

**DANNENBAUM**  
ENGINEERING CORPORATION

4141 Blue Lake Circle, Suite 240  
Dallas, Texas 75244  
972 239 2002

# Memo

To: Jeff Durham  
CC:  
From: Danny Everett, P.E.  
Date: 4/24/2014  
Re: CR 419 Change Order 1

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Jeff,

Upon inspection of the CR 419 site after the heavy rainfall, Dannenbaum is recommending that the County add additional rip rap to the site to avoid further erosion. The best course of action to prevent any further erosion will be to do the following:

- Line the creek bed and downstream banks that are 3:1 or steeper with 12" stone protection.
- Be sure toe of new 12" riprap and existing 18" riprap is installed properly
- Move, where applicable, some of the existing 18" riprap from the outer edges of the upper apron to the bottom of the creek channel on the upstream and downstream ends of the bridge to "lock-in" the 18" riprap toe and contain the newly placed 12" riprap
- We believe the current grading/soil in these areas to be sufficient bedding material for placement so bedding material will not be added for this riprap.

We are estimating this to be approximately 54 CY of 12" Riprap Protection. TXDOT bids show pricing for all sizes of riprap to be similar (since it is based on the CY) so Massana's flat cost of \$4,914.00 is appropriate for the additional rip rap and installation. Please let me know if you have any questions.

Sincerely,

*Daniel W. Everett, P.E.*

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