State of California **Business, Transportation and Housing Agency**

Memorandum

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To: Majid Kharrati – 11
Project Design Engineer

Date: September 22, 2014

File: 11-SD-5-(PM)R28.6/R30.5
EA 022331/ EFIS 1100000012

From: **DEPARTMENT OF TRANSPORTATION**
DIVISION OF ENGINEERING SERVICES
Geotechnical Services
Office of Geotechnical Design – South 2

Subject: Design Memorandum for Interstate 5/ Genesee Avenue Interchange Improvement Project Retaining Wall-13, Retaining Wall-14, and Retaining Wall-15, Facing Anchor Design.

The Office of Geotechnical Design-South 2 (OGDS2) has prepared this memorandum for the I-5/Genesee Avenue Interchange Improvement Project in the City of San Diego, in San Diego County, California.

This memorandum documents the design parameters and recommendations for the anchor system which will support the structural facing to be placed on Retaining Wall-13 (RW-13), Retaining Wall-14 (RW-14), and Retaining Wall-15(RW-15). The information contained in this memorandum supersedes any conflicting information contained in other reports.

The GRE retaining wall will be constructed with a temporary construction face which consists of gravel filled wire baskets. Upon completion of the sixty day (60day) settlement period a final concrete face will be constructed in front of the temporary facing. . The settlement periods are presented in Section 13.0 of the foundation reports developed for the retaining walls. The RW-13 and RW-14 design parameters and recommendations pertaining to the design of the anchor system for the finished face are presented in the table. RW-15 facing system will consist of two-inches (2in) of shotcrete cover applied to the wire basket face. A maximum of one-inch (1in)of additional shotcrete may be applied to provide desired architectural effects. The permanent anchor system is unnecessary because RW-15 is considered a temporary wall that will be buried during the I-5 North Coast Corridor Widening Project, EA 11-235800/1100000159.

Geosynthetically Reinforced Earth Retaining Wall

Structural Facing, Anchor Design Parameters

	Horizontal Spacing Maximum (ft)	Vertical Spacing Maximum (ft)	Anchor Bar Diameter Minimum (inch)	Design Pullout Resistance (kip/ft)	Minimum Nail Length (ft)
Retaining Wall-13	10	6	1	0.8	10
Retaining Wall-14	10	6	1	0.8	10
Retaining Wall-15	See Note 1				

Note:

1. RW-15 facing will consist of two-inches (2in) shotcrete cover applied to wire baskets and one-inch (1in) of shotcrete for architectural effects.

The following are additional design considerations:

1. Static loading governs the design of the GRE facing anchor system; therefore seismic loading need not be considered.
2. The static load on each anchor will be approximately three thousand two hundred-pounds (3200lbs) or eighty-pounds per square foot (80lb/ft ^{per} basket row). The loading of the basket face is applied uniformly.
3. The allowable bond stress used to calculate the minimum anchor length, as with soil nail design the ultimate bond stress was estimated and one-half of that value was used to determine the allowable bond stress. The allowable bond stress used for the anchor design was three hundred pounds per square-foot (300psf). The anchor should have a pullout capacity of eight thousand-pounds (8000lbs)
4. The anchor system will consist of one-inch (1in) diameter bars placed on a ten-foot (10ft) horizontal by a six-foot (6ft) vertical spacing. The anchors will have a minimum length of ten-feet (10ft).
5. The first three feet (3ft) of the anchor should be encased in a grouted plastic sleeve. This grouted sleeve should extend one-inch beyond the face of the wire basket.
6. The anchor should be encased in concrete. Concrete encasement will have a minimum dimension of eight-inch by eight-inch (8in x 8in). The anchors may be encased in concrete at time of placement or prior to placement in the fill. Rough texture on the concrete is desired. The concrete will not extend into the gravel filled basket.
7. The anchor bearing plate should not be in direct contact with the basket. A minimum of one-inch of concrete between the basket face and the anchor bearing plate is desired.
8. Minimum clearance between the concrete encased anchor and the GRE retaining wall geogrid should be two-inches (2in).
9. The pervious backfill material within the wire basket should be well compacted and in good contact with the anchor to provide maximum support of anchor within the basket.
10. Concrete used to encase anchors must be cured prior to placing any external loads on the anchors, such as compaction of additional reinforcement lifts.

Please ensure that this FR addendum is included in both the District and Structure Construction Resident Engineer (RE) Pending Files. OGDS2 staff will be available for further assistance. Should you have any questions or comments regarding this report, please contact Mike Fordham at (760) 929-5951 or Brian Hinman at (858) 467-4051.

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