

The background image shows a road construction site. A large roller compacted concrete machine is the central focus, with a worker standing on top of it. To the left, another worker in a white uniform is visible. The road is lined with orange and white traffic barrels and a white plastic safety fence. In the distance, there are trees and a utility pole. The overall scene is a typical highway construction environment.

Roller Compacted Concrete: South Carolina DOT Experience

Andy Johnson, Ph.D., P.E.

Pavement Design Engineer

Portland Cement Association – SE Region

30 10:52AM

History

- Approached around 2000 by industry.
- SCDOT provided site for demonstration near Aiken, SC, constructed March 2002.





February 2003



History

- Approached around 2000 by industry.
- Provided site for demonstration near Aiken, SC, constructed March 2002.
- Demonstration considered successful.

August 2013



August 2013



Why is SCDOT interested?

- Urban/fast-track construction
 - Lift thickness limitations
 - Drop-off limitations
 - Maintenance of cross-traffic
 - Rapid construction
- Would use RCC as base under asphalt
 - Success with Cement Stabilized Aggregate Bases

US 78, Ladson, SC

- US Route 78 widened from 2 lanes to 5 in 1984.
- Pavement design was 3.8 inches HMA plus 8 inches aggregate base.
- Considerable difficulty was encountered during construction due to unstable subgrade.
- By 2005, pavement was in very poor condition.

US 78, 2007



US 78, 2007



US 78, Ladson, SC

- In 2008, existing pavement was removed to a depth of 12 inches and replaced with 10 inches RCC and 2 inches HMA.
- Project length was approximately 0.9 miles, four lanes wide.







US 78, Ladson, SC

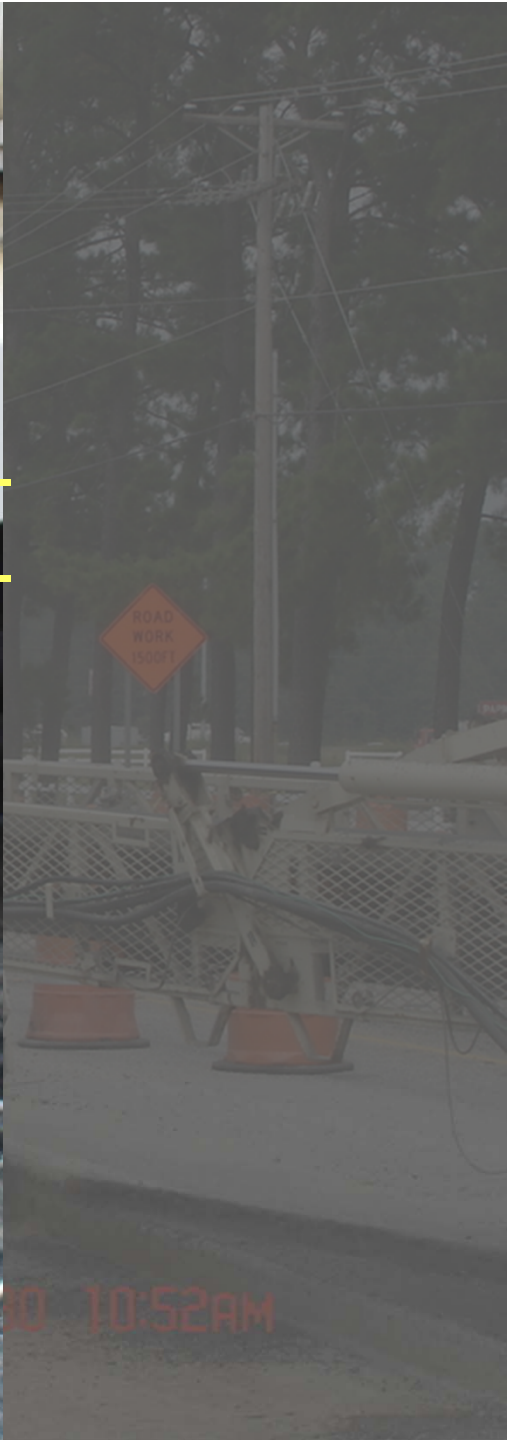
- In 2008, existing pavement was removed to a depth of 12 inches and replaced with 10 inches RCC and 2 inches HMA.
- Problems were encountered with the subgrade as in the 1980s.
- Overall, project went smoothly.
- Construction joint issues were encountered in 2009 after a week of +100° temperatures.



