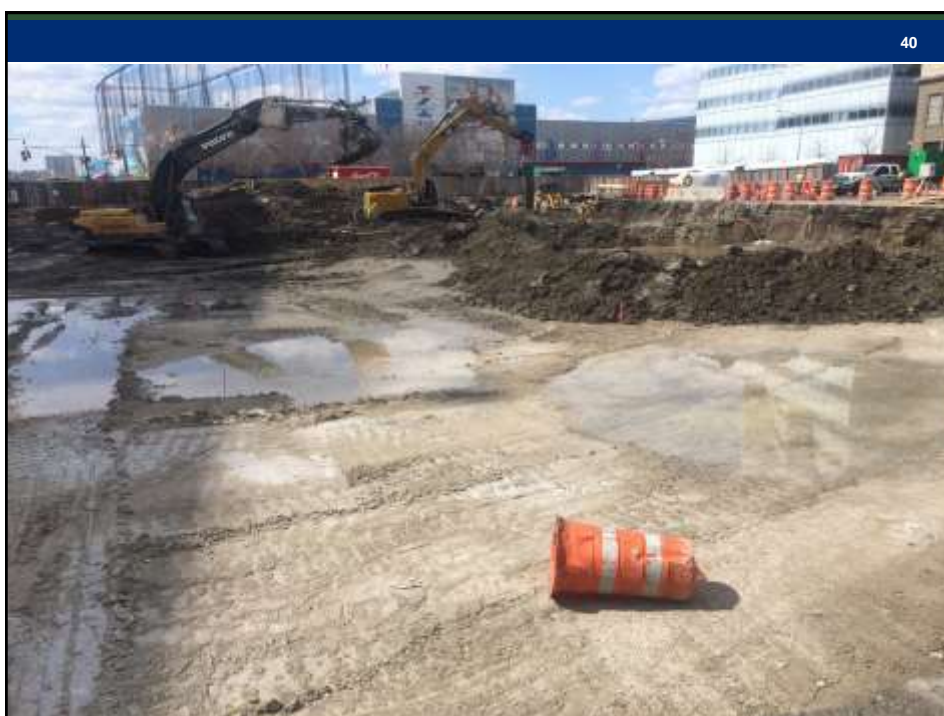
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## Wet-Sticking ISS to Containment Wall



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## SUMMARY

Met ISS Monolith Strength goal:  
within the 50-150 psi range

28-day ISS Monolith Strength very consistent

28-day permeability all meet or exceeded the Monolith goal:  
 $1 \times 10^{-6}$  cm/sec

28-day permeability within an order of magnitude:  
 $7.1 \times 10^{-7}$  to  $1 \times 10^{-7}$  cm/sec

Under budget & on time (despite burying the Cat)



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## Thank You

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