



STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

BEVERLY EAVES PERDUE
GOVERNOR

EUGENE A. CONTI, JR.
SECRETARY

December 21, 2011

Peter Larkin, P.E.
Tensor International Corporation
453 Lake Shore Drive
Sunset Beach, NC 28468

Subject: Updated Approval of Tensor's ARES Retaining Wall System

Dear Mr. Larkin:

The Geotechnical Engineering Unit (GEU) has reviewed the update submittal dated August 15, 2011 for Tensor's ARES Retaining Wall System in accordance with the "NCDOT Policy for Mechanically Stabilized Earth Retaining Walls" and the GEU Standard Mechanically Stabilized Earth (MSE) Retaining Walls Provision. The update submittal included new precast concrete panels and a revised bodkin connection. In addition to the August 15th submittal, subsequent revised standard panel drawings, reinforcement tables and design calculations were received. Based on this information, the update submittal for Tensor's ARES wall system is approved in accordance with the MSE wall policy and standard provision. This policy and provision is available from:

<http://www.ncdot.org/doh/preconstruct/highway/geotech/msewalls/>

For your reference, the approved geogrid reinforcements and corresponding revised design parameters to be used for future NCDOT MSE wall design submittals are listed in the tables below.

- For geogrid reinforcement (Fine Aggregate)

Reinforcement	T_{ut} (kips/ft)	RF_{CR}	RF_D	$RF_{D, Fine}$ Aggregate	T_{al} (kips/ft)	$F^* =$ $C_1 * \tan\phi$	α	ρ for Fine Aggregate (degree)	CR_{cr}	T_{ac} (kips/ft)
UX1400MSE	4.80	2.62	1.1	1.12	1.49	0.506 (0.405*)	1.0	28.35	0.361	1.57
UX1500MSE	7.80	2.62	1.1	1.1	2.46	0.506	1.0	28.35	0.361	2.56
UX1600MSE	9.87	2.62	1.1	1.1	3.11	0.506	1.0	28.35	0.361	3.24
UX1700MSE	11.99	2.67	1.1	1.1	3.71	0.506	1.0	28.35	0.361	3.93

* UX1400MSE geogrid greater than 2ft below top of wall

- For geogrid reinforcement (Coarse Aggregate)

Reinforcement	T_{ut} (kips/ft)	RF_{CR}	RF_D	$RF_{D, Coarse}$ Aggregate	T_{al} (kips/ft)	$F^* =$ $C_1 * \tan\phi$	α	ρ for Coarse Aggregate (degree)	CR_{cr}	T_{ac} (kips/ft)
UX1400MSE	4.80	2.62	1.1	1.25	1.33	0.625	1.0	32.0	0.361	1.57
UX1500MSE	7.80	2.62	1.1	1.25	2.16	0.625	1.0	32.0	0.361	2.56
UX1600MSE	9.87	2.62	1.1	1.25	2.74	0.625	1.0	32.0	0.361	3.24
UX1700MSE	11.99	2.67	1.1	1.25	3.27	0.625	1.0	32.0	0.361	3.93

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LOCATION:
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ENTRANCE B-2
1020 BIRCH RIDGE DRIVE
RALEIGH NC 27610

The GEU Standard MSE Retaining Walls Provision has been revised effective with the January, 2012 letting. The revised provision allows for one reinforcement splice per reinforcement length (not counting the connection) provided splices are approved for the chosen MSE wall system and reinforcement pieces are at least 6 ft long. A splice detail for the bodkin connection has been submitted along with testing data for the connection and a material certification for the high-density polyethylene (HDPE) bar. Based on this information, splices are approved for Tensar's ARES wall system in accordance with the standard provision.

If you have any questions, I can be reached at (919) 707-6850.

Sincerely,



Njoroge W. Wainaina
State Geotechnical Engineer

cc: K. J. Kim, Ph.D., P.E., Eastern Regional Geotechnical Manager (w/ submittal)
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