25 11:50AM



9 10:45AM



Projects in Aiken and Columbia

- In 2009, we constructed four RCC projects let in two packages.
- Three projects were in the Columbia area:
 - New State Rd. (2" HMA/10" RCC)
 - Greystone Blvd. (2" HMA/10" RCC)
 - S. Beltline Blvd. (10" RCC/Diamond Grind)
- One project in Aiken, SC
 - Richland Ave. (10" RCC/Diamond Grind)

New State Road -2010



New State Road -2013



New State Road -2010



New State Road -2013



Greystone Blvd. - 2009



Greystone Blvd. - 2009



Greystone Blvd - 2009.



Greystone Blvd. - 2010



Greystone Blvd. - 2013



30 10:52AM

Greystone Blvd. - 2013



30 10:52AM

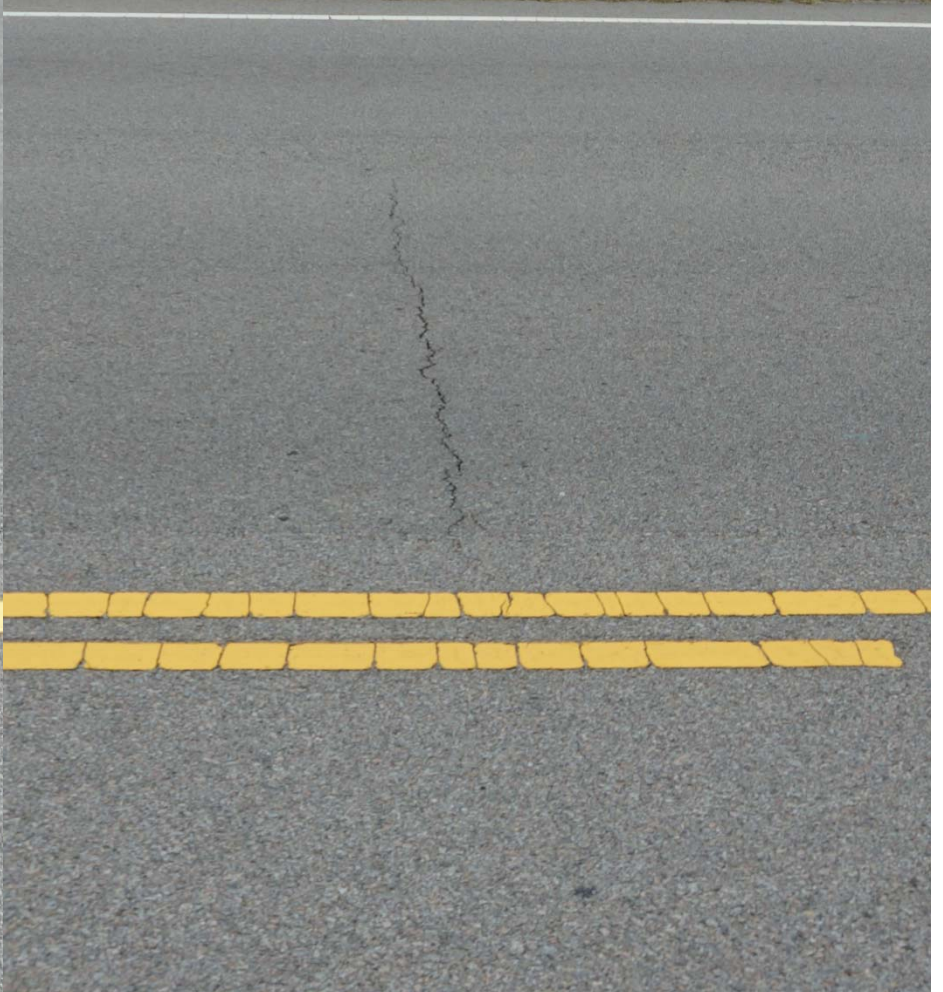


2010

Greystone Blvd.



