



---

# Land Application of Concrete Byproducts: Next Steps




**Sheri Knox – Amec Foster Wheeler**  
Durham, North Carolina  
sheri.knox@amecfw.com

**Rob Willcox – Willcox & Mabe Soil Solutions**  
Greensboro, North Carolina  
rob@willcoxmaresoil.com

---

1 © Amec Foster Wheeler 2017. 05/05/2017



---

# Introduction and Overview

- Background
- Waste Management
- Land Application
- Permit Renewal/Modification
- Summary

---

2 © Amec Foster Wheeler 2017. 05/05/2017

## Background



➤ Diamond Grinding is a pavement preservation technique:

- Thin Surface of Pavement Removed
- Closely Spaced Diamond Saw Blades



## Background – Diamond Grinding



Diamond Grinding New Concrete

## Background – Diamond Grinding



Diamond Grinding on New Bridge Deck

5

© Amec Foster Wheeler 2017.

05/05/2017

## Background – Diamond Grinding



### ➤ Advantages:

- Cost Effective – fraction of pavement overlays
- Increases Smoothness and Improves ride
- Reduces Noise
- Improves Skid Resistance
- Improves Drainage

6

© Amec Foster Wheeler 2017.

05/05/2017

## Background – Typical Disposal



➤ **Wastewater  
Typical  
Disposal  
Options:**

- Wastewater Treatment Facilities
- Landfills
- Dewatered in Trenches or Pits



## Waste Management



- NCDOT and its Contractors are legally responsible for all industrial process wastes generated during construction, maintenance and preservation projects.
- NCDOT is required to minimize waste sent to landfills from its projects.

## Waste Management – Land Application



- 2010 - Developing a New Approach to Disposal
- 2011 - Land Application Identified
- 2012 - Land Application Permit for W.Wake Expressway
- 2013 - Statewide Permit for Land Application Received
- 2014 - Statewide Permit Including Reduced Monitoring.
  - Metals testing removed
  - pH, total solids, calcium carbonate equivalence (CCE) remain

## Waste Management- Guidelines



- 2015 – NCDOT “Guidelines on the Management and Disposal of Concrete Grinding Residuals” (CGR)
  - Management Plan – Collection & Containment (30 days prior)
  - Sampling & pH Control Plan
  - Spill Control Plan
  - Document Disposal Option
  - <https://connect.ncdot.gov/resources/Environmental/Environmental%20Permits%20and%20Guidelines/Forms/AllItems.aspx>

## Waste Management – pH Adjustment



pH Adjustment thru addition of Muriatic Acid

## Waste Management - Options



- 2015 – NCDOT “Guidelines” Disposal Options Include:
  - POTW or Permitted WWTP
  - Solids at Municipal Landfill
  - Land Application Statewide Permit

## Land Application



- Land Application is the measured distribution of beneficial products on a crop based upon agronomic rates
  - Example: Diamond grinding slurries from concrete residuals can be applied to road shoulders at agronomic rates to improve soil acidity

## Land Application - Benefits



- Benefits of Land Application Include:
  - Soil pH adjustment
  - Replaces need for agricultural lime
  - Potential reduction in disposal cost for contractors and NCDOT
  - Reduction of materials that are being landfilled

## Land Application



AgChem TerraGator Land Applying

15

© Amec Foster Wheeler 2017.

05/05/2017

## Land Application



Pumper Truck Land Applying

16

© Amec Foster Wheeler 2017.

05/05/2017



## Permit Renewal/Modifications – Clarification



- Additional Clarification to 2015 Guidelines:
  - pH Adjustment
  - Acceptable Discharge Methods
  - Temporary Storage Concept
- Address in Permit Renewal/Potential Modifications

## Permit Renewal/Modifications



- Acceptable Direct Discharge Methods will be Summarized
- Example: Direct Discharge through an open pipe is not considered Land Application and is not allowed.



## Permit Renewal/Modifications



- 2<sup>nd</sup> Example:  
Although Acceptable  
in Other States; Not  
Currently Allowed in  
North Carolina



## Permit Renewal/Modifications



- Acceptable Temporary  
Storage Methods will  
be Summarized
- Example: Difficult to  
Handle because of  
Phase Separation;  
Temporary Storage  
Options may be  
Limited



## Permit Renewal/Modifications



- Federal and State Regulations Govern Management of Byproducts:
  - Environmental Protection Agency (EPA)
  - Resource Conservation and Recovery Act (RCRA)
  - NC Dept. of Environmental Quality (NCDEQ), Division of Water Resources (DWR)
  - NCDEQ, Division of Waste Management (DWM)

## Permit Renewal – May 31, 2017



- 2017 – Statewide Permit Renewal/Modifications
- Guidelines for Direct Discharge
  - Acceptable Discharge Practices
  - Application Rates
  - Monitoring
- Guidelines for Temporary Storage
  - Acceptable Storage Practices
  - Storage Concepts
  - Monitoring

## Permit Renewal/Mod – Tech Transfer



- Education
  - Guidelines specifics may be further detailed in standard operating procedures available to contractors
  - Guidelines incorporated into contract language
  - Guidelines posted on internet
  - Conferences
  - Cost estimation tool

23

© Amec Foster Wheeler 2017.

05/05/2017

## Summary



- Advantages of Pavement Resurfacing:
  - Cost Effective – fraction of pavement overlays
  - Increases smoothness and improves ride
  - Reduces noise
  - Improves skid resistance
  - Improves drainage
- Advantages of Land Application Include:
  - Soil pH adjustment
  - Replaces need for agricultural lime
  - Potential reduction in disposal cost for contractors and NCDOT
  - Reduction of materials that are being landfilled
- Guidelines for Direct Discharge and Temporary Storage:
  - In Progress for May 31, 2017 Statewide Permit Renewal

24

© Amec Foster Wheeler 2017.

05/05/2017

**THANK YOU**

---



Questions