2013



Greystone Blvd. -2013



30 10:52AM

S. Beltline Blvd.
2010



S. Beltline Blvd.
2013



S. Beltline Blvd. - 2009



S. Beltline Blvd. - 2009



S. Beltline Blvd. - 2010



S. Beltline Blvd. - 2013



S. Beltline Blvd. - 2010



S. Beltline Blvd. - 2013



30 10:52AM

S. Beltline Blvd. - 2010



S. Beltline Blvd. - 2013



Richland Ave. - 2010



Richland Ave. - 2013

30 10:52AM

Richland Ave. - 2010





Richland Ave. - 2010



Richland Ave. - 2010



Richland Ave. - 2013

30 10:52AM



Richland Ave. - 2013

30 10:52AM

Richland Ave. - 2010





Richland Ave. - 2013

30 10:52AM

Richland Ave. - 2013



30 10:52AM

Observations

- 10" RCC causes problems when placed with typical equipment.
- Even with best practices, getting acceptable surface texture is difficult.
- RCC can be placed in an urban environment without excessive traffic disruption.
- Diamond grinding can be successfully done on RCC.

Observations

- Construction joints, longitudinal and transverse, are a problem.
- Finer mixes seem to produce better surface textures.
- Rideability is an issue for urban work with many starts and stops.

Observations

- Dark staining at joints does not appear to be a subsurface drainage problem; has not caused premature deterioration yet.

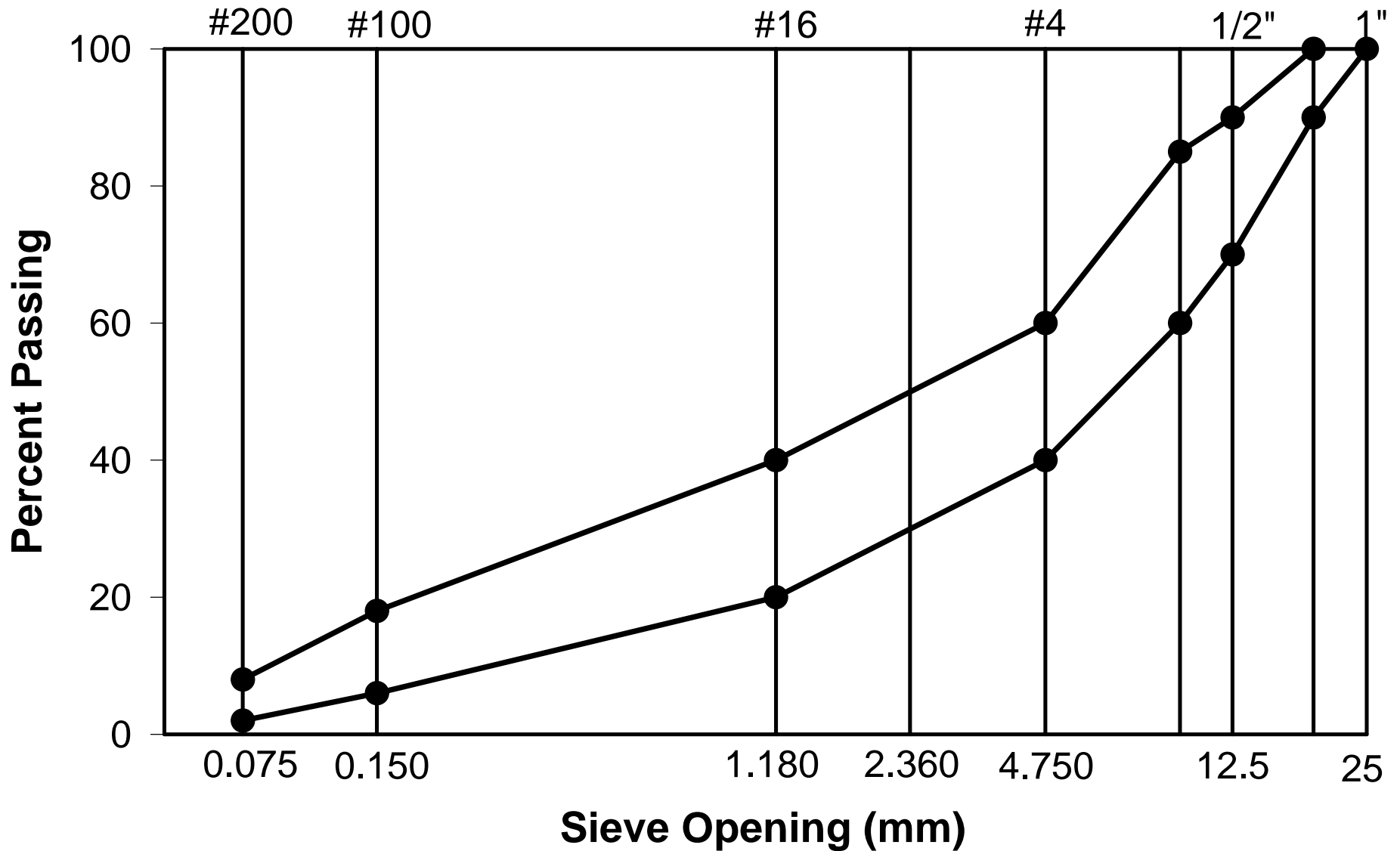
What is our current practice?

- Use 8” instead of 10”
 - The paver automatics on the high-density pavers max out at 10”.
 - This can result in high roughness, especially if the subgrade is uneven.
- Ensure that the construction joints are vertical and cut back several feet from the previous work.

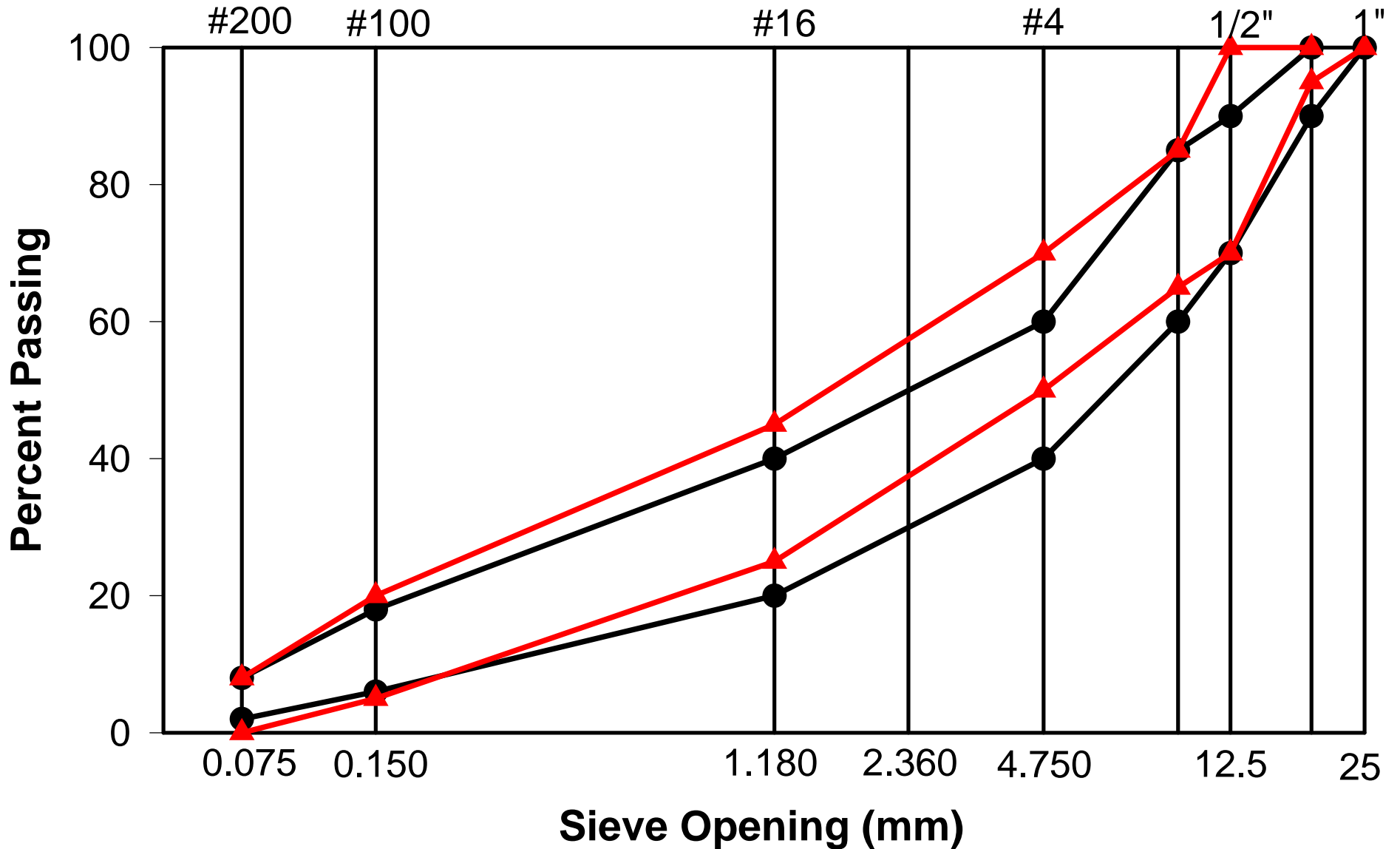
What is our current practice?

- Changed our gradation requirements to be finer based on work with ACPA.

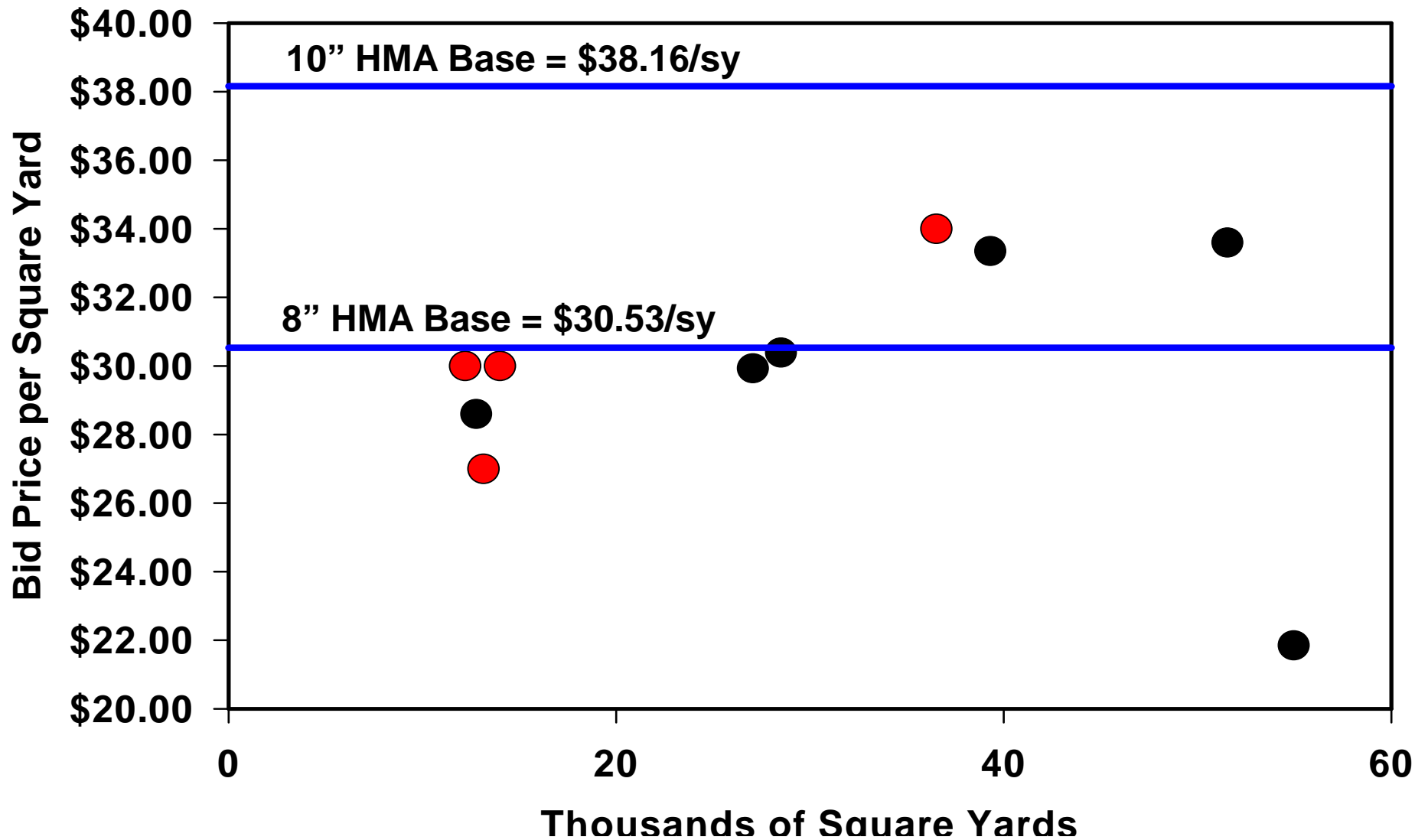
Current Gradation



New Gradation



Economics



Questions